MITSUBISHI
ELECTRIC

Position Board
SSCNETⅢ/H Interface

MR-MC200/MR-MC300 Series
Position Board
User's Manual (Details)

-MR-MC210
-MR-MC211
-MR-MC220U3
-MR-MC220U6
-MR-MC240
-MR-MC241
-MR-MC341

SAFETY PRECAUTIONS

(Read these precautions before using this product.)
Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
The precautions given in this manual are concerned with this product only.
In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠ WARNING

- Configure safety circuits external to the personal computer to ensure that the entire system operates safely even when a fault occurs in the external power supply, the personal computer or the position board. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the position board.
- Configure a circuit so that the position board is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- For the operating status of each station after a communication failure, refer to manuals for the device used. For the manuals, please consult your local Mitsubishi representative. Incorrect output or malfunction due to a communication failure may result in an accident.
- When connecting an external device with a position board to modify data of a running position board, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, or operating status change) of a running position board, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote position board is controlled by an external device, immediate action cannot be taken if a problem occurs in the position board due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and position board in case of a communication failure.
- Do not write any data to the "area for manufacturer setting" of the dual port memory in the position board. Also, do not use any "use prohibited" signals as an output signal from the position board to each module. Doing so may cause malfunction of the position board system. For the "area for manufacturer setting" and the "use prohibited" signals, refer to the user's manual, this manual, and the relevant manuals for the module used.

[Design Precautions]

⚠WARNING

- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident.
- Configure safety circuits external to the personal computer to ensure that the entire system operates safely even when a fault occurs in the external power supply, the personal computer, or the position board. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) OPR (Original Point Return) is controlled by two kinds of data: an OPR direction and an OPR speed. Deceleration starts when the near-point dog signal turns on. If an incorrect OPR direction is set, motion control may continue without deceleration. To prevent machine damage caused by this, configure an interlock circuit external to the position board.
  (2) When the position board detects an error, the motion slows down and stops or the motion suddenly stops. Set the parameter to meet the specifications of a positioning control system. In addition, set the OPR parameter and positioning data within the specified setting range.
  (3) Outputs may remain on or off, or become undefined due to a failure of a component such as an insulation element and transistor in an output circuit, where the position board cannot detect any error. In a system that the incorrect output could cause a serious accident, configure an external circuit for monitoring output signals.
    - If safety standards (ex., robot safety rules, etc.,) apply to the system using the position board, module, servo amplifier, and servo motor, make sure that the safety standards are satisfied.
    - Construct a safety circuit externally of the position board, module, or servo amplifier if the abnormal operation of the module or servo amplifier differs from the safety directive operation in the system.

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to electromagnetic interference. Keep a distance of 100mm or more between those cables.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the position board is powered on or the software is rebooted, the time taken to enter the system startup status varies depending on the system configuration and/or parameter settings. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the position board or reboot the software while the settings are being written. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so also may cause malfunction and failure of the position board.

[Security Precautions]

⚠WARNING

- To maintain the security (confidentiality, integrity, and availability) of the position board and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

[Installation Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing the position board. Failure to do so may result in electric shock or cause the position board to fail or malfunction.

[Installation Precautions]

⚠CAUTION

- Use the position board in an environment that meets the general specifications in this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- Use board fixing screws and securely tighten the position board. Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction. For the specified torque range, refer to the attached manual for the personal computer.
- Beware that the position board and the heat sink could be very hot while power is on and immediately after power-off.
- Do not directly touch any conductive parts and electronic components of the position board or connector. Hold the front panel or edge of the print board. Doing so can cause malfunction or failure of the position board.
- Do not disassemble or modify the position board. Doing so may cause failure, malfunction, injury, or a fire.
- Before handling the position board, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the position board to fail or malfunction.
- Install the position board to a personal computer which is compliant with PCI/CompactPCI®/PCI Express® standard. Failure to do so may cause a failure or malfunction.
- Securely insert the position board into the slot following the board installation instruction of the personal computer. Incorrect insertion of the position board may cause malfunction, failure, or drop of the board.
- When installing the position board, take care not to contact with other boards.
- When installing the position board, take care not to get injured by an implemented component or a surrounding member.
- Handle the position board in a place where static electricity will not be generated. Failure to do so may cause a failure or malfunction.
- The position board is included in an antistatic envelope. When storing or transporting it, be sure to put it in the antistatic envelope. Failure to do so may cause a failure or malfunction.
- Do not drop or apply a strong impact to the position board. Doing so may cause a failure or malfunction.

[Wiring Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or damage to the position board.
- After installation and wiring, attach the cover of the equipment the position board is installed to before turning it on for operation. Failure to do so may result in electric shock.

[Wiring Precautions]

⚠CAUTION

- Individually ground the FG terminals, the controllers, servo amplifiers and servo motors embedded with a position board with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction. Do not use a common grounding with other equipment.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the position board, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the position board. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to noise. Keep a distance of 100 mm or more between those cables.
- Place the wires and the cables to connect the position board in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in malfunction or damage to the position board or cables.
  In addition, the weight of the wires and the cables may put stress on the position board in an environment of strong vibrations and shocks.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the position board and the external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or the position board, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the position board, do not pull the cable by the cable part. For the cable with the connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the position board may result in malfunction or damage to the position board or the cable.
- Prevent foreign matter such as dust or wire chips from entering the personal computer embedded with a position board. Such foreign matter can cause a fire, failure, or malfunction.
- For cables to be used in the system, select the ones that meet the specifications in this manual. If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Also, do not expose it to liquid or strong shock. Doing so will cause the battery to produce heat, explode, ignite, or leak, resulting in injury and fire.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock.

[Startup and Maintenance Precautions]

⚠CAUTION

- When connecting an external device with a position board or an intelligent function module to modify data of a running position board, configure an interlock in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running position board, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote position board is controlled by an external device, immediate action cannot be taken if a problem occurs in the position board due to a communication failure. To prevent this, configure an interlock in the program, and determine corrective actions to be taken between the external device and position board in case of a communication failure.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) 25cm or more away in all directions from the position board. Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not mount/remove the position board more than 50 times. Exceeding the limit may cause malfunction.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- Before handling the position board, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Wearing a grounded antistatic wrist strap is recommended. Failure to discharge the static electricity may cause the module to fail or malfunction.
- Use a clean and dry cloth to wipe off dirt on the position board.
- Before testing the operation, set a low speed value for the speed limit parameter so that the operation can be stopped immediately upon occurrence of a hazardous condition.
- Confirm and adjust the program and each parameter before operation. Unpredictable movements may occur depending on the machine.

[Startup and Maintenance Precautions]

⚠CAUTION

- When using the absolute position system function, on starting up, and when the position board or absolute position motor has been replaced, always perform a home position return.
- Before starting the operation, confirm the brake function.
- Do not perform a megger test (insulation resistance measurement) during inspection.
- After maintenance and inspections are completed, confirm that the position detection of the absolute position detection function is correct.
- Lock the control panel and prevent access to those who are not certified to handle or install electric equipment.
- The position board is included in an antistatic envelope. When storing or transporting it, be sure to put it in the antistatic envelope. Failure to do so may cause a failure or malfunction.
- The microprocessor built in the position board will reach a high temperature during operation. Do not touch the heat sink directly when replacing the position board. Doing so may result in a burn.

[Operating Precautions]

⚠CAUTION

- When changing data and operating status, and modifying program of the running position board from an external device such as a personal computer connected to an intelligent function module, read the relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.
- Do not power off the position board or reboot the software while the setting values in the dual port memory are being written to the flash ROM in the position board. Doing so will make the data in the flash ROM undefined. The values need to be set in the dual port memory and written to the flash ROM again. Doing so also may cause malfunction or failure of the position board.
- Note that when the reference axis speed is specified for interpolation operation, the speed of the partner axis (2nd, 3rd, or 4th axis) may exceed the speed limit value.
- Do not go near the machine during test operations or during operations such as teaching. Doing so may lead to injuries.

[Computer Connection Precautions]

⚠CAUTION

- For Ethernet cables to be used in the system, select the ones that meet the specifications in this manual. If not, normal data transmission is not guaranteed.
- When connecting a personal computer to a module having a USB interface, observe the following precautions as well as the instructions described in the manual for the personal computer used. Failure to do so may cause the module to fail.
  (1) When the personal computer is AC-powered
  When the personal computer has a 3-pin AC plug or an AC plug with a grounding wire, connect the plug to a grounding receptacle or ground the grounding wire. Ground the personal computer and the module with a ground resistance of 100 ohms or less.
  When the personal computer has a 2-pin AC plug without a grounding wire, connect the computer to the module by following the procedure below. For power supplied to the personal computer and the module, using the same power source is recommended.
  1. Unplug the personal computer from the AC receptacle.
  2. Check that the personal computer is unplugged. Then, connect the personal computer to the module with a USB cable.
  3. Plug the personal computer into the AC receptacle.
  (2) When the personal computer is battery-powered
  The personal computer can be connected to the module without taking specific measures.

[Disposal Precautions]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.

[Transportation Precautions]

⚠CAUTION

- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.
- The position board is a precision machine, so do not drop or apply strong impacts on it.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric position board.
This manual describes the performance specifications, procedures before operations, wiring, functions, programming, and troubleshooting.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the position board to handle the product correctly.
Please make sure that the end users read this manual.

Relevant products

MR-MC210, MR-MC211, MR-MC220U3, MR-MC220U6, MR-MC240, MR-MC241, MR-MC341

Point

Symbols used in this manual are shown below.
- [MC200]: Symbols indicating that it corresponds to only MR-MC210/MR-MC211/MR-MC220U3/MR-MC220U6/MR-MC240/MR-MC241
- [MC300]: Symbols indicating that it corresponds to only MR-MC341

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RELEVANT MANUALS

Manual name [manual number]	Description	Available form
MR-MC200/MR-MC300 Series Position Board User's Manual (Details) [IB-0300223ENG] (This manual)	Specifications of the position board, information on how to establish a system, maintenance/inspection, trouble shooting, functions for the positioning control of the position board, programming, dual port memory and others.	Print book e-Manual PDF
MR-MC200/MR-MC300 Series Position Board User's Manual (API Library) [IB-0300225ENG]	Library of functions and others that the host personal computer uses to control the position board.	Print book e-Manual PDF

Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Buffer memory	Memory in a position board and an intelligent function module to store data such as setting values and monitor values.
Control cycle	A cycle in which the SSCNET controller controls the operation such as command import, position control, status output, and communication with servo amplifier.
GX Works2	The product name of the software package for the MELSEC programmable controllers. Used only when setting the SSCNETⅢ/H head module or a module that is connected to the SSCNETⅢ/H head module.
Intelligent function module	A module that has functions other than input and output, such as an A/D converter module and D/A converter module.
Link device	Internal devices (RX/RY/RWr/RWw) of the position board, sensing module, and SSCNETⅢ/H head module.
MR Configurator2	A product name of servo setup software.
MR-J3(W)-_B	Servo amplifier model MR-J3-_B_(-RJ)/MR-J3W-_B.
MR-J4(W_)-_B	Servo amplifier model MR-J4-_B_(-RJ)/MR-J4W_-_B.
MR-J5(W_)-_B	Servo amplifier model MR-J5-_B_(-RJ)/MR-J5W_-_B.
MR-JE-_B(F)	Servo amplifier model MR-JE-_B/MR-JE-_BF.
MR-MC2_ _	Another term for PCI bus compatible position board MR-MC210/MR-MC211, CompactPCI bus compatible position board MR-MC220U3/MR-MC220U6, PCI Express bus compatible position board MR-MC240/MR-MC241.
MR-MC3_ _	Another term for PCI Express bus compatible position board MR-MC341.
Remote input (RX)	Information input from the sensing module, and SSCNETⅢ/H head module to the position board on a 1-bit basis.
Remote output (RY)	Information output from the position board to the sensing module, and SSCNETⅢ/H head module on a 1-bit basis.
Remote register (RWr)	Information for inputting to the position board from the sensing module, and SSCNETⅢ/H head module on a 16-bit (1-word) basis.
Remote register (RWw)	Information for outputting to the sensing module, and SSCNETⅢ/H head module from the position board on a 16-bit (1-word) basis.
SSCNETⅢ[*1]	High-speed synchronized network between the position board and the servo amplifier.
SSCNETⅢ/H[*1]	
Station No.	Station No. on the position board.
System program	Internal program that controls the position board.
Transient transmission	A function of data communication unperiodically among nodes (station) on network.
User program	Program created by the user that operates on the host personal computer.

*1 SSCNET: Servo System Controller NETwork

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
API library	A generic term for the library of functions for positioning control that the host personal computer uses to control the position board.
Channel (CH)	An abbreviation for the SSCNET control channel.
Dual port memory	A generic term for a communication area in order to execute especially the motion control in the buffer memory.
Host personal computer	A generic term for computer equipped with position board and on which user program operates.
I/O device	A generic term for the link device on the dual port memory.
Line	An abbreviation for SSCNET communication lines.
Position board	A generic term for MR-MC2_ _ and MR-MC3_ _.
Remote I/O module	A generic term for modules that connect I/O modules and intelligent function modules to SSCNETⅢ/H, including the sensing module and SSCNETⅢ/H head module.
Sensing analog I/O module or MR-MT2300	An abbreviation for analog I/O module (MR-MT2300).
Sensing encoder I/F module or MR-MT2400	An abbreviation for encoder I/F module (MR-MT2400).
Sensing extension module	A generic term for I/O module (MR-MT2100), pulse I/O module (MR-MT2200), analog I/O module (MR-MT2300), encoder I/F module (MR-MT2400).
Sensing I/O module or MR-MT2100	An abbreviation for I/O module (MR-MT2100).
Sensing module	A generic term for SSCNETⅢ/H compatible sensing module MR-MT2000 series.
Sensing pulse I/O module or MR-MT2200	An abbreviation for pulse I/O module (MR-MT2200).
Sensing SSCNETⅢ/H head module or MR-MT2010	An abbreviation for SSCNETⅢ/H head module (MR-MT2010).
Servo amplifier	An abbreviation for SSCNETⅢ/H compatible servo amplifier.
SSCNETⅢ(/H)	A generic term for SSCNETⅢ/H, SSCNETⅢ.
SSCNETⅢ/H head module	A generic term for MELSEC L series SSCNETⅢ/H head module (LJ72MS15).
Test tool	An abbreviation for start-up and examination tool for position board.
Utility software	A generic term for the Position Board Utility2 (MRZJW3-MC2-UTL) which includes the position board API library, the position board test tool, and the position board device driver.

1 SUMMARY

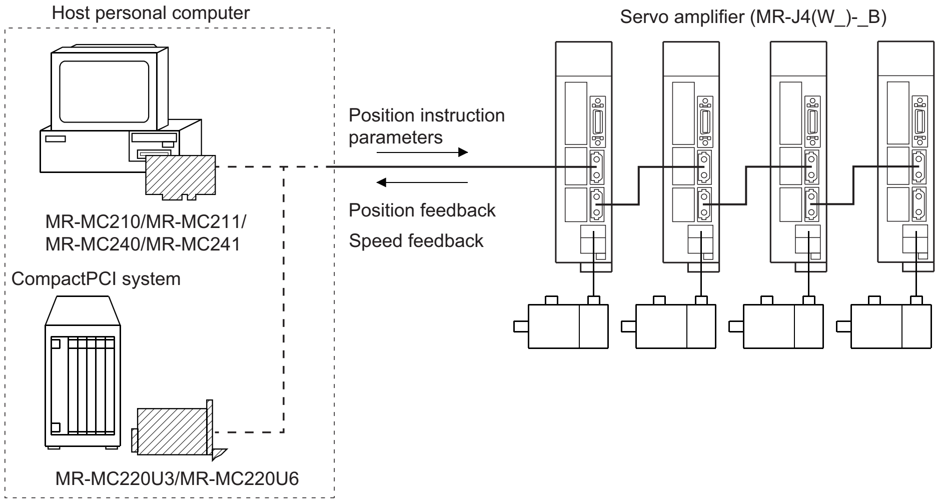
1.1 Summary

Position board [MC200]

The following position boards are available for the position board MR-MC2_ _.

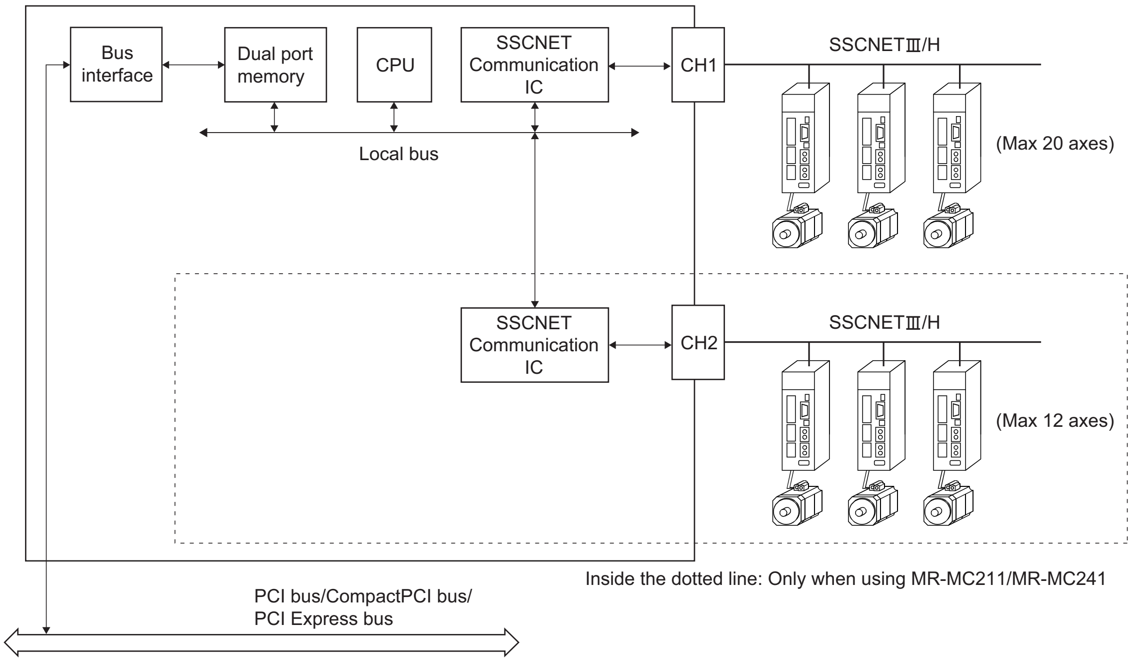
- PCI bus compatible position board (MR-MC210/MR-MC211)
- CompactPCI bus compatible position board (MR-MC220U3/MR-MC220U6)
- PCI Express bus compatible position board (MR-MC240/MR-MC241)

The PCI bus compatible position board (MR-MC210/MR-MC211) and PCI Express bus compatible position board (MR-MC240/MR-MC241) are mounted to the host personal computer, and the CompactPCI bus compatible position board (MR-MC220U3/MR-MC220U6) is mounted to a CompactPCI system. They control our servo amplifiers and remote I/O modules (sensing module (MR-MT2000 series) and SSCNETⅢ/H head module (LJ72MS15)). The position board and the servo amplifiers are connected with SSCNETⅢ/H, which is a high speed synchronous network.



The PCI bus compatible position board (MR-MC210)/CompactPCI bus compatible position board (MR-MC220U3/MR-MC220U6)/PCI Express bus compatible position board (MR-MC240) have one SSCNET control channel (hereinafter: channel(CH)) and one SSCNET communication line (hereinafter: line), and can control positioning for up to 20 axes and remote I/O control for up to 4 stations. The PCI bus compatible position board (MR-MC211)/PCI Express bus compatible position board (MR-MC241) have one SSCNET control channel and two SSCNET communication lines, and can control positioning for up to 32 axes (up to 20 axes per line) and remote I/O control for up to 4 stations. By reading and writing the dual port memory mapped to the memory space of each bus, the host personal computer can command position board to start operation, and get servo amplifier status. The host personal computer can also receive position pass and positioning complete interruptions via each bus.

The position board is equipped with standard mode and interface mode for positioning control. The positioning control mode that corresponds with the application can be selected by parameter. The mode cannot be changed during SSCNET communication (while system is running). Positioning in standard mode is performed using a point table mapped on the dual port memory of the position board. Arbitrary positioning is possible by writing data to this point table from the host personal computer.
Also, startup of JOG operation and home position return, etc. as well as parameter changing and monitoring are possible through accessing this dual port memory on the position board from the host personal computer.
Interface mode is a sequential positioning command method that uses a user program on the host personal computer. The user program controls the servo amplifier with an arbitrary acceleration/deceleration pattern by writing the position command to the position command buffer of the position board every communication cycle (control cycle). Some functions from standard mode cannot be used, or are restricted when in interface mode.



Point

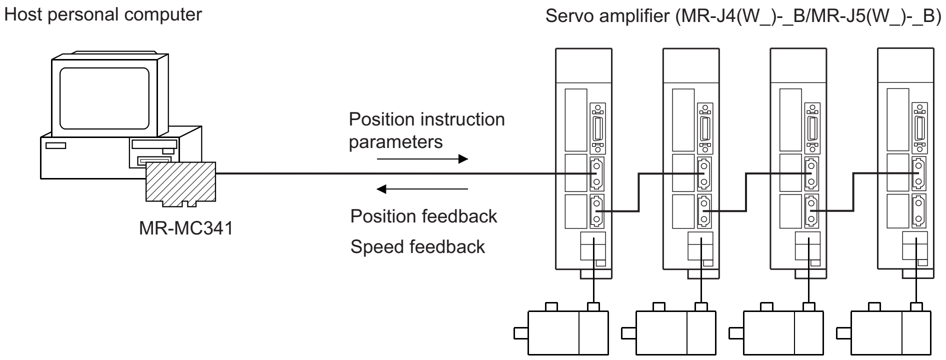
Depending on the specifications of the host personal computer, the PCI Express slot may be directly connected to the CPU of the host personal computer.
If the PCI Express compatible position board (MR-MC240/MR-MC241) that was produced in or before October 2018 is mounted to a PCI Express slot that is directly connected to the CPU of the host personal computer, it may not be able to operate.
Mount the PCI Express compatible position board to a PCI Express slot that is not directly connected to the CPU of the host personal computer (connected to a chipset).
The year and month of manufacture for the position board can be confirmed on the rating plate. For details, refer to the following.
☞ Page 55 Confirming serial No.

Position board [MC300]

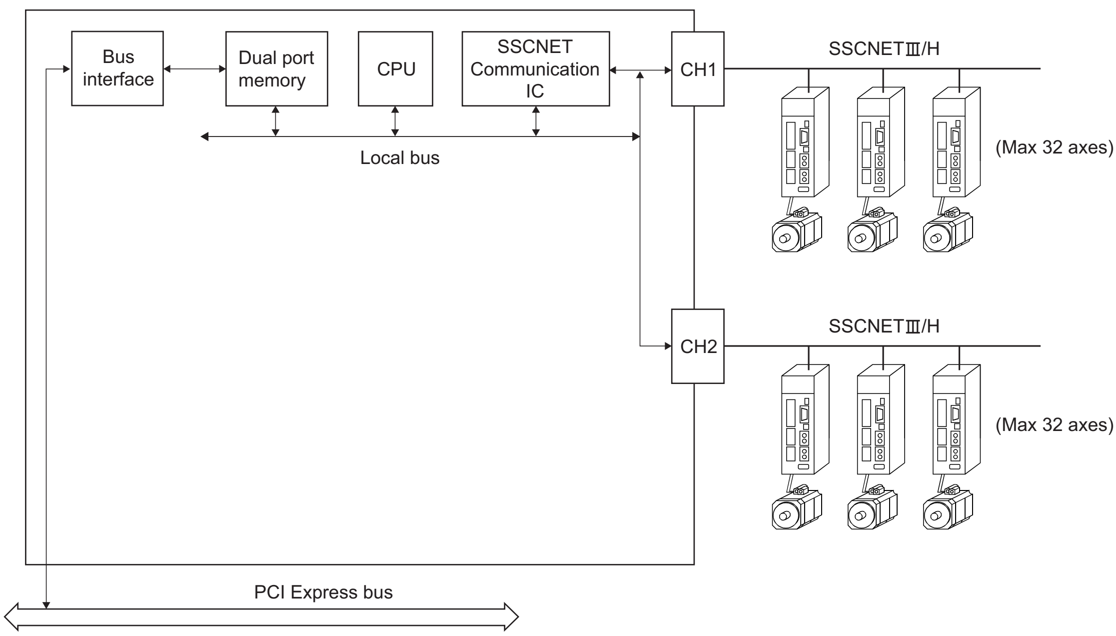
The following position boards are available for the position board MR-MC3_ _.

- PCI bus compatible position board (MR-MC341)

The PCI Express bus compatible position board (MR-MC341) is mounted to the host personal computer, and controls our servo amplifiers (MRJ4(W_)-_B or MR-J5(W_)-_B) and remote I/O modules (sensing module (MR-MT2000 series) and SSCNETⅢ/H head module (LJ72MS15)). The position board and the servo amplifiers are connected with SSCNETⅢ/H, which is a high speed synchronous network.



The PCI Express bus compatible position board (MR-MC341) has one SSCNET control channel and two SSCNET communication lines, and can control positioning for up to 64 axes (up to 32 axes per line) and remote I/O control for up to 16 stations (up to 8 stations per line). By reading and writing the dual port memory mapped to the memory space of the PCI Express bus, the host personal computer can command position board to start operation, and get servo amplifier status. The host personal computer can also receive position pass and positioning complete interruptions via PCI Express bus.
The position board is equipped with standard mode and interface mode for positioning control. The positioning control mode that corresponds with the application can be selected by parameter. The mode cannot be changed during SSCNET communication (while system is running). Positioning in standard mode is performed using a point table mapped on the dual port memory of the position board. Arbitrary positioning is possible by writing data to this point table from the host personal computer.
Also, startup of JOG operation and home position return, etc. as well as parameter changing and monitoring are possible through accessing this dual port memory on the position board from the host personal computer.
Interface mode is a sequential positioning command method that uses a user program on the host personal computer. The user program controls the servo amplifier with an arbitrary acceleration/deceleration pattern by writing the position command to the position command buffer of the position board every communication cycle (control cycle). Some functions from standard mode cannot be used, or are restricted when in interface mode.



1.2 Features

The position board has the following features.

Structuring of the SSCNETIII/H communication servo system by the personal computer control

The position board can be directly connected to our servo amplifiers using SSCNETⅢ/H.

- By connecting the position board and servo amplifier and servo amplifiers with a high speed synchronous network by SSCNETⅢ/H, the reduction of wiring is achieved. The maximum distance between the position board and servo amplifier, or servo amplifier and servo amplifier for the SSCNETⅢ cable on the same bus is 100m (328.08ft.). This increases flexibility at system design.
- By using SSCNETⅢ cable (optical communication), the influence of electromagnetic noise etc. from servo amplifiers and such is reduced.
- The servo parameters can be set on the position board side and written to the servo amplifier, or read from the servo amplifier using the SSCNET communication.
- The current feedback position and error description contained in the servo can be confirmed by the dual port memory of the position board.
- Communication between MR Configurator2 and the servo amplifiers is possible via the position board USB.

Programming in C programming language with the API library

Positioning control for the servo in C programming language is enabled with the API library included with the Position Board Utility2 (MRZJW3-MC2-UTL).

Supports event-driven programming

The host personal computer is notified by the interrupt via the PCI bus when the conditions for an interrupt such as passing through a preset point or positioning complete are met. The user program can create event-driven programs according to the interrupt factors.

High-speed operation startup time

The high-speed operation startup time within the control cycle (0.22ms fastest) is achieved when the number of axes is less than or equal to the maximum number of synchronous startup axes.

Wide variety of positioning control functions

The main functions such as the home position return control and the standard mode (positioning control) and interface mode (sequential positioning command method) which are required for any positioning system and the sub functions which limit and add functions to those controls are supported.

■Enhanced home position return control

Ten home position return methods are provided: dog method, data set method, stopper method, dog cradle method, limit switch combined method, limit switch front end method, dog front end method, Z-phase detection method, scale home position signal detection method, and scale home position signal detection method 2. Select an applicable method according to the system.

■Wide variety of control methods
The control methods shown below are provided for the positioning control.

- Independent positioning of each axis
  The positioning control can be performed independently for each axis at the arbitrary timing.
- Interpolation control
  The interpolation control using multiple axes can be performed.
  - 2-axis to 4-axis linear interpolation control
  - 2-axis circular interpolation control [MC300]
- Tandem drive
  The tandem drive for 2 axes can be performed. In scale home position signal detection method and scale home position signal detection method 2, the deviation between the 2 axes at home position return can be compensated.
- Interface mode
  The user program controls the servo amplifier with an arbitrary acceleration/deceleration pattern that is not supported in standard mode by writing the position command to the position command buffer of the position board every communication cycle (control cycle).

■Continuous processing of multiple positioning data
The multiple positioning data can be processed continuously by the positioning startup at once.

■Acceleration/deceleration processing
Six acceleration/deceleration processing methods are provided: linear acceleration/deceleration, S-curve acceleration/deceleration, start up speed, smoothing filter, jerk ratio acceleration/deceleration [MC300], and vibration suppression command filter 1 [MC300]. The acceleration/deceleration curve can be selected according to the machine characteristic.

Supports other axes start function
With the other axes start function, the position board can determine the conditions and automatically start other axes, and turn ON/OFF output signals. The position board does not go through the user program processing so there are no delays or dispersions. This also lessens the load on the user program.

High maintainability
The maintainability is enhanced in the position board by the following.

■Data retention without battery
Parameter data can be stored in the flash ROM inside the position board. This feature allows the retaining of data without a battery.

■Alarm collection function
The alarm details when an alarm occurs are automatically stored in the flash ROM inside the position board.
Storing the alarm information allows the user to confirm the alarm from the user program or test tool even after the position board is powered off or reset.

Setting, monitoring, and testing through test tool
Using the test tool of Position Board Utility2 (MRZJW3-MC2-UTL), users can check the validity of the preset parameters and point table by performing test operation of the position board before creating a user program.
The control monitor/graph function allows users to debug programs efficiently.

Forced stop function
The batch forced stop is available for connected servo amplifiers by the forced stop input signal of the external input.

Easy application to the absolute position system

- Our servo amplifiers and servo motors support the absolute position system. Absolute position system can be used by connecting the battery for absolute position system to the servo amplifier.
- Once the home position has been established, the home position return operation is unnecessary at the system's power supply ON.
- With the absolute position system, the home position return using a data set method is used to establish the home position. The wiring of proximity dog, etc. is unnecessary.

1.3 Specifications

General specifications

General specifications of the position board are shown below.

Item	Specification	
	MR-MC2_ _	MR-MC3_ _
Operating ambient temperature	0 to 55°C (32 to 131°F)	0 to 45°C (32 to 113°F) (secure an airflow)[*1]
Storage ambient temperature	-20 to 65°C (-4 to 149°F)	-25 to 75°C (-13 to 167°F)
Operating ambient humidity	10 to 90%RH, non-condensing	5 to 95%RH, non-condensing
Storage ambient humidity	10 to 90%RH, non-condensing	5 to 95%RH, non-condensing
Operating ambience	Indoors (where not subject to direct sunlight), no corrosive gas, no significant amount of dirt or dust	
Operating altitude[*2]	2000m (6561.68ft.) or less	
Mounting location	Inside control panel	
Overvoltage category[*3]	Ⅱ or less	
Pollution level[*4]	2 or less	
Cooling method	Self cooling	Air cooling (cooling fan required)[*5] Recommended cooling fan size (airflow): 60mm square or more (10CFM or more)
Power supply	• MR-MC210, MR-MC220U3, MR<MC220U6 Power supply voltage: 5VDC ± 5%, Leakage current: 450mA or less • MR-MC211 Power supply voltage: 5VDC ± 5%, Leakage current: 700mA or less • MR-MC240 Power supply voltage: 3.3VDC ± 9%, Leakage current: 1100mA or less • MR-MC241 Power supply voltage: 3.3VDC ± 9%, Leakage current: 1500mA or less	• MR-MC341 Power supply voltage: 3.3VDC ± 9%, Leakage current: 3000mA or less Power supply voltage: 12VDC ± 8%, Leakage current: 500mA or less

*1 Using CPU cooling fans, PC power supply cooling fans, and PC case fans, be sure to induce an airflow in the PC case of the host personal computer that the position board is installed.

*2 Do not use or store under pressure higher than the atmospheric pressure of altitude 0m (0ft.). Doing so can cause an operation failure. When using under pressure, please contact our sales representative.

*3 This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category Ⅱ applies to the equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300V is 2500V.

*4 This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. The pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

*5 Confirm with the manufacturer of the cooling fan to be used.

⚠ CAUTION

- The position board must be stored and used under the conditions listed in the table of specifications above.
- When not using for a long time, disconnect the power line from the servo amplifier.
- Place the position board and servo amplifier in static electricity preventing vinyl bags and store.
- When storing for a long time, please contact with our sales representative. Also, execute a trial operation.

List of specifications of position board

Function			Specification	
			MR-MC2_ _	MR-MC3_ _
System function	Control cycle		0.88ms/0.44ms/0.22ms (select using parameters)	0.88ms/0.44ms/0.22ms (select using parameters)
	Controllable axes		MR-MC210: Up to 20 axes MR-MC211: Up to 32 axes MR-MC220U3: Up to 20 axes MR-MC220U6: Up to 20 axes MR-MC240: Up to 20 axes MR-MC241: Up to 32 axes	MR-MC341: Up to 64 axes
	Control stations		Up to 4 stations	Up to 16 stations
	Axes and stations per line		24	40
	Control mode		Standard mode: Positioning control method by the position board Interface mode: Sequential positioning command method by user program	Standard mode: Positioning control method by the position board Interface mode: Sequential positioning command method by user program
	SSCNET communication		SSCNETⅢ/H, SSCNETⅢ	SSCNETⅢ/H
Operational function[*1*2]	JOG operation		Provided	Provided
	Incremental feed		Provided	Provided
	Automatic operation	Method	Point table method, 1 axis control, Continuous operation to torque control	Point table method, 1 axis control, Continuous operation to torque control
		Point table size	32bytes/point	48bytes/point
		Number of point tables	320 points for all axes	2048 points for all axes
	Linear Interpolation		Point table method Linear interpolation control for up to 4 axes (Not available for control cycle 0.22ms)	—
	Interpolation operation		—	Point table method Linear interpolation control for up to 4 axes Circular interpolation for 2 axes (Available for control cycle 0.22ms)
	Home position return		Dog method, data set method, stopper method, dog cradle method, limit switch combined method, limit switch front end method, dog front end method, Z-phase detection method, scale home position signal detection method, scale home position signal detection method 2 (Can indicate direction for home position return, proximity dog is for level detection, can change home position return method while system is running)	Dog method, data set method, stopper method, dog cradle method, limit switch combined method, limit switch front end method, dog front end method, Z-phase detection method, scale home position signal detection method, scale home position signal detection method 2 (Can indicate direction for home position return, proximity dog is for level detection, can change home position return method while system is running)
			Home position reset (data set) (The current position can be reset to the home position)	Home position reset (data set) (The current position can be reset to the home position)
Application function	Electronic gear		Electronic gear numerator: 1 to 5242879 Electronic gear denominator: 1 to 589823	Electronic gear numerator: 1 to 5242879 Electronic gear denominator: 1 to 589823
	Speed units		Command unit/min, command unit/s, and r/min can be selected.	Command unit/min, command unit/s, and r/min can be selected.
	Acceleration/ deceleration	Command speed range	1 to speed limit	1 to speed limit
		Start speed range	1 to speed limit	1 to speed limit
		Time constant range	0 to 20000ms/speed limit	0 to 20000ms/speed limit
		Separate setting of acceleration/ deceleration constant	Provided	Provided
		Time constant setting by points	Provided	Provided
		Acceleration/ deceleration method	Linear acceleration/deceleration, smoothing filter, start up speed, S-curve acceleration/deceleration (sine acceleration/deceleration)	Linear acceleration/deceleration, smoothing filter, start up speed, S-curve acceleration/deceleration (sine acceleration/deceleration), jerk ratio acceleration/deceleration, vibration suppression command filter 1
	Stop function		Forced stop, stop operation, rapid stop operation	Forced stop, stop operation, rapid stop operation
	Limit switch		Provided (hardware stroke limit)	Provided (hardware stroke limit)
	Software limit		Provided (software stroke limit)	Provided (software stroke limit)
	Interlock		Provided	Provided
	Rough match output		Provided	Provided
	Torque limit		Provided	Provided
	Command change		Location, speed, time constant	Location, speed, time constant
	Backlash		Provided	Provided
	Position switch		Provided	Provided

Function			Specification	
			MR-MC2_ _	MR-MC3_ _
Application function	Completion of operation signal		Provided	
	Interference check		Provided (Not available for control cycle 0.22ms)	Provided (Available for control cycle 0.22ms)
	Home position search limit		Provided	
	Gain switching		Provided	
	PI-PID switching		Provided	
	Absolute position detection system		Provided	
	Home position return request		Provided	
	Other axes start	Data	Up to 32	Up to 64
		Condition size	24bytes	40bytes
		Operation details size	80bytes	88bytes
	High response I/F		Provided	
	In-position signal		Provided	
	Digital I/O		Provided	Uses I/O device function (expanded points method)
	I/O device		Bits: Up to 4096 points Words: Up to 256 points	Bits: Up to 9126 points Words: Up to 576 points
			Bit data and word data share the point table	
	Servo amplifier general I/O		Provided	
	Dual port memory exclusive control		Provided	
	Pass position interrupt		Pass position conditions: Up to 64	Pass position conditions: Up to 128
	Mark detection		Mark detections: Up to 64	Mark detections: Up to 128 (MR-J5(W_)-_B is not available)
	Continuous operation to torque control		Provided	
	SSCNETⅢ/H head module connection		Provided	
	Sensing module connection		Provided (station mode and axis mode)	
Auxiliary function	Reading/writing parameters		Provided	
	Changing parameters at the servo		Provided	
	Alarm/system error		Provided	
	Monitor		Current command position, current feedback position, speed command, position droop, electrical current command, servo alarm No., external signal status, etc.	
			Can be latched, updated every few milliseconds.	Can be latched, updated every few milliseconds, can be updated every control cycle with "Control option 4 (parameter No.0206)"
	High speed monitor		Current command position, current feedback position, moving speed, feedback moving speed, external signal, electrical current feedback, position droop (interface mode only)	
			Can be latched, updated every control cycle.	
	Interrupt		When start operation/stop operation (operation processing/in-position/smoothing stop/rough match, etc.), alarm occurrence (servo alarm/operation alarm, etc.)	
			Interrupt conditions during the start operation/stop operation can be selected.	
	User watchdog function		Provided (Processed by the software with the watchdog of the of the user program.[*3])	
	Software reboot function		Provided	
	Parameter backup		Parameters can be saved to the flash ROM.	
	Test mode		By connecting MR Configurator2 via the position board, the servo amplifier can easily be tested.	
	Reconnect/disconnect function		Provided	
	Sampling		Maximum sampling points: 65536 points. (Ring buffer of 8192 points)	Maximum sampling points: 65536 points. (Ring buffer of 65536 points)
	Log		History of start operation, alarms, etc., can be recorded.	
	Operation cycle monitor function		Provided	
	External forced stop disabled		Provided	
	Amplifier-less axis function		Provided	
	Alarm history function		Alarm history is saved to the flash ROM.	
	Transient transmit		Provided	
Tandem drive			Up to 2 axes × 8 groups	
Interface mode			Positioning control, speed-torque control, event detection function	

Function		Specification	
		MR-MC2_ _	MR-MC3_ _
Board ID		0 to 3 (set with setting switch)	
DI	Limit switch +	None (DI signals are input from the servo amplifier or the dual port memory, etc. by the parameter setting.)	
	Limit switch -		
	Proximity dog		
	Forced stop	1 point	
DO		None	

*1 The position board can move within the limits of -2147483648 to 2147483647. Movement outside the limits is not covered with warranty. If software limits have been disabled, be careful not to move it outside of the physical limits.

*2 For the absolute position detection system, the command limits of the position after calculation using the electronic gear are also "-2147483648 to 2147483647". It is possible for the moveable limits to be narrower than "-2147483648 to 2147483647", depending on the electronic gear.

*3 This is not the watch dog for the CPU on the position board.

Bus specifications

PCI bus specifications

Items	Specification	
	MR-MC210	MR-MC211
Address bit	32bit	
Data bit	32bit	
System clock	33MHz	
System voltage	+5V	
Shape	Half length: 106.7mm × 167.6mm (4.20inch × 6.60inch)	
Hot swap	Not supported	
Base address	Set configuration register by BIOS	

CompactPCI bus specifications

Items	Specification	
	MR-MC220U3	MR-MC220U6
Address bit	32bit	
Data bit	32bit	
System clock	33MHz	
System voltage	+5V	
Shape	Board size: 100mm × 160mm (3.94inch × 6.30inch) Front panel length: 128.7mm (5.07inch)	Board size: 100mm × 160mm (3.94inch × 6.30inch) Front panel length: 262.05mm (10.32inch)
Connector	J1 connector only	
Hot swap	Not supported	
Base address	Set configuration register by BIOS	

PCI Express bus specifications

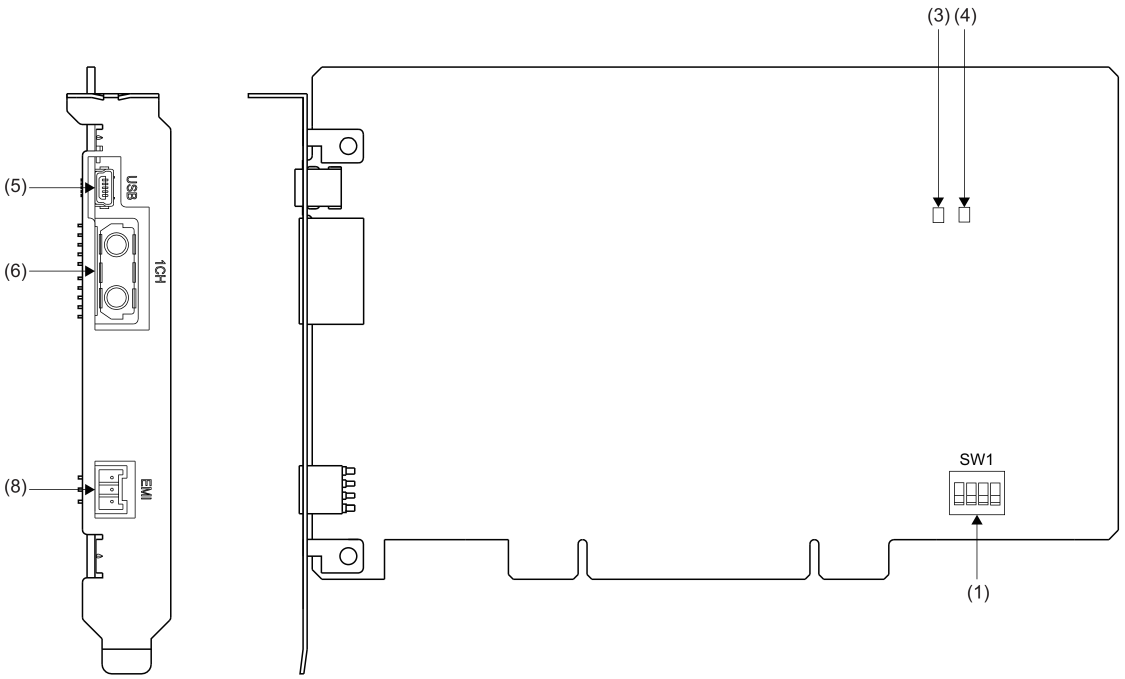
Items	Specification		
	MR-MC240*1	MR-MC241*1	MR-MC341
Bus specification	PCI Express1.1		PCI Express2.0
Shape	Half length: 111.15mm × 167.6mm (4.38inch × 6.60inch)		Half length: 105.77mm × 128.8mm (4.16inch × 5.07inch)
Link width	× 1		
Transfer rate	2.5Gbps		5.0Gbps
System voltage	+3.3V		+3.3V, +12V

*1 Depending on the specifications of the host personal computer, the PCI Express slot maybe directly connected to the CPU of the host personal computer.
If the PCI Express compatible position board (MR-MC240/MR-MC241) that was produced in or before October 2018 is mounted to a PCI Express slot that is directly connected to the CPU of the host personal computer, it may not be able to operate.
Mount the PCI Express compatible position board to a PCI Express slot that is not directly connected to the CPU of the host personal computer (connected to a chipset).
The year and month of manufacture for the position board can be confirmed on the rating plate. For details, refer to the following.
☞ Page 55 Confirming serial No.

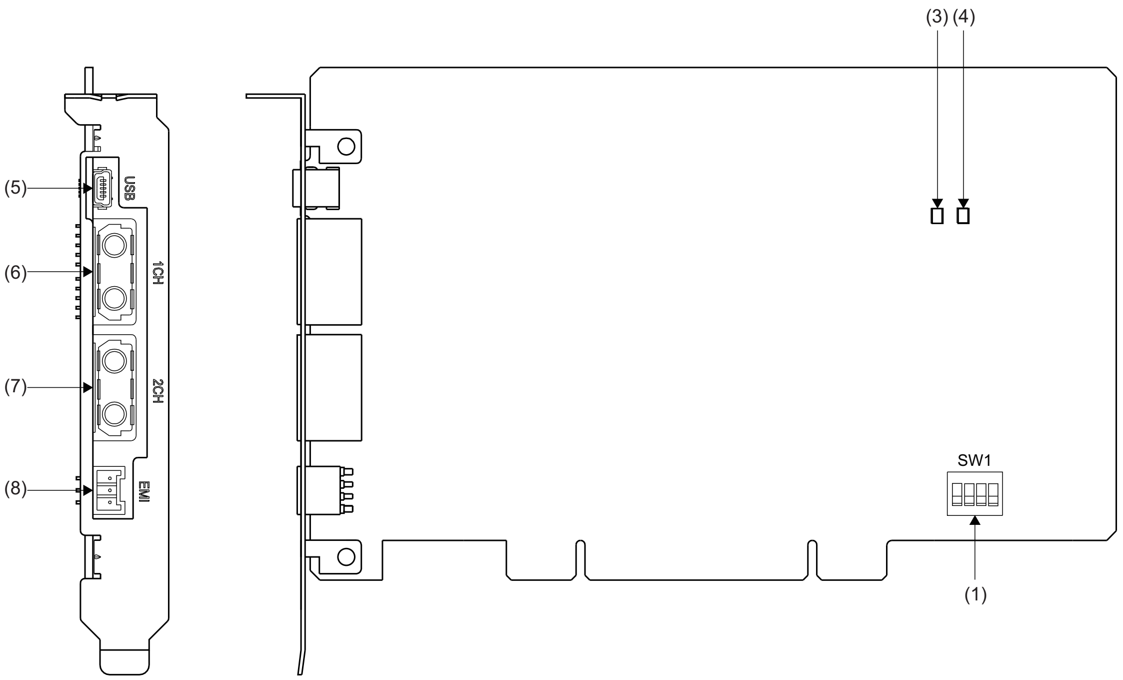
1.4 Name of Each Section

Name of each section [MC200]

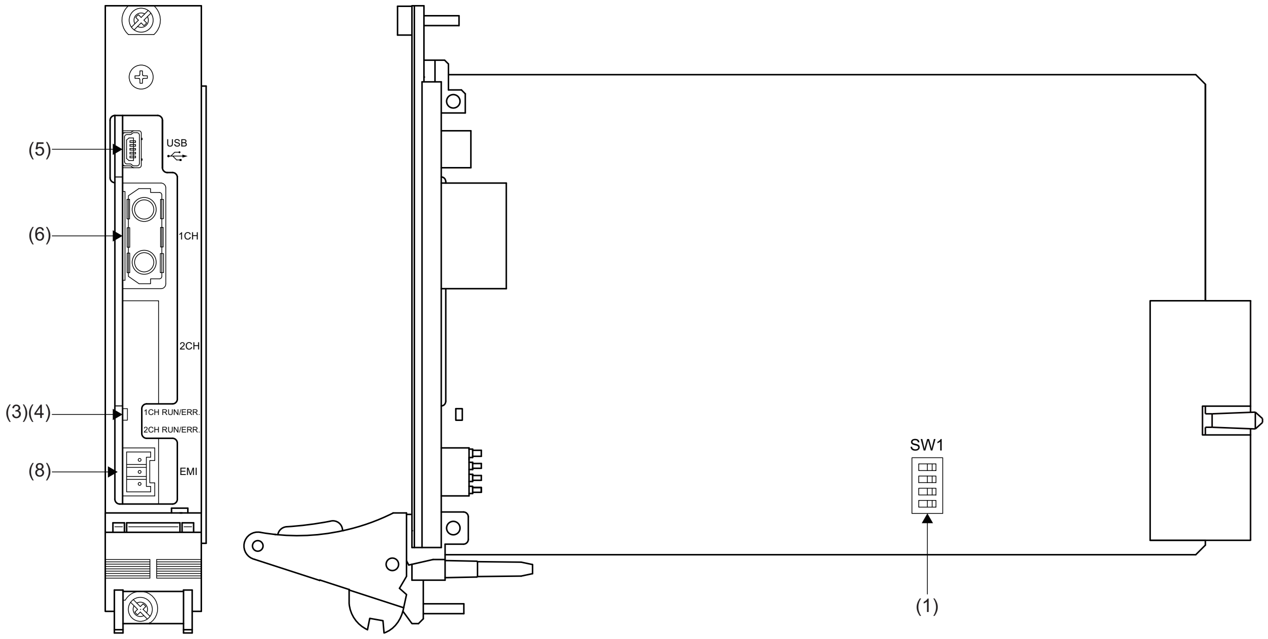
MR-MC210



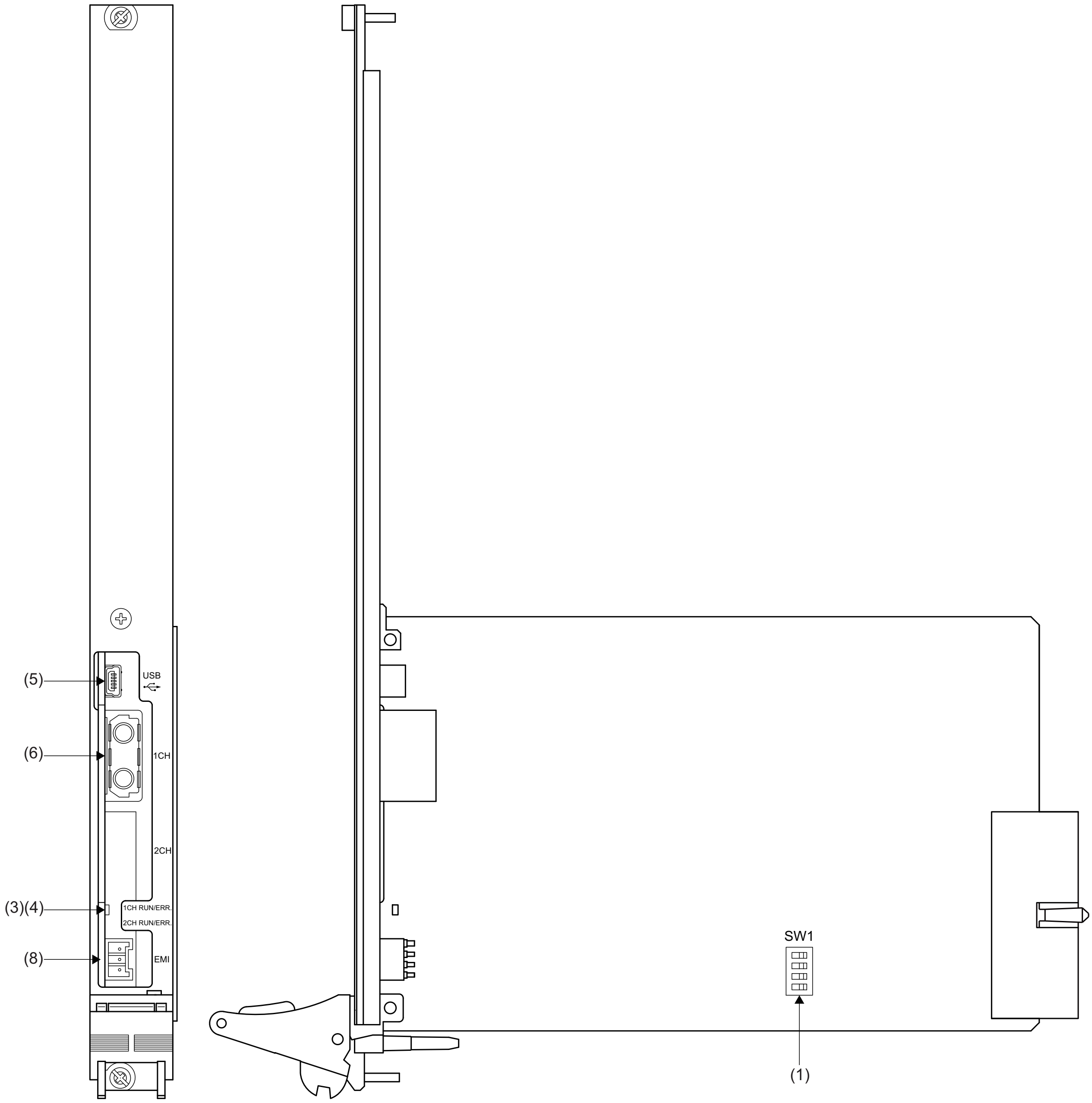
MR-MC211



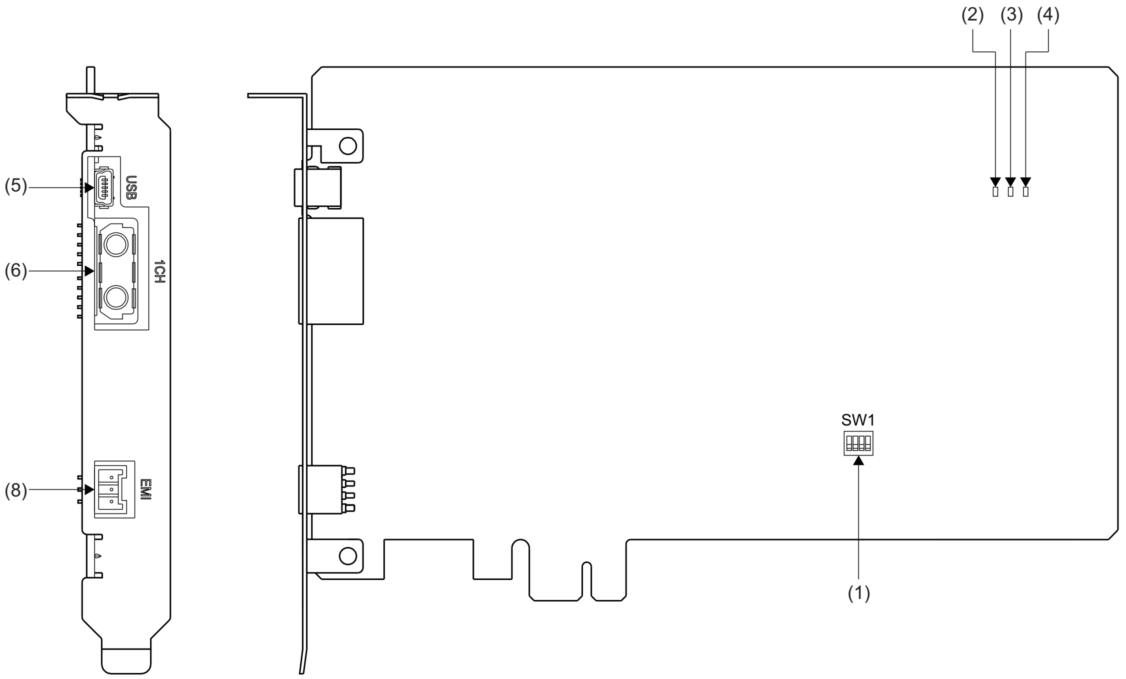
MR-MC220U3



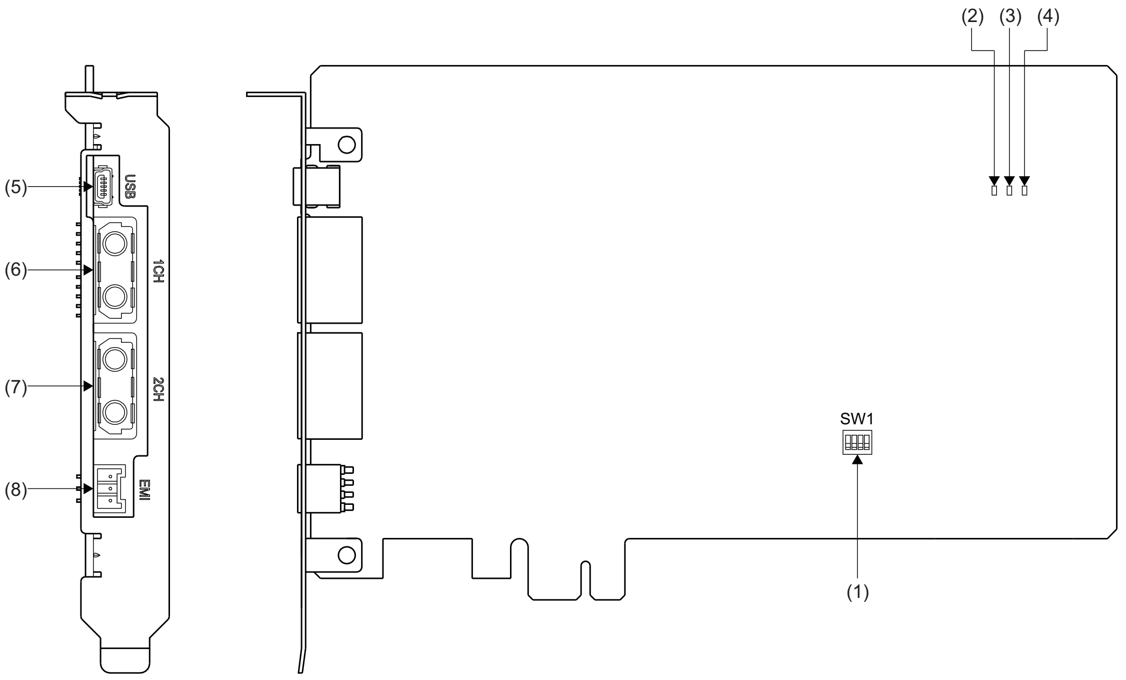
MR-MC220U6

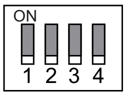
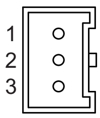


MR-MC240



MR-MC241



No.	Name			Description
(1)	Setting Switch (SW1) 	Switch 1	Board ID selection	Define a board ID in order to distinguish between multiple position boards. • Switch1 ON, Switch 2 ON: Board ID3 • Switch1 OFF, Switch 2 ON: Board ID2 • Switch1 ON, Switch 2 OFF: Board ID1 • Switch1 OFF, Switch 2 OFF: Board ID0 (default value)
		Switch 2		
		Switch 3	For manufacturer setting	Make sure the switch is always OFF.
		Switch 4	Interrupt output mask selection	Mask interrupt output when interrupt occurs. • ON: Valid • OFF: Invalid (default value)
(2)	PCI Express link (green)			• ON: PCI Express link up • OFF: PCI Express disconnected
(3)	Operation indicator (green)			• ON: At power ON • Flashing: At system startup • OFF: At power OFF
(4)	Error indicator (red)			• OFF: Normal • ON: At system error (E001H to E302H) occurrence
(5)	USB connector			Connector for communication with the position board test tool and MR Configurator2. (connects MR-J3USBCBL3M)
(6)	SSCNETⅢ connector (line 1)*1			Connector for communication with a servo amplifier. (connects MR-J3BUS_M)
(7)	SSCNETⅢ connector (line 2)*1			
(8)	Forced stop input connector*2			The following is the pin layout and connections of the forced stop input connector as viewed from the front. (Do not connect to any of the terminals explained as "No connect".)  •Pin No.1: EMI •Pin No.2: No connect •Pin No.3: EMI.COM

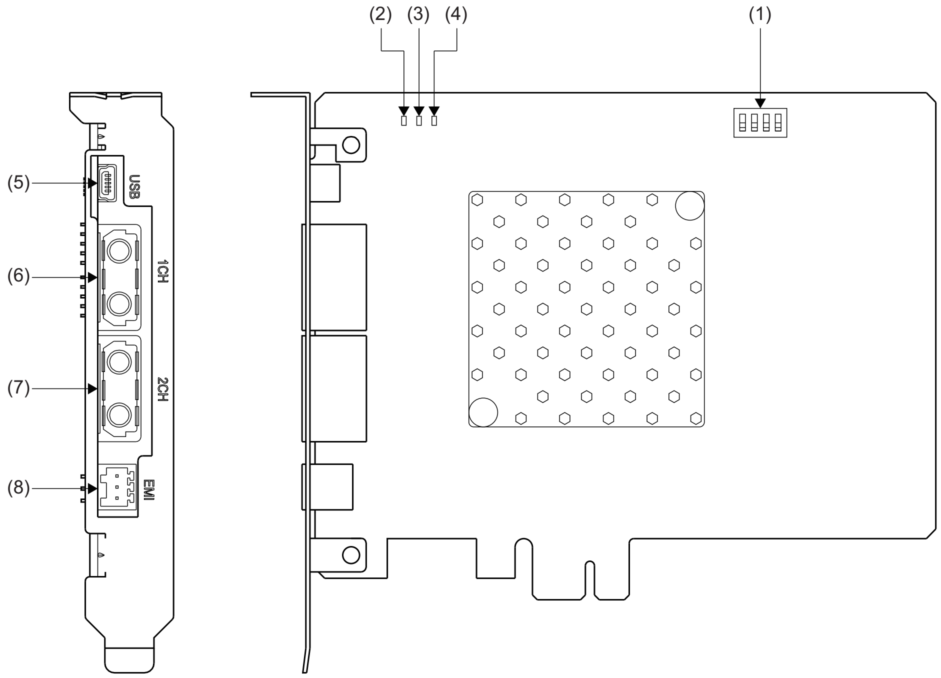
*1 Put the SSCNETⅢ cable in the duct or fix the cable at the closest part to the position board with bundle material in order to prevent SSCNETⅢ cable from putting it is own weight on SSCNETⅢ connector.

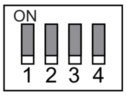
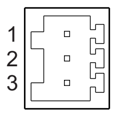
*2 Cable-side connector model name are as follows.

Manufacturer	Name	Model	Reference
Molex, LLC	Crimp housing	51103-0300	—
	Crimp terminal	50351-8100	Applicable wire size: AWG28 to AWG22 (0.08 to 0.32mm²) Two crimp terminals are required per housing.
	Hand crimp tool	63811-8100	Applicable terminal: 50351

Name of each section [MC300]

MR-MC341



No.	Name			Description
(1)	Setting Switch (SW1) 	Switch 1	Board ID selection	Define a board ID in order to distinguish between multiple position boards. • Switch1 ON, Switch 2 ON: Board ID3 • Switch1 OFF, Switch 2 ON: Board ID2 • Switch1 ON, Switch 2 OFF: Board ID1 • Switch1 OFF, Switch 2 OFF: Board ID0 (default value)
		Switch 2		
		Switch 3	For manufacturer setting	Make sure the switch is always OFF.
		Switch 4		
(2)	PCI Express link (green)			• ON: PCI Express link up • OFF: PCI Express disconnected
(3)	Operation indicator (green)			• ON: At power ON • Flashing: At system startup • OFF: At power OFF
(4)	Error indicator (red)			• OFF: Normal • ON: At system error (E001H to E302H) occurrence
(5)	USB connector			Connector for communication with the position board test tool and MR Configurator2. (connects MR-J3USBCBL3M)
(6)	SSCNETⅢ connector (line 1)*1			Connector for communication with a servo amplifier. (connects MR-J3BUS_M)
(7)	SSCNETⅢ connector (line 2)*1			
(8)	Forced stop input connector*2*3			The following is the pin layout and connections of the forced stop input connector as viewed from the front. (Do not connect to any of the terminals explained as "No connect".)  •Pin No.1: EMI •Pin No.2: No connect •Pin No.3: EMI.COM

*1 Put the SSCNETⅢ cable in the duct or fix the cable at the closest part to the position board with bundle material in order to prevent SSCNETⅢ cable from putting it is own weight on SSCNETⅢ connector.

*2 Cable-side connector model name are as follows.

Manufacturer	Model
PHOENIX CONTACT GmbH & Co. KG)	FK-MC0, 5/3-ST-2, 5

*3 Wire size: AWG28 to AWG20 (0.08 to 0.52mm²)

1.5 Bus Interface

Configuration register

PCI bus compatible position board (MR-MC210/MR-MC211)/CompactPCI bus compatible position board (MR-MC220U3/MR-MC220U6)

Address (hexadecimal)	31 to 24	23 to 16	15 to 8	7 to 0	Remarks
00	Device ID 0624		Vendor ID 10BA		• Vendor ID: Mitsubishi Electric 10BA • Device ID: 0624
04	Status		Command		—
08	ClassCode 118000			Revision ID 01	• Revision ID: 01 • Class Code: 118000 (data processing controller)
0C	BIST*1	HeaderType*1	LatencyTimer*1	CacheLineSize*1	—
10	Base Address Register 0				—
14	Base Address Register 1				—
18	Base Address Register 2				Dual port memory (including board ID) leading address • Memory Space Indicator (bit0): 0 (Memory space) • Type (bit1 to 2): 00 (32bit, arbitrary position of address space) • Prefetchable (bit3): 0 (Prefetch prohibited)
1C	Base Address Register 3*1				—
20	Base Address Register 4*1				—
24	Base Address Register 5*1				—
28	Cardbus CIS Pointer*1				—
2C	Subsystem ID 0601		Subsystem Vendor ID 10BA		• Subsystem Vendor ID: Mitsubishi Electric 10BA • Subsystem ID: 0601
30	Expansion ROM Base Address*1				—
34	(Reserved)*1			CAP_PTR*1	—
38	(Reserved)*1				—
3C	Max_Lat*1	Min_Gnt*1	Interrupt Pin 01	Interrupt Line	Interrupt Pin: 01 (INTA use)

*1 Has not been implemented, therefore, if read an indefinite value is returned.

PCI Express bus compatible position board

■When using MR-MC240/MR-MC241

Address (hexadecimal)	31 to 24	23 to 16	15 to 8	7 to 0	Remarks
00	Device ID 0624		Vendor ID 10BA		• Vendor ID: Mitsubishi Electric10BA • Device ID: 0624
04	Status		Command		—
08	ClassCode 118000			Revision ID 01	• Revision ID: 01 • Class Code: 118000 (data processing controller)
0C	BIST*1	HeaderType*1	LatencyTimer*1	CacheLineSize*1	—
10	Base Address Register 0				—
14	Base Address Register 1				—
18	Base Address Register 2				Dual port memory (including board ID) leading address • Memory Space Indicator (bit0): 0 (Memory space) • Type (bit1 to 2): 00 (32bit, arbitrary position of address space) • Prefetchable (bit3): 0 (Prefetch prohibited)
1C	Base Address Register 3*1				—
20	Base Address Register 4*1				—
24	Base Address Register 5*1				—
28	Cardbus CIS Pointer*1				—
2C	Subsystem ID 0601		Subsystem Vendor ID 10BA		• Subsystem Vendor ID: Mitsubishi Electric 10BA • Subsystem ID: 0601
30	Expansion ROM Base Address*1				—
34	(Reserved)*1			CAP_PTR*1	—
38	(Reserved)*1				—
3C	Max_Lat*1	Min_Gnt*1	Interrupt Pin 01	Interrupt Line	Interrupt Pin: 01 (INTA use)
40	PM Capability		NxtCap	PM Cap	—
44	Data	BSE	PMCSR		—
48	MSI Control		NxtCap	MSI Cap	MSI Control (bit0): 0 INTA interrupt
4C	Message Address (Lower)				—
50	Message Address (Upper)				—
54	Reserved		Message Data		—
58	PE Capability		NxtCap	PE Cap	—
5C	PCI Express Device Capabilities				—
60	Device Status		Device Control		—
64	PCI Express Link Capabilities				—
68	Link Status		Link Control		—
6C to FF	Reserved Legacy Configuration Space (Returns 0x00000000)				—
100	Next Cap	Capability Version	PCI Express Extended Capability - DSN		—
104	PCI Express Device Serial Number (1st)				—
108	PCI Express Device Serial Number (2nd)				—
10C to FFF	Reserved Extended Configuration Space (Returns Completion with 0x00000000)				—

*1 Has not been implemented, therefore, if read an indefinite value is returned.

■When using MR-MC341

Address (hexadecimal)	31 to 24	23 to 16	15 to 8	7 to 0	Remarks
00	Device ID 0624		Vendor ID 10BA		• Vendor ID: Mitsubishi Electric 10BA • Device ID: 0624
04	Status		Command		—
08	ClassCode 118000			Revision ID 01	• Revision ID: 01 • Class Code: 118000 (data processing controller)
0C	BIST 00	HeaderType*1	LatencyTimer 00	CacheLineSize*1	—
10	Base Address Register 0				Dual port memory (including board ID) leading address • Memory Space Indicator (bit0): 0 (Memory space) • Type (bit1 to 2): 00 (32bit, arbitrary position of address space) • Prefetchable (bit3): 0 (Prefetch prohibited)
14	Base Address Register 0 (Upper)				—
18	Base Address Register 2*1				—
1C	Base Address Register 2 (Upper)*1				—
20	Base Address Register 4*1				—
24	Base Address Register 4 (Upper)*1				—
28	(Reserved)*1				—
2C	Subsystem ID 0601		Subsystem Vendor ID 10BA		• Subsystem Vendor ID: Mitsubishi Electric 10BA • Subsystem ID: 0603
30	Expansion ROM Base Address*1				—
34	(Reserved)*1			CAP_PTR	—
38	(Reserved)*1				—
3C	Max_Lat*1	Min_Gnt*1	Interrupt Pin 01	Interrupt Line	Interrupt Pin: 01 (INTA use)
40	(Reserved)*1				—
44	(Reserved)*1				—
48	(Reserved)*1				—
4C	(Reserved)*1				—
50	MSI Control		NxtCap	MSI Cap	MSI Control (bit0): 1 MSI interrupt
54	Message Address (Lower)				—
58	Message Address (Upper)				—
5C	(Reserved)*1		Message Data		—
60	(Reserved)*1				—
64	(Reserved)*1				—
68	(Reserved)*1				—
6C	(Reserved)*1				—
70	(Reserved)*1				—
74	(Reserved)*1				—
78	PM Capability		NxtCap	PM Cap	—
7C	Data	BSE	PMCSR		—
80	PE Capability		NxtCap	PE Cap	—
84	PCI Express Device Capabilities				—
88	Device Status		Device Control		—
8C	PCI Express Link Capabilities				—
90	Link Status		Link Control		—
94	PCI Express Slot Capabilities*1				—
98	Slot Status*1		Slot Control*1		—
9C	Root Capabilities*1		Root Control*1		—
A0	Root Status*1				—
A4	PCI Express Device Capabilities2				—
A8	Device Status2*1		Device Control2*1		—
AC	PCI Express Link Capabilities2				—

Address (hexadecimal)	31 to 24	23 to 16	15 to 8	7 to 0	Remarks
B0	Link Status2		Link Control2		—
B4	PCI Express Slot Capabilities2*1				—
B8	Slot Status2*1		Slot Control2*1		—

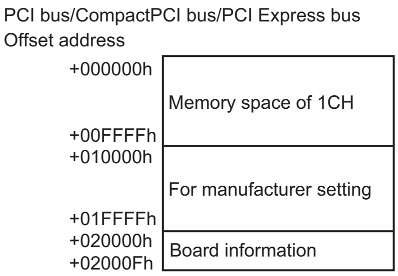
*1 Has not been implemented, therefore, if read an indefinite value is returned.

Dual port memory map

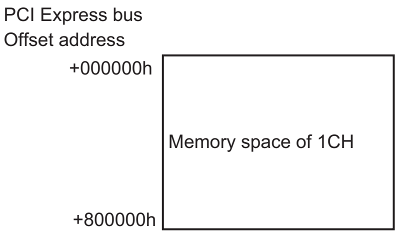
The bus width of dual port memory is 32bit. For the address map of the dual port memory on the position board side, refer to the following.

☞ Page 554 TABLE MAP

MR-MC2_ _



MR-MC3_ _



Point

Board information is allocated within the memory space of 1CH. For details, refer to the following.

☞ Page 45 Board information

Board information

The (R)s in the table designate read only, while the (W)s designate write only capability.

Address (hexadecimal)		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
MR-MC2_ _	MR-MC3_ _								
020000	001000	Bus type (R)		Implemented CH information (R)		Interrupt output mask information (R)*1	For manufacturer setting	Board ID information (R)	
020001	001001	For manufacturer setting						Number of SSCNET lines (R)	
020002	001002	For manufacturer setting							
020003	001003								
020004	001004	For manufacturer setting						Signal during interrupt output (R)*1	
020005	001005	For manufacturer setting							
020006	001006								
020007	001007								
020008	001008	For manufacturer setting						Interrupt signal clear register (1CH) (W)*1	
020009	001009	For manufacturer setting							
⋮	⋮								
02000F	00100F								
—	001010								
	⋮								
	00101F								

*1 When using MR-MC3_ _, "For manufacturer setting".

Board ID information

Status set with the dip switch is displayed.

bit1	bit0	Content
0	0	0
0	1	1
1	0	2
1	1	3

Interrupt output mask information [MC200]

Status set with the dip switch is displayed.

bit3	Content
0	Invalid
1	Valid

Implemented CH information

bit5	bit4	Content
0	0	1CH
0	1	For manufacturer setting
1	0	
1	1	

Bus type

bit7	bit6	Content
0	0	PCI bus
0	1	CompactPCI bus
1	0	PCI Express bus
1	1	For manufacturer setting

Number of SSCNET lines

bit1	bit0	Content
0	0	1 line
0	1	2 lines
1	0	For manufacturer setting
1	1	

Signal during interrupt output [MC200]

bit1	bit0	Content
0	0	Interrupts are not generated
0	1	During interrupt output

Interrupt signal clear register (1CH) [MC200]

bit1	bit0	Content
0	0	Invalid
0	1	1CH interrupt signal is cleared

1.6 SSCNETIII Cables

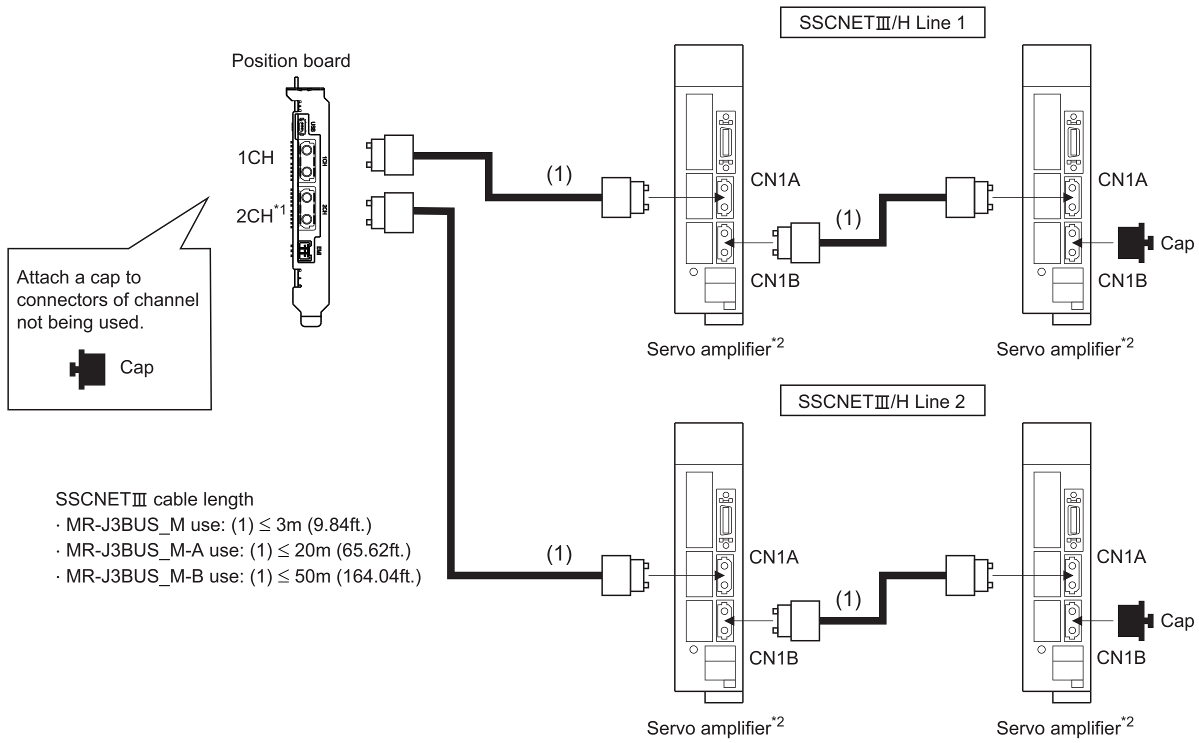
Connect the position board and servo amplifiers, or servo amplifier and servo amplifier by SSCNETⅢ cable. When using MR-MC210/MR-MC220U3/MR-MC220U6/MR-MC240, the SSCNETⅢ cable for connecting servo amplifiers can be used for one line only. When using MR-MC211/MR-MC241/MR-MC341, the SSCNETⅢ cable for connecting servo amplifiers can be used for up to two lines (use 1CH and 2CH).

SSCNETIII cable specifications

Model name		Cable length [m (ft.)]	Description
MR-J3BUS_M (Standard cord for inside panel)	MR-J3BUS015M	0.15 (0.49)	• Position board ↔ Servo amplifier • Servo amplifier ↔ Servo amplifier
	MR-J3BUS03M	0.3 (0.98)	
	MR-J3BUS05M	0.5 (1.64)	
	MR-J3BUS1M	1 (3.28)	
	MR-J3BUS3M	3 (9.84)	
MR-J3BUS_M-A (Standard cable for outside panel)	MR-J3BUS5M-A	5 (16.40)	
	MR-J3BUS10M-A	10 (32.81)	
	MR-J3BUS20M-A	20 (65.62)	
MR-J3BUS_M-B (Long distance cable)	MR-J3BUS30M-B	30 (98.43)	
	MR-J3BUS40M-B	40 (131.23)	
	MR-J3BUS50M-B	50 (164.04)	

Connection between the position board and servo amplifiers

Connect the SSCNETⅢ cables to the following connectors.
For the connection and disconnection of SSCNETⅢ cable, refer to the following.
☞ Page 59 SSCNETIII cable



*1 MR-MC211/MR-MC241/MR-MC341 only
*2 It cannot communicate if the connection of CN1A and CN1B is mistaken.

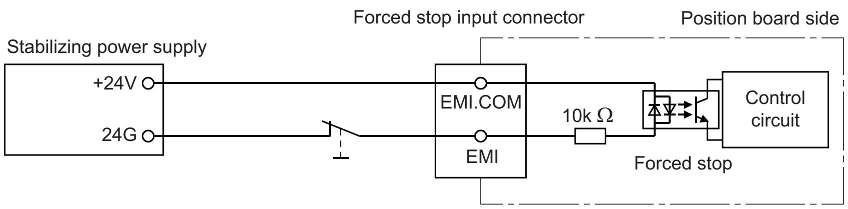
1.7 Forced Stop Input Terminal

Table of the forced stop input terminal specifications

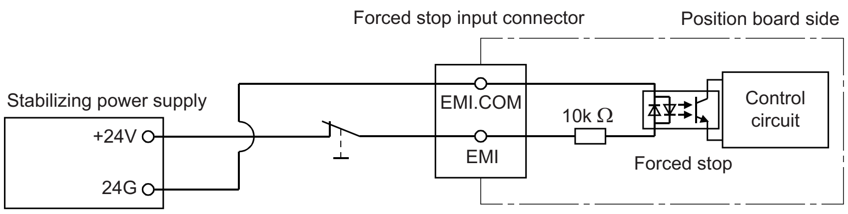
Item		Specifications	
		MR-MC2_ _	MR-MC3_ _
Number of input points		Forced stop signal: 1 point	
Input method		Positive common/Negative common shared type	
Rated input current		2.4mA	
Isolation method		Photocoupler	
Operating voltage range		20.4 to 26.4VDC (+10/ -15%, ripple ratio 5% or less)	
ON voltage/current		17.5VDC or more/2.0mA or more	
OFF voltage/current		1.8VDC or less/0.18mA or less	
Input resistance		Approx. 10kΩ	
Response time	OFF → ON	1ms or less	
	ON → OFF		
External connector type		3 pin connector	
Recommended wire size		0.08 to 0.32mm² (AWG28 to AWG22)	0.08 to 0.52mm² (AWG28 to AWG20)

Forced stop circuit

■Positive common



■Negative common

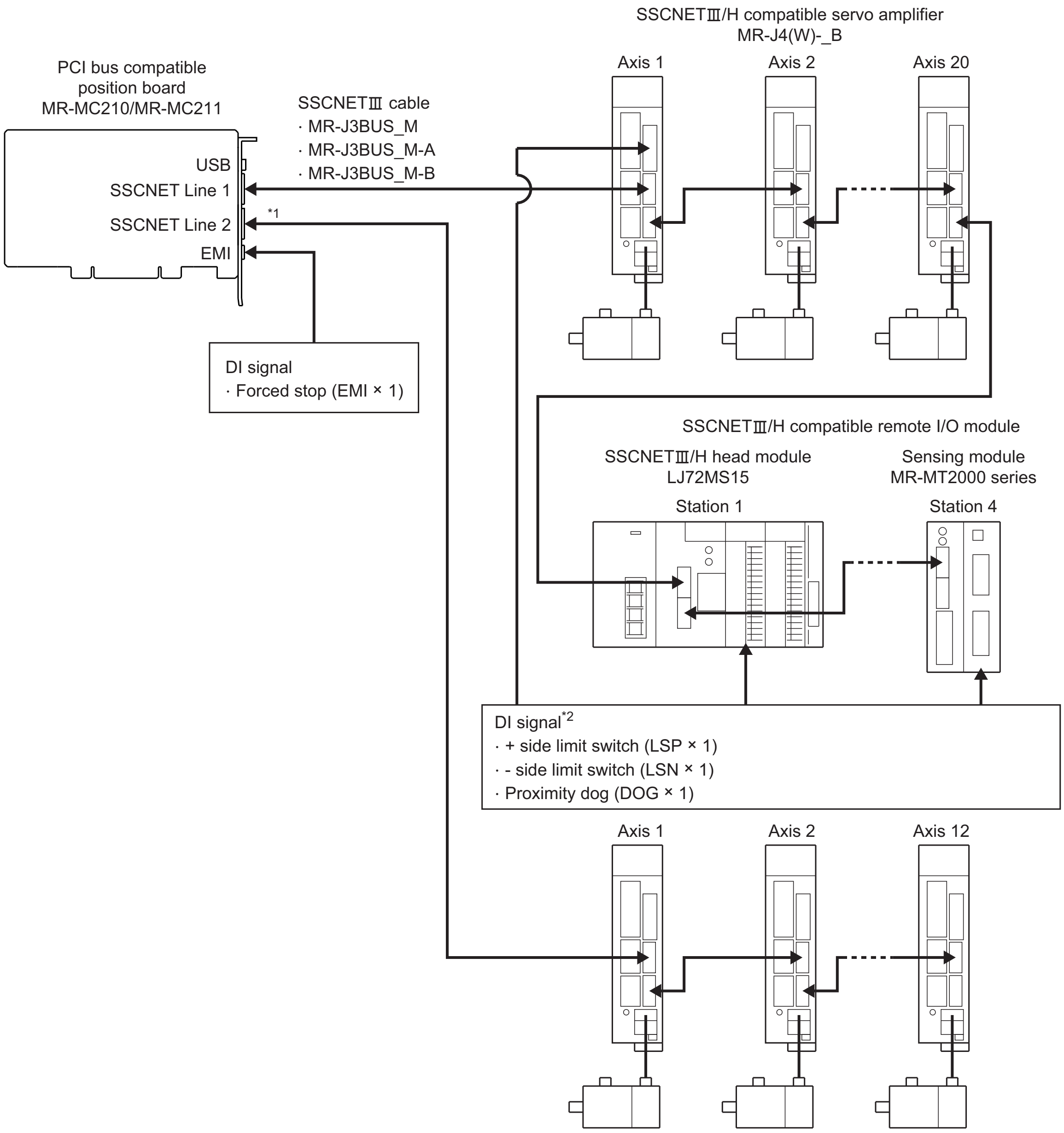


2 SYSTEM CONFIGURATION

This section describes the system configuration and equipment settings for the position board.

2.1 System Configuration [MC200]

MR-MC210/MR-MC211 system configuration



*1 MR-MC211 only

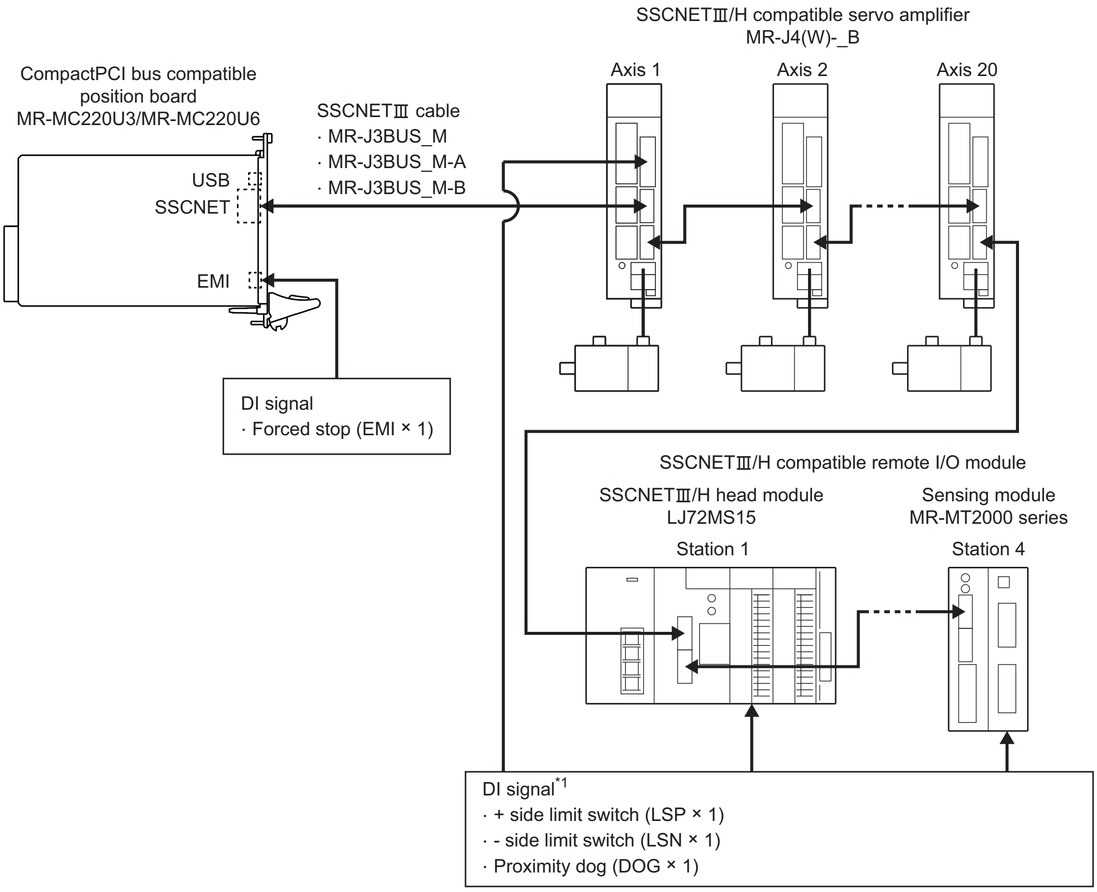
*2 The DI signal (LSP/LSN/DOG) from servo amplifier and input module connected to remote I/O module can be input.

Point

To change the number of axes (stations) distributed to line 1 and line 2, refer to the following.

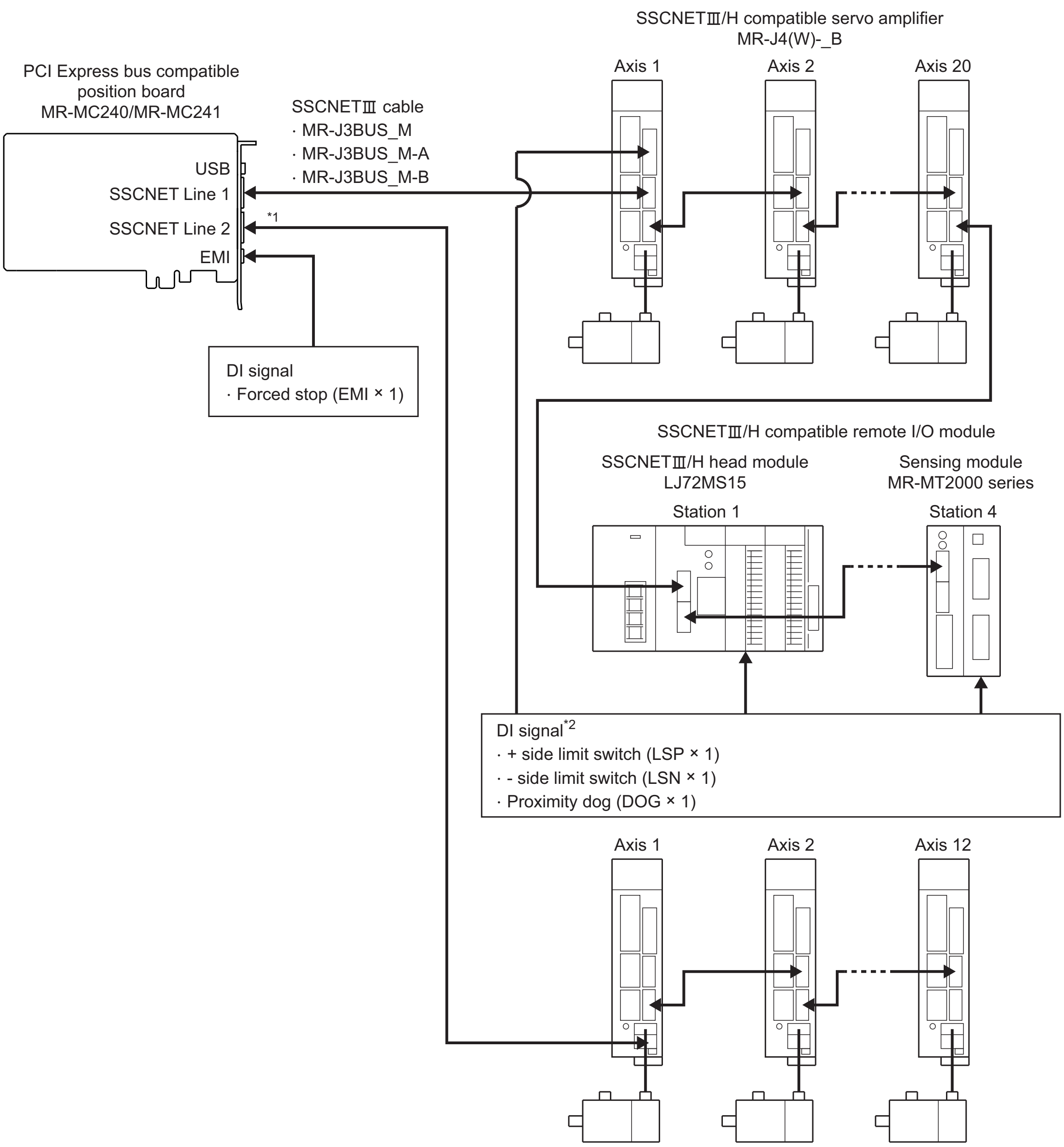
☞ Page 75 Axis No. assignment
☞ Page 303 System startup
☞ Page 319 System startup
☞ Page 347 System startup

MR-MC220U3/MR-MC220U6 system configuration



*1 The DI signal (LSP/LSN/DOG) from servo amplifier and input module connected to remote I/O module can be input.

MR-MC240/MR-MC241 system configuration



*1 MR-MC241 only

*2 The DI signal (LSP/LSN/DOG) from servo amplifier and input module connected to remote I/O module can be input.

Point

To change the number of axes (stations) distributed to line 1 and line 2, refer to the following.

☞ Page 75 Axis No. assignment

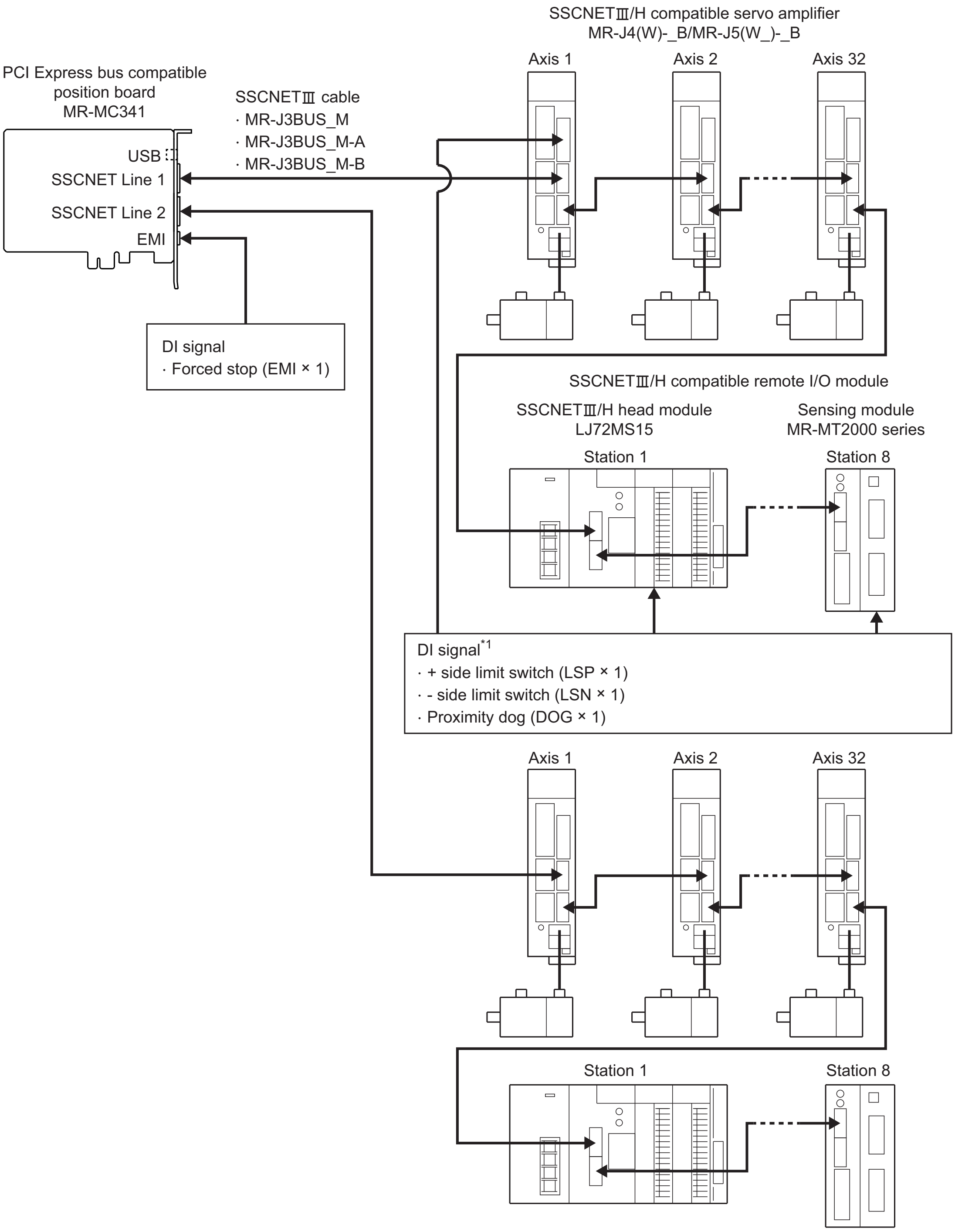
☞ Page 303 System startup

☞ Page 319 System startup

☞ Page 347 System startup

2.2 System Configuration [MC300]

MR-MC341 system configuration



*1 The DI signal (LSP/LSN/DOG) from servo amplifier and input module connected to remote I/O module can be input

Point

To change the number of axes (stations) distributed to line 1 and line 2, refer to the following.

☞ Page 75 Axis No. assignment
☞ Page 303 System startup
☞ Page 319 System startup
☞ Page 347 System startup

2.3 System Configuration Equipment

Related module

Part name	Model name	Description
Position board	MR-MC210	Up to 20 axes control, Operation cycle 0.22ms, 0.44ms, 0.88ms, PCI bus compatible[*1]
	MR-MC211	Up to 32 axes control, Operation cycle 0.22ms, 0.44ms, 0.88ms, PCI bus compatible[*1]
	MR-MC220U3	Up to 20 axes control, Operation cycle 0.22ms, 0.44ms, 0.88ms, CompactPCI bus compatible[*1]
	MR-MC220U6	Up to 20 axes control, Operation cycle 0.22ms, 0.44ms, 0.88ms, CompactPCI bus compatible[*1]
	MR-MC240	Up to 20 axes control, Operation cycle 0.22ms, 0.44ms, 0.88ms, PCI Express bus compatible[*1]
	MR-MC241	Up to 32 axes control, Operation cycle 0.22ms, 0.44ms, 0.88ms, PCI Express bus compatible[*1]
	MR-MC341	Up to 64 axes control, Operation cycle 0.22ms, 0.44ms, 0.88ms, PCI Express bus compatible (Forced stop input connector is attached)[*1]
USB cable	MR-J3USBCBL3M	Position board MR-MC2_ _ /MR-MC3_ _ ↔ host personal computer
SSCNETⅢ cable	MR-J3BUS_M[*2]	• MR-MC2_ _/MR-MC3_ _ ↔ MR-J4(W)-_B/MR-J4(W)-_B ↔ MR-J4(W)-_B • MR-MC3_ _ ↔ MR-J5(W_)-_B/MR-J5(W_)-_B ↔ MR-J5(W_)-_B [MC300] • Standard cord for inside panel 0.15m (0.49ft.), 0.3m (0.98ft.), 0.5m (1.64ft.), 1m (3.28ft.), 3m (9.84ft.)
	MR-J3BUS_M-A[*2]	• MR-MC2_ _/MR-MC3_ _ ↔ MR-J4(W)-_B/MR-J4(W)-_B ↔ MR-J4(W)-_B • MR-MC3_ _ ↔ MR-J5(W_)-_B/MR-J5(W_)-_B ↔ MR-J5(W_)-_B [MC300] • Standard cable for outside panel 5m (16.40ft.), 10m (32.81ft.), 20m (65.62ft.)
	MR-J3BUS_M-B[*2*3]	• MR-MC2_ _/MR-MC3_ _ ↔ MR-J4(W)-_B/MR-J4(W)-_B ↔ MR-J4(W)-_B • MR-MC3_ _ ↔ MR-J5(W_)-_B/MR-J5(W_)-_B ↔ MR-J5(W_)-_B [MC300] • Long distance cable 30m (98.43ft.), 40m (131.23ft.), 50m (164.04ft.)

*1 Cable for forced stop input is not attached to the position board. The cable should be made by the customer.
*2 _ = Cable length (015: 0.15m (0.49ft.), 03: 0.3m (0.98ft.), 05: 0.5m (1.64ft.), 1: 1m (3.28ft.), 2: 2m (6.56ft.), 3: 3m (9.84ft.), 5: 5m (16.40ft.), 10: 10m (32.81ft.), 20: 20m (65.62ft.), 25: 25m (82.02ft.), 30: 30m (98.43ft.), 40: 40m (131.23ft.), 50: 50m (164.04ft.)
*3 Please contact your nearest Mitsubishi Electric sales representative for the cable of less than 30m (98.43ft.).

Equipment with SSCNETIII(/H) connection

Part name	Model name	Description	Remarks
MR-J5 series servo amplifier[*1]	MR-J5_B_	—	Refer to the following manual. 📖MR-J5-B/MR-J5W-B User's Manual (Introduction)
	MR-J5-_B_-RJ	Load-side encoder A/B/Z-phase input compatible	
	MR-J5W_-_B	For 2-axis type, 3-axis type	
MR-J4 series servo amplifier	MR-J4-_B_	—	Refer to the servo amplifier instruction manual.
	MR-J4-_B_-RJ	Fully closed loop control four-wire type/load-side encoder A/B/Z-phase input compatible/Compatible with MR-D30 functional safety unit	
	MR-J4W-_B_	For 2-axis type, 3-axis type	
MR-J3 series servo amplifier	MR-J3-_B_	—	
	MR-J3W-_B	For 2-axis type	
	MR-J3-_B-RJ006	For fully closed control	
	MR-J3-_B-RJ004	For linear servo motor	
	MR-J3-_B-RJ080W	For direct drive motor	
	MR-J3-_BS	For drive safety servo	
	MR-J3W-0303BN6	For 2-axis type	
MR-JE series servo amplifier	MR-JE-_B	—	
	MR-JE-_BF	—	
SSCNETⅢ/H head module	LJ72MS15	Maximum link points input 64bytes, output 64bytes	Refer to the following manual. 📖MELSEC-L SSCNETⅢ/H Head Module User's Manual
Sensing module	MR-MT2010	Sensing SSCNETⅢ/H head module	Refer to the sensing module instruction manual.
	MR-MT2100	Sensing I/O module	
	MR-MT2200	Sensing pulse I/O module	
	MR-MT2300	Sensing analog I/O module	
	MR-MT2400	Sensing encoder I/F module	

*1 Only be used in MR-MC3_ _

Software packages

■Utility software

Model name	Software package
Position Board Utility2	MRZJW3-MC2-UTL

■Servo set-up software package

Model name	Software package
MR Configurator2	SW1DNC-MRC2-E

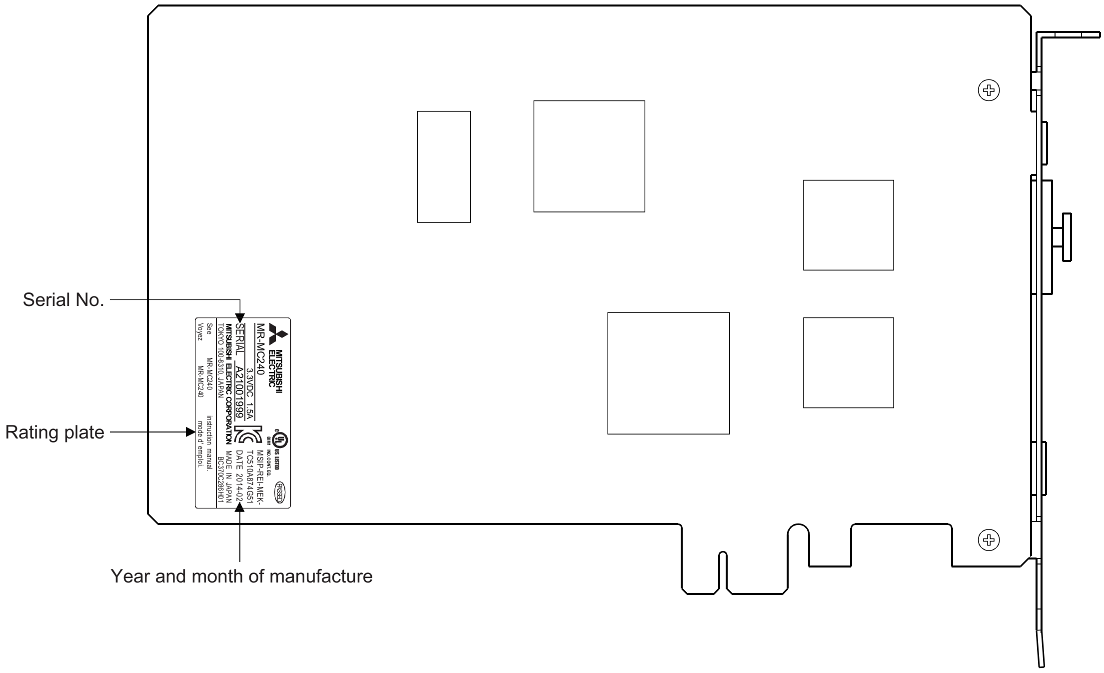
2.4 Confirming Serial No. and Operating System Software Version

Confirming the serial No. of position board and software version are shown below.

Confirming serial No.

Rating plate

The rating plate is on the position board. The position board serial No. is printed on the SERIAL line, and the year and month of manufacture is printed on the DATE line.



Point

[MC200]

When the position board is mounted to the host personal computer, the serial No. cannot be confirmed. Take note of the serial No. before mounting.

System information [MC300]

The position board serial No. can be confirmed on the serial No. (0000C0H to 0000CFH) of system information. The serial No. is stored as ASCII code.

Address (hexadecimal)

0000C0 · · · 0000CF

Serial No.	0 (30h)	1 (31h)	0 (30h)	1 (31h)	8 (38h)	1 (31h)	0 (30h)	1 (31h)	0 (30h)	0 (30h)	0 (30h)	0 (30h)	0 (30h)	0 (30h)	0 (30h)	0 (30h)

In ( ): ASCII code

Point

[API library]

To confirm the serial No., use the sscGetBoardSerialNumber function.

Confirming software version

The software version of the position board can be confirmed on the system program software version (0030H to 003FH [MC200]/0000D0H to 0000DFH [MC300]) of system information. System program software version is stored as ASCII code.

Address (hexadecimal)
0030 · · · 003F
0000D0 · · · 0000DF

System program software version	B (42h)	C (43h)	D (44h)	- (2Dh)	B (42h)	4 (34h)	8 (38h)	W (57h)	1 (31h)	0 (30h)	1 (31h)	- (2Dh)	A (41h)	0 (30h)	␣ (20h)	\0 (00h)

In ( ): ASCII code
␣ : Space

Software type name (B to 1)
Type name (1 0 1)
<Example> 101: MR-MC2_ _
181: MR-MC3_ _
Version (A 0 ␣)

Point

[API library]
To confirm the software version, use the sscGetBoardVersion function.

2.5 Restrictions by the Software's Version

There are restrictions in the function that can be used by the version of the software.

—: No restriction by version.

Function/Item	Software version		
	MR-MC2_ _	MR-MC3_ _	MRZJW3-MC2-UTL
Digital I/O	A1 or later	—	Ver.1.20 or later
Servo amplifier general I/O			
Digital output signal control for the other axes start			
Dual port memory exclusive control			
Pass position interrupt			
Interface mode	A3 or later		Ver.1.50 or later
Alarm history function			
Addition of waiting for SSCNET response (0009h) to system status code			
Speed-torque control (interface mode only)	A4 or later		Ver.1.60 or later
Addition of operation cycle alarm to system alarms			
Addition of position droop to high speed monitor (interface mode only)			
Mark detection function compatible	A5 or later		Ver.1.70 or later
Change home position return method while system is running.			
Continuous operation to torque control (automatic operation in standard mode only)			
External forced stop disabled function			
Point table loop method	A6 or later		
Servo amplifier (MR-JE-_B) compatible	A7 or later		
Addition of forced stop to system interrupt factor			
SSCNETⅢ/H head module connection	A8 or later		Ver.1.80 or later
Transient transmit compatible			
Addition of station No. in order of connection to monitor			
I/O device compatible			
Changeable interpolation group	A9 or later		Ver.1.90 or later
Position change during deceleration			Ver.1.00 or later
Sensing module (station mode) connection	B1 or later		Ver.1.90 or later
SSCNETⅢ/H head module 0.22ms connection			Ver.1.80 or later
Sensing module (axis mode) connection	B3 or later		Ver.1.90 or later
Position board MR-MC341 compatible	Not supported		Ver.3.00 or later
Serial No. display			
Jerk ratio acceleration/deceleration			
Vibration suppression command filter 1			
Circular interpolation		A1 or later	Ver.3.10 or later
Proximity pass function			
USB communication connection function	—		
Addition of cancel condition to pass position interrupt	Not supported	A4 or later	Ver.3.30 or later
MR-J5(W_)-_B compatible		A6 or later	Ver.3.40 or later
Addition of smoothing time constant to point table			

3 INSTALLATION AND WIRING

3.1 Board Installation

This section explains instructions for handling and installation environment of the position board.

Instructions for handling

The following explains instructions for handling.

- Shut off the external power supply (all phases) used in the system before mounting or removing the host personal computer of the board. Failure to do so may cause an electric shock, failure, or malfunction of the board.
- Do not touch any connectors while power is ON. Doing so may cause electric shock or malfunction.
- Do not directly touch any conductive parts and electronic components of the board. Doing so may cause malfunction or failure of the board.
- Do not disassemble or modify the board. Doing so may cause failure, malfunction, injury, or fire.
- Use board fixing screws and securely tighten the board. Tighten the screws within the specified torque range. Undertightening can cause a drop, short circuit, or malfunction. Overtightening can damage the screw and/or the board, resulting in a drop, short circuit, or malfunction. For the tightening torque for the board fixing screws, refer to the manual attached to the host personal computer.
- Before handling the board, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the board to fail or malfunction.
- Install the board to a host personal computer which is compliant with PCI standard. Failure to do so may cause a failure or malfunction.
- Securely insert the board into the PCI slot following the board installation instruction of the host personal computer. Incorrect insertion of the board may cause a malfunction, failure, or drop of the board.
- When installing the board, take care not to get injured by an implemented component or a surrounding member.
- When installing the board, take care not to contact with other boards.
- Handle the board in a place where static electricity is not generated. Failure to do so may cause a failure or malfunction.
- The board is included in a static electricity preventing vinyl bag. When storing or transporting it, be sure to put it in the static electricity preventing vinyl bag. Failure to do so may cause a failure or malfunction.
- Do not drop or apply a strong impact to the board. Doing so may cause a failure or malfunction.

Installation environment

For the installation of the host personal computer in which the position board is installed, refer to the manual for the host personal computer.

Instructions for board installation environment

Use the board in an environment that meets the general specifications (☞ Page 30 General specifications). Failure to do so may result in an electric shock, fire, malfunction, or damage to or deterioration of the product.

Instructions for host personal computer installation environment

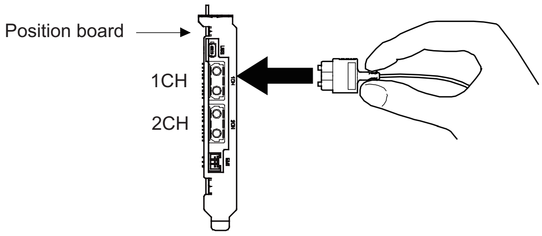
Always ground the host personal computer to the protective ground conductor. Failure to do so may cause a malfunction.

3.2 Connection and Disconnection of Cable

SSCNETIII cable

Precautions for handling the SSCNETIII cable

- Do not stamp the SSCNETⅢ cable.
- When laying the SSCNETⅢ cable, be sure to secure the minimum cable bend radius or more. If the bend radius is less than the minimum cable bend radius, it may cause malfunctions due to characteristic deterioration, wire breakage, etc.
- For connection and disconnection of SSCNETⅢ cable, hold surely a tab of cable connector.



Connection of SSCNETIII cable

- For connection of SSCNETⅢ cable to the position board, connect it to the SSCNETⅢ connector 1CH or 2CH of position board while holding a tab of SSCNETⅢ cable connector. Be sure to insert it until it clicks.
- If the cord tip for the SSCNETⅢ cable is dirty, optical transmission is interrupted and it may cause malfunctions. If it becomes dirty, wipe with a bonded textile, etc. Do not use solvent such as alcohol.

Disconnection of SSCNETIII cable

- For disconnection of SSCNETⅢ cable, pull out it while holding a tab of SSCNETⅢ cable connector or the connector.
- After disconnection of SSCNETⅢ cable, be sure to put a cap (attached to position board or servo amplifier) to the position board and servo amplifier.
- For SSCNETⅢ cable, attach the tube for protection optical cord's end face on the end of connector.

Precautions of SSCNETIII cable wiring

SSCNETⅢ cable is made from optical fiber. If optical fiber is added a power such as a major shock, lateral pressure, haul, sudden bending or twist, its inside distorts or breaks, and optical transmission is not available. Especially, as optical fiber for MR-J3BUS_M and MR-J3BUS_M-A is made of synthetic resin, it melts down if being left near the fire or high temperature. Therefore, do not make it touched the part, which becomes high temperature, such as radiator or regenerative option of servo amplifier, or servo motor.

Be sure to use optical fiber within the range of operating temperature described in this manual.

Read described item of this section carefully and handle it with caution.

■Minimum bend radius

Make sure to lay the cable with greater radius than the minimum bend radius. Do not press the cable to edges of equipment or others. For SSCNETⅢ cable, the appropriate length should be selected with due consideration for the dimensions and arrangement of position board and servo amplifier. When closing the door of control panel, pay careful attention for avoiding the case that SSCNETⅢ cable is hold down by the door and the cable bend becomes smaller than the minimum bend radius.

Model name of SSCNETIII cable	Minimum bend radius [mm (inch)]
MR-J3BUS_M	25 (0.98)
MR-J3BUS_M-A	Enforced covering cord: 50 (1.97), Cord: 25 (0.98)
MR-J3BUS_M-B	Enforced covering cord: 50 (1.97), Cord: 30 (1.18)

■Tension
If tension is added on the SSCNETⅢ cable, the increase of transmission loss occurs because of external force which concentrates on the fixing part of SSCNETⅢ cable or the connecting part of SSCNETⅢ connector. At worst, the breakage of SSCNETⅢ cable or damage of SSCNETⅢ connector may occur. For cable laying, handle without putting forced tension.

Model name of SSCNETIII cable		Tension strength [N]
MR-J3BUS_M	_ = 015	70
	_ = 03 to 3	140
MR-J3BUS_M-A		420 (Enforced covering cord)
MR-J3BUS_M-B		980 (Enforced covering cord)

■Lateral pressure
If lateral pressure is added on the SSCNETⅢ cable, the cable itself distorts, internal optical fiber gets stressed, and then transmission loss increases. At worst, the breakage of SSCNETⅢ cable may occur. As the same condition also occurs at cable laying, do not tighten up SSCNETⅢ cable with a thing such as nylon band (TY-RAP). Do not trample it down or tuck it down with the door of control panel or others.

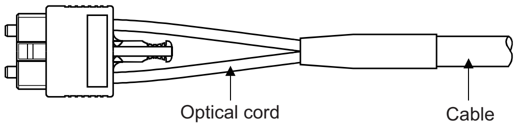
■Twisting
If SSCNETⅢ cable is twisted, it becomes the same stress added condition as when local lateral pressure or bend is added. Consequently, transmission loss increases, and the breakage of SSCNETⅢ cable may occur at worst.

■Disposal
When incinerating optical cable (cord) used for SSCNETⅢ cable, hydrogen fluoride gas or hydrogen chloride gas which is corrosive and harmful may be generated.
For disposal of SSCNETⅢ cable, request for specialized industrial waste disposal services who has incineration facility for disposing hydrogen fluoride gas or hydrogen chloride gas.

Point

- Be sure to connect SSCNETⅢ cable with the above connector. If the connection is mistaken, between the position board and servo amplifier cannot be communicated.
- Forced removal of the SSCNETⅢ cable from the position board damages the position board and SSCNETⅢ cables.
- After removal of the SSCNETⅢ cable, be sure to put a cap on the SSCNETⅢ connector. Otherwise, adhesion of dirt deteriorates in characteristic and it may cause malfunctions.
- Do not remove the SSCNETⅢ cable while turning on the power supply of position board and servo amplifier.
  Do not see directly the light generated from SSCNETⅢ connector of position board or servo amplifier and the end of SSCNETⅢ cable. When the light gets into eye, may feel something is wrong for eye. (The light source of SSCNETⅢ cable complies with class1 defined in JISC6802 or IEC60825-1.)
- If the SSCNETⅢ cable is added a power such as a major shock, lateral pressure, haul, sudden bending or twist, its inside distorts or brakes, and optical transmission is not available.
  Be sure to take care enough so that the short SSCNETⅢ cable is added a twist easily.
- Be sure to use the SSCNETⅢ cable within the range of operating temperature described in this manual. Especially, as optical fiber for MR-J3BUS_M and MR-J3BUS_M-A are made of synthetic resin, it melts down if being left near the fire or high temperature. Therefore, do not make it touched the part which becomes high temperature, such as radiator or regenerative option of servo amplifier, or servo motor.
- When laying the SSCNETⅢ cable, be sure to secure the minimum cable bend radius or more.
- Put the SSCNETⅢ cable in the duct or fix the cable at the closest part to the position board with bundle material in order to prevent SSCNETⅢ cable from putting its own weight on SSCNETⅢ connector.
  When laying cable, the optical cord should be given loose slack to avoid from becoming smaller than the minimum bend radius, and it should not be twisted.
  When bundling the cable, fix and hold it in position by using cushioning such as sponge or rubber which does not contain migratable plasticizing.
  If using adhesive tape for bundling the cable, fire resistant acetate cloth adhesive tape 570F (Teraoka Seisakusho Co., Ltd) is recommended.

• Migratable plasticizer is used for vinyl tape. Keep the MR-J3BUS_ M, and MR-J3BUS_M-A cables away from vinyl tape because the optical characteristic may be affected.
Generally, soft polyvinyl chloride (PVC), polyethylene resin (PE) and fluorine resin contain non-migratable plasticizer and they do not affect the optical characteristic of SSCNETⅢ cable. However, some wire sheaths and cable ties, which contain migratable plasticizer (phthalate ester), may affect MR-J3BUS_M and MR-J3BUS_M-A cables (made of plastic). In addition, MR-J3BUS_M-B cable (made of quartz glass) is not affected by plasticizer.



SSCNETⅢ/H cable	Cord	Cable
MR-J3BUS_M	△	
MR-J3BUS_M-A	△	△
MR-J3BUS_M-B	○	○

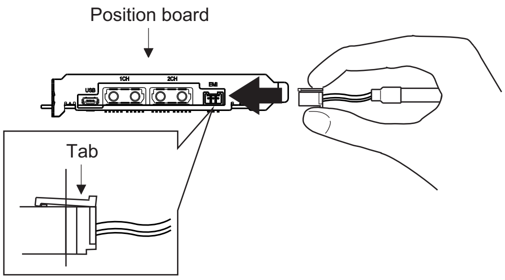
○: Normally, cable is not affected by plasticizer.
△: Phthalate ester plasticizer such as DBP and DOP may affect optical characteristic of cable.

• If the adhesion of solvent and oil to the cord part of SSCNETⅢ cable may lower the optical characteristic and machine characteristic. If it is used such an environment, be sure to do the protection measures to the cord part.
• When keeping the position board or servo amplifier, be sure to put on a cap to connector part so that a dirt should not adhere to the end of SSCNETⅢ connector.
• SSCNETⅢ connector to connect the SSCNETⅢ cable is put a cap to protect light device inside connector from dust. For this reason, do not remove a cap until just before connecting SSCNETⅢ cable. Then, when removing SSCNETⅢ cable, make sure to put a cap.
• Keep the cap and the tube for protecting light cord end of SSCNETⅢ cable in a plastic bag with a zipper of SSCNETⅢ cable to prevent them from becoming dirty.
• When exchanging the position board or servo amplifier, make sure to put a cap on SSCNETⅢ connector. When asking repair of position board or servo amplifier for some troubles, make also sure to put a cap on SSCNETⅢ connector. When the connector is not put a cap, the light device may be damaged at the transit. In this case, exchange and repair of light device is required.

Forced stop input cable

Precautions for handling the forced stop input cable

For connection or removal of the forced stop input cable, do it surely while holding a connector of forced stop input cable.



Connection of the forced stop input cable

For connection of a forced stop input cable to the position board, connect it surely to an EMI connector of position board while holding a connector. Be sure to insert it until it clicks.

Removal of the forced stop input cable

For removal of the forced stop input cable, push a tab and pull out the cable while holding a connector.

Point

The following handling damages the position board or forced stop input cable.

- Forced removal of the forced stop input cable from the position board.
- The forced stop input cable is twined other cables.
- Excessive power is applied at cable laying.

Wire the cable correctly.

3.3 Wiring

This section explains instructions for wiring.

For grounding method and measure against noise, refer to the following.

☞ Page 747 EMC AND LOW VOLTAGE DIRECTIVES

Instructions for wiring

⚠DANGER

- Completely turn off the power used in the system externally before board installation or placing wiring. Not doing so could result in electric shock or damage to the product.
- When turning on the power supply or operating after wiring, be sure that the cover of the equipment the board is connected to is correctly attached. Not attaching the cover could result in electric shock.

⚠CAUTION

- Be sure to ground the host personal computer. Not doing so could result in electric shock or operation failure. (Ground resistance: 100Ω or less)
- Be sure there are no foreign matters such as sawdust or wiring debris inside the host personal computer. Such debris could cause fire, damage, or operation failure.
- When removing the cable from the board, do not pull the cable. Hold the connector that is connected to the board. Pulling the cable that is still connected to the board may cause malfunction or damage to the board or cable.

Wiring of connector [MC300]

Specialized tools are not required for wiring the external forced stop cable connector because plugs with spring connection are used.

Applicable wire size and wire fabrication

■Applicable wire size

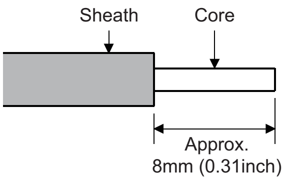
The applicable wire size for external forced stop cable connector is shown below.

Connector	Model	Applicable wire size
Forced stop input connector	FK-MC0, 5/3-ST-2, 5	0.08 to 0.52mm^2 (AWG28 to AWG20)

■Wire fabrication

Strip the wire according to stripped length indicated in the figure below.

Slide the sheath off the wire and gently twist and straighten the strands. When using the wire, be careful not to short with stray strands entering the neighboring poles. Do not use solder on the wire's core as this may lead to insufficient contact.



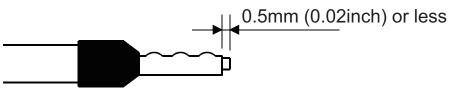
- Using a ferrule

A ferrule can also be used to connect with the connector.

Use the ferrules in the table below for the external forced stop cable connector.

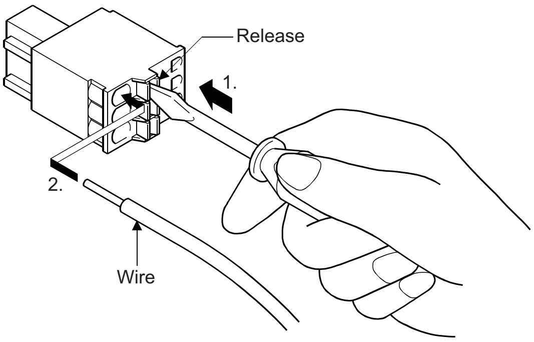
Connector	Wire size	Ferrule model		Crimping tool	Manufacturer
		For 1 wire	For 2 wires		
External forced stop cable connector	AWG21	AI0.5-8 OG	—	CRIMPFOX-ZA3	PHOENIX CONTACT GmbH & Co. KG

Cut the wire sticking out from the end of the ferrule to 0.5mm (0.02inch) or less.



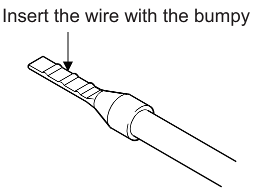
Inserting wire

1. Press the connector release with a tool such as a flathead screwdriver.
2. While holding the release down, insert the wire all the way in.



Point

When using a ferrule, make sure the bumpy side is facing towards the release.
When inserting 2 wires into one terminal, use a twin ferrule.



4 SYSTEM STARTUP

The following explains the preparations and settings for system startup.
When using a SSCNETⅢ/H head module, and a sensing module, refer to the following.

- SSCNETⅢ/H head module: ☞ Page 301 SSCNETIII/H Head Module Connection
- Sensing module (station mode): ☞ Page 315 Sensing Module (Station Mode) Connection
- Sending module (axis mode): ☞ Page 344 Sensing Module (Axis Mode) Connection

4.1 Startup Procedures

1. Confirmation of wiring and ambient environment

Visually confirm whether the position board and the servo amplifier are wired correctly. Also confirm the ambient environment.

☞ Page 66 Confirmation of Wiring and Ambient Environment

2. Position board setting

Set a board ID by the board ID selection (SW1) of the position board.

☞ Page 66 Position Board Setting

3. Servo amplifier setting

Set an axis No. on the axis selection rotary switch/rotary switch [MC300] of the servo amplifier.

☞ Page 67 Servo Amplifier Setting

4. Parameter setting

Set a parameter initialization (system command code: 0003h).

After the parameter initialization, set the parameters according to the system for control cycle, control option 1, sensor input option, vendor ID, and type code. For other parameters, set them according to needs.

☞ Page 71 Parameter Setting

5. System startup

After setting each parameter, start the system startup (system command code: 000Ah).

☞ Page 82 System Startup Processing

6. Perform operation

Then operate where necessary.

Point

When a test operation is necessary before creating a user program, the parameter settings, the system startup, the operation and such can be performed using the test tool attached to the utility software.

4.2 Confirmation of Wiring and Ambient Environment

Wiring

For wiring, refer to the following.

☞ Page 58 INSTALLATION AND WIRING

Cable treatment

Confirm that the wiring cables and the connector part should not be strained.

Environment

Confirm that signal cables and bus of the host personal computer are not shorted by wire offcuts and metallic dust.

4.3 Position Board Setting

The board ID is set by the board ID selection (SW1) switch of the position board.

Board ID

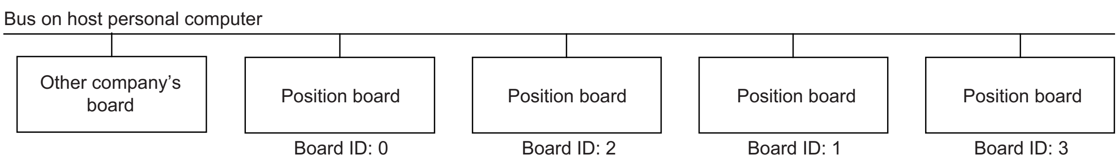
The board ID and the board ID selection switch No. are correlated as shown in the table below.

Set the board ID so that it does not duplicate. If it is duplicated, it may interfere with board identification on the host personal computer side.

Board ID	Switch 1	Switch 2
3	ON	ON
2	OFF	ON
1	ON	OFF
0	OFF	OFF

The following is a setting example for controlling four position boards.

Ex.



Board ID	Switch 1	Switch 2
0	OFF	OFF
2	OFF	ON
1	ON	OFF
3	ON	ON

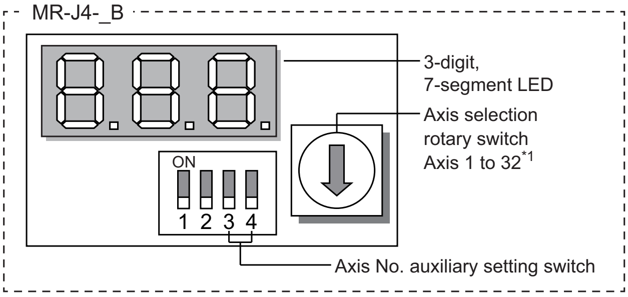
Point

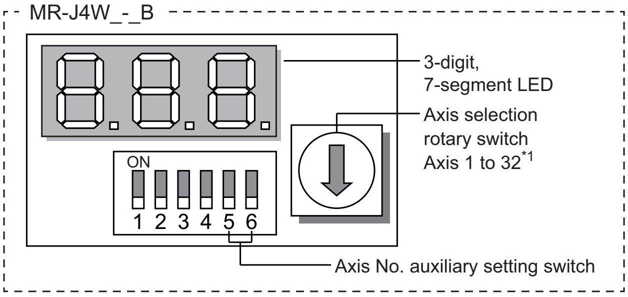
- The board ID may be in no particular order, and can be arbitrarily selected from 0 to 3.
- The number of connectable position boards varies by the bus specifications of the host personal computer.
- USB connections between one personal computer and multiple position boards set to an overlapping board ID may interfere with board identification on the personal computer-side. As such, do not perform multiple USB connections at the same time.

4.4 Servo Amplifier Setting

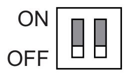
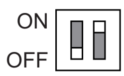
MR-J4(W_)-_B

The axis No. of MR-J4(W_)-_B is set by the axis selection rotary switch (SW1) and the axis No. auxiliary setting (SW2) of the servo amplifier.





*1 When set with the auxiliary setting

Servo amplifier axis No.	Axis selection rotary switch	Axis No. auxiliary setting switch	Servo amplifier display (3-digit, 7-segment LED)
d1	0		01
d2	1		02
d3	2		03
d4	3		04
d5	4		05
d6	5		06
d7	6		07
d8	7		08
d9	8		09
d10	9		10
d11	A		11
d12	B		12
d13	C		13
d14	D		14
d15	E		15
d16	F		16
d17	0		17
d18	1		18
d19	2		19
d20	3		20
d21	4		21 [MC300]
d22	5		22 [MC300]
d23	6		23 [MC300]
d24	7		24 [MC300]
d25	8		25 [MC300]
d26	9		26 [MC300]
d27	A		27 [MC300]
d28	B		28 [MC300]
d29	C		29 [MC300]
d30	D		30 [MC300]
d31	E		31 [MC300]
d32	F		32 [MC300]

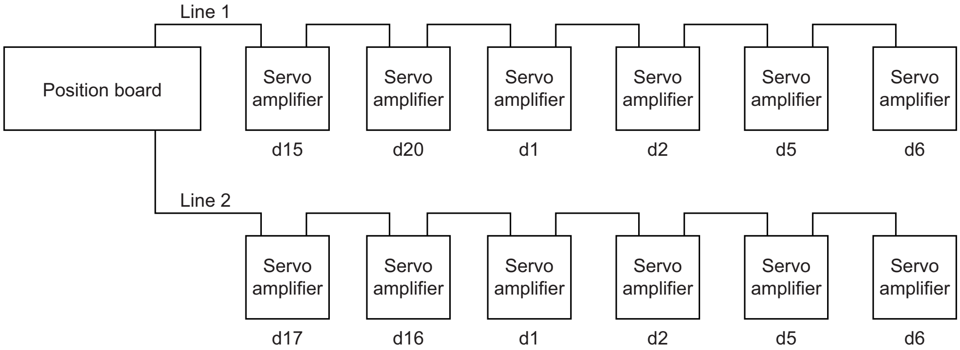
Point

- For each switch setting, refer to the servo amplifier instruction manual for your servo amplifier.
- If "An Axis That Has Not Been Mounted Exists (system error E400H)" occurred, the axis with wrong axis No. set can be confirmed with Information concerning axis that is not mounted (monitor No.0480H to 0482H) in the system information.
- The servo amplifier axis No. and the axis No. to be managed on the position board are different. For details, refer to the following

☞ Page 75 Axis No. assignment

Ex.

When using MR-MC211 to control six axes (MR-J4-_B) for each line by control cycle 0.88ms



Line 1				Line 2			
Servo amplifier axis No.	Axis selection rotary switch	Axis No. auxiliary setting switch		Servo amplifier axis No.	Axis selection rotary switch	Axis No. auxiliary setting switch	
		3	4			3	4
d15	E	OFF	OFF	d17	0	OFF	ON
d20	3	OFF	ON	d16	F	OFF	OFF
d1	0	OFF	OFF	d1	0	OFF	OFF
d2	1	OFF	OFF	d2	1	OFF	OFF
d5	4	OFF	OFF	d5	4	OFF	OFF
d6	5	OFF	OFF	d6	5	OFF	OFF

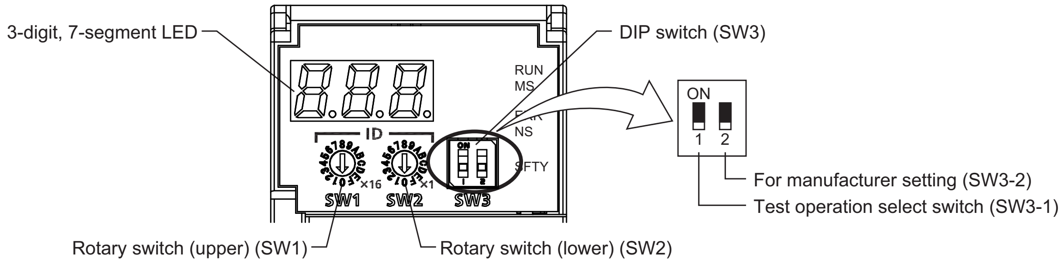
Point

- The servo amplifier axis No. may be in no particular order, and can be arbitrarily selected from axes d1 to d20 [MC200]/axes d1 to d32 [MC300].
- The number of connectable servo amplifiers varies by the control cycle.

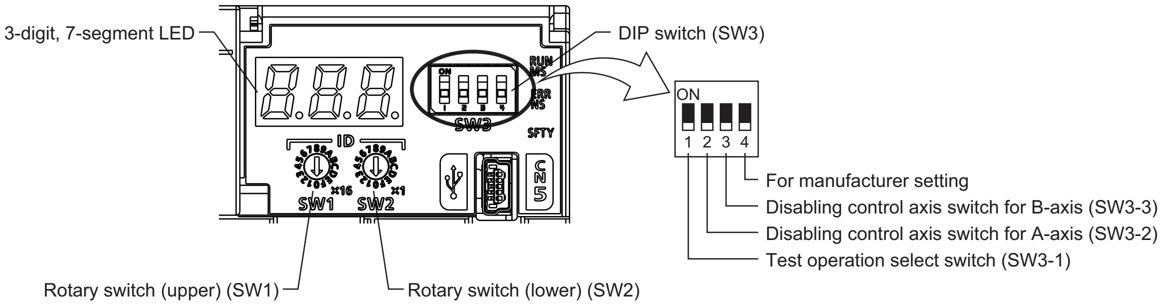
MR-J5(W_)-_B [MC300]

Axis No. of MR-J5(W_)-_B is set by the rotary switch (upper) (SW1) and rotary switch (lower) (SW2) on the servo amplifier.

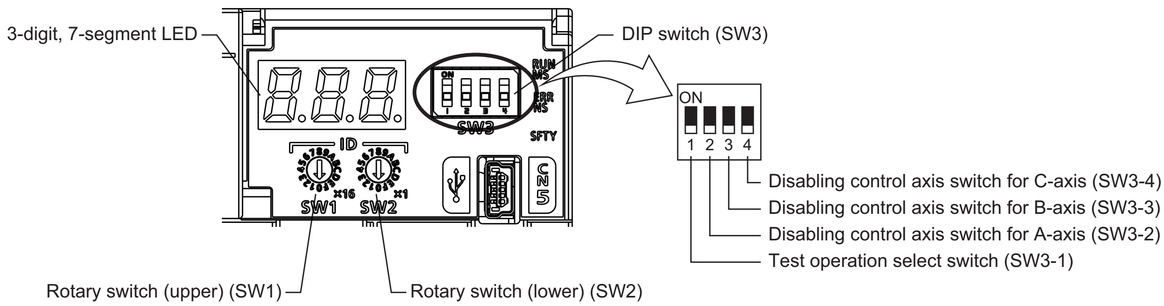
■For MR-J5-_B



■For MR-J5W2-_B



■For MR-J5W3-_B



Servo amplifier axis No.	Rotary switch (SW1)	Rotary switch (SW2)	Servo amplifier display (3-digit, 7-segment LED)
d1	0	0	001
d2	0	1	002
d3	0	2	003
d4	0	3	004
d5	0	4	005
d6	0	5	006
d7	0	6	007
d8	0	7	008
d9	0	8	009
d10	0	9	00A
d11	0	A	00B
d12	0	B	00C
d13	0	C	00D
d14	0	D	00E
d15	0	E	00F
d16	0	F	010
d17	1	0	011

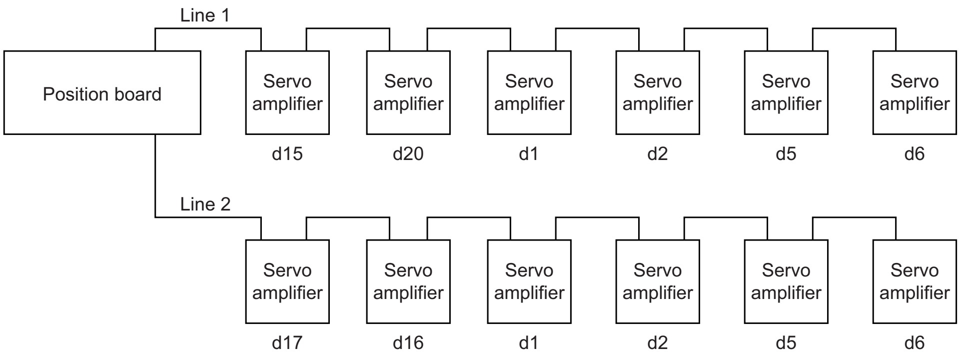
Servo amplifier axis No.	Rotary switch (SW1)	Rotary switch (SW2)	Servo amplifier display (3-digit, 7-segment LED)
d18	1	1	012
d19	1	2	013
d20	1	3	014
d21	1	4	015
d22	1	5	016
d23	1	6	017
d24	1	7	018
d25	1	8	019
d26	1	9	01A
d27	1	A	01B
d28	1	B	01C
d29	1	C	01D
d30	1	D	01E
d31	1	E	01F
d32	1	F	020

Point

For a multiple-axis servo amplifier (MR-J4W_-_B), the number of axis used can be changed using the control axis invalid switch (SW3). When disabling axes, disable the switches in order from the rear axis. When disabling the front axis only, the servo alarm [AL. 011.2_Disabling control axis setting error] occurs.

Ex.

When using MR-MC341 to control six axes (MR-J5-_B) for each line by control cycle 0.88ms



Line 1			Line 2		
Servo amplifier axis No.	Rotary switch (SW1)	Rotary switch (SW2)	Servo amplifier axis No.	Rotary switch (SW1)	Rotary switch (SW2)
d15	0	E	d17	1	0
d20	1	3	d16	0	F
d1	0	0	d1	0	0
d2	0	1	d2	0	1
d5	0	4	d5	0	4
d6	0	5	d6	0	5

Point

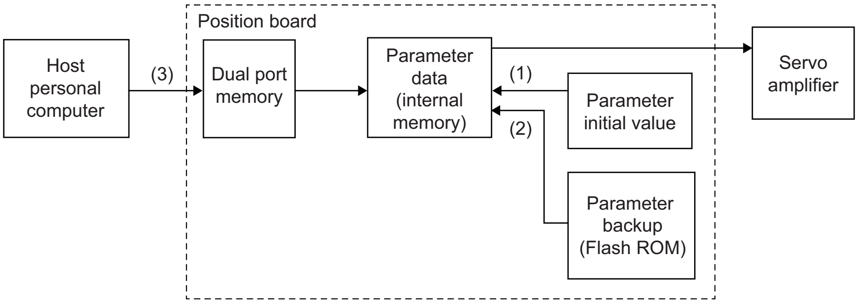
- The servo amplifier axis No. may be in no particular order, and can be arbitrarily selected from 32 axis.
- The number of connectable servo amplifiers varies by the SSCNET communication method and the control cycle.

4.5 Parameter Setting

After the parameter initialization, set the parameters according to the system such as for the control cycle and the input option of the external signal (sensor).

Parameter initialization

After turning on the position board power, initialize the parameter and set before the system startup starts.



1. Confirm the system preparation completion (system status code: 0001h).

2. To read parameter initial values, perform the parameter initialization (system command code: 0003h). (Above (1))
To read parameters from the flash ROM, perform the flash ROM parameter read (system command code: 0004h). (Above (2))
(Always initialize parameter or read parameter from the flash ROM.)

3. Confirm the parameter initialization completion (system status code: 0003h).
Confirm the flash ROM parameter read completion (system command code: 0004h).

4. Write the parameters from the user program if required. (Above (3))

Point

[API library]
- To perform the procedures 1., use the sscGetSystemStatusCode function.
- To perform the procedures 2. to 3., use the sscResetAllParameter function.

[MC200]
- To perform the procedures 4., use the sscChangeParameter function/sscChange2Parameter function.

[MC300]
- To perform the procedures 4., use the sscChangeParameter function/sscChange2Parameter function/sscChangeParameterEx function/sscChange2ParameterEx function.
To write the expanded parameter of MR-J5(W_)-_B, use the sscChangeParameterEx function/sscChange2ParameterEx function.

System option 1 setting

SSCNET communication method and control cycle are set by "System option 1 (parameter No.0001)".
SSCNET communication method is used for communication between a position board and connected units such as servo amplifiers and SSCNETⅢ/H method is available.
Control cycle is a cycle in which the position board controls the operation such as command import, position control, status output, and communication with servo amplifier and 0.88ms, 0.44ms and 0.22ms are available.
The number of controllable servo amplifier axes for each control cycle is shown below.

Position board	Control cycle	Maximum number of axes connected*1	Maximum number of axes connected for each line	Controllable axis No.
MR-MC210/MR-MC220U3/MR-MC220U6/MR-MC240	0.88ms	20 axes	20 axes	Axis 1 to 20
	0.44ms	16 axes	16 axes	Axis 1 to 16
	0.22ms*2	8 axes	8 axes	Axis 1 to 8
MR-MC211/MR-MC241	0.88ms	32 axes	20 axes	Axis 1 to 32
	0.44ms	16 axes	16 axes	Axis 1 to 16
	0.22ms*2	8 axes	8 axes	Axis 1 to 8
MR-MC341*3	0.88ms	64 axes	32 axes	Axis 1 to 64
	0.44ms	64 axes	32 axes	Axis 1 to 64
	0.22ms*2	32 axes	16 axes	Axis 1 to 32

*1 Do not connect more servo amplifiers than the maximum number of axes connected. When more servo amplifiers are connected than the maximum number of axes connected, "System Setting Error (operation alarm 38H, detail 01H)" occurs in the uncontrollable axes.
*2 When using the 3-axis servo amplifier MR-J4W3- B, use the servo amplifier software version A3 or later.
*3 The 2-axis servo amplifier MR-J4W2- B cannot allocate axes after 16. The 3-axis servo amplifier MR-J4W3- B cannot allocate axes after axis 15.

Control cycle settings are imported during system startup (system command code: 000Ah), and cannot be changed during system running (system status code: 000Ah).

System parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0001	*SYSOP1	System option 1	0000h	—	0000h to 0002h	■■■□ (Control cycle setting) Set the control cycle. • 0: 0.88ms • 1: 0.44ms • 2: 0.22ms ■□■■ (SSCNET communication method) Set the SSCNET communication method. SSCNET communication method is shared in lines 1 and 2. • 0: SSCNETⅢ/H

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

System information

Address (hexadecimal)		Name	Description
MR-MC2_ _	MR-MC3_ _		
0004	000004	Control cycle status	0001h: 0.88ms 0002h: 0.44ms 0003h: 0.22ms
0005	000005		
0006	000006	For manufacturer setting	
0007	000007		

Servo parameter setting

Set the servo parameter according to the type connected.
For details about the servo parameter, refer to the following.
☞ Page 660 Servo Parameters

System option 2 setting

Set control mode (standard mode or interface mode) by "Control mode selection" of "System option 2 (parameter No.0002)". When using interface mode, select "1: Interface mode".
When interface mode is assigned and system is startup, the in interface mode signal (IFMO) turns ON.
Control mode setting is imported during system startup (system command code: 000Ah), and cannot be changed during system running (system status code: 000Ah).

System parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0002	*SYSOP2	System option 2	0000h	—	0000h to 1101h	■■■□ (Axis/station No. assignment) Set "1: Valid" when validating axis/station No. assignment. When axis/station No. assignment is "0: invalid", axis/station No. is automatically assigned. • 0: Invalid • 1: Valid ■□■■ (Consistency check selection at system startup) Set whether to perform consistency check for controlled axes setting at system startup. • 0: Valid • 1: Invalid □■■■ (Control mode selection) Set the control mode. • 0: Standard mode • 1: Interface mode

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

I/O table setting

Set the I/O table to be used (digital I/O table or I/O device table) by "I/O table (parameter No.004A)".
I/O table setting is imported during system startup (system command code: 000Ah), and cannot be changed during system running (system status code: 000Ah).

System parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
004A	*IOTBL	I/O table	0000h	—	[MC200] 0000h to 0001h [MC300] 0000h to 0002h	■■■□ (I/O table selection) Set the I/O table to be used. • 0: Use digital I/O table • 1: Use I/O device table (MR-MC2_ _ method) • 2: Use I/O device table (expanded points method) [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

In relation to the digital I/O function, the following functions are expanded for the I/O device function. We recommend using the I/O device function.
- Expansion of I/O points used
- Supports control of I/O word devices

Control option 1 setting

When controlling servo amplifier, set "1: Control" for "Control axis" of "Control option 1 (parameter No.0200)". When the axis No. is set out of the controllable range, "System Setting Error (operation alarm 38H)" occurs at the corresponding axis, and the axis cannot be controlled. If the servo amplifier set is in a state where communication cannot be made, such as not connected or control circuit power is OFF, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs during system startup (system command code: 000Ah).

Point

If "An Axis That Has Not Been Mounted Exists (system error E400H)" occurred, the axis with wrong No. set can be confirmed with information concerning axis that is not mounted (monitor No.0480H, 0481H) in the system information.

Control axis settings are imported during system startup (system command code: 000Ah), and cannot be changed during system running (system status code: 000Ah).

Control parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 2111h	■■■□ (Control axis) Set "1: Controlled" when controlling the servo amplifier. • 0: Not controlled • 1: Controlled ■■□■ (Amplifier-less axis function) Set "1: Valid" when not communicating with the servo amplifier. When setting "1" with "Control axis", the operation without the servo amplifier (simulation) is available. • 0: Invalid • 1: Valid ■□■■ (No home position) Set "1: Valid" when setting the position at the time of power on as the home position. After returning to the home position, the home position becomes the position where the home position return is performed. • 0: Invalid • 1: Valid □■■■ (Speed unit) Set the speed command unit. • 0: Position command unit/min • 1: Position command unit/s • 2: r/min

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

When "Amplifier-less axis function" of "Control option 1 (parameter No.0200)" is "1: Valid", the position board simulates the operations of servo amplifier and operates as if it is connected. Operation can be confirmed without connecting the servo amplifier. When the setting is valid, the position board do not communicate with the servo amplifier.

Axis No. assignment

With Axis No. assignment, the axis No. (on the position board) can be assigned by the axis No. on the servo amplifier.

When Axis No. assignment is invalid

When Axis No. assignment is invalid, correspondence between the axis No. on a position board and the axis No. on a servo amplifier is shown in the following table.

■When SSCNET communication method is SSCNETⅢ/H

- Using MR-MC2_ _

Servo amplifier axis No.		Line 1																			
		d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	d15	d16	d17	d18	d19	d20
Axis No.	0.88ms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0.44ms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	—	—	—	—
	0.22ms	1	2	3	4	5	6	7	8	—	—	—	—	—	—	—	—	—	—	—	—

Servo amplifier axis No.		Line 2																			
		d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	d15	d16	d17	d18	d19	d20
Axis No.	0.88ms	21	22	23	24	25	26	27	28	29	30	31	32	—	—	—	—	—	—	—	—
	0.44ms	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0.22ms	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

- Using MR-MC3_ _

Servo amplifier axis No.		Line 1																			
		d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	d15	d16	…	d30	d31	d32
Axis No.	0.88ms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	…	30	31	32
	0.44ms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	…	30	31	32
	0.22ms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	—	—	—	—

Servo amplifier axis No.		Line 2																			
		d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	d15	d16	…	d30	d31	d32
Axis No.	0.88ms	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	…	62	63	64
	0.44ms	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	…	62	63	64
	0.22ms	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	—	—	—	—

When Axis No. assignment is valid

When Axis No. assignment is valid, the axis Nos. (1 to 32 [MC200]/1 to 64 [MC300]) (on the position board) can be assigned by the servo amplifier axis Nos. (d1 to d20 [MC200]/d1 to d64 [MC300]) arbitrarily.

To assign the axis Nos., set the following parameters.

Point

To set servo amplifier axis Nos., use "Axis No. assignment (parameter No.0203)".

Valid servo amplifier axis Nos. differ depending on the control cycle. Up to 20 axes [MC200]/32 axes [MC300] can be set.

- Control cycle 0.88ms: 1 to 20 [MC200]/1 to 32 [MC300]
- Control cycle 0.44ms: 1 to 16 [MC200]/1 to 32 [MC300]
- Control cycle 0.22ms: 1 to 8 [MC200]/1 to 16 [MC300]

■System parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0002	*SYSOP2	System option 2	0000h	—	0000h to 1101h	■■■□ (Axis/station No. assignment) Set "1: Valid" when validating axis/station No. assignment. When axis/station No. assignment is "0: Invalid", axis/station No. is automatically assigned. • 0: Invalid • 1: Valid

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

■Control parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0203	*AXALC	Axis No. assignment	0000h	—	[MC200] 0000h to 011Fh [MC300] 0000h to 012Fh	■■□□ (Servo amplifier axis No.) Set the servo amplifier axis No. to be assigned to the axis Nos. on the position board. • 00h: No axis No. assignment • 01h to 14h: Axis No. [MC200] • 01h to 20h: Axis No. [MC300] <Example> 0Ah Axis No.10 ■□■■ (Servo amplifier line No.) Set the servo amplifier line No. to be assigned to the axis Nos. on the position board. • 0 to 1: Line No.-1

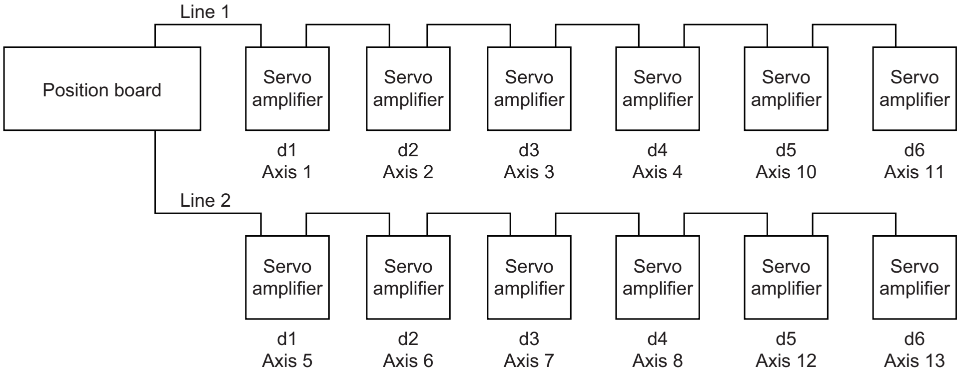
*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

- An axis No. out of the valid range causes "System Setting Error (operation alarm 38H, detail 03H)".
- Regardless of "Control axis setting" of "Control option 1 (parameter No.0200)", set the axis No. so that the axis No. assignment is not duplicated. (Except for 00: No axis No. assignment) Duplicated axis Nos. cause "System Setting Error (operation alarm 38H, detail 04H)".
- When "1: Controlled" is set in "Control axis setting" of "Control option 1 (parameter No.0200)", always set the axis Nos. When "0: Not controlled" is set, "System Setting Error (operation alarm 38H, detail 02H)" occurs.

Ex.

When connecting six axes for each line



Axis No.	1	2	3	4	5	6	7	8	10	11	12	13
"Axis No. assignment (parameter No.0203)" setting value	0001h	0002h	0003h	0004h	0101h	0102h	0103h	0104h	0005h	0006h	0105h	0106h
Servo amplifier axis No.	Line 1 d1	Line 1 d2	Line 1 d3	Line 1 d4	Line 2 d1	Line 2 d2	Line 2 d3	Line 2 d4	Line 1 d5	Line 1 d6	Line 2 d5	Line 2 d6

Sensor input option setting

External signal (sensor) is connected by setting "Sensor input options (parameter No.0219)".

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
0218	*SSIA	Sensor signal input assignment [MC300]	0000h	—	0000h to 0111h	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" is "2: Use I/O device table (expanded points method)". ■■■□ (Input device assignment (LSP)) Set the input device assignment connecting LSP to valid/invalid. • 0: Assignment not set • 1: Assignment valid ■■□■ (Input device assignment (LSN)) Set the input device assignment connecting LSN to valid/invalid. • 0: Assignment not set • 1: Assignment valid ■□■■ (Input device assignment (DOG)) Set the input device assignment connecting DOG to valid/invalid. • 0: Assignment not set • 1: Assignment valid
0219	*SOP	Sensor input options	0000h	—	0000h to 0304h	■■■□ (Sensor input system) Set the input system of the sensor (LSP, LSN, DOG). • 0: Not use • 1: Driver input • 2: Digital or input device input • 3: Not connected (It does not detect LSP, LSN, DOG.) • 4: Dual port memory input ■□■■ (Limit switch signal selection) Set valid/invalid of the limit switch. • 0: LSP/LSN are valid • 1: LSP is valid, LSN is invalid • 2: LSP is invalid, LSN is valid • 3: LSP/LSN are invalid
021A	*SLSP	Sensor signal (LSP) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)" setting. [When using "0: Use digital I/O table"] ■■■□ (Digital input assignment) Set valid/invalid for the digital input assignment where LSP is connected. • 0: Not assigned • 1: Assigned □□□■ (Digital input No. assignment) Set the digital input No. where the LSP is connected. • 000h to 3FFh: DI_000 to DI_3FF [When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■■□ (Input device assignment) Set valid/invalid for the input device assignment where LSP is connected. • 0: Not assigned • 1: Assigned □□□■ (Input device No. assignment) Set the input device No. where the LSP is connected. • 000h to FFFh: DVI_000 to DVI_3FF [When using "2: Use I/O device table (expanded points method)"] [MC300] Set the input device assignment connecting LSP to valid/invalid in "Sensor signal input assignment (parameter No.0218)". □□□□ (Input device No. assignment) Set the input device No. where the LSP is connected. • 0000h to 23FFh: DVI_0000 to DVI_23FF
021B	*SLSN	Sensor signal (LSN) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	Assign the input of the sensor signal (LSN). The settings are the same as "Sensor signal (LSP) connection specification (parameter No.021A)".
021C	*SDOG	Sensor signal (DOG) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	Assign the input of the sensor signal (DOG). The settings are the same as "Sensor signal (LSP) connection specification (parameter No.021A)".

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

When setting to "1: Driver input"

When setting "Sensor input system" of "Sensor input options (parameter No.0219)" to "1: Driver input" as the sensor destination, the sensor (LSP, LSN, DOG) status connected to the driver (such as a servo amplifier) is imported via SSCNET.

■MR-J4(W_)-_B/MR-J5(W_)-_B [MC300] is used as a servo amplifier

• MR-J4-_B/MR-J5-_B

Signal name	Destination connector pin No.	Symbol
LSP	CN3-2	DI1
LSN	CN3-12	DI2
DOG	CN3-19	DI3

• MR-J4W2-_B/MR-J5W2-_B

Signal name	Destination connector pin No.		Symbol*1
	A-axis	B-axis	
LSP	CN3-7	CN3-20	DI1□
LSN	CN3-8	CN3-21	DI2□
DOG	CN3-9	CN3-22	DI3□

*1 □: A, B

• MR-J4W3-_B/MR-J5W3-_B

Signal name	Destination connector pin No.			Symbol*1
	A-axis	B-axis	C-axis	
LSP	CN3-7	CN3-20	CN3-1	DI1□
LSN	CN3-8	CN3-21	CN3-2	DI2□
DOG	CN3-9	CN3-22	CN3-15	DI3□

*1 □: A, B, C

Point

- For the sensor connection to the driver, refer to the instruction manual of the driver.
- If the communication error (system error E401H to E407H) occurs, the sensor (LSP, LSN, DOG) input status turns OFF.
- If the communication error (system error E400H) occurs, the input status of the corresponding axis turns OFF.

When setting to "2: Digital or input device input"

When setting "Sensor input system" of "Sensor input options (parameter No.0219)" to "2: Digital or input device input" as the sensor destination, the setting target differs depending on "I/O table (parameter No.004A)" setting.
Refer to the following as well.

☞ Page 236 Digital I/O to Page 243 Servo Amplifier General I/O
☞ Page 301 SSCNETIII/H Head Module Connection to Page 344 Sensing Module (Axis Mode) Connection

"I/O table (parameter No.004A)" setting	Used input signal	Parameter specifying the input signal connection
0: Use digital I/O table	Digital input signal (DI_□□□)	Sensor signal (LSP) connection specification (parameter No.021A) Sensor signal (LSN) connection specification (parameter No.021B) Sensor signal (DOG) connection specification (parameter No.021C)
1: Use I/O device table (MR-MC2 method)	Input device signal (DVI_□□□)	
2: Use I/O device table (expanded points method) [MC300]	Input device signal (DVI_□□□)	Sensor signal input assignment (parameter No.0218) Sensor signal (LSP) connection specification (parameter No.021A) Sensor signal (LSN) connection specification (parameter No.021B) Sensor signal (DOG) connection specification (parameter No.021C)

4

When setting to "3: Not connected"

When setting "Sensor input system" of "Sensor input options (parameter No.0219)" to "3: Not connected" as the sensor destination, the sensor (LSP/LSN/DOG) is not detected. Limit switch functions are always invalid. In the home position return using the proximity dog, the position board operates without the detected proximity dog.

When setting to "4: Dual port memory input"

When setting "Sensor input system" of "Sensor input options (parameter No.0219)" to "4: Dual port memory input" as the sensor destination, the + side limit switch input signal (LSPC), the - side limit switch input signal (LSNC) and the proximity dog input signal (DOGC) are imported as substitutes for sensors.

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1004	005004	0	ITL	Interlock	Master
		1	RMONR	High speed monitor latch command	Each axis
		2	—	For manufacturer setting	—
		3			
		4	LSPC	+ side limit switch input	Each axis
		5	LSNC	- side limit switch input	Each axis
		6	DOGC	Proximity dog input	Each axis
		7	—	For manufacturer setting	—

Point

When the sensor input command (LSPC, LSNC, DOGC) is turned ON, a normally-open contact turns ON (a normally-closed contact turns OFF). The polarity of the limit switch input command is the normally-closed contact. The polarity of the proximity dog input command can be changed by "Proximity dog input polarity" of "Home position return option 1 (parameter No.0240)".

⚠ CAUTION

When setting "Sensor input system" of "Sensor input options (parameter No.0219)" to "1: Driver input", a delay occurs due to the communication to detect the signal status. In addition to the time until the device to be used detects the input signal, take the delay time due to the communication into consideration when installing each sensor. The delay time of MR-J4(W_)-_B/MR-J5(W_)-_B [MC300] is as follows.

- Communication delay time when the control cycle is 0.88ms: approx. 2ms
- Communication delay time when the control cycle is 0.44ms: approx. 1.5ms
- Communication delay time when the control cycle is 0.22ms: approx. 1.3ms

Vendor ID and type code setting

Available functions, parameter settings and ranges vary by servo amplifier type. At the time the communication with the servo amplifier has started, the position board performs consistency check between vendor ID and type code of the servo amplifier connected and the parameter set. If a consistency check error occurs, "Driver Type Code Error (system error E405H)" is output, therefore set correct vendor ID and type code.

Point

If "Driver Type Code Error (system error E405H)" occurred, the axis that has set an incorrect type code can be confirmed with "Type code erroneous axis information (monitor No.0484H to 0485H)".

Control parameters

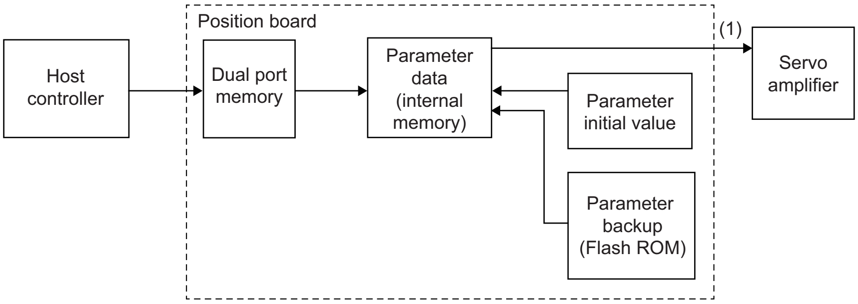
Parameter No.	Symbol[*1]	Name	Description
021D	*VEND	Vendor ID	Set the vendor ID (SSCNETⅢ/H communication) • 0000h: Mitsubishi Electric
021E	*CODE	Type code	Set the type code. • 1000h: MR-J4(W_)-_B • 1400h: MR-J5(W_)-_B [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

4.6 System Startup Processing

System startup procedure

After the parameter initialization, start the system startup before performing operations.



1. The number of seconds passed since 0000hrs, January 1, 1970 is stored in the system startup time.*1
   The time is used to create data for alarm history function.
2. Set the time synchronization information.*1
3. Perform the start system startup command (system command code 000Ah). (Above (1))
   The position board starts communicating with the servo amplifier and write the servo parameters according to the parameters set (☞ Page 71 Parameter initialization), and system running is in process (system status code: 000Ah).
4. Confirm the during system running (system status code 000Ah).

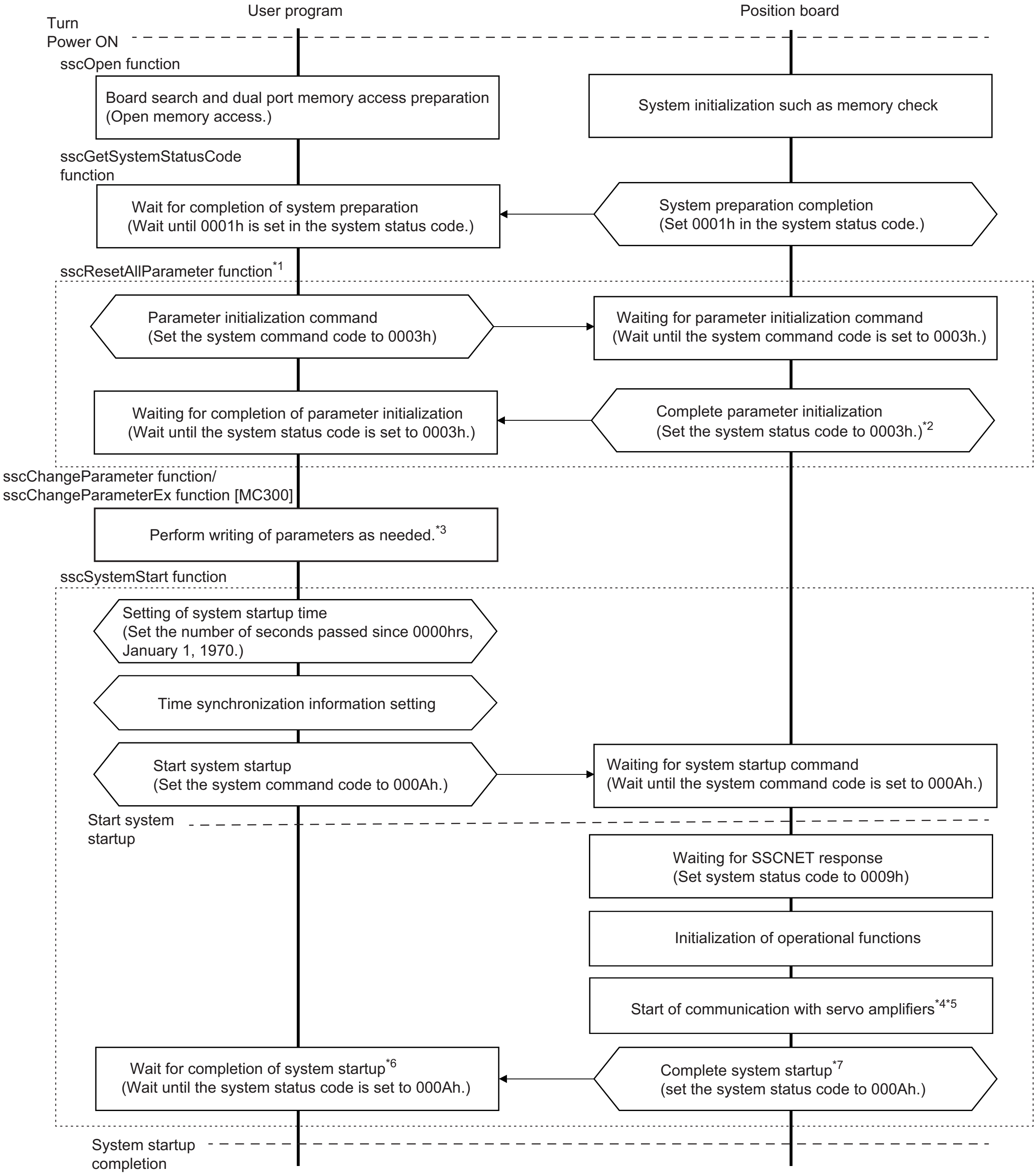
*1 When using the API library, the time is automatically set in the sscSystemStart API function.

Point

[API library]

- To start the system startup, use the sscSystemStart function.
- For a detailed procedure for the system startup, refer to the sample programs (InterruptDrive/AllParamWrite) contained on the utility software.

Sequence example



*1 The parameter initialization process (sscResetAllParameter function) is listed for compatibility with older models. It can be omitted for MR-MC2_ _/MR-MC3_ _.

*2 (1) in the diagram of parameter initialization (☞ Page 71 Parameter initialization)

*3 (3) in the diagram of parameter initialization (☞ Page 71 Parameter initialization)

*4 (1) in the diagram of system startup processing (☞ Page 82 System Startup Processing)

*5 Communication with the axes for which "Control axis" of "Control option1 (parameter No.0200)" is set to "1: Control performed" is implemented, therefore be sure to set the control axis parameters.

*6 When the system status code does not become 000Ah (an error code is not stored either.), the following is possible: the SSCNET communication cable is disconnected, the connected equipment is turned OFF, or "SSCNET communication method" of "System option 1 (parameter No.0001)" is incorrect. The set communication method can be confirmed in "SSCNET communication method".

*7 If an error occurs during the system startup, an error code is set in the system status code. For the error codes, refer to the following. ☞ Page 745 System Error

5 OPERATIONAL FUNCTIONS

5.1 Summary

There are six modes in operational functions.

Operation mode	Description
JOG operation	Operate while the start operation signal (ST) is ON.
Incremental feed	Feed constant
Automatic operation	Position according to the point table.
Linear interpolation [MC200]	Perform the linear interpolation control for up to 4 axes, according to the point table.
Interpolation operation [MC300]	Perform the linear interpolation control for up to 4 axes and the circular interpolation control for 2 axes according to the point table.
Home position return	Move to the home position, and establish the home position.
Home position reset	Set the current command position as the home position.

After selecting the operation mode, the operation is started by turning ON the start operation signal (ST)/fast start operation signal (FST). The operation processing signal (OP) turns ON during the operation, and when the operation is completed, the operation completed signal (OPF) turns ON.

Interface

Axis command/status bit

The common axis command/status bits for operational functions are as follows.

■Axis command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1001	005001	0	ST	Start operation
		1	DIR	Movement direction
		2	STP	Stop operation
		3	RSTP	Rapid stop
		4	—	For manufacturer setting
		5	ORST	Operation alarm reset
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1002	005002	0	AUT	Automatic operation mode
		1	ZRN	Home position return mode
		2	JOG	JOG operation mode
		3	S	Incremental feed mode
		4	—	For manufacturer setting
		5	LIP	Linear interpolation mode [MC200]/interpolation operation mode [MC300]
		6	DST	Home position reset mode
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1006	005006	0	FST	Fast start operation
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

- Details concerning axis command bit

Symbol	Signal name	Function details	
		Function	Operation
ST	Start operation	Start the operation.	When the start operation signal (ST) turns ON while the operation is stopped, the selected operation mode starts. For the JOG operation, the deceleration starts when the start operation signal (ST) turns OFF. For the other operation modes, the operation does not stop even when the start operation signal (ST) turns OFF. When the start operation signal (ST) turns ON during the operation, it is invalid.
DIR	Movement direction	Specify the movement direction. Use in the JOG operation mode/ incremental feed mode.	When the movement direction signal (DIR) turns ON, and the start operation signal (ST) turns ON, the operation starts in the reverse direction. When the movement direction signal (DIR) turns OFF, and the start operation signal (ST) turns ON, the operation starts in the forward direction.
AUT	Automatic operation mode	Specify the automatic operation mode.	When the automatic operation mode signal (AUT) turns ON, the automatic operation mode is specified. When the automatic operation mode signal (AUT) turns OFF, the automatic operation mode is canceled.
ZRN	Home position return mode	Specify the home position return mode.	When the home position return mode signal (ZRN) turns ON, the home position return mode is specified. When the home position return mode signal (ZRN) turns OFF, the home position return mode is canceled.
JOG	JOG operation mode	Specify the JOG operation mode.	When the JOG operation mode signal (JOG) turns ON, the JOG operation mode is specified. When the JOG operation mode signal (JOG) turns OFF, the JOG operation mode is canceled.
S	Incremental feed mode	Specify the incremental feed mode.	When the incremental feed mode signal (S) turns ON, the incremental feed mode is specified. When the incremental feed mode signal (S) turns OFF, the incremental feed mode is canceled.
LIP	Linear interpolation mode [MC200]	Specify the linear interpolation mode.	When the linear interpolation mode signal (LIP) turns ON, the linear interpolation mode is specified. When the linear interpolation mode signal (LIP) turns OFF, the linear interpolation mode is canceled.
	Interpolation operation mode [MC300]	Specify the interpolation operation mode.	When the interpolation operation mode signal (LIP) turns ON, the interpolation operation mode is specified. When the interpolation operation mode signal (LIP) turns OFF, the interpolation operation mode is canceled.
DST	Home position reset mode	Specify the home position reset mode.	When the home position reset mode signal (DST) turns ON, the home position reset mode is specified. When the home position reset mode signal (DST) turns OFF, the home position reset mode is canceled.
FST	Fast start operation	Start the operation. Instead of using the start operation signal (ST), by using the fast start operation signal (FST), the time taken to start the operation from the second time and after can be reduced. This is not supported in the JOG operation.	When the fast start operation signal (FST) turns ON while the operation is stopped, the selected operation mode starts. When the start operation is accepted, the fast start operation signal (FST) is tuned OFF. When the fast start operation signal (FST) turns ON during the operation, it is invalid.

Point

[API library]
The fast start operation signal (FST) is used in the internal processing of all start operational functions (sscAutoStart function etc.), except for the JOG operation.

■Axis status bits

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1061	0050A1	0	OP	Operation processing
		1	CPO	Rough match
		2	PF	Positioning completed
		3	ZP	Home position return completed
		4	SMZ	Smoothing stop
		5	OALM	Operation alarm
		6	OPF	Operation completed
		7	PSW	Position switch

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1062	0050A2	0	AUTO	In automatic operation mode
		1	ZRNO	In home position return mode
		2	JO	In JOG operation mode
		3	SO	In incremental feed mode
		4	—	For manufacturer setting
		5	LIPO	In linear interpolation mode [MC200]/In interpolation operation mode [MC300]
		6	DSTO	In home position reset mode
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1064	0050A4	0	ISTP	Interlock stop
		1	RMRCH	High speed monitor being latched
		2	POV	Exceeded stop position
		3	STO	Start up acceptance completed
		4	—	For manufacturer setting
		5		
		6	ZREQ	Home position return request
		7	—	For manufacturer setting

• Details concerning axis status bits

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
OP	Operation processing	Notify that the axis is in the operation.	The start operation signal (ST)/fast start operation signal (FST) turned ON, and the operation started.	The operation is completed.
PF	Positioning completed	Notify that the positioning of the end point in the operation that uses the point table is completed normally. Unlike the operation completed signal (OPF), it does not turn ON due to the alarm and the stop operation signal (STP) etc.	The positioning of the end point is completed normally.	The start operation signal (ST)/fast start operation signal (FST) turned ON, and the next operation started. The operation mode was changed.
ZP	Home position return completed	Notify that the home position return is completed normally.	The home position return is completed normally.	The start operation signal (ST)/fast start operation signal (FST) turned ON, and the next operation started. The operation mode was changed.
SMZ	Smoothing stop	Notify the servo amplifier that the output of command pulse is stopped. For the linear interpolation mode [MC200]/interpolation operation mode [MC300], notify the servo amplifier that the output of command pulses for all axes which are set to the same group is stopped.	All of the conditions below have been established, and the output of command pulses has stopped. (1) The operation of command pulses (before the filter) has completed, or is temporarily stopped. (during pauses such as positioning complete and interlocks) (2) The command pulse to the servo amplifier is "0". (3) When using the smoothing filter, or the vibration suppression command filter [MC300], the droop of the internal operation of the filter (for command pulses that have not been output) is "0". (4) During the linear interpolation [MC200]/interpolation operation [MC300], the conditions (1) to (3) above have been established in each axis in the group.	When one of the conditions for turning ON has not been established, and the output of command pulses has started.
OPF	Operation completed	Notify that the axis has completed the operation.	The operation has completed.	The start operation signal (ST)/fast start operation signal (FST) turned ON, and the next operation started.
AUTO	In automatic operation mode	Notify that the axis is in the automatic operation mode.	The automatic operation mode signal (AUT) turns ON.	The automatic operation mode signal (AUT) turns OFF. Multiple operation modes are selected. An unsupported operation mode is selected.
ZRNO	In home position return mode	Notify that the axis is in the home position return mode.	The home position return mode signal (ZRN) turned ON.	The home position return mode signal (ZRN) turns OFF. Multiple operation modes are selected. An unsupported operation mode is selected.
JO	In JOG operation mode	Notify that the axis is in the JOG operation mode.	The JOG operation mode signal (JOG) turned ON.	The JOG operation mode signal (JOG) turns OFF. Multiple operation modes are selected. An unsupported operation mode is selected.
SO	In incremental feed mode	Notify that the axis is in incremental feed mode.	The incremental feed mode signal (S) turned ON.	The incremental feed mode signal (S) turns OFF. Multiple operation modes are selected. An unsupported operation mode is selected.

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
LIPO	In linear interpolation mode [MC200]	Notify that the axis is in the linear interpolation mode.	The linear interpolation mode signal (LIP) turned ON.	The linear interpolation mode signal (LIP) turns OFF. Multiple operation modes are selected. An unsupported operation mode is selected.
	In interpolation operation mode [MC300]	Notify that the axis is in the interpolation operation mode.	The interpolation operation mode signal (LIP) turned ON.	The interpolation operation mode signal (LIP) turns OFF. Multiple operation modes are selected. An unsupported operation mode is selected.
DSTO	In home position reset mode	Notify that the axis is in home position reset mode.	The home position reset mode signal (DST) turns ON.	The home position reset mode signal (DST) turns OFF. Multiple operation modes are selected. An unsupported operation mode is selected.
POV	Exceeded stop position	Notify that the stop position was exceeded by continuous operation, or position change.	The stop position is exceeded.	The start operation signal (ST) turned ON, and the next operation started. The operation mode was changed.
STO	Start up acceptance completed	Notify that the start operation signal (ST) has been accepted.	The start operation signal (ST) turns ON.	The start operation signal (ST) turns OFF.

Precautions

The precautions common to each operation mode are described below.

- When the operation is started before selecting the operation mode, "Operation Mode Error (operation alarm 20H, detail 02H)" occurs, and the operation is not performed. Be sure to select the operation mode before starting the operation.
- When multiple operation modes are selected and the operation is started, "Operation Mode Error (operation alarm 20H, detail 01H)" occurs, and the operation is not performed. Be sure to select one operation mode and start the operation.
- When the operation mode is changed during the operation, "Mode Change During Operation (operation alarm 23H, detail 01H)" occurs, and the operation is stopped. Do not change the operation mode during the operation.
- When starting the operation, be sure to confirm that the start up acceptance completed signal (STO) (or the fast start operation signal (FST)) is turned OFF before turning ON the start operation signal (ST) (or the fast start operation signal (FST)). The signals are read every control cycle, therefore the leading edge of the start operation signal (ST) (or the fast start operation signal (FST)) may not be able to be confirmed.···(1)

Point

[API library]
With regard to (1) of Precautions, confirming that the start up acceptance completed signal (STO) (or the fast start operation signal (FST)) are OFF is performed in the internal processing of all start operation functions (sscAutoStart function etc.), therefore this process is not required in the user program.

Point

For the table bit for each signal, refer to the following.
☞ Page 554 TABLE MAP

Maximum number of simultaneous start axes

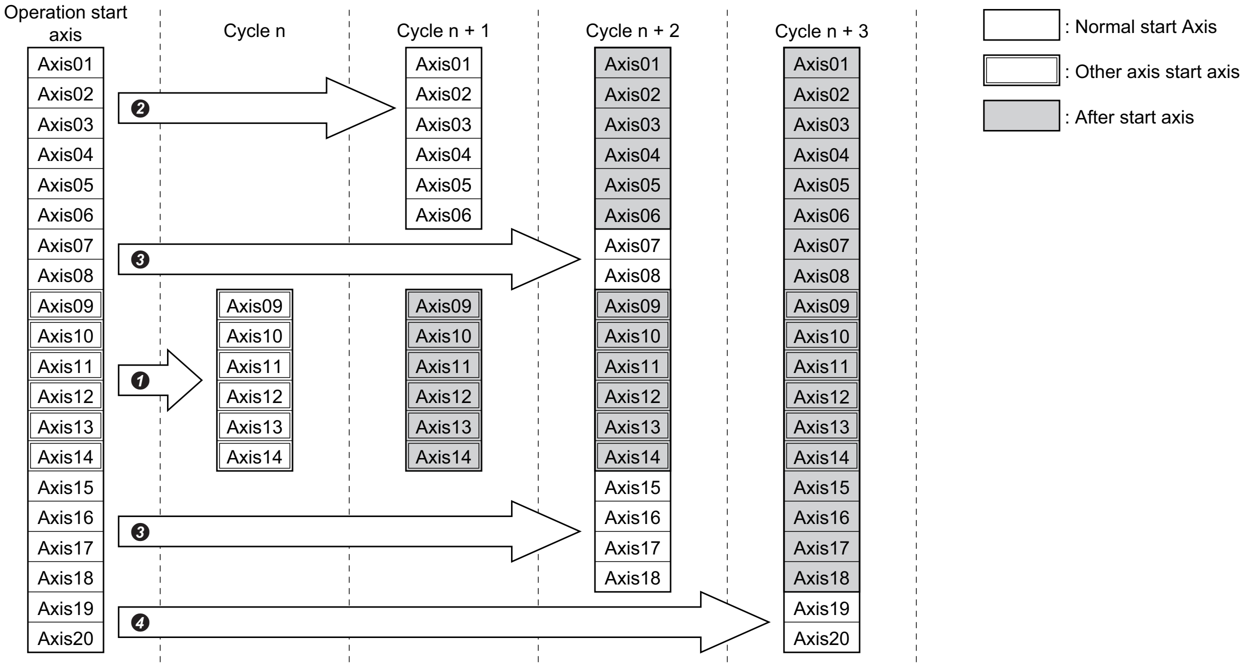
There are restrictions for the number of axes which can start simultaneously in each operational function and in start operation using other axes start. When the number of started axes exceeds the maximum number of simultaneous start axes, the start operation is performed for the rest of axes in the next control cycle or later.

Control cycle	Maximum number of simultaneous start axes	
	MR-MC2_ _	MR-MC3_ _
0.88ms	16	32
0.44ms	6	12
0.22ms	2	4

Point

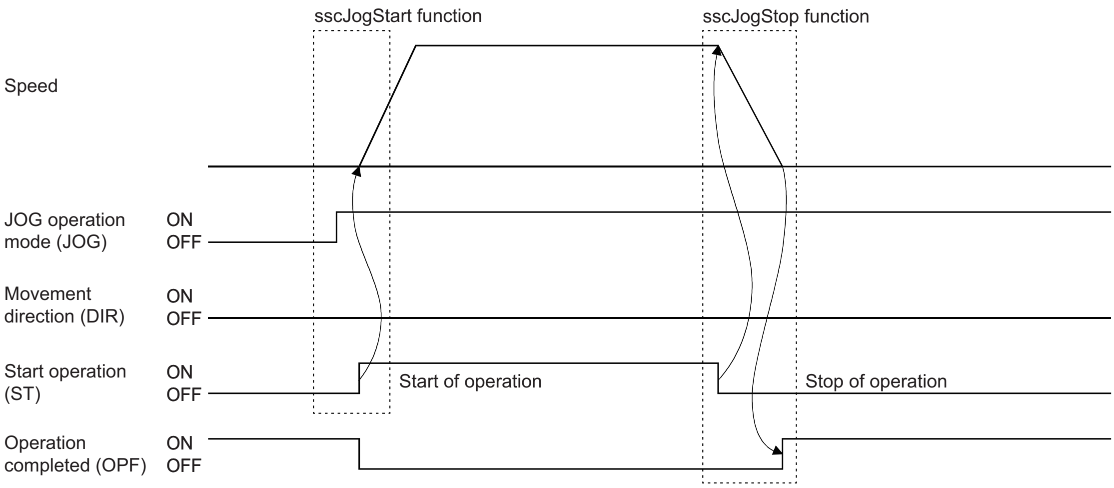
- For the start operation of the linear interpolation [MC200]/interpolation operation [MC300], one group is regarded to consist of four axes, irrespective of the number of axes in the group.
- For the start operation of the tandem drive, one group is regarded to consist of one axis.
- The start operation by other axes start takes priority, the other axes start in order.
- When the number of axes which is set in the start axis designation of the other axes start table exceeds the maximum number of simultaneous start axes, other axes start error occurs when the other axes start conditions are fulfilled.

The following shows the operation when axes 9 to 14 are started by other axes start by control cycle of 0.44ms with maximum No. of simultaneous start axes of 6, and the other 14 axes are started in normal start operation.



5.2 JOG Operation

When the movement direction is specified and the start operation signal (ST) is input, it starts in the designated direction and movement continues until the start operation signal (ST) turns OFF. When the start operation signal (ST) turns OFF, it slows and comes to a stop.
The JOG operation can be used without completing the home position return (the home position return request signal (ZREQ) is ON).



Start operation method

The start operation is performed according to the following procedure.

Operating procedure

1. Turn ON the JOG operation mode signal (JOG).
2. Set the manual feed speed, the manual feed acceleration time constant, and the manual feed deceleration time constant.
3. Use the movement direction signal (DIR) to set the movement direction of the axis. When the movement direction signal (DIR) is OFF, the axis moves in the + direction. And when it is ON, the axis moves in the - direction.
4. Turn ON the start operation signal (ST).

Point

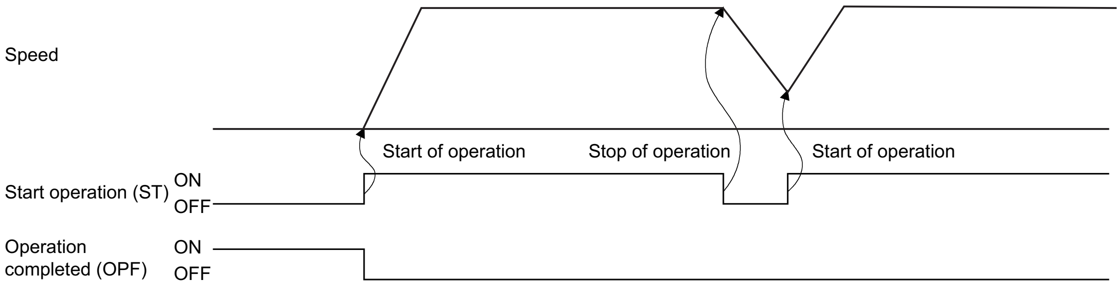
The manual feed speed, the manual feed acceleration time constant, the manual feed deceleration time constant, and the movement direction signal (DIR) are read at the startup of the start operation signal (ST). Therefore, even if there are changes to the data or signal after the start operation, they are ignored.

Point

[API library]
- To perform the procedures 1. to 4., use the sscJogStart function.
- To perform the stop operation, use the sscJogStop function/sscJogStopNoWait function.

Resuming operation

When the start operation signal (ST) turns OFF, the deceleration is started; however, if the start operation signal (ST) turns back ON while decelerating, it does not completely stop but reaccelerates.

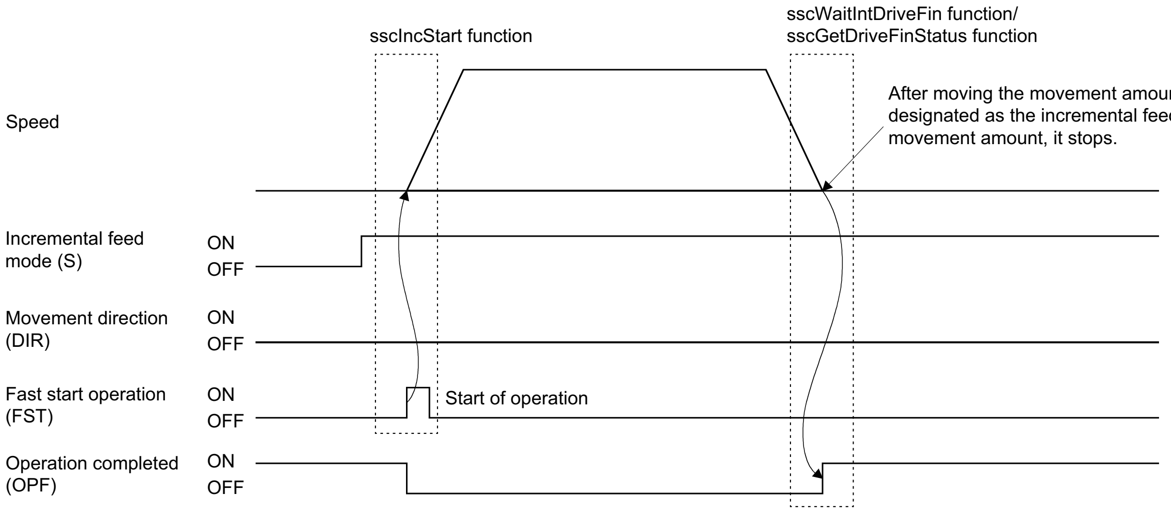


5

5.3 Incremental Feed

The constant feed is implemented for each fast start operation signal (FST). The feed amount is specified using the incremental feed movement amount.

The incremental feed also can be used in the state without completing the home position return (the home position return request signal (ZREQ) is ON).



Start operation method

The start operation is performed according to the following procedure.

Operating procedure

1. Turn ON the incremental feed mode signal (S).
2. Set the manual feed speed, the manual feed acceleration time constant, and the manual feed deceleration time constant.
3. Set the incremental feed movement amount.
4. Use the movement direction signal (DIR) to set the movement direction of the axis. When the movement direction signal (DIR) is OFF, the axis moves in the + direction and when it is ON, the axis moves in the - direction.
5. Turn ON the fast start operation signal (FST).

Point

- The manual feed speed, the manual feed acceleration time constant, the manual feed deceleration time constant, the movement direction signal (DIR), and the incremental feed movement amount are read at the leading edge of the fast start operation signal (FST). It follows that after the start operation, even if there are changes to the data or the signal, they are ignored.
- Only positive numbers are valid for the incremental feed movement amount. The movement direction is designated by the movement direction signal (DIR).

Point

[API library]

- To perform the procedures 1. to 5., use the sscIncStart function.
- To confirm the completion of the operation, use the sscGetDriveFinStatus function/sscWaitIntDriveFin function.
- To perform the stop operation, use the sscDriveStop function/sscDriveStopNoWait function.

5.4 Automatic Operation

The automatic operation (positioning) uses the point table method for the operation. The position data and the feed speed designation are set in the point table. When turning ON the fast start operation signal (FST), the instructions are executed in order from the instruction set at the start point No. to the end point No. If the automatic operation is started prior to the completion of home position return (the home position return request signal (ZREQ) is ON), "Home Position Return Not Complete (operation alarm 90H, detail 01H)" occurs upon starting the operation, and the operation is stopped.

Point

- The start point No. for each of the axis point tables is "0000h".
- The start point for each of the axis point tables can be designated using the point No. offset. For the point No. offset, refer to the following.

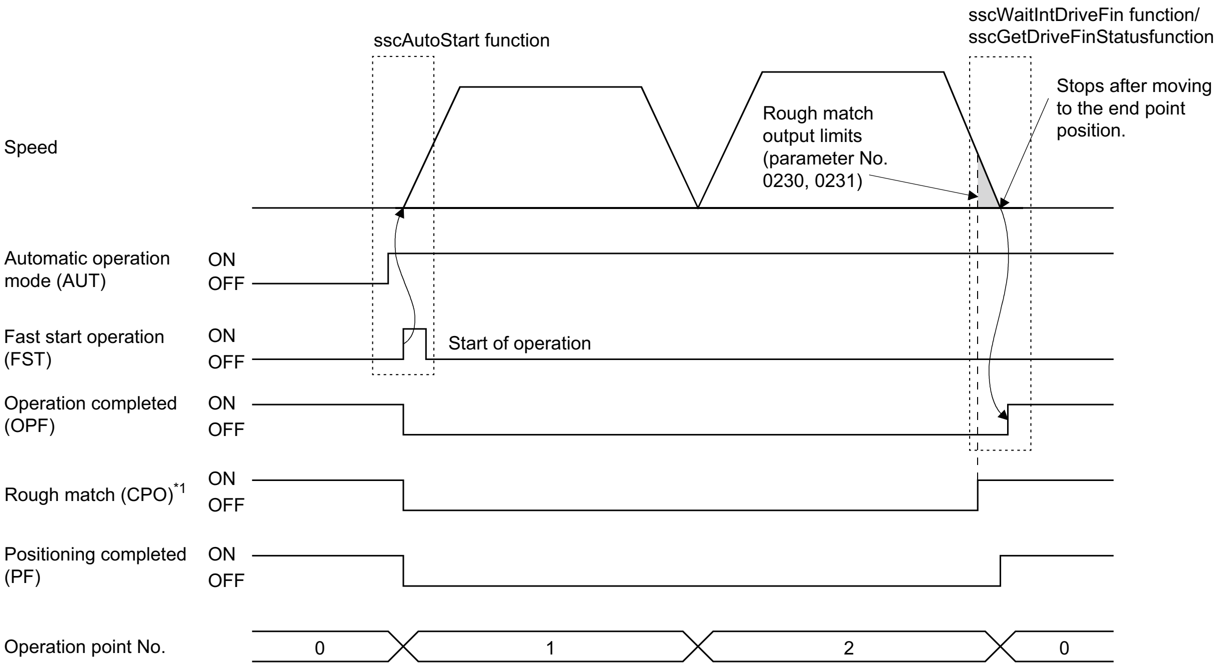
☞ Page 641 Point No. Offset

Point table

Point	Position data [command unit]	Feed speed [speed unit]	Acceleration time constant [ms]*1	Deceleration time constant [ms]*1	Dwell/ predwell [ms]*1	Auxiliary command	Other axes start specification	S-curve ratio [%]	For manufacturer setting
	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	4bytes	1byte	3bytes
0000	2000	2000	20	30	0	0000h	00000000h	0	0
0001	5000	2000	30	50	0	0000h	00000000h	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

...	Interpolation axis No. *2	Arc coordinate *2*3 [MC300]	Acceleration/ deceleration data 1 [MC300]	Acceleration/ deceleration data 2 [MC300]	Acceleration/ deceleration data 3 [MC300]	Acceleration/ deceleration data 4 [MC300]	Auxiliary command 2 [MC300]	Smoothing time constant [ms] [MC300]	For manufacturer setting [MC300]
	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	2bytes	1byte	5bytes
...	00000000h	0	2000	2000	20	30	0000h	0	0
...	00000000h	0	5000	2000	30	50	0000h	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

*1 The time specified by the acceleration constant, the deceleration constant and the dwell are rounded off based on the control cycle. (The value is rounded to the nearest integer.)
<Example> When the dwell is specified to 10ms with the control cycle of 0.88ms
The time until the running point is completed after the completion of the point movement is 11 control cycles (approx. 9.778ms).
*2 Not used in the automatic operation. The setting is invalid.
*3 When using MR-MC2_ _, it is "For manufacturer setting".



*1 The rough match signal (CPO) is determined when the end point is executed. Therefore, it does not turn ON when passing points on the way.

Start operation method

The start operation is performed according to the following procedure.

Operating procedure

1. Set up the point table.
2. Set the start point No. and the end point No.
3. Turn ON the automatic operation mode signal (AUT).
4. Turn ON the fast start operation signal (FST).

Point

- When stopping the operation midway, turn ON the stop operation signal (STP).
- The current operation point No. can be confirmed through the operation point No. of the axis status table (same as "Operation point No. (monitor No.030AH)").
- The point No. starts from "0".
- The point table is a total of 320 [MC200]/2048 [MC300] points for all axes. The number of points distributed to each axis can be adjusted using the point No. offset. For details, refer to the following.

☞ Page 641 Point No. Offset

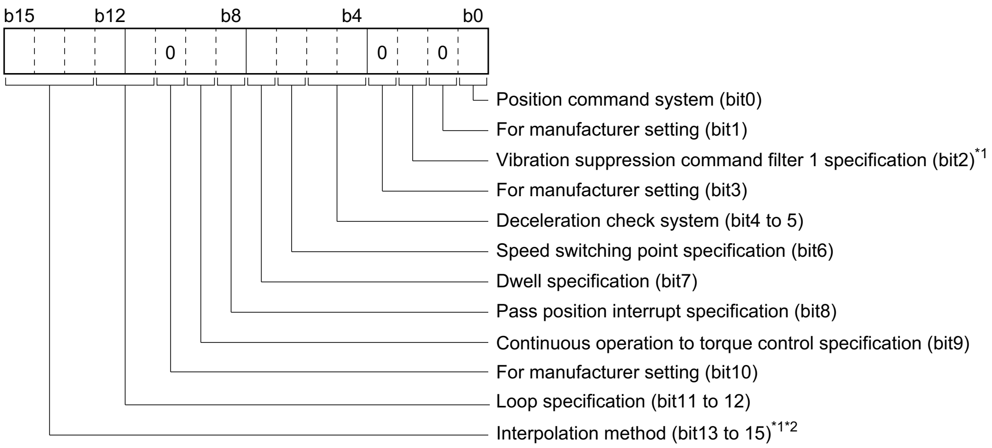
Point

[API library]

- To set up the point table in 1., use the sscSetPointDataEx function.
- To perform the procedures 2. to 4., use the sscAutoStart function.
- To confirm the completion of the operation, use the sscGetDriveFinStatus function/sscWaitIntDriveFin function.
- To perform the stop operation, use the sscDriveStop function/sscDriveStopNoWait function.
- To set/get the point No. offset, use the sscSetPointOffset function/sscCheckPointOffset function.
- For details about the procedure from startup of the automatic operation to confirm the completion of the operation, refer to the sample programs (InterruptDrive/PollingDrive) contained in the utility software.

Auxiliary command

The auxiliary command can be set in the following procedure.



*1 When using MR-MC2_ _, it is "For manufacturer setting".

*2 The interpolation method cannot be used with the automatic operation. The setting is invalid.

Ex.

For designation of the position command system (bit0) as "1: Relative position command" and the deceleration check system (bit4 to 5) as "2: Continue operation"

Set to "0021h".

Position command system (bit0)

Select the position data command system.

Setting value	Description
0: Absolute position command	The position data is the position from the home position.
1: Relative position command	The position data is the movement distance from the current command position.

Point

If the setting of the position command system is incorrect, "Point Table Setting Error (operation alarm 25H, detail 01H)" occurs, and the operation is stopped.

Vibration suppression command filter 1 specification (bit2) [MC300]

Select whether to enable/disable the vibration suppression command filter 1.

0: Vibration suppression command filter 1 disabled

1: Vibration suppression command filter 1 enabled

Point

For the vibration suppression command filter 1, refer to the following.

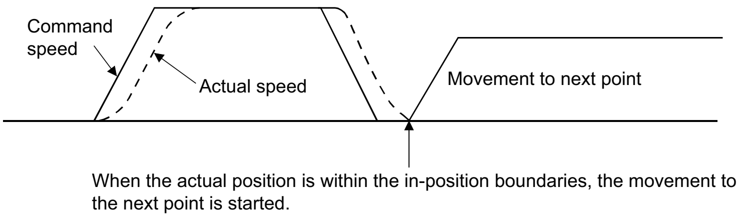
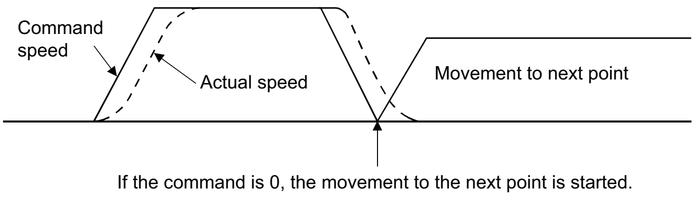
☞ Page 164 Vibration suppression command filter 1 [MC300]

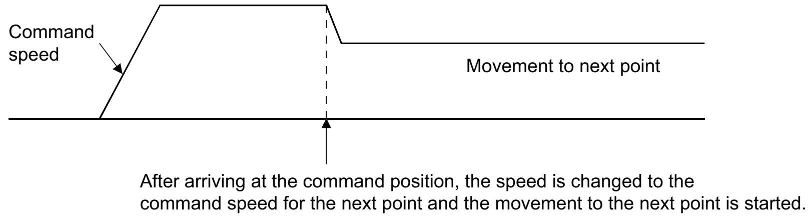
Deceleration check system (bit4 to 5)

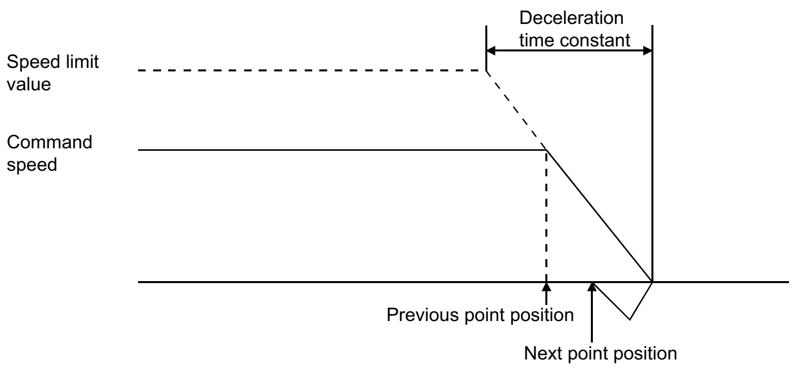
Designate the point movement completion conditions.

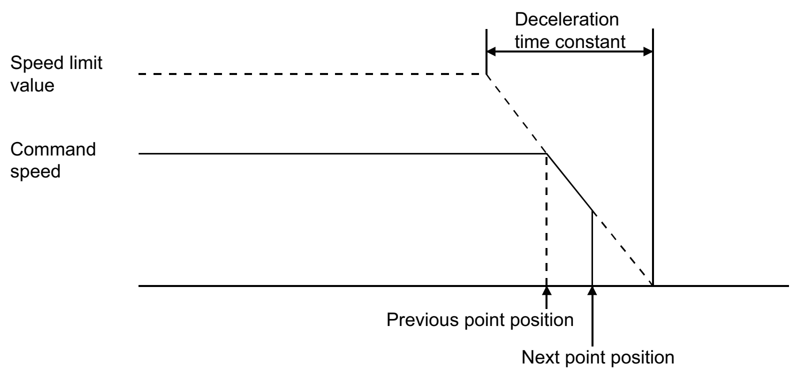
Point

If the setting of the deceleration check system (bit4 to 5) is incorrect, "Point Table Setting Error (operation alarm 25H, detail 02H)" occurs, and the operation is stopped.

Setting value	Description
0: In-position stop	After the completion of the command pulse output, the point movement is completed when the actual position reached in-position. 
1: Smoothing stop	After the completion of the command pulse output, the point movement is completed. 

<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>2: Continue operation</td><td>After arriving at the command position, the speed is changed to the command speed for the next point, and the movement to the next point is started.
The acceleration/deceleration time constants for changing speeds are set to the acceleration/deceleration time constants of the next point.
However, the continuous operation is not performed under the following conditions.
■When a dwell is set
After the smoothing stop and the time which is set by the dwell is elapsed, the movement to the next point is started.
■When there is an end point
Operates in the same way as the smoothing stop.


For the end point of the continuous operation, if the position after the deceleration stop exceeds the command position, a selection can be made from the following. The following can be selected from "Continuous operation position over-bound processing" of "Control option 2 (parameter No.0201)".
• 0: Alarm (Stop by the alarm.)
• 1: Return to command position (After completion of the deceleration stop, return to the command position.)
• 2: Stop firmly at command position (Stop at the command position.)
When selecting "1: Return to command position", the exceeded stop position signal (POV) turns ON. The exceeded stop position signal (POV) turns OFF at the next start up.
"1: Return to command position"


"2: Stop firmly at command position"


</td></tr>
</table>

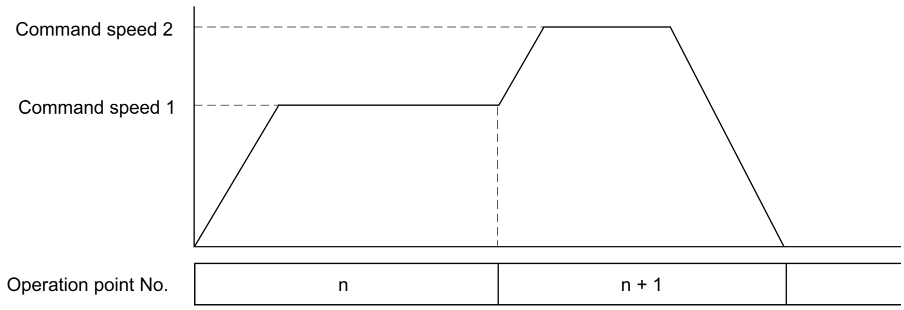
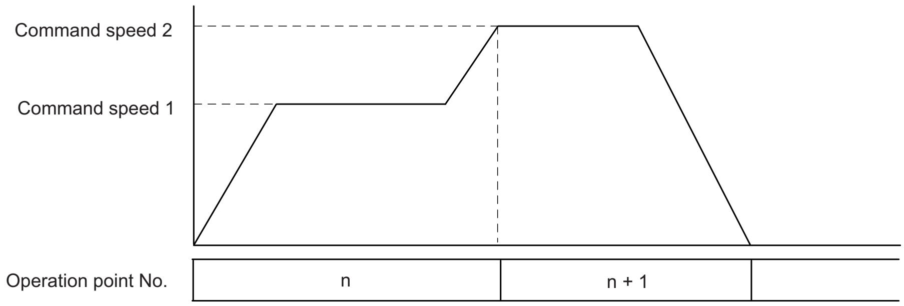
Point

The deceleration position may exceed the command position in the following cases. In those cases, "Position Exceeded During Positioning (operation alarm 24H, detail 01H)" occurs, and the operation is stopped.

- In the case the movement direction is reversed when positioning the next point of the point in which the continuous operation is specified by the deceleration check system (bit4 to 5).
- In the case the table point is continued in order which the (point n) deceleration check method (bit4 to 5) moves "2: Continue operation" to (point n+1) "1: Smoothing stop" or "0: In-position stop" to (point n+2) reversing the movement direction, but the positioning distance of the point n+1 is not satisfied with the required deceleration distance.

Speed switching point specification (bit6)

When selecting "2: Continue operation" in the deceleration check system (bit4 to 5), specify the point to be completed the speed change.

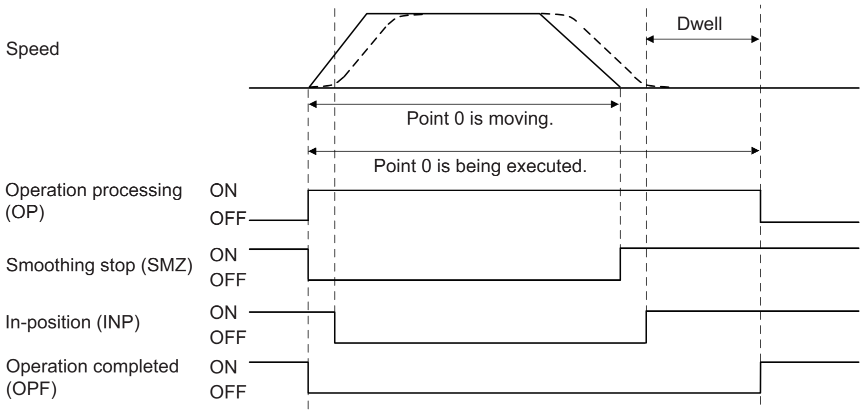
Setting value	Description
0: After point switching	
1: Before point switching	

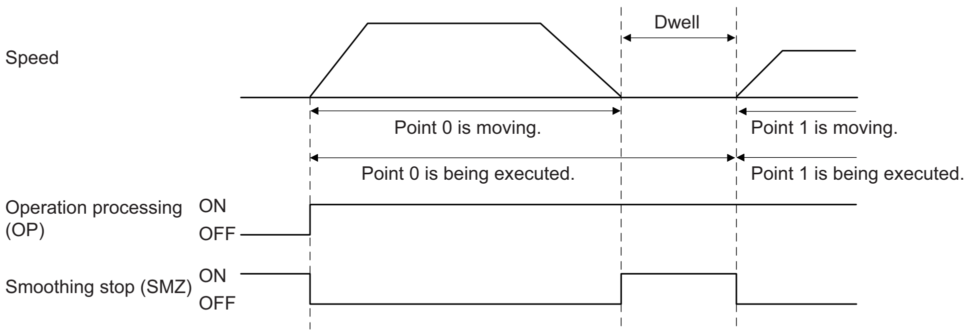
Point

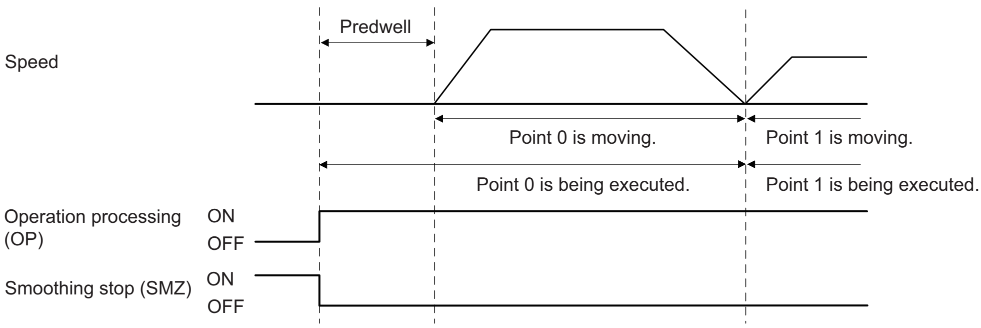
When setting "1: Before point switching", the point table (feed speed) of the next point is imported (read) at the start operation or the timing when the point switches to the next point. If the setting of the point table of the next point is incorrect, "Point Table Setting Error (operation alarm 25H, detail 08H)" occurs, and the operation is stopped.

Dwell specification (bit7)

Specify the system of dwell.

<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0: Dwell</td><td>
Specify the time until the running point is completed after the point movement is completed. For the pass point, after the time specified with the dwell has elapsed, the next point starts moving. For the end point, after the time specified with the dwell has elapsed, the operation completed signal (OPF) turns ON.
• The setting range of dwell is "0 to 65535ms".
■When the deceleration check system (bit4 to 5) is "0: In-position stop"
Count the lapsed time from after the in-position signal (INP) turns ON after the smoothing stop signal (SMZ) turns ON. The following shows the case for the end point.


■When the deceleration check system (bit4 to 5) is "1: Smoothing stop"
Count the lapsed time from the smoothing stop signal (SMZ) turns ON. The following shows the case for the pass point.


■When the deceleration check system (bit4 to 5) is "2: Continue operation"
When the dwell is set, the condition of the point movement completion is the smoothing stop. Therefore, the control is the same as when "1: Smoothing stop" is set to the deceleration check system (bit4 to 5).
</td></tr>
<tr><td>1: Predwell</td><td>
The point starts moving after the time specified with the predwell has elapsed.


• The setting of the predwell is valid only in the start point. If the predwell is set in the other points, "Point Table Setting Error (operation alarm 25H, detail 0AH)" occurs, and the operation is stopped.
• In the initial setting, the setting range of the predwell is "0 to 3000ms". When setting the value outside the range, "Point Table Setting Error (operation alarm 25H, detail 0AH)" occurs, and the operation is stopped. To remove the limit of the setting range, set "1: 0 to 65535ms" to "Predwell setting range" of "Control option 4 (parameter No.0206)".
</td></tr>
</table>

⚠CAUTION

If the large value is set to the predwell by mistake, the wait time of the axis is long unexpectedly, and it may look as if the axes do not start the operation. In that case, it is dangerous to approach the moving part because the axes operate unexpectedly. Do not approach the moving parts even when the axes do not operate while the operation processing signal (OP) is ON because the axes may operate.

Pass position interrupt specification (bit8)

Select valid or invalid for the pass position interrupt.

0: Pass position interrupt invalid

1: Pass position interrupt valid

Point

For this setting, only the point data of the start point No. is valid. When setting the point data after the start point No., "Point Table Setting Error (operation alarm 25H, detail 0CH)" occurs, and the operation is stopped.

Continuous operation to torque control specification (bit9)

Select valid or invalid for the continuous operation to torque control.

0: Continuous operation to torque control invalid

1: Continuous operation to torque control valid

Point

For the continuous operation to torque control specification, refer to the following.

☞ Page 281 Continuous Operation to Torque Control

Loop specification (bit11 to 12)

Specify the start and end when using the point table in the loop method.

0: Not using point table method

1: Loop start point

2: Loop end point

Point

For the loop specification, refer to the following.

☞ Page 101 Point table loop method

Other axes start specification

Set other axes start data No. (1 to 32 [MC200]/1 to 64 [MC300]). When setting the other axes start data No., the position board starts the other axes according to the other axes start conditions and the operation details.

Up to 2 other axes start data No. can be set. For details about the other axes start function, refer to the following.

☞ Page 212 Other Axes Start

Point

When the setting of the other axes start specification is incorrect, "Point Table Setting Error (operation alarm 25H, detail 09H)" occurs, and the operation is stopped.

S-curve ratio

Perform the S-curve acceleration/deceleration for "Acceleration/deceleration method" selected in "Speed options (parameter No.0220)". For the automatic operation, this setting is valid regardless of the setting of "S-curve ratio (parameter No.0221)".

- 0 to 29: S-curve acceleration/deceleration invalid
- 30 to 100: S-curve acceleration/deceleration

Point table loop method

The point table loop method can be used by setting the loop specification (bit11 to 12) of the auxiliary command. When using the point table in the loop method, refer to/set the following data.

Axis data command/status table

■Axis data command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Content	Setting range	
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _
102C	00503C	Start point No.	0 to 319	0 to 2047
102D	00503D			
102E	00503E	End point No.	0 to 319	0 to 2047
102F	00503F			
103A	00504A	Latest command point No.*1	1 to 320	1 to 2048
103B	00504B			

*1 Set the latest command point No. to the value of "point No. + 1".

■Axis data status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Content	Output range	
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _
108C	0050DC	Operation point No.	0 to 320	0 to 2048
108D	0050DD			

Axis status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1067	0050A7	0	PPIOP	Operating pass position interrupt	Master
		1	PPIFIN	Pass position interrupt completed	Master
		2	PPIERR	Pass position interrupt incompleted	Master
		3	—	For manufacturer setting	—
		4			
		5			
		6			
		7	AUTLO	In point table loop	Master

■Details on status bit

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
AUTLO	In point table loop	Indicate that the point table is being used in the loop method.	The operation of "1: Loop start point" set to the auxiliary command loop specification (bit11 to 12) of the operation start point has started.	One of the following conditions is satisfied. • The operation of "2: Loop end point" set to the auxiliary command loop specification (bit11 to 12) is completed. • During the operation of the point set to the auxiliary command loop specification (bit11 to 12), the operation is completed due to the alarm or the stop.

Controlling method for using the point table in the loop method

The controlling method for using the point table in the loop method is as follows.

1. Set the point table and the latest command point No.
2. Set the start point No. and the end point No. of the loop to the start point No. and the end point No.
3. Turn ON the automatic operation mode signal (AUT).
4. Turn ON the fast start operation signal (FST).
5. After the completion of the operation for each point, update (overwrite) the point table, and set the latest command point No.
6. At the completion of the operation, set "2: Loop end point" to the auxiliary command loop specification (bit11 to 12), and set the latest command point No.

Point

- When the operation point No. matches the latest command point No., the operation waits until the latest command point No. is updated. (The operation is not completed, and remains in a stopped state.)
- When the speed change is conducted during the standby, the speed change error signal (SCE) turns ON, and the speed cannot be changed.
- When the time constant change is conducted during the standby, the acceleration time constant change error signal (TACE), or the deceleration time constant change error signal (TDCE) turns ON, and the time constant cannot be changed.
- When the loop start point is specified but the latest command point No. is "0", "Point Table Loop Error (operation alarm 5FH, detail 01H)" occurs, and the operation does not start.
- When the loop start point is set in the one-point operation (the start No. matches the end No.), "Point Table Loop Error (operation alarm 5FH, detail 02H)" occurs, and the operation does not start.
- When inputting the value smaller than "start point No. + 1", or the value larger than "end point No. + 1" to the latest command point No., "Point Table Loop Error (operation alarm 5FH, detail 03H)" occurs, followed by the deceleration stop.
- Only the point data for the start point No. is valid for the loop start point of this setting. The point data after the loop start point that is set to the loop start point is invalid.
- After the operation of the point in which the continuous operation is specified, when the next point has not been updated, "Point Table Loop Error (operation alarm 5FH, detail 04H)" occurs, and the operation is canceled with the deceleration stop.
- During the operation that does not use the loop method, when the loop end point is specified, "Point Table Loop Error (operation alarm 5FH, detail 05H)" occurs, and the operation is canceled with the deceleration stop.
- When specifying the before point switching in the speed switching point specification, use three points or more.
- When specifying the before point switching in the speed switching point specification, update the next point before the start of the operation for the specified point. When the next point is not updated before the start of the operation of the specified point, "Point Table Loop Error (operation alarm 5FH, detail 06H)" occurs, and the operation is canceled with the deceleration stop.
- The settings for which only the point of the start point No. is valid (pass position interrupt specification, etc.) are only valid for the start operation point. When setting the point other than the start operation point, the operation is the same as when setting point data after the start point No.

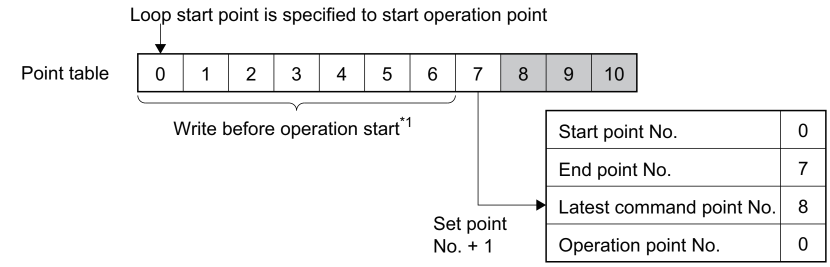
Point

[API library]
- To set the point table, use the sscSetPointDataEx function.
- To set the latest command point No., use the sscSetLatestPointNumber function.
- To perform the procedures 2. to 4., use the sscAutoStart function
- To confirm the completion of the operation, use the sscGetDriveFinStatus function/sscWaitIntDriveFin function.
- To perform the stop operation, use the sscDriveStop function/sscDriveStopNoWait function.
- To set/get the point No. offset, use the sscSetPointOffset function/sscCheckPointOffset function.
- For a detailed procedure from startup of automatic operation to confirm completion of operation, refer to the sample program (DrivePointLoop) contained on the utility software.

Operation example

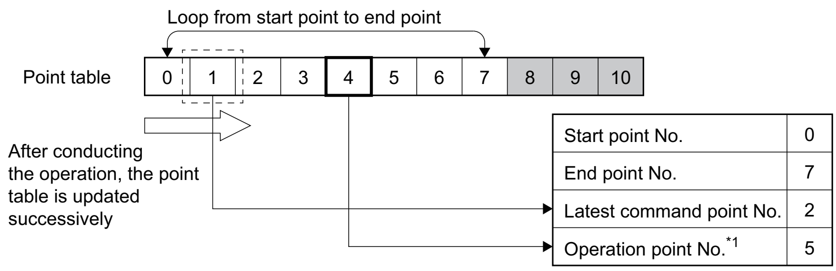
The following is the operation example of using the point No.0 to 7.

■Before start of operation



*1 Writing point data for the entire area used in the loop before the operation start is not necessary.

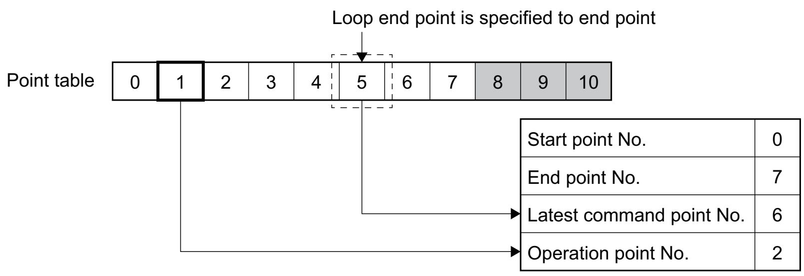
■During operation



*1 Do not update the point table of the operation point No.

■At operation completion

After operating to point 5, the operation is completed.



Acceleration/deceleration data [MC300]

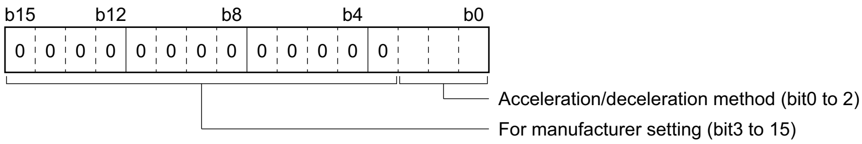
Set the acceleration/deceleration data 1 to 4.

For details, refer to the following.

☞ Page 161 Jerk ratio acceleration/deceleration [MC300]

Auxiliary command 2 [MC300]

The following can be specified in the auxiliary command 2.



Bit	Name	Description
0 to 2	Acceleration/deceleration method	Select the acceleration/deceleration method. • 0: Linear acceleration/deceleration, S-curve acceleration/deceleration • 1: Jerk ratio acceleration/deceleration
3 to 15	For manufacturer setting	—

Point

For the jerk ratio acceleration/deceleration, refer to the following.

☞ Page 161 Jerk ratio acceleration/deceleration [MC300]

Smoothing time constant [MC300]

When "Acceleration/deceleration method" of "Speed options (parameter No.0220)" is set to "1: Smoothing filter", and "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "1: Use point table", this setting is valid.

- 0 to 100: Smoothing time constant [ms]

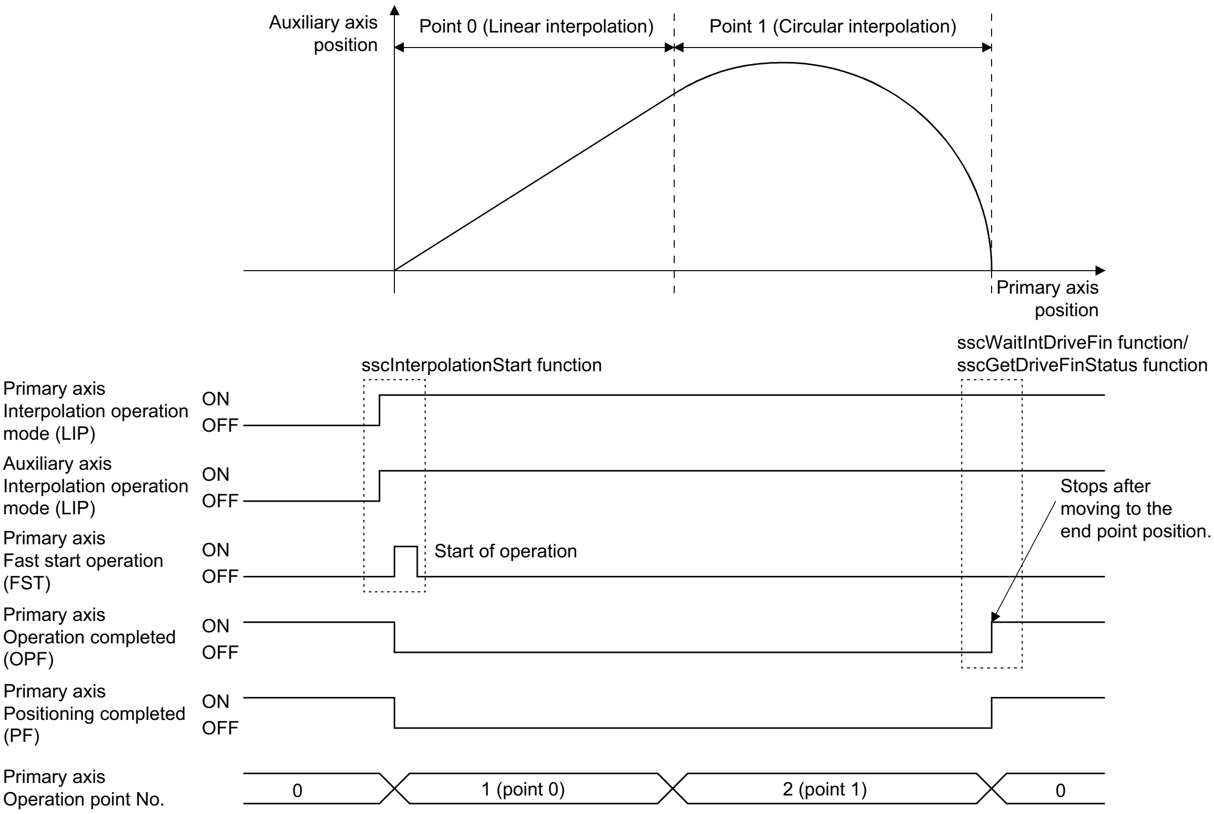
Point

- For the smoothing filter, refer to the following.
  ☞ Page 155 Smoothing filter
- When the smoothing time constant is set to "0", the acceleration/deceleration processing is linear acceleration/deceleration.
- When the deceleration check method is in the continuous operation, point 2 and after operate with the smoothing time constant setting in point 1. The smoothing time constant set in point 2 and after is not reflected in the acceleration/deceleration processing.
- If the smoothing time constant is set outside the range, "Point Table Setting Error (operation alarm 25H, detail 18H)" occurs, and the operation is stopped.

5.5 Interpolation Operation [MC300]

The interpolation operation performs the interpolation control for multiple axes. This system enables a maximum of 4-axis linear interpolation control and the circular interpolation control for 2 axes.
When the position data and the feed speed are set in the point table and the fast start operation signal (FST) is input after changing to the interpolation operation mode, all of the axes set up in the group perform the interpolation operation. The axis in which the fast start operation signal (FST) is input is referred to as "primary axis", and all other axes are referred to as an "auxiliary axis".
For details about the interpolation control, refer to the following.

☞ Page 109 Linear Interpolation
☞ Page 118 Circular Interpolation [MC300]



Point

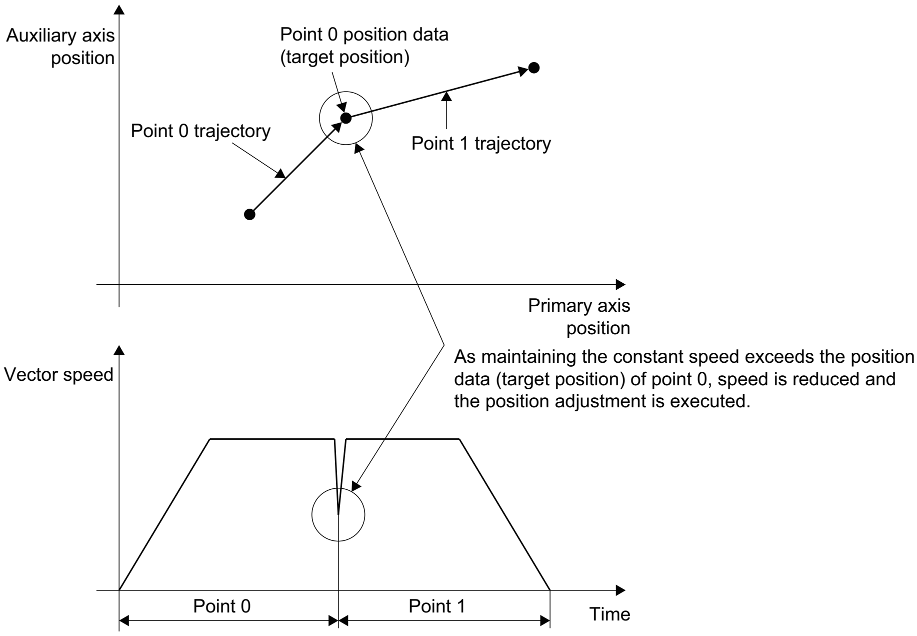
- It is available to switch between the linear interpolation and the circular interpolation at each point during the interpolation operation for 2 axes.
- The interpolation group cannot be changed during the operation.

Proximity pass function

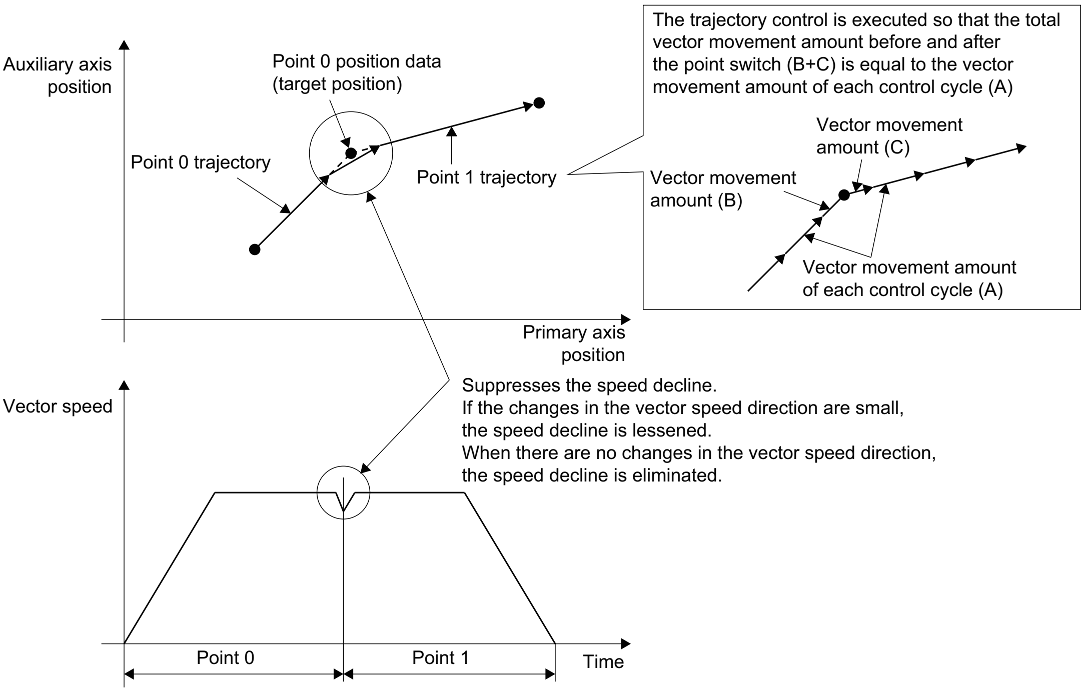
The proximity pass function suppresses machine vibrations that occur at the point data switching when performing the continuous operation via the interpolation control. To enable the proximity pass, set "1: Proximity pass" in "Interpolation options (parameter No.0261)" of "Trajectory processing during continuous operation".
While the proximity pass is enabled, the surplus movement amount at the end of each successively executed point data is transferred over to the next point data. By not performing the position adjustment, the output speed losses can be reduced, and the machine vibrations at the speed changes can be suppressed.
As the position adjustment is not performed, the trajectory that passes through the proximity of the position set as the position data for the point table serves as the control.
The following shows the trajectory when the continuous operation has been performed using the 2-axis linear interpolation control.

"Trajectory processing during continuous operation" of "Interpolation options (parameter No.0261)"

■"0: Position adjustment" (initial value)



■"1: Proximity pass"



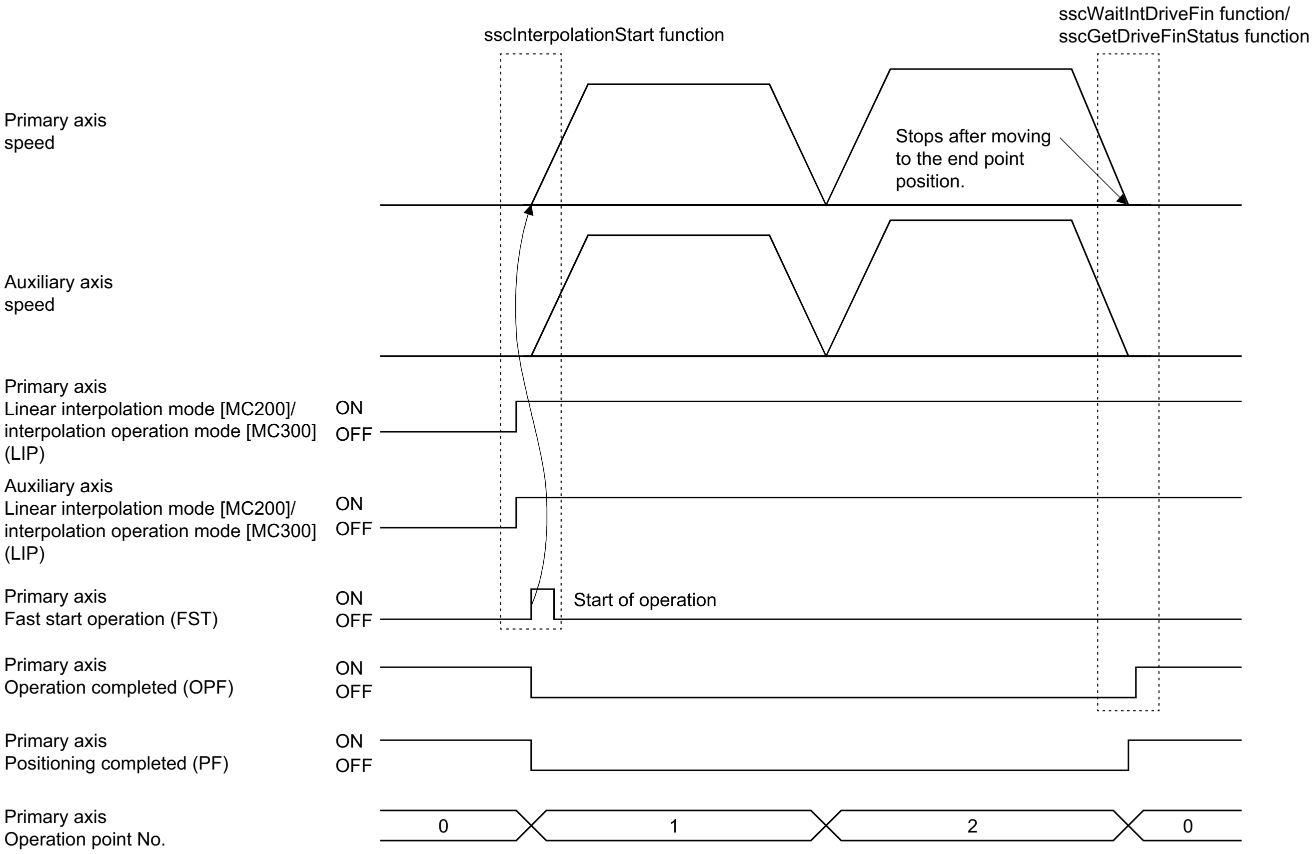
Point

- When performing the continuous operation, if the movement amount specified in the position data is small, the output speed may fail to reach the command speed.
- Because the movement direction check is not performed during the interpolation operation, the deceleration stop does not occur even if the movement direction changes. Therefore, the rapid reversal may occur if the movement direction changes. To avoid the rapid reversal, do not select the continuous operation when using the deceleration check method on the point data for the pass point. Instead, use either the in-position stop or the smoothing stop.
- When the target position is reached within the control cycle where the position change/speed change/time constant change was executed, the trajectory processing through the position adjustment is performed.

5.6 Linear Interpolation

The linear interpolation operation has the linear interpolation control performed for the axes set up as a group. This system enables a maximum of 4-axis linear interpolation control. When the feed speed and the position data are set in the point table and the fast start operation signal (FST) is input, all of the axes set up in the group perform the linear interpolation operation. If the linear interpolation operation is started prior to the completion of the home position return (the home position return request signal (ZREQ) is ON), "Home Position Return Not Complete (operation alarm 90H, detail 01H)" occurs upon starting the operation, and the operation is stopped.

From this point on, the axis in which the fast start operation signal (FST) is input is referred to as "primary axis", and all other axes are referred to as an "auxiliary axis".

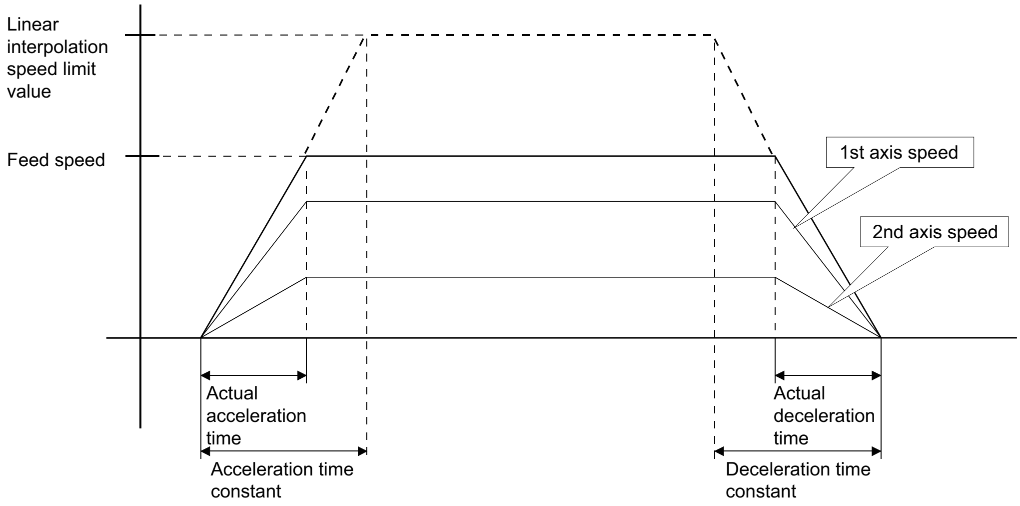


Point

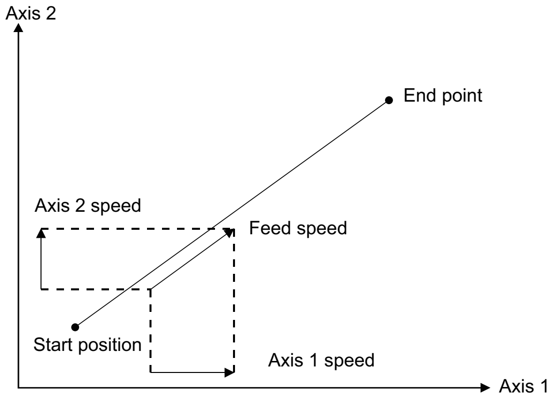
- When "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "0: Use control parameter", the group setting is set using "Group No." of "Linear interpolation group [MC200]/interpolation group [MC300] (parameter No.0260)". If the group No. is set to "00h", the axis becomes an independent axis, and the linear interpolation operation cannot be performed. The valid number of groups varies by the control cycle. When "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "1: Use point table", the axis set to the interpolation axis No. of the point table becomes a linear interpolation group, and the interpolation control can be executed simultaneously for the valid number of groups.
  Valid group No. when the control cycle is 0.88ms: 1 to 8 [MC200]/1 to 16 [MC300]
  Valid group No. when the control cycle is 0.44ms: 1 to 4 [MC200]/1 to 8 [MC300]
  Valid group No. when the control cycle is 0.22ms: 0 [MC200]/1 to 4 [MC300]
- Even when the linear interpolation group is within the valid group No. range, the operation cycle alarm signal (OCME) and the operation cycle warning signal (OCMW) may turn ON depending on the combination of functions used.
- For the fast start operation signal (FST), input on a primary axis only.

Ex.

When interpolating axis 1 and axis 2



The speed for each axis is determined by distributing the feed speed by the movement amount ratio.



Settings

Set the following items when performing the linear interpolation. For details about the point table, refer to the following.

☞ Page 93 Automatic Operation

Setting 1: Items set for system parameter

Items	Content	Remarks
System parameter	Interpolation axis setting method (System option 5 (parameter No.004C))	Set the input method of the interpolation axis No. for the linear interpolation [MC200]/interpolation operation [MC300].

Setting 2: Items set for all axes to be interpolated

Items	Content	Remarks
Point table	Position data	Set within maximum movement amount. (Maximum movement amount = 999999999)
	Other axes start specification	Set when using the other axes start.
	Pass position interrupt specification	Set when using the pass position interrupt.
	Smoothing time constant [MC300]	When "Acceleration/deceleration method" of "Speed options (parameter No.0220)" is set to "1: Smoothing filter", and "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "1: Use point table", this setting is valid.
Axis data	Start point No. End point No.	Set such that the number of points between start and end is the same for all axes in the group configuration.
Axis data (command bit)	Linear interpolation mode signal [MC200]/ interpolation operation mode signal [MC300] (LIP)	Turn ON the applicable bit.
Control parameter	Linear interpolation group [MC200]/ interpolation group [MC300] (parameter No.0260)	When "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "0: Use control parameter", set the linear interpolation group No. Up to 4 axes can be set up for the same group. For the tandem drive axes, only the master axis must be set.
	Speed limit value (parameter No.0222, 0223)	Set the speed limit for each axis. Use when selecting "0: Speed clamp" or "1: Alarm stop" for "Excessive speed processing" of "Linear interpolation options [MC200]/interpolation options [MC300] (parameter No.0261)".

Setting 3: Items set for the primary axis

Items	Content	Remarks
Point table for primary axis	• Feed speed • Acceleration time constant [ms] • Deceleration time constant [ms] • Dwell [ms] • Auxiliary command • S-curve ratio [%] • Interpolation axis No. • Interpolation method [MC300] • Vibration suppression command filter1 specification [MC300]	The interpolation axis No. is only required when "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "1: Use point table". Only the start point No. setting is valid. This setting cannot be changed during the operation.
Control parameters for the primary axis	• Speed units (Control option 1 (parameter No.0200)) • Speed units multiplication factor (parameter No.020E, 020F) • Start up speed (parameter No.0224, 0225) • Linear interpolation options [MC200]/ interpolation options [MC300] (parameter No.0261) • Linear interpolation speed limit value [MC200]/interpolation speed limit value [MC300] (parameter No.0262, 0263)	The r/min of the speed unit cannot be specified.
Command data for the primary axis	Latest command point No.	Set when using the point table loop method.

Point table

Point	Position data [command unit]	Feed speed [speed unit]	Acceleration time constant [ms]*1	Deceleration time constant [ms]*1	Dwell/ predwell [ms]*1	Auxiliary command	Other axes start specification	S-curve ratio [%]	For manufacturer setting
	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	4bytes	1byte	3bytes
0000	2000	2000	20	30	0	0000h	00000000h	0	0
0001	5000	2000	30	50	0	0000h	00000000h	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

...	Interpolation axis No.	Arc coordinate [MC300]*2	Acceleration/ deceleration data 1 [MC300]*2	Acceleration/ deceleration data 2 [MC300]*2	Acceleration/ deceleration data 3 [MC300]*2	Acceleration/ deceleration data 4 [MC300]*2	Auxiliary command 2*2	Smoothing time constant [ms] [MC300]	For manufacturer setting
	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	2bytes	1byte	5bytes
...	00000002h	0	0	0	0	0	0000h	0	0
...	00000002h	0	0	0	0	0	0000h	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

*1 The time specified by the acceleration constant, the deceleration constant and the dwell are rounded off based on the control cycle. (The value is rounded to the nearest integer.)
<Example> When the dwell is specified to 10ms with the control cycle of 0.88ms
The time until the running point is completed after the completion of the point movement is 11 control cycles (approx.9.778ms).

*2 Not used in the linear interpolation.

■Interpolation axis No.

b31	b24	b16	b8 b0
For manufacturer setting	Interpolation axis No.3	Interpolation axis No.2	Interpolation axis No.1

Bit	Name	Description
0 to 7	Interpolation axis No.1	Specify the axis Nos. of auxiliary axes set to the same group during the linear interpolation.
8 to 15	Interpolation axis No.2	
16 to 23	Interpolation axis No.3	
24 to 31	For manufacturer setting	—

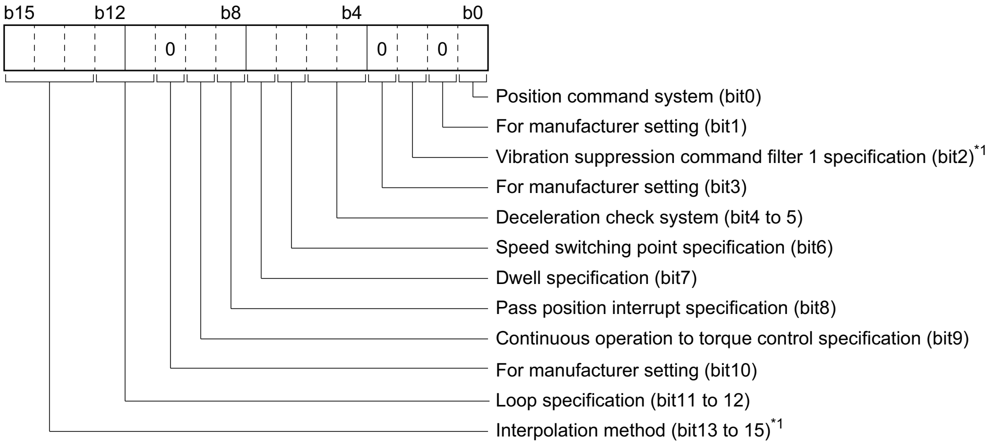
Ex.

When setting the axis 2, 3, and 4 to the interpolation axis No.1 to 3 respectively which have the axis 1 as the primary axis Set "00040302h".

<Cause of alarm>

- When an axis No. exceeding the maximum number of controllable axes is set to the interpolation axis No.1 to 3, "Linear Interpolation Point Data Error [MC200]/Interpolation Point Data Error [MC300] (operation alarm 41H, detail 03H)" occurs, and the operation is stopped.
- When the number of linear interpolation [MC200]/interpolation operation [MC300] groups operating simultaneously exceeds the valid number of groups, "Linear Interpolation Point Data Error [MC200]/Interpolation Point Data Error [MC300] (operation alarm 41H, detail 04H)" occurs, and the operation is stopped.

■Auxiliary command



Bit	Name	Description
0	Position command system	☞ Page 95 Position command system (bit0)
1	For manufacturer setting	—
2	Vibration suppression command filter 1 specification*1	☞ Page 95 Vibration suppression command filter 1 specification (bit2) [MC300]
3	For manufacturer setting	—
4 to 5	Deceleration check system	☞ Page 96 Deceleration check system (bit4 to 5)
6	Speed switching point specification	☞ Page 98 Speed switching point specification (bit6)
7	Dwell specification	☞ Page 99 Dwell specification (bit7)
8	Pass position interrupt specification	☞ Page 100 Pass position interrupt specification (bit8)
9	Continuous operation to torque control specification	☞ Page 100 Continuous operation to torque control specification (bit9)
10	For manufacturer setting	—
11 to 12	Loop specification	☞ Page 100 Loop specification (bit11 to 12)
13 to 15	Interpolation method*1	Select the control method for interpolation operation. • 0: Linear interpolation • 1: Auxiliary point-specified circular interpolation*2 • 2: Central point-specified circular interpolation (CW)*2 • 3: Central point-specified circular interpolation (CCW)*2

*1 When using MR-MC2_ _, it is "For manufacturer setting".
*2 Not used in the linear interpolation.

Point

If the interpolation method is set outside the range, "Point Table Setting Error (operation alarm 25H, detail 11H)" occurs, and the operation is stopped.

Start operation method

The start operation is performed according to the following procedure.

Operating procedure

1. Set the linear interpolation group [MC200]/interpolation group [MC300], the linear interpolation speed limit value [MC200]/interpolation speed limit value [MC300], and the linear interpolation options [MC200]/interpolation options [MC300] in the control parameters. The group No. is only required when "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "0: Use control parameter", and is valid during system startup. Other than that, it is valid during writing of parameters.

2. Set the point table. At this time, all items are set up for the primary axis and only the position data is set up for the auxiliary axes. Settings for other items are invalid.

3. Set the start point No. and the end point No. for all of the axes in the group configuration. Set the setting so that the number of points for all of the axes is the same.

4. Turn ON the linear interpolation mode signal [MC200]/interpolation operation mode signal [MC300] (LIP) for all of the axes in the group.

5. Turn ON the fast start operation signal (FST) for the primary axis.

Point

- To stop the operation, turn ON the stop operation signal (STP) of any axis in the linear interpolation group.
- The current operation point No. can be confirmed through the operation point No. of the axis status table (same as "Operation point No. (monitor No.030AH)").
- The start point No. for the point table is "0".
- The point table is a total of 320 [MC200]/2048 [MC300] points for all axes. The number of points distributed to each axis can be adjusted using the point No. offset. For details, refer to the following.
  ☞ Page 641 Point No. Offset
- When using the point table in the loop method, the primary axis setting values are valid for the latest command point No. and the start point No. /end point No. of the loop. Update the latest command point No. after writing the point tables of all axes in the group.
- The specifications when using "1: Use point table" as "Interpolation axis setting method" of "System option 5 (parameter No.004C)" are shown below.
  · The specification of the interpolation axis No. is only valid for the starting point.
  · "Linear interpolation group [MC200]/interpolation group [MC300] (parameter No.0260)" is invalid even when specified.
  · The startup method does not change.
  · The changeable interpolation group signal (IPCH) turns ON.
  · The interpolation group No. being executed is output to the primary axis and the auxiliary axis for which the linear interpolation is being executed.
  · The interpolation group No. being executed for the primary axis and the auxiliary axis for which the linear interpolation has ended is cleared and becomes "0".

Point

[API library]
- To set up the point data as shown 2., use the sscSetPointDataEx function
- To perform the procedures 3. to 5., use the sscLinearStart function [MC200]/sscInterpolationStart function [MC300].
- To perform the stop operation, use the sscDriveStop function/sscDriveStopNoWait function.
- To confirm the completion of the operation, use the sscGetDriveFinStatus function/sscWaitIntDriveFin function.
- To set/get the point No. offsets, use the sscSetPointOffset function/sscCheckPointOffset function.

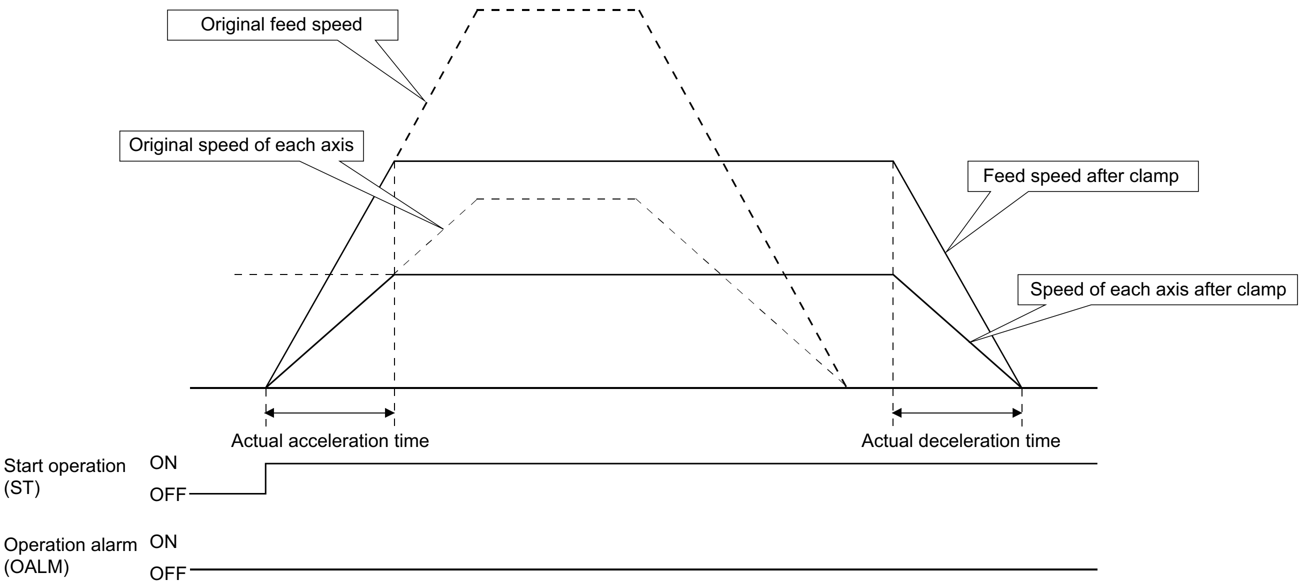
Processing for exceeding speed limit for each axis

The processing is different concerning exceeding the speed limit for each axis depending on the setting for "Excessive speed processing" of "Linear interpolation options [MC200]/interpolation options [MC300] (parameter No.0261)".

Using a speed clamp

When "Excessive speed processing" of "Linear interpolation options [MC200]/interpolation options [MC300] (parameter No.0261)" is set to "0: Speed clamp", if there is an axis that exceeds the speed limit, other axis grouped with the axis are also clamped.

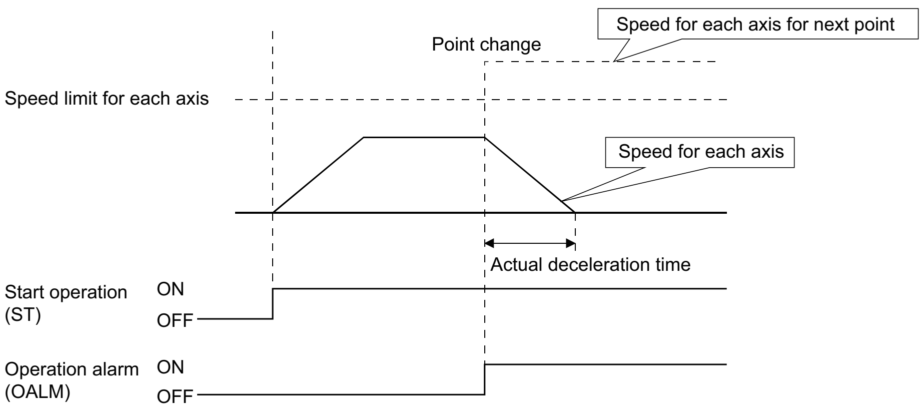
The actual acceleration/deceleration time is the time until reaching the feed speed after clamping.



For using alarm stop (example for the continuous operation point change)

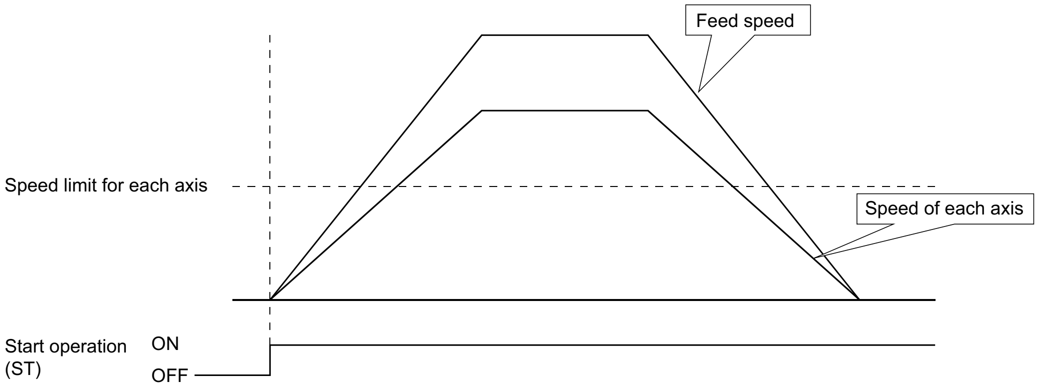
When "Excessive speed processing" of "Linear interpolation options [MC200]/interpolation options [MC300] (parameter No.0261)" is set to "1: Alarm stop", if there is an axis that exceeds the speed limit for each axis for the point change other than the start up or the continuous operation, an alarm is set and the start up cannot be performed.

During the continuous operation, if there is an axis that exceeds the speed limit for each axis, an alarm is set and the deceleration to a stop is performed.



No processing

When "Excessive speed processing" of "Linear interpolation options [MC200]/interpolation options [MC300] (parameter No.0261)" is set to "2: No processing", the normal operation is continued even if the speed limit is exceeded.



Precautions

This enables the operation at the limits of the motor; however, there is the possibility of occurring overload or over speed alarms.

Restrictions

The following restrictions apply concerning use of the linear interpolation.

- "Linear Interpolation Start Up Error [MC200]/Interpolation Start Up Error [MC300] (operation alarm 40H)" occurs in a primary axis for the following.

Description	Alarm No.	Detail No.
If an axis with anything other than the linear interpolation mode signal [MC200]/interpolation operation mode signal [MC300] (LIP) selected exists in the same group.	40H	01H
If 5 or more axes are set in the same group.		02H
If a group No. that exceeds the valid group No. is set when performing the start operation for the linear interpolation.		03H
If the axes in the group are set with a varying number of points.		04H
If "Speed unit" of "Control option 1 (parameter No.0200)" is set to "2: r/min".		05H

- "Linear Interpolation Point Data Error [MC200]/Interpolation Point Data Error [MC300] (operation alarm 41H)" occurs in a primary axis and "Group Error (operation alarm 16H, detail 01H)" occurs in an auxiliary axis for the following.

Description	Alarm No.	Detail No.
If there is an axis within the group whose movement amount exceeds the maximum of 999999999.	41H	01H
If the speed limit for the group configured axis is exceeded. (If "Excessive speed processing" of "Linear interpolation options [MC200]/interpolation options [MC300]" is set to "1: Alarm stop".)		02H

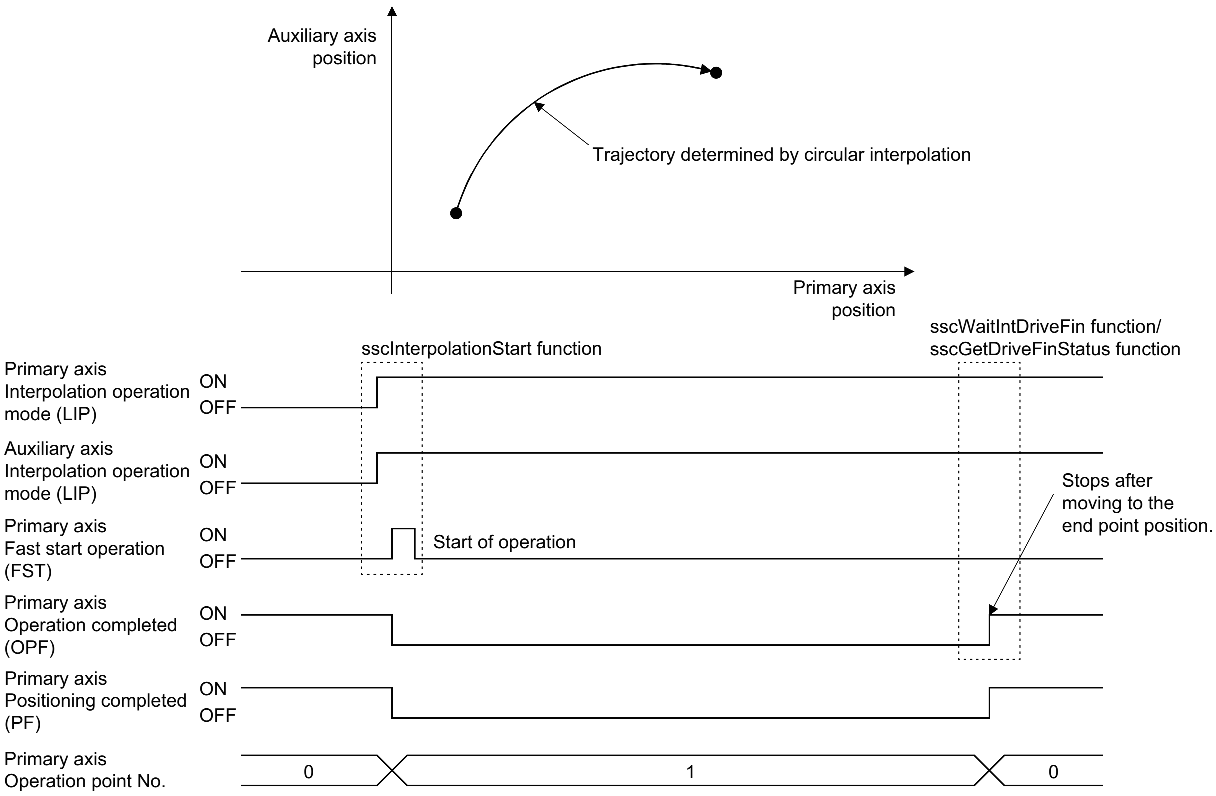
- If the auxiliary axis is in the operation or in the alarm state when in the linear interpolation mode [MC200]/interpolation operation mode [MC300], "Can't Start Linear Interpolation Auxiliary Axis Error [MC200]/Can't Start Interpolation Auxiliary Axis Error [MC300] (operation alarm 42H)" occurs in the primary axis.
- If an alarm occurs during the operation, the corresponding alarm occurs in the axis where an error occurred, and "Group Error (operation alarm 16H, detail 01H)" occurs in all the other axes in the group.
- If any of the axes defined below is within the group, "Out of Software Limit Boundaries (operation alarm A1H, detail 01H)" or "Reached Software Limit (operation alarm A2H, detail 01H)" occurs.

Description	Alarm No.	Detail No.
If there is movement from within software limits to outside the limits.	A1H	01H
If there is movement from outside software limits in the direction of outside the limits.	A2H	01H

- The command change signal is input to the primary axis for the following. The input of the signal into auxiliary axes is invalid.
  - When changing speeds
  - When changing time constants
  - When changing position
- When performing the linear interpolation in high accuracy, use the same type of servo amplifier for the interpolation group. When using different types of servo amplifier such as a combination of MR-J4(W_)-_B and MR-J5(W_)-_B, the trajectory may not be kept.
- When using the smoothing filter, the smoothing time constant must be set to all axes. When the smoothing time constant setting differs between the primary axis and the auxiliary axis, the trajectory may not be kept.

5.7 Circular Interpolation [MC300]

The circular interpolation operation performs the circular interpolation control for axes set to the group. This system can perform the circular interpolation control for 2 axes. There are the arc specification methods, "auxiliary point-specified method" and "central point-specified method".
When the position data and the feed speed are set in the point table and the fast start operation signal (FST) is input, the interpolation operation (circular interpolation) of the 2 axes set up in the group is performed. If the circular interpolation operation is performed prior to the completion of the home position return (the home position return request signal (ZREQ) is ON), "Home Position Return Not Complete (operation alarm 90H, detail 01H)" occurs at the operation start-up and the operation is stopped.
From this point on, the axis in which the fast start operation signal (FST) is input is referred to as "primary axis", and all other axes are referred to as an "auxiliary axis".



Settings

Set the following items when performing the circular interpolation. For details about the point table, refer to the following.

☞ Page 93 Automatic Operation

Setting 1: Items set for system parameter

Items	Content	Remarks
System parameter	Interpolation axis setting method (System option 5 (parameter No.004C))	Set the input method of the interpolation axis No. for the interpolation operation.

Setting 2: Items set for all axes to be interpolated

Items	Content	Remarks
Point table	Position data	Set within the end point range.
	Arc coordinate	Set the position for the auxiliary or central point.
	Other axes start specification	Set when using the other axes start.
	Pass position interrupt specification	Set when using the pass position interrupt.
	Smoothing time constant [MC300]	When "Acceleration/deceleration method" of "Speed options (parameter No.0220)" is set to "1: Smoothing filter", and "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "1: Use point table", this setting is valid.
Axis data	Start point No. End point No.	Set such that the number of points between start and end is the same for all axes in the group configuration.
Axis data (command bit)	Interpolation operation mode signal (LIP)	Turn ON the applicable bit.
Control parameter	Interpolation group (parameter No.0260)	When "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "0: Use control parameter", set the circular interpolation group No. Up to 2 axes can be set up for the same group. For the tandem drive axes, only the master axis must be set.

Setting 3: Items set for the primary axis

Items	Content	Remarks
Point table for primary axis	• Feed speed • Acceleration time constant [ms] • Deceleration time constant [ms] • Dwell [ms] • Auxiliary command • S-curve ratio [%] • Interpolation axis No. • Interpolation method • Vibration suppression command filter1 specification	■Auxiliary point-specified circular interpolation Set "Interpolation method (bit13 to 15)" of the auxiliary command as "1: Auxiliary point-specified circular interpolation". ■Central point-specified circular interpolation Set "Interpolation method (bit13 to 15)" of the auxiliary command as either "2: Central point-specified circular interpolation (CW)" or "3: Central point-specified circular interpolation (CCW)" so as to match the rotation direction.
		The interpolation axis No. is only required when "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "1: Use point table". Only the start point No. setting is valid. This setting cannot be changed during the operation. The feed speed is clamped according to the interpolation speed limit value.
Control parameters for the primary axis	• Speed unit (Control option 1 (parameter No.0200)) • Speed units multiplication factor (parameter No.020E, 020F) • Speed up speed (parameter No.0224, 0225) • Interpolation options (parameter No.0261) • Interpolation speed limit value (parameter No.0262, 0263) • Allowable error range for circular interpolation (parameter No.02CC, 02CD)*1	The r/min of the speed unit cannot be specified.
Command data for the primary axis	Latest command point No.	Set when using the point table loop method.

*1 Use only when performing the central point-specified circular interpolation control.

Point table

Point	Position data [command unit]	Feed speed [speed unit]	Acceleration time constant [ms]*1	Deceleration time constant [ms]*1	Dwell/predwell [ms]*1	Auxiliary command	Other axes start specification	S-curve ratio [%]	For manufacturer setting
	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	4bytes	1byte	3bytes
0000	2000	2000	20	30	0	0000h	00000000h	0	0
0001	5000	2000	30	50	0	0000h	00000000h	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

...	Interpolation axis No.	Arc coordinate *2	Acceleration/deceleration data 1*2	Acceleration/deceleration data 2*2	Acceleration/deceleration data 3*2	Acceleration/deceleration data 4*2	Auxiliary command 2*2	Smoothing time constant [ms] [MC300]	For manufacturer setting
	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	2bytes	1byte	5bytes
...	00000002h	0	0	0	0	0	0000h	0	0
...	00000002h	0	0	0	0	0	0000h	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

*1 The time specified by the acceleration constant, the deceleration constant and the dwell are rounded off based on the control cycle. (The value is rounded to the nearest integer.)
<Example> When the dwell is specified to 10ms with the control cycle of 0.88ms
The time until the running point is completed after the completion of the point movement is11 control cycles (approx. 9.778ms).

*2 Not used in the circular interpolation.

■Interpolation axis No.

b31 – b24	b23 – b16	b15 – b8	b7 – b0
For manufacturer setting	Interpolation axis No.3	Interpolation axis No.2	Interpolation axis No.1

Bit	Name	Description
0 to 7	Interpolation axis No.1	Specify the axis Nos. of auxiliary axes set to the same group during the interpolation operation.
8 to 15	Interpolation axis No.2*1	
16 to 23	Interpolation axis No.3*1	
24 to 31	For manufacturer setting	—

*1 Not used.

Ex.

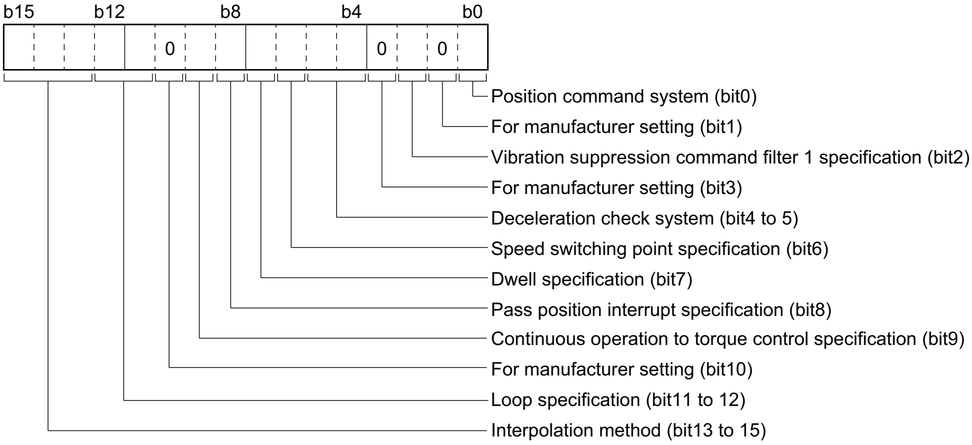
When setting the axis 2 to the interpolation axis No.1

Set "00000002h".

Point

The interpolation axis No. is only required when "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "1: Use point table".

■Auxiliary command



Bit	Name	Description
0	Position command system	☞ Page 95 Position command system (bit0)
1	For manufacturer setting	—
2	Vibration suppression command filter 1 specification	☞ Page 95 Vibration suppression command filter 1 specification (bit2) [MC300]
3	For manufacturer setting	—
4 to 5	Deceleration check system	☞ Page 96 Deceleration check system (bit4 to 5)
6	Speed switching point specification	☞ Page 98 Speed switching point specification (bit6)
7	Dwell specification	☞ Page 99 Dwell specification (bit7)
8	Pass position interrupt specification	☞ Page 100 Pass position interrupt specification (bit8)
9	Continuous operation to torque control specification	☞ Page 100 Continuous operation to torque control specification (bit9)
10	For manufacturer setting	—
11 to 12	Loop specification	☞ Page 100 Loop specification (bit11 to 12)
13 to 15	Interpolation method	Select the control method for interpolation operation. • 0: Linear interpolation*1 • 1: Auxiliary point-specified circular interpolation • 2: Central point-specified circular interpolation (CW) • 3: Central point-specified circular interpolation (CCW)

*1 Not used in the circular interpolation.

Point

If the interpolation method is set outside the range "Point Table Setting Error (operation alarm 25H, detail 11H)" occurs, and the operation is stopped.

■Arc coordinate

Set the coordinates of the auxiliary point or the central point for the arc. The settings vary by the interpolation method.

Group settings

The group settings for the circular interpolation are set in either control parameters or the point table depending on "System option 5 (parameter No.004C)" being used.

When setting in the control parameters, the group cannot be changed after the system start. When setting in the point table it is possible to change the group even after the system start, but to do so the interpolation axis Nos. of the point table must be set through a user program or other means.

Point

The valid number of groups varies by the control cycle. When "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is set to "1: Use point table", the axis set to the interpolation axis Nos. of the point table becomes an interpolation operation group, and the valid number of groups can simultaneously execute the interpolation control.

- Valid group No. when the control cycle is 0.88ms: 1 to 16
- Valid group No. when the control cycle is 0.44ms: 1 to 8
- Valid group No. when the control cycle is 0.22ms: 1 to 4

Control parameters

When "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "0: Use control parameter", set the group No. for the primary axis and the auxiliary axis in "Interpolation group (parameter No.0260)".

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0260	*LGRP	Interpolation group	0000h	—	0000h to 0010h	■■□□ (Group No.) Set the group for the interpolation operation. • 00h: Invalid • 01h to 10h: Group No. <Example> 0Ah Group No.10	Master

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point table

When "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "1: Use point table", set the group axis (auxiliary axis) to the interpolation axis No. of the point table for the primary axis.

Point

- The specification of the interpolation axis No. is only valid for the starting point.
- "Interpolation group (parameter No.0260)" is invalid even when specified.
- The startup method does not change.
- The changeable interpolation group signal (IPCH) turns ON.
- The interpolation group No. being executed is output to the primary axis and the auxiliary axis for which the circular interpolation is being executed.
- The interpolation group No. being executed for the primary axis and the auxiliary axis for which the circular interpolation has ended is cleared and becomes "0".

<Cause of alarm>

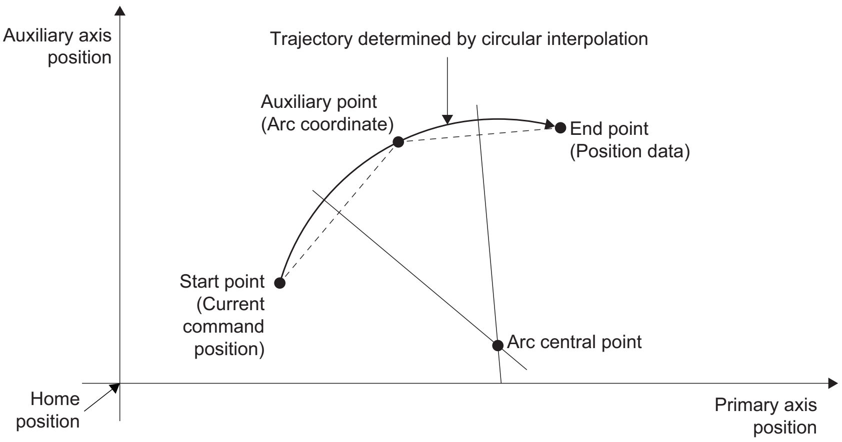
- When an axis No. exceeding the maximum number of controllable axes is set to the interpolation axis No.1 to 3, "Interpolation Point Data Error (operation alarm 41H, detail 03H)" occurs, and the operation is stopped.
- When the number of interpolation operation groups operating simultaneously exceeds the valid number of groups, "Interpolation Point Data Error (operation alarm 41H, detail 04H)" occurs, and the operation is stopped.
- When the axis No. of the interpolation operation auxiliary axis overlaps with the primary axis No. or another auxiliary axis No., "Interpolation Point Data Error (operation alarm 41H, detail 05H)" occurs, and the operation is stopped.

Auxiliary point-specified 2-axis circular interpolation control

The auxiliary point-specified 2-axis circular interpolation control performs the positioning from the current command position (start point) to the position set as the position data for the point data (end point) using an arc trajectory which passes through the auxiliary point set as the arc coordinate.
The control trajectory is the center of the arc of the point of intersection from the perpendicular bisectors of either the start point (current command position) to the auxiliary point (arc coordinate) or the auxiliary point (arc coordinate) to the end point (position data).

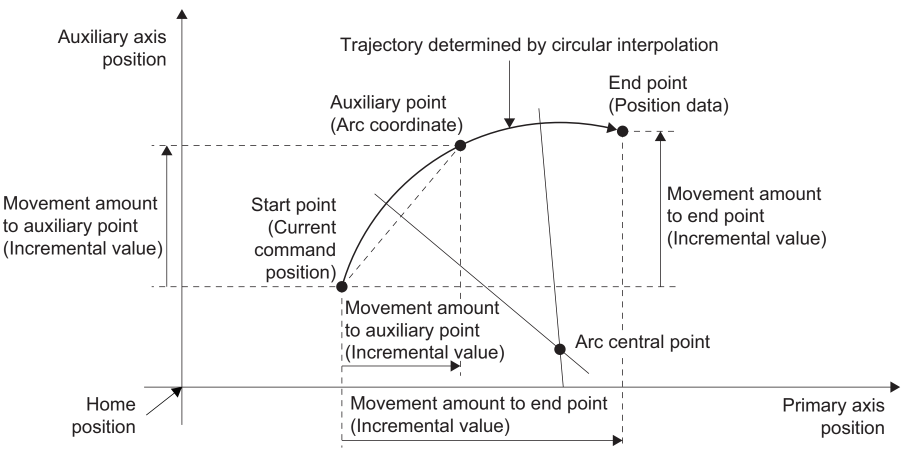
Auxiliary point-specified position command method

■When absolute position command is used



■When relative position command is used

The auxiliary point and the end point are specified by their relative position (incremental value) from the start point.



Restrictions

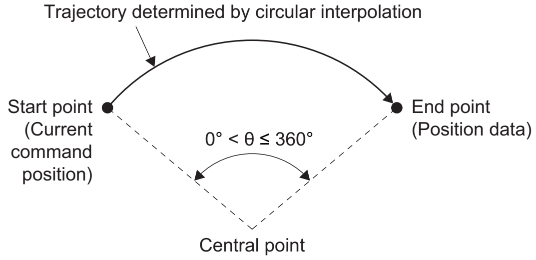
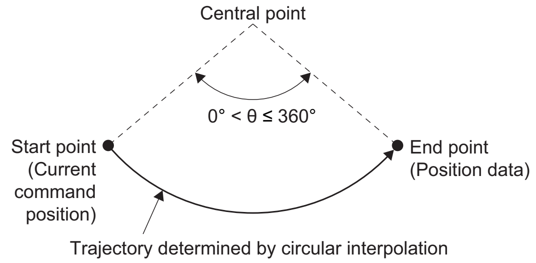
The following restrictions apply concerning use of the auxiliary point-specified 2-axis circular interpolation.

- In the cases below, "Interpolation Point Data Error (operation alarm 41H)" occurs and the operation cannot be started. For cases that occur during the operation, an immediate stop occurs when an operation alarm is detected.

Description	Alarm No.	Detail No.
When the radius exceeds "536870912 (=2^{29})".	41H	1AH
When the position of the auxiliary point is outside the range of "-2147483648 (-2^{31}) to 2147483647 (2^{31}-1)".		14H
When the position of the end point is outside the range of "-2147483648 (-2^{31}) to 2147483647 (2^{31}-1)".		16H
When the position of the central point is outside the range of "-2147483648 (-2^{31}) to 2147483647 (2^{31}-1)".		19H
When the start point = end point.		15H
When the start point = auxiliary point.		11H
When the end point = auxiliary point.		12H
When the start point, the auxiliary point, and the end point form a straight line.		13H

Central point-specified 2-axis circular interpolation control

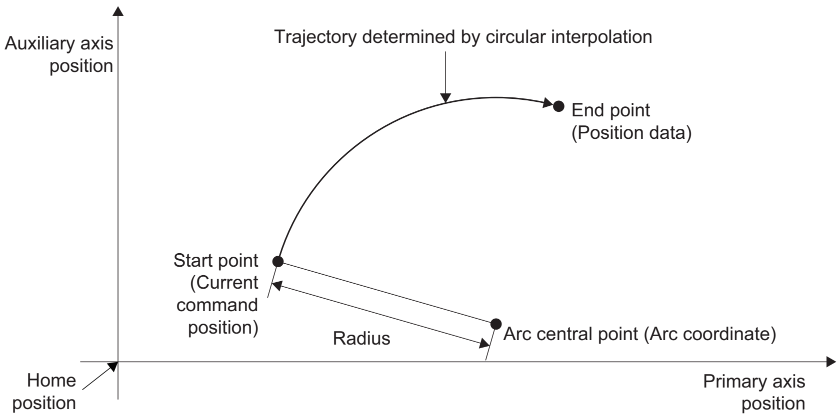
The central point-specified 2-axis circular interpolation control performs the position control using an arc trajectory with the arc coordinate at its center while interpolating in accordance with the designated arc direction.
The following shows a trajectory determined by the circular interpolation that has a controllable arc angle and the rotation direction set according to the interpolation method.

<table>
<tr><th>Interpolation method</th><th>Rotation direction</th><th>Controllable arc angle</th><th>Positioning path</th></tr>
<tr><td>Central point-specified circular interpolation (CW)</td><td>Clockwise</td><td rowspan="2">0° < θ ≤ 360°</td><td>
</td></tr>
<tr><td>Central point-specified circular interpolation (CCW)</td><td>Counterclockwise</td><td>
</td></tr>
</table>

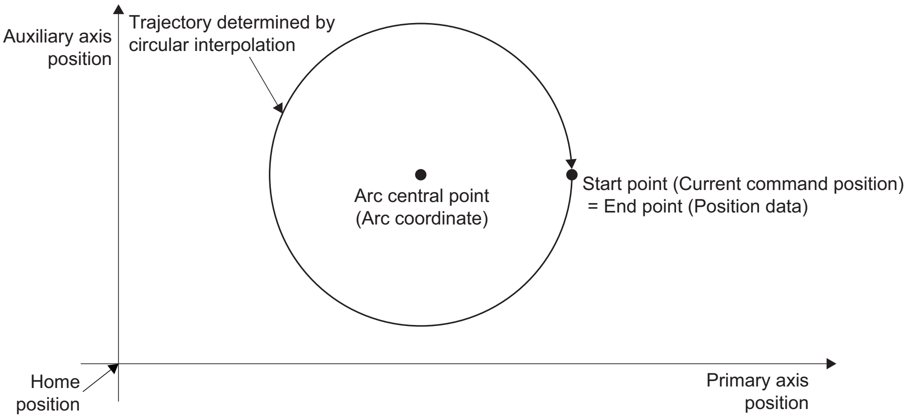
Central point-specified position command method

■When absolute position command is used

The interpolation control is performed from the current command position (start point coordinate) to the position set as the position data for the point data (end point coordinate) using an arc trajectory with the central point coordinate set as the arc coordinate at its center.

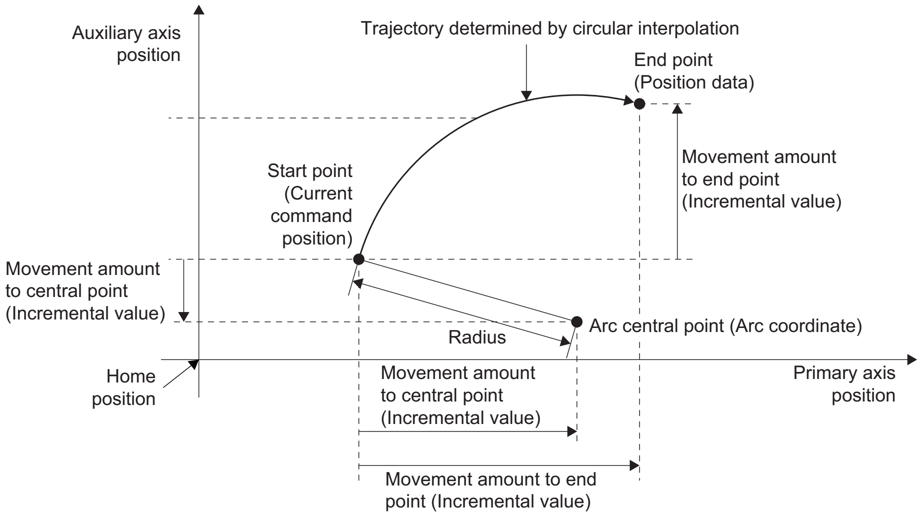


If the end point coordinate (position data) is set to be identical to the start point coordinate, the interpolation control for a perfect circle that has a radius comprised of the start point coordinate and the arc central point is possible.

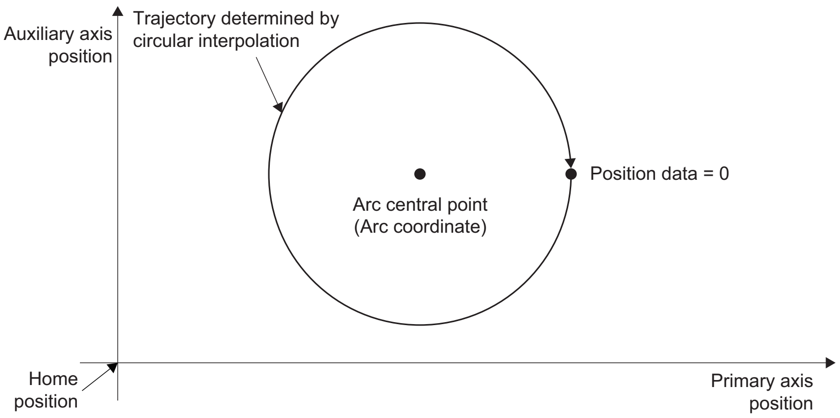


■When relative position command is used

The interpolation control is performed from the current command position (start point) to the movement amount (incremental value) position(s) set as the position data for the point data using an arc trajectory with the central point coordinate set as the arc coordinate at its center.

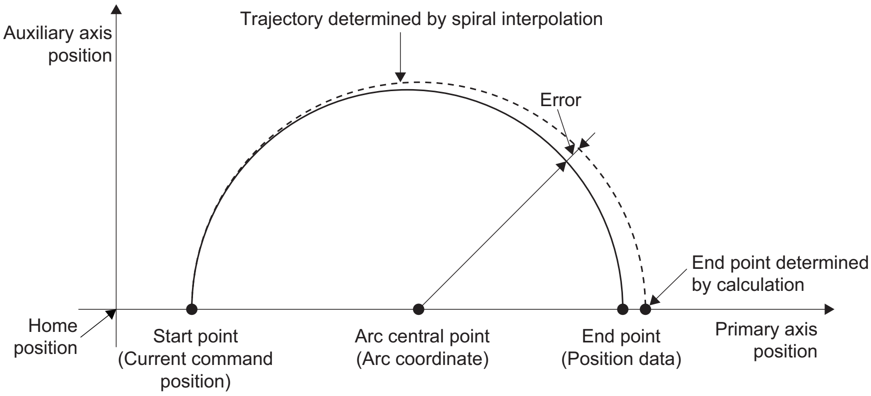


By setting the position data for the point data to "0", the interpolation control for a perfect circle that has a radius comprised of the start point and the central point is possible.



Error compensation

For the central point-specified 2-axis circular interpolation control, the arc trajectory calculated from the start point and the central point may be out of the position of the end point set as the position data for the point data.
When the calculated error is within "Allowable error range for circular interpolation (parameter No.02CC, 02CD)", both the interpolation control to the set end point and the error compensation are performed simultaneously. (This is known as "spiral interpolation".)



For the central point-specified 2-axis circular interpolation control, the radius is calculated from the start and the central points; the top of this radius is then used to calculate the angular speed on the assumption that it is operating at the feed speed, following which radius compensation is performed in proportion to the angular speed by which it moved from the start point. Therefore, when there is a difference (error) between "radius calculated from the start point and the central point (start point radius)" and "radius calculated from the end point and the central point (end point radius)", the vector speed and the feed speed vary as shown below.

■When the start point radius > end point radius

Compared to the case without an error, the speed gets slower as the end point is approached.

■When the start point radius < end point radius

Compared to the case without an error, the speed gets faster as the end point is approached.

Restrictions

The following restrictions apply concerning use of the central point-specified 2-axis circular interpolation.

- In the cases below, "Interpolation Point Data Error (operation alarm 41H)" occurs and the operation cannot be started. For cases that occur during the operation, an immediate stop occurs when an operation alarm is detected.

Description	Alarm No.	Detail No.
When the radius exceeds "536870912 (=2^{29})".	41H	1AH
When the start point coordinate = central point coordinate.		17H
When the end point coordinate = central point coordinate.		18H
When the central point coordinate is outside the range of "-2147483648 (-2^{31}) to 2147483647 (2^{31}-1)".		19H
When the position of the end point is outside the range of "-2147483648 (-2^{31}) to 2147483647 (2^{31}-1)".		16H
When the difference between the radius of the start/central points and the radius of the end/central points exceeds "Allowable error range for circular interpolation (parameter No.02CC and 02CD)".		10H

Start operation method

The start operation is performed according to the following procedure.

Operating procedure

1. Set the interpolation group, the interpolation speed limit value, and the interpolation options in the control parameters. The group No. is only required when "Interpolation axis setting method" of "System option 5 (parameter No.004C)" is "0: Use control parameter", and is valid during system startup. Other than that, it is valid during writing of parameters.
2. Set the point table. At this time, all items are set up for the primary axis and only the position data is set up for the auxiliary axes. Settings for other items are invalid.
3. Set the start point No. and the end point No. for all of the axes in the group configuration. Set the setting so that the number of points for all of the axes is the same.
4. Turn ON the interpolation operation mode signal (LIP) for all of the axes in the group.
5. Turn ON the fast start operation signal (FST) for the primary axis.

5

Point

- For the fast start operation signal (FST), input on a primary axis only.
- To stop the operation, turn ON the stop operation signal (STP) of any axis in the interpolation group.
- The current operation point No. can be confirmed through the operation point No. of the axis status table (same as "Operation point No. (monitor No.030AH)").
- The start point No. for the point table is "0".
- The point table is a total of 2048 points for all axes. The number of points distributed to each axis can be adjusted using the point No. offset. For details, refer to the following.
  ☞ Page 641 Point No. Offset
- When using the point table in the loop method, the primary axis setting values are valid for the latest command point No. and the start point No./end point No. of the loop. Update the latest command point No. after writing the point tables of all axes in the group.

Point

[API library]
- To set up the point data as shown 2., use the sscSetPointDataEx function.
- To perform the procedures 3. to 5., use the sscInterpolationStart function.
- To perform the stop operation, use the sscDriveStop function/sscDriveStopNoWait function.
- To confirm the completion of the operation, use the sscGetDriveFinStatus function/sscWaitIntDriveFin function.
- To set/get the point No. offsets, use the sscSetPointOffset function/sscCheckPointOffset function.

Exceeding speed limits for each axis

The setting for "Excessive speed processing" of "Interpolation options (parameter No.0261)" is invalid for the circular interpolation. In the feed speed, set the value for each axis so that the speed does not exceed the speed limit value. (The speed calculated by the position board is not restricted by the speed limit value.)

Restrictions

The following restrictions apply concerning use of the circular interpolation.

- "Interpolation Start Up Error (operation alarm 40H)" occurs in a primary axis for the following.

Description	Alarm No.	Detail No.
If an axis with anything other than the interpolation operation mode signal (LIP) selected exists in the same group.	40H	01H
If a single group is set with either 1 axis or 3 or more axes.		02H
If a group No. that exceeds the valid group No. is set when performing the start operation for the interpolation operation.		03H
If the axes in the group are set with a varying number of points.		04H
If "Speed unit" of "Control option 1 (parameter No.0200)" is set to "2: r/min".		05H

- If the auxiliary axis is in the operation or in the alarm state when in the interpolation operation mode, "Can't Start Interpolation Auxiliary Axis Error (operation alarm 42H)" occurs in the primary axis.
- If an alarm occurs during the operation, the corresponding alarm occurs in the axis where an error occurred, and "Group Error (operation alarm 16H, detail 01H)" occurs in all the other axes in the group.
- If any of the axes set below is within the group, "Out of Software Limit Boundaries (operation alarm A1H, detail 01H)" or "Reached Software Limit (operation alarm A2H, detail 01H)" occurs.

Description	Alarm No.	Detail No.
If the start point coordinate is outside software limits and there is movement away from the direction of the movement allowed area.	A1H	01H
If either the end point or auxiliary point (when using auxiliary point-specification) coordinates are outside software limits.		
If software limits are reached during the operation.[*1]	A2H	01H

*1 In this case, a deceleration stop occurs when the limit is reached.

- The command change signal is input into the primary axis for the following. The input of the signal into auxiliary axes is invalid. (Not compatible when changing position. The position change error occurs.)
  - When changing speeds
  - When changing time constants
- The continuous operation position over-bound processing operates through "2: Stop firmly at command position" regardless of "Continuous operation position over-bound processing" of "Control option 2 (parameter No.0201)" settings.
- Circular interpolation is not supported by the interference check function. "Interference Check Axis Setting Error (operation alarm 43H, detail 0FH)" is output at circular interpolation operation start up and operation start up is stopped. For continuous operation, a deceleration stop occurs.
- When using the other axes start, if the self-axis pass data for the other axis start is either "start point coordinate ≤ end point coordinate < axis pass position data" or "axis pass position data < end point coordinate ≤ start point coordinate", the axis judgement coordinate is judged as being outside limits. ("Other Axes Start Setting Error (operation alarm 4DH, detail 12H)") Segment the arc trajectory and set the point table as necessary.
- When performing the circular interpolation in high accuracy, use the same type of servo amplifier for the interpolation group. When using different types of servo amplifier such as a combination of MR-J4(W_)-_B and MR-J5(W_)-_B, the trajectory may not be kept.
- When using the smoothing filter, the smoothing time constant must be set to all axes. When the smoothing time constant setting differs between the primary axis and the auxiliary axis, the trajectory may not be kept.

5.8 Home Position Return

The home position return enables the establishment of a start position (home position) in the positioning control. By performing the home position return, the instructed coordinates can match with the machine coordinates. When the incremental system method is used, the home position return is required whenever tuning ON the power supply. On the other hand, when the absolute positioning detection system is used, performing the home position return restores the current command position even after the power supply is turned OFF. This makes a home position return unnecessary after the power is turned ON again. For the absolute position detection system, refer to the following.

☞ Page 203 Absolute Position Detection System

The following table shows the methods of home position return. Select the optimum method according to the configuration and application of the machine with "Home position return option 1 (parameter No.0240)". For any home position return method, when a home position return is completed, the current command position is a position set in "Home position coordinates (parameter No.0246, 0247)".

Method	Description
Home position return using a dog method	A method that uses the first Z-phase after the proximity dog rear end as the home position.
Home position return using a data set method	A method that uses a current position as the home position. No proximity dog or Z-phase is necessary.
Home position return using a stopper method	A method that uses the position of the collision stop caused by JOG operation or something similar as the home position. No proximity dog or Z-phase is necessary.
Home position return using a dog cradle method	A method that uses the first Z-phase after the proximity dog front end as the home position.
Home position return using a limit switch combined method	A method that uses the Z-phase prior to the limit switch of the opposite direction to the home position return direction as the home position.
Home position return using a limit switch front end method	A method that uses the limit switch front end of the opposite direction to the home position return direction as the home position. No proximity dog or Z-phase is necessary.
Home position return using a dog front end method	A method that uses the proximity dog front end as the home position. No Z-phase is necessary.
Home position return using a Z-phase detection method	A method that uses the nearest Z-phase as the home position. No proximity dog is necessary.
Home position return using a scale home position signal detection method	A method that uses the linear scale home position signal as the home position.
Home position return using a scale home position signal detection method 2	A method that uses the nearest linear scale home position signal as the home position for home return direction. No proximity dog is necessary.

Point

- When using the following home position return methods, set the proximity dog signal and the limit switch signal so that the Z-phase can be passed during home position return.
  · Home position return using a dog method
  · Home position return using a dog cradle method
  · Home position return using a limit switch combined method
- When performing home position return using a Z-phase detection method, the Z-phase is required to be passed through with the JOG operation etc. When the Z-phase is not passed, "Z-phase Not Passed (operation alarm 91H, detail 01H) occurs. However, when "1: Not need to pass motor Z phase after the power supply is switched on" is selected in "Home position setting condition selection" of "Function selection C-4 (MR-J4(W_)-_B: parameter No.1190, MR-J5(W_)-_B: parameter No. 20A3 [MC300])", the home position return can be executed even when the Z-phase is not passed, and the restriction above is removed.
- Set "1: Valid" in "No home position" of "Control option 1 (parameter No.0200)" when setting the position at the time of power on as the home position. Once a home position return is performed, a position determined by the home position return is set to the home position.
- In the home position return, smoothing filter is invalid.
- In the Z-phase detection method, "2: Shortcut direction" can be selected for "Home position return direction" of "Home position return option 1 (parameter No.0240)". When shortcut direction is selected in other home position return methods than Z-phase detection method, "Home Position Return Parameter Setting Error (operation alarm 9DH, detail 03H)" occurs when the operation starts.

Home position return method

The home position return method with "Home position return option 1 (parameter No.0240)".

Type	Software version	Description
Using MR-MC2_ _	A4 or earlier	Set "Home position return method" of "Home position return method option 1 (parameter No.0240)". The value at system startup is effective. Therefore, the system needs to be restarted if the parameters are changed.
	A5 or later	"Home position return method" of "Home position return method option 1 (parameter No.0240)" can be changed while the system is running.
Using MR-MC3_ _	No restriction	

Point

- When home position return method is changed during home position return, the new home position return method becomes valid at the startup of the next home position return.
- Home position return direction and proximity dog input polarity cannot be changed while the system is running.
- When Z-phase detection is set to home position return method and shortcut direction is set for home position return direction, the home position return method cannot be changed while the system is running. If the home position return is changed, "Home Position Return Parameter Setting Error (operation alarm 9DH, detail 03H)" occurs at the next home position return startup.
- When a home position return method that does not exist in the home position return setting range is selected, "Home Position Return Parameter Setting Error (operation alarm 9DH, detail 04H)" occurs at the home position return startup.

Start operation method

The start operation is performed according to the following procedure.

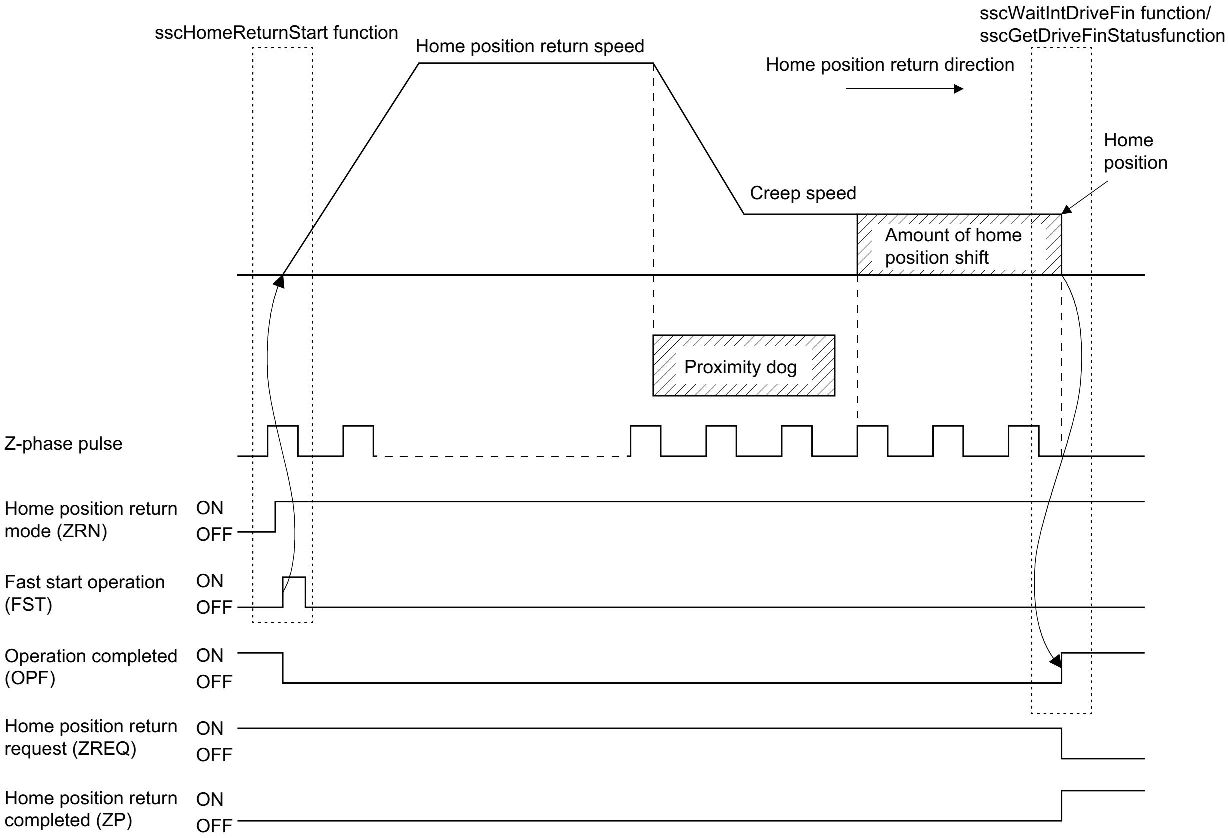
Operating procedure

1. Set "Home position return speed (parameter No.0242, 0243)", "Home position return acceleration time constant (parameter No.0244)", "Home position return deceleration time constant (parameter No.0245)", "Home position coordinates (parameter No.0246, 0247)", "Creep speed (parameter No.024C)", and "Home position return direction (parameter No.0240)".

2. Turn ON the home position return mode signal (ZRN).

3. Turn ON the fast start operation signal (FST).

4. When the home position return is completed, the home position return request signal (ZREQ) turns OFF and the home position return completed signal (ZP) turns ON.



Point

- Set "Amount of home position shift (parameter No.0248, 0249)" and "Home position search limit (parameter No.024A, 024B)" if required.
- When the home position return is completed, the home position return completed signal (ZP) turns ON. The home position return completed signal (ZP) turns OFF at the next start operation or at the operation mode change.
- The home position return request signal (ZREQ) turns ON when the home position return starts.

Point

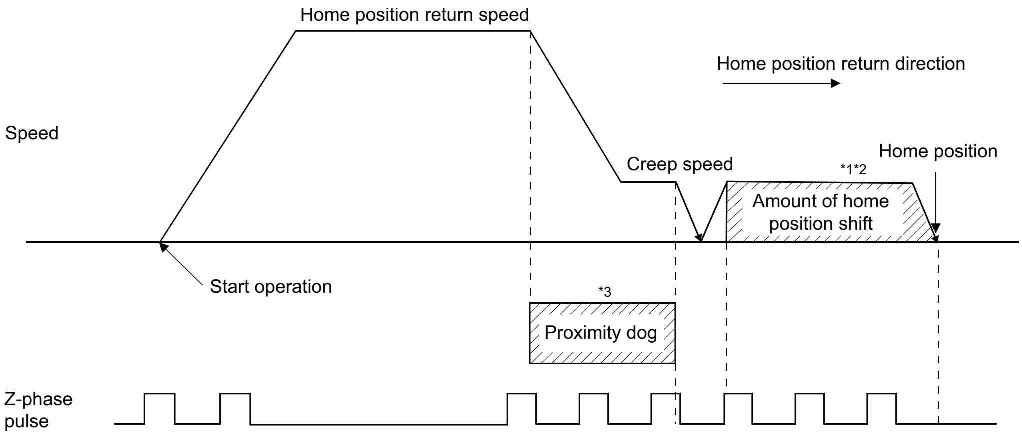
[API library]

- To perform the procedures 2. to 3., use the sscHomeReturnStart function.
- To confirm the completion of the operation, use the sscGetDriveFinStatus function/sscWaitIntDriveFin function.
- To perform the stop operation, use the sscDriveStop function/sscDriveStopNoWait function.
- For a detailed procedure from the startup of the home position return to confirm the completion of the operation, refer to the sample programs (InterruptDrive/PollingDrive) contained on the utility software.

Home position return using a dog method

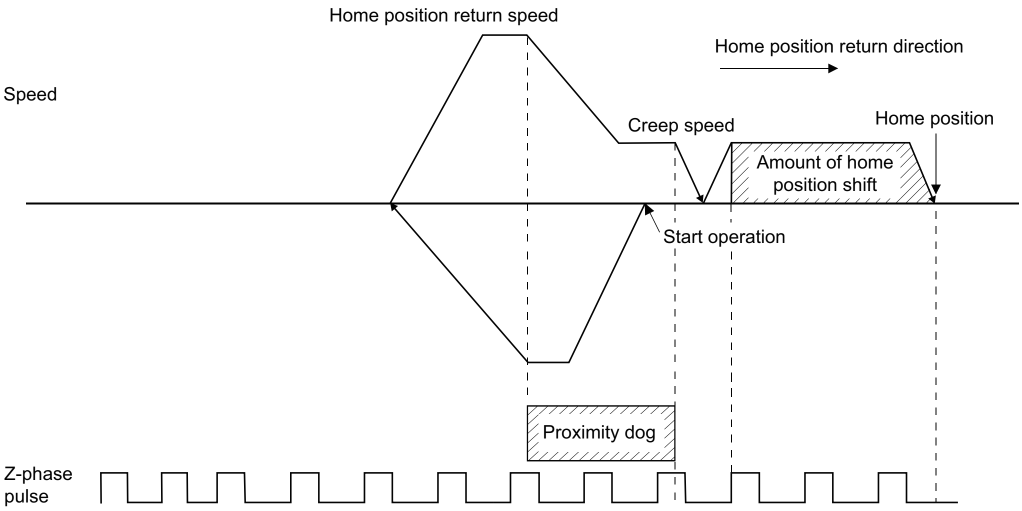
The deceleration is started at the front end of the dog, and the first Z-phase after passing the rear end of the dog is defined as the home position.

When there is a proximity dog in the direction of home position return



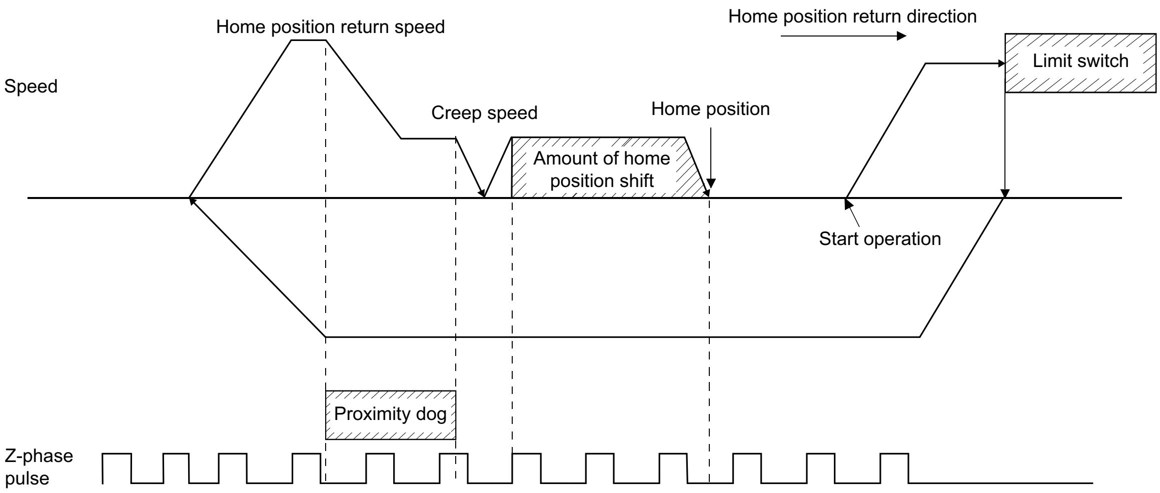
*1 The amount of home position offset is set to "Amount of home position shift (parameter No.0248, 0249)".
*2 If the amount of shift in the home position is zero, the servo stops above the Z-phase.
*3 The polarity of the proximity dog input signal can be changed using "Home position return option 1 (parameter No.0240)". (The above figure shows the case of the normally closed contact.)

When the dog is on at start operation



5

When the proximity dog is in the opposite direction against the direction of home position return



If a limit switch is detected at the start operation position

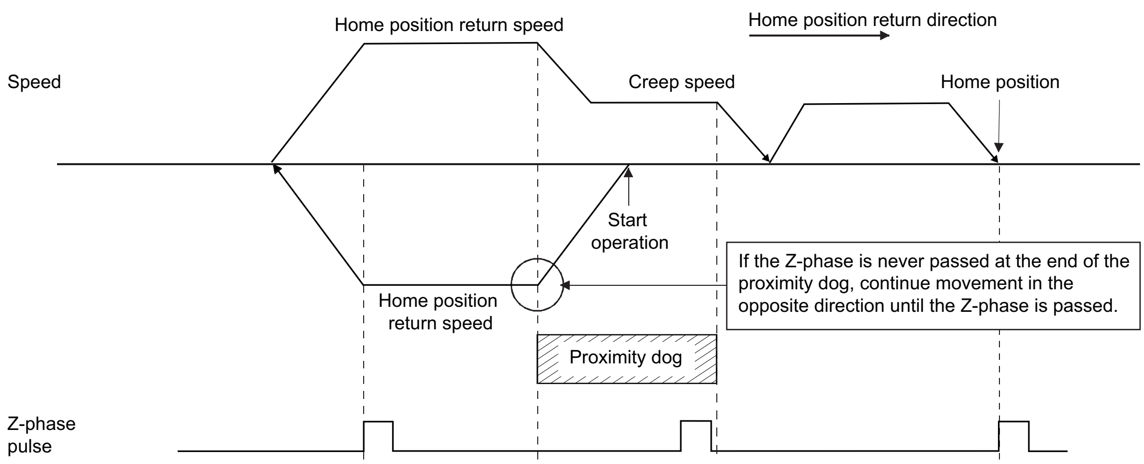
If a limit switch in the direction of home position return is detected, the home position return should be executed by the following pattern.

☞ Page 134 When the proximity dog is in the opposite direction against the direction of home position return

Also, if the limit switch is in the opposite direction against the direction of home position return, the home position return should be executed by the following pattern.

☞ Page 133 When there is a proximity dog in the direction of home position return

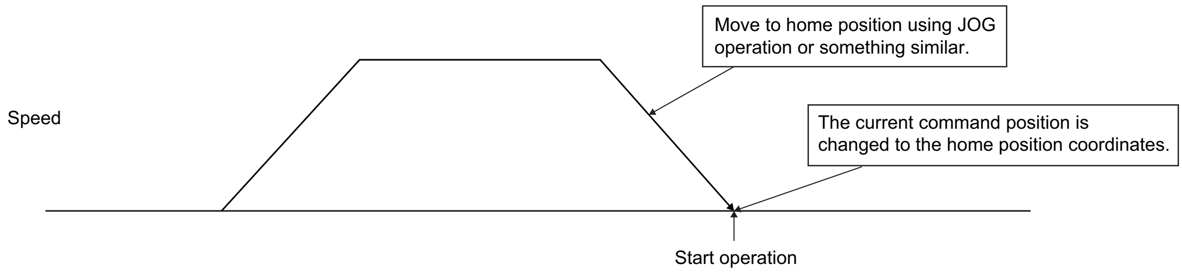
When the start operation position is on a dog and when moving in the opposite direction the Z-phase was not traveled through until the dog is turned OFF



Home position return using a data set method

The command position at the start operation of the home position return is defined as the home position. It is necessary to move to home position using JOG operation or something similar in advance.

When the home position is the current command position



Point

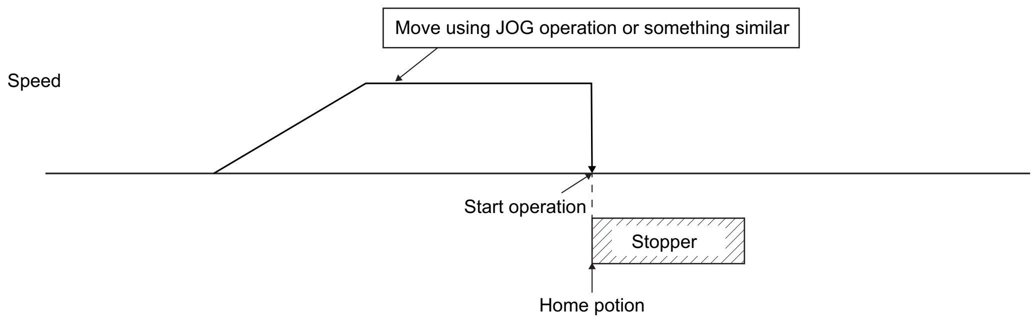
If the limit switch signal is turned OFF when the operation is started, "Limit Switch (operation alarm A0H, detail 01H)" occurs and home position return cannot be executed.

Home position return using a stopper method

When start operation is performed for home position return using stopper method, droop pulse is cleared and current feedback position is defined as the home position.

It is necessary to move using JOG operation or something similar in advance and to execute the collision stop from the stopper using torque limit functions. For the torque limit, refer to the following.

☞ Page 174 Torque Limit



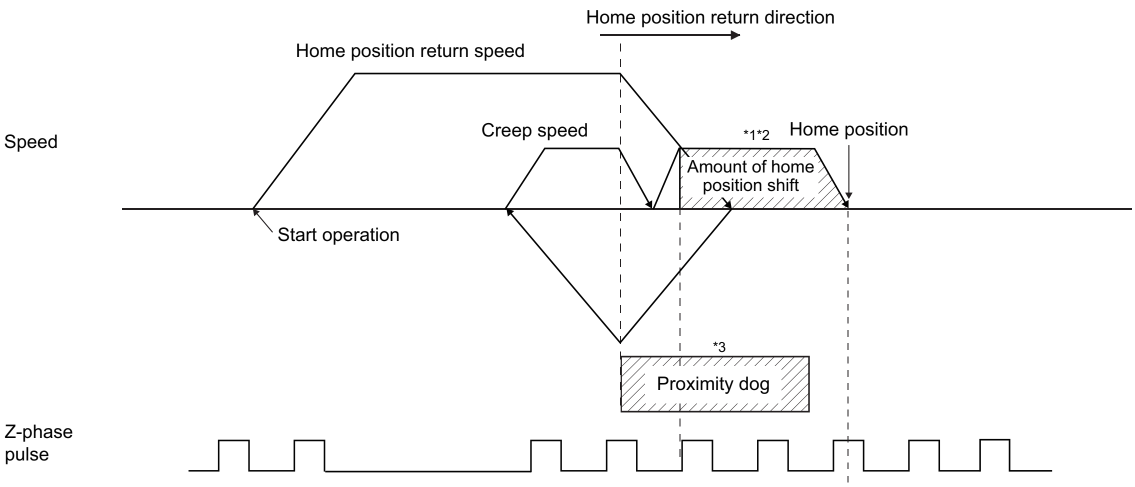
Point

- If the torque limit effective signal (TLC) is turned OFF when the operation is started, "Not Limiting Torque (operation alarm 95H, detail 01H)" occurs and the home position return cannot be executed.
- If the home position return direction and the stopper method direction are opposite, "Home Position Return Direction Error (operation alarm 94H, detail 01H)" occurs and the home position return cannot be executed.

Home position return using a dog cradle method

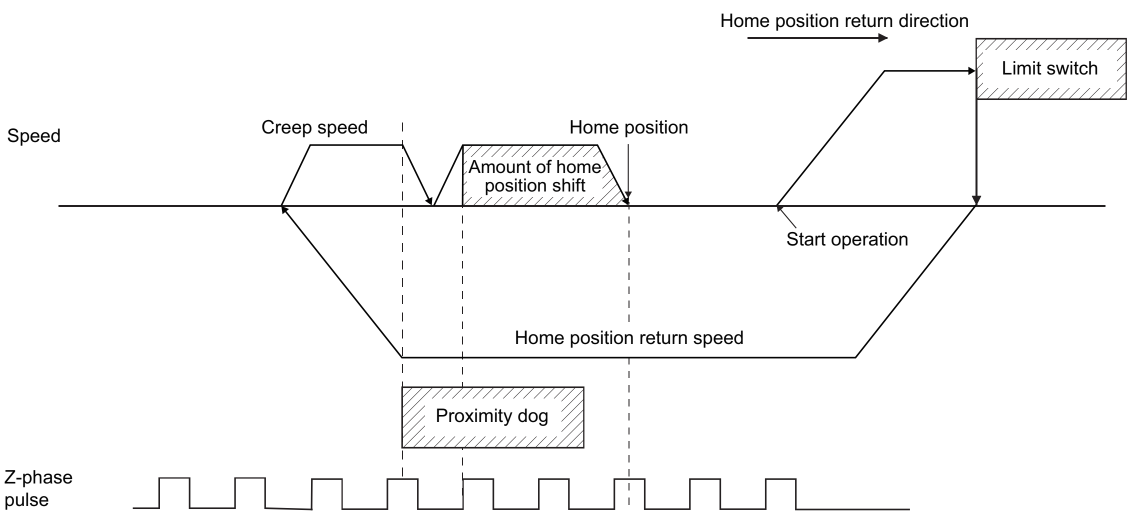
A method where deceleration is started at the front end of the dog, then return briefly to the front end of the dog, and start moving again at a creep, and that uses the first Z-phase after the dog front end passes as the home position.

When there is a proximity dog in the direction of home position return

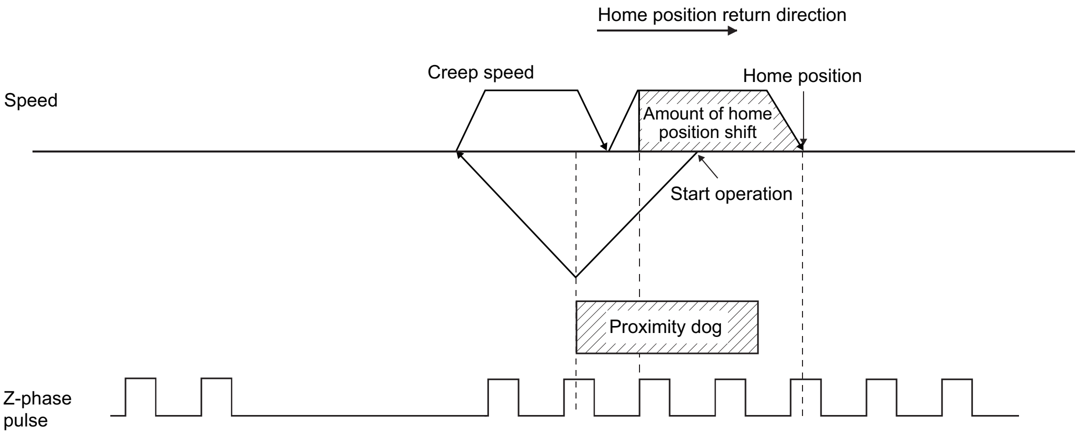


*1 The amount of home position offset is set to "Amount of home position shift (parameter No.0248, 0249)".
*2 If the amount of shift in the home position is zero, the servo stops above the Z-phase.
*3 The polarity of the proximity dog input signal can be changed using "Home position return option 1 (parameter No.0240)". (The above figure shows the case of the normally closed contact.)

When the proximity dog is in the opposite direction against the direction of home position return



When the start operation position is on the dog



If a limit switch is ON at the start operation position

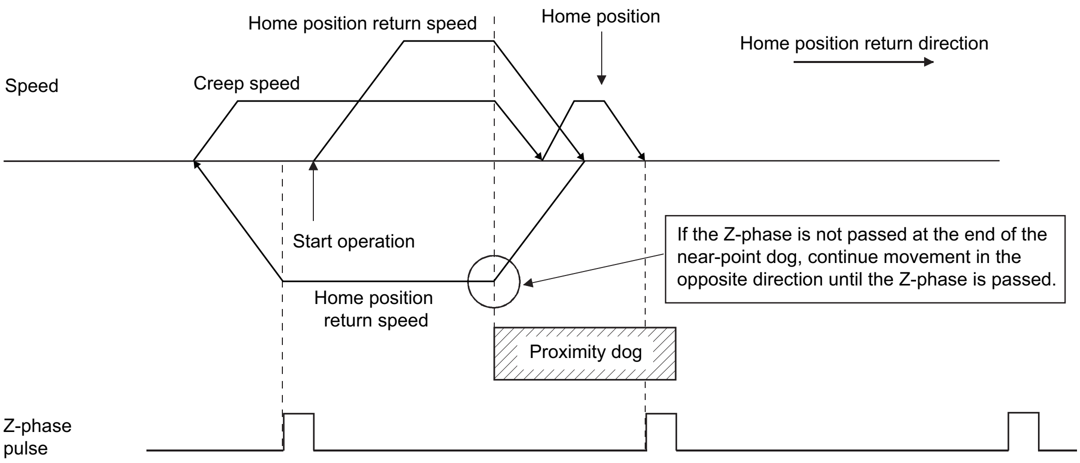
If the limit switch in the direction of home position return is ON, the home position return should be executed by the following pattern.

☞ Page 136 When the proximity dog is in the opposite direction against the direction of home position return

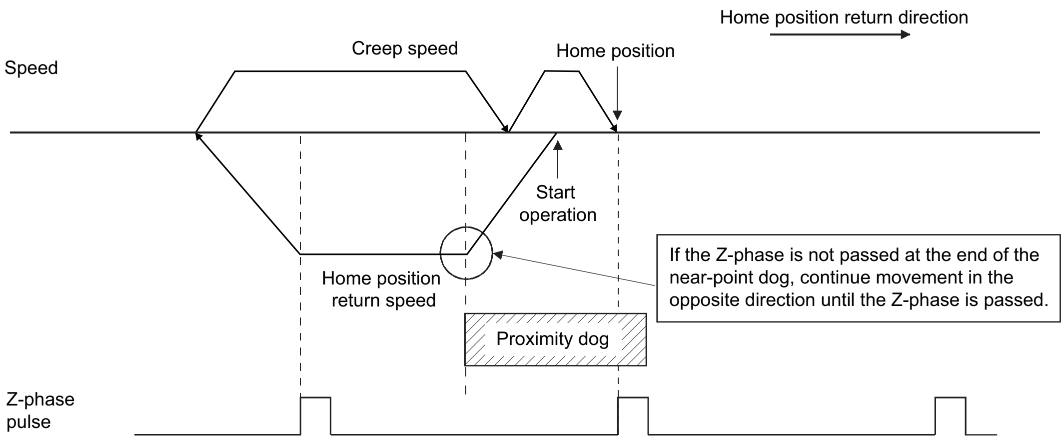
Also, if the limit switch in the opposite direction against the direction of home position return is ON, the home position return should be executed by the following pattern.

☞ Page 136 When there is a proximity dog in the direction of home position return

When the start operation position is on a dog and when moving in the opposite direction the Z-phase is not traveled through until the dog is turned OFF

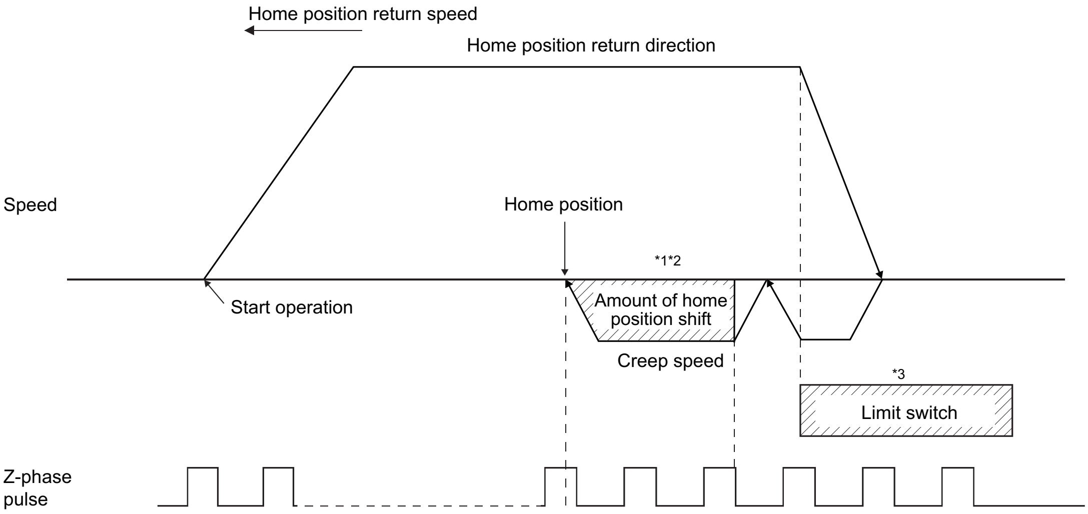


When the start operation position is on a dog and when moving in the opposite direction the Z-phase is not traveled through until the dog is turned OFF



Home position return using a limit switch combined method

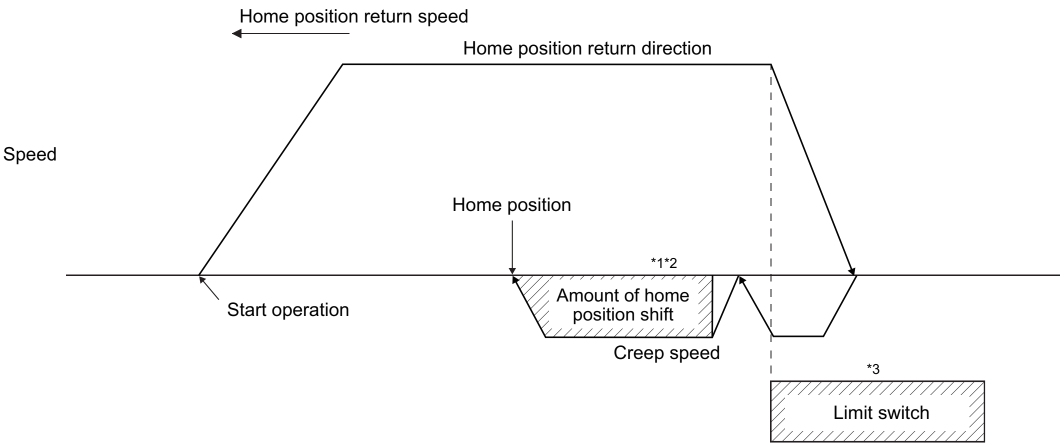
The Z-phase prior to the limit switch of the opposite direction to the home position return direction is defined as the home position.



*1 The amount of home position offset is set to "Amount of home position shift (parameter No.0248, 0249)".
*2 If the amount of shift in the home position is zero, the servo stops above the Z-phase.
*3 Polarity of the limit switch signal is only defined for normally-closed contact.

Home position return using a limit switch front end method

In the home position return using a limit switch front end method, the limit switch front end that is opposite to the home position direction is defined as the home position.



*1 The amount of home position offset is set to "Amount of home position shift (parameter No.0248, 0249)".
*2 If the amount of shift in the home position is zero, the limit switch front end.
*3 Polarity of the limit switch signal is only defined for normally-closed contact.

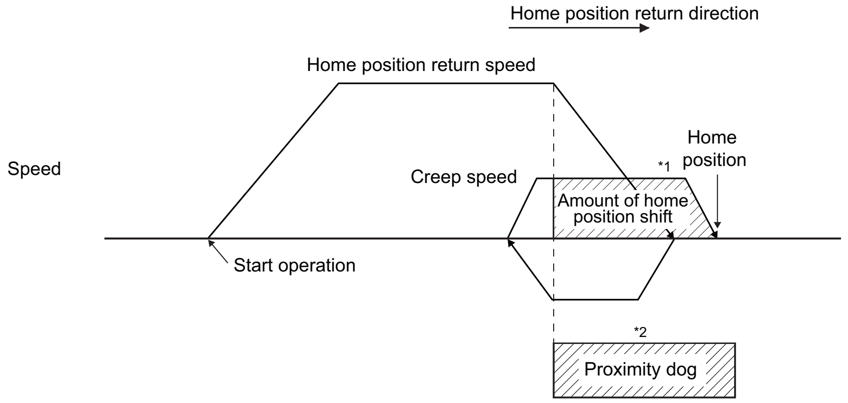
Point

A dispersion of the home position occurs depending on the detection timing of the limit switch front end. When this dispersion is a problem, the dispersion can be smaller by reducing the creep speed.

Home position return using a dog front end method

In the home position return using a dog front end method, the motion detected by the proximity dog front end slows down to stop, and return to the proximity dog front end at creep speed, setting there to the home position.

When there is a proximity dog in the direction of home position return

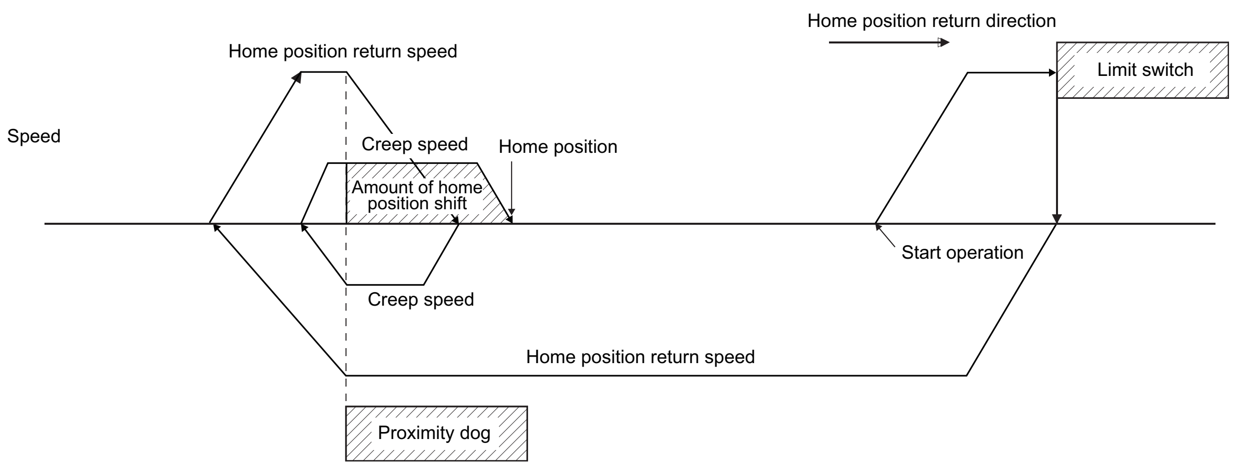


*1 The amount of home position offset is set to "Amount of home position shift (parameter No.0248, 0249)".
*2 If the amount of shift in the home position is zero, the servo stops at the proximity dog front end.

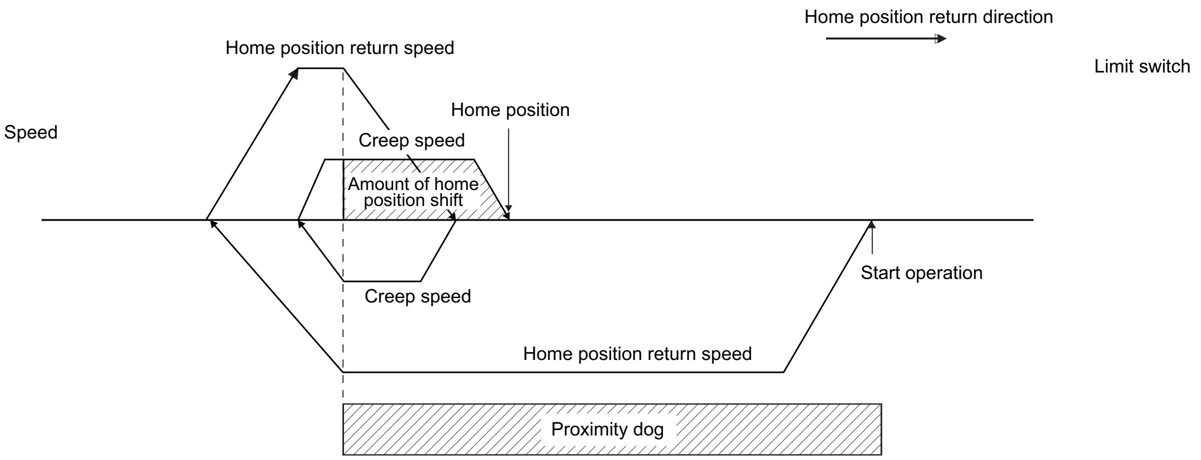
Point

A dispersion of the home position occurs depending on the detection timing of the dog front end. When this dispersion is a problem, the dispersion can be smaller by reducing the creep speed.

When the proximity dog is in the opposite direction against the direction of home position return



When the start operation position is on the proximity dog



If a limit switch is ON at the start operation position

When the limit switch on the same side as the home position return direction is ON, the home position return should be executed by the following pattern.

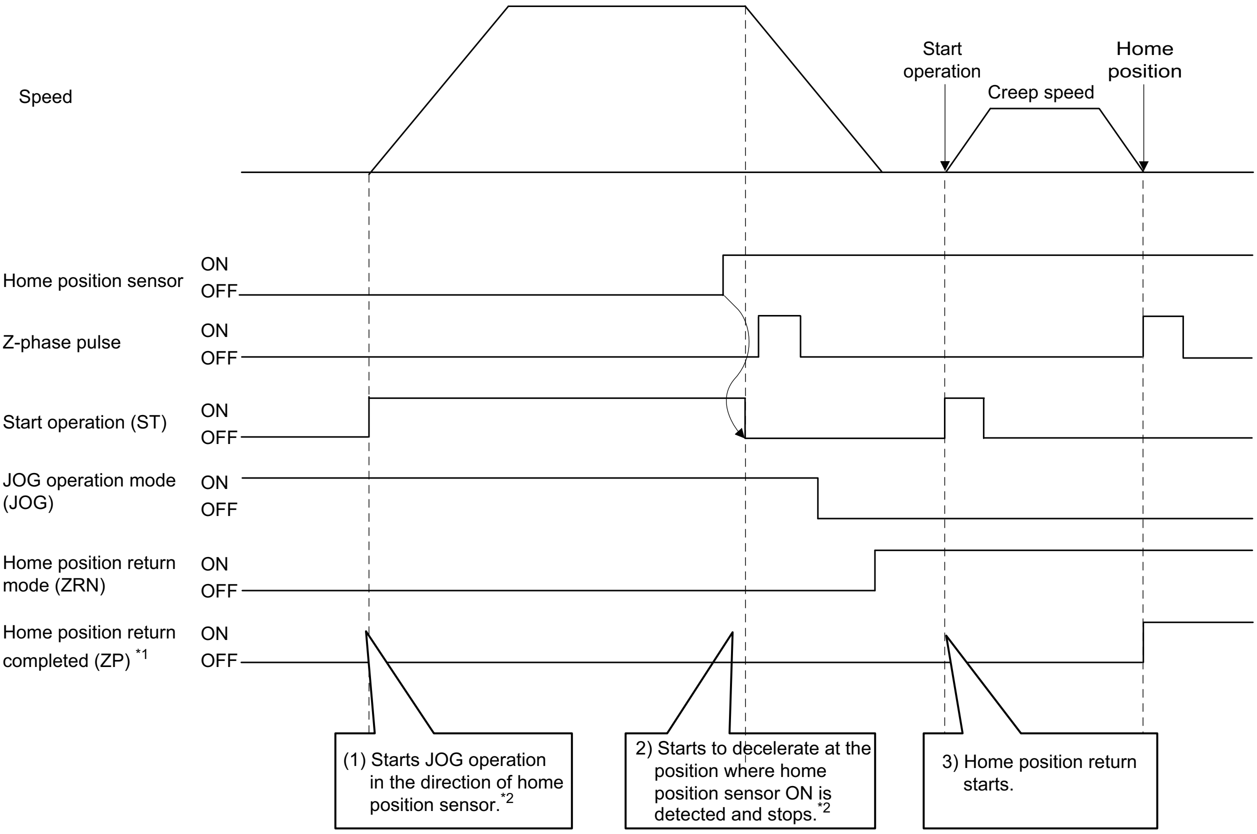
☞ Page 141 When the start operation position is on the proximity dog

Also, when the limit switch on the opposite side of the home position return direction is ON, the home position return should be executed by the following pattern.

☞ Page 140 When there is a proximity dog in the direction of home position return

Home position return using a Z-phase detection method

After moving from the position where home position return has started to the nearest Z-phase (in addition, after moving by shift amount when home position shift amount is set), home position return is completed. It is necessary to move to around home position using JOG operation or something similar in advance.
For "Home position return direction" of "Home position return option 1 (parameter No.0240)", in addition to - direction and + direction, shortcut direction can be selected. For the shortcut direction, home position return is operated to the direction where the movement amount gets small against Z-phase. At this time, code of the home position shift amount is consistent with the movement direction from the Z-phase. (Example: If home position shift amount is -100 [command unit], home position is the position moved from Z-phase by -100 [command unit].)



*1 When not passing Z-phase (ZPASS is tuned OFF), "Z-phase Not Passed (operation alarm 91H, detail 01H)" occurs when the operation starts and home position return cannot be executed. Perform the home position return after passing through Z-phase by JOG operation or something similar.

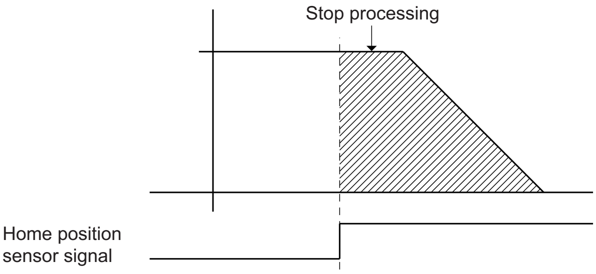
*2 Home position sensor signal is an externally installed signal and monitored by a user program. Execute the movement to around home position by this signal.

Point

- When limit switch signal of home position return direction is turned OFF, "Limit Switch (operation alarm A0H, detail 01H to 02H)" occurs when the operation starts and home position return cannot be executed.
- When "1: Searching again" is set to "Home position signal re-search" of "Home position return option 1 (parameter No.0240)", "Home Position Return Parameter Setting Error (operation alarm 9DH, detail 02H)" occurs when the operation starts and home position return cannot be executed. Always set to "0: Do not search again".

Cautions

In the sequence "(2) Starts to decelerate at the position where home position sensor ON is detected and stops" above, stop processing by response delay to the home position sensor signal and deceleration occurs during the time until the axis stops.



Stop processing = La + Lb + Lc + Ldc

La: Movement amount associated with delay time (Ta) from sensor-on to JOG operation stop command issued = (Moving speed) × Ta*1

Lb: Movement amount associated with delay time (Tb) of position board = (Moving speed) × Tb*2

Lc: Movement amount associated with delay of servo = (distance equivalent to drop pulse)*3

Ldc: Distance which deceleration takes = (Moving speed) × (Deceleration time) ÷ 2

*1 Depending on the specification of user program side

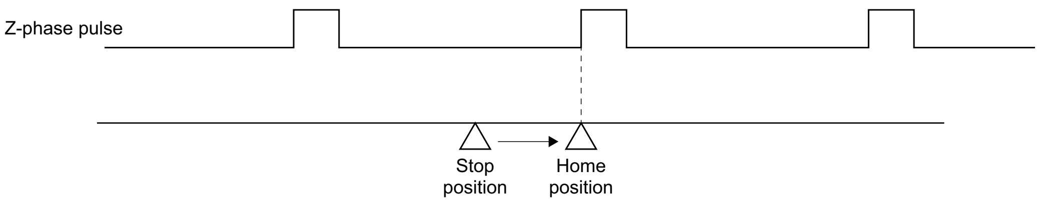
*2 Tb ≒ Control cycle × 2

*3 Droop pulse ≒ (N × Pt) ÷ (60 × PG1)
N: Motor speed [r/min]
Pt: Number of pulses per revolution
PG1: Position loop gain 1
(The unit of droop pulse calculated here is equivalent to the motor end encoder resolution.)

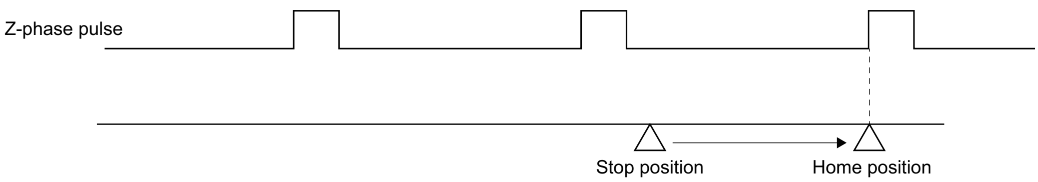
This stop processing changes depending on dispersion of the response delay of the sensor signal.

Therefore, reference encoder Z-phase of sequence 3) above may change by 1 revolution of the motor when stop position is near the encoder Z-phase by the relationship between home sensor position signal and encoder Z-phase.

- When stop position is before the encoder Z-phase



- When stop position is before the encoder Z-phase

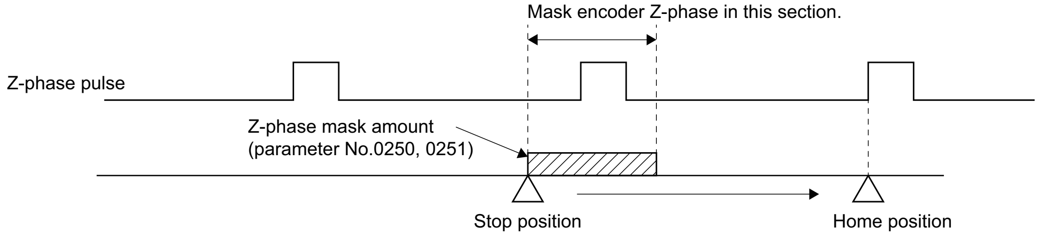


To avoid this event, adjust position relationship between home position sensor signal and encoder Z-phase, adjust the command speed of JOG operation or set correct value to "Z-phase mask amount (parameter No.0250, 0251)".

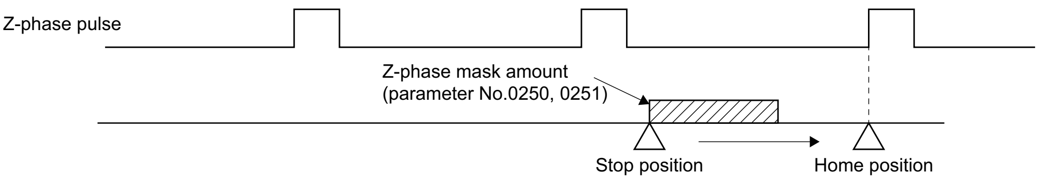
Encoder Z-phase mask amount

When the stop position is near the encoder Z-phase by the dispersion, the Z-phase position to be the home position can be fixed by setting encoder Z-phase mask amount.

- When stop position is before the encoder Z-phase



- When stop position is after the encoder Z-phase



Point

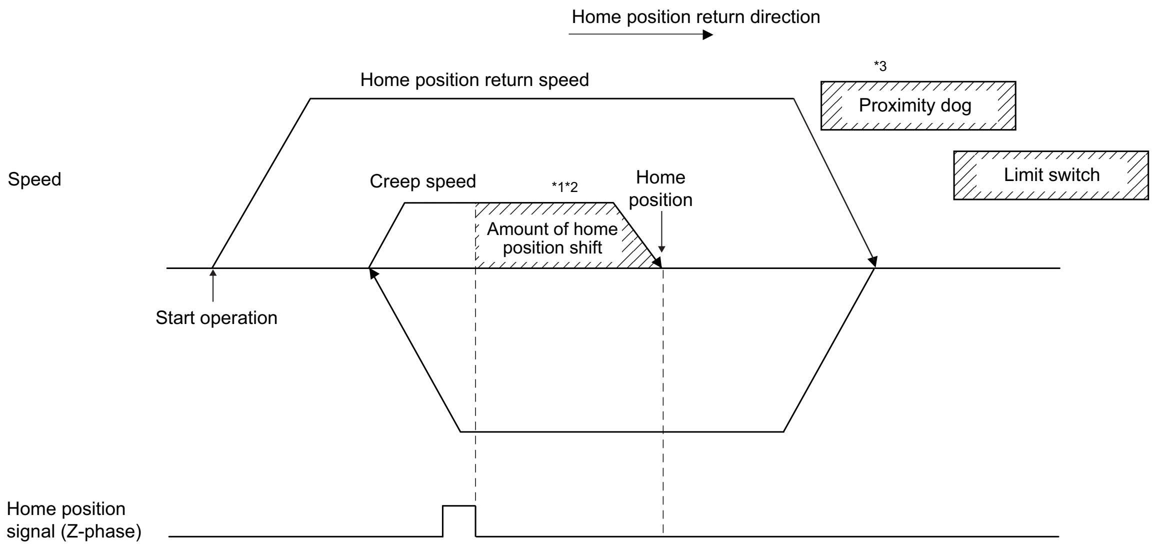
- When the stop position disperses largely, the home position may change by 1 revolution of the motor even when encoder Z-phase mask amount is set. In this case, adjust command speed to reduce the dispersion.
- When the following conditions are satisfied in the calculation of Z-phase mask amount, "Z-phase Mask Amount Setting Error (operation alarm 9CH, detail 01H)" occurs when the operation starts and home position return cannot be executed. Reexamine the setting value of the Z-phase mask amount.

  · The value calculated by Z-phase mask amount × electronic gear numerator (CMX) ÷ electronic gear denominator (CDV) exceeds 32bit.

  · The value calculated by the Z-phase mask amount + the movement amount to the Z-phase exceeds 32bit.

Home position return using a scale home position signal detection method

Home position return is performed using a home position signal (Z-phase) on a linear scale. After detecting the proximity dog, move in the opposite direction of the home position and the position where a home position signal is detected is defined to be the home position. When multiple home position signals on the linear scale, the nearest home position signal to the proximity dog is defined as the home position.

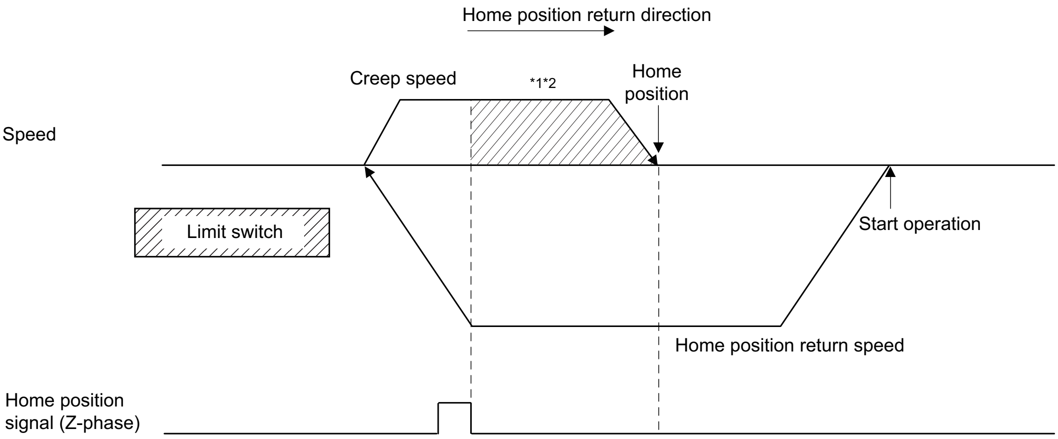


*1 The amount of home position offset is set to "Amount of home position shift (parameter No.0248, 0249)".
*2 If the amount of shift in the home position is 0, the servo stops on the Z-phase.
*3 When a limit switch signal is detected, an alarm occurs and execution of home position return is terminated.
Set the proximity dog signal before the limit switch signal.
Set the proximity dog signal to overlap with the limit switch signal as shown above.

5

Home position return using a scale home position signal detection method 2

Home position return is performed using a home position signal (Z-phase) on a linear scale. Move in the opposite direction of the home position and the position where a home position signal is detected is defined to be the home position. When multiple home position signals on the linear scale, the nearest home position signal in the opposite direction of home position return direction is defined as the home position.



*1 The amount of home position offset is set to "Amount of home position shift (parameter No.0248, 0249)".
*2 If the amount of shift in the home position is 0, the servo stops on the Z-phase.

Point

- When a limit switch signal is detected, an alarm occurs and execution of home position return is terminated. Set the home position signal before the limit switch signal.
- Start position is needed to be adjusted with a user program so that the Z-phase is passed.
- When there are multiple Z-phase, start position is needed to be adjusted with a user program so that the reference Z-phase is passed first.
- Z-phase mask function cannot be used.
- The servo returns to Z-phase after detecting the Z-phase, movement direction is reversed, which is different from home position return using a Z-phase detection method.

5.9 Home Position Reset Function (Data Set Function)

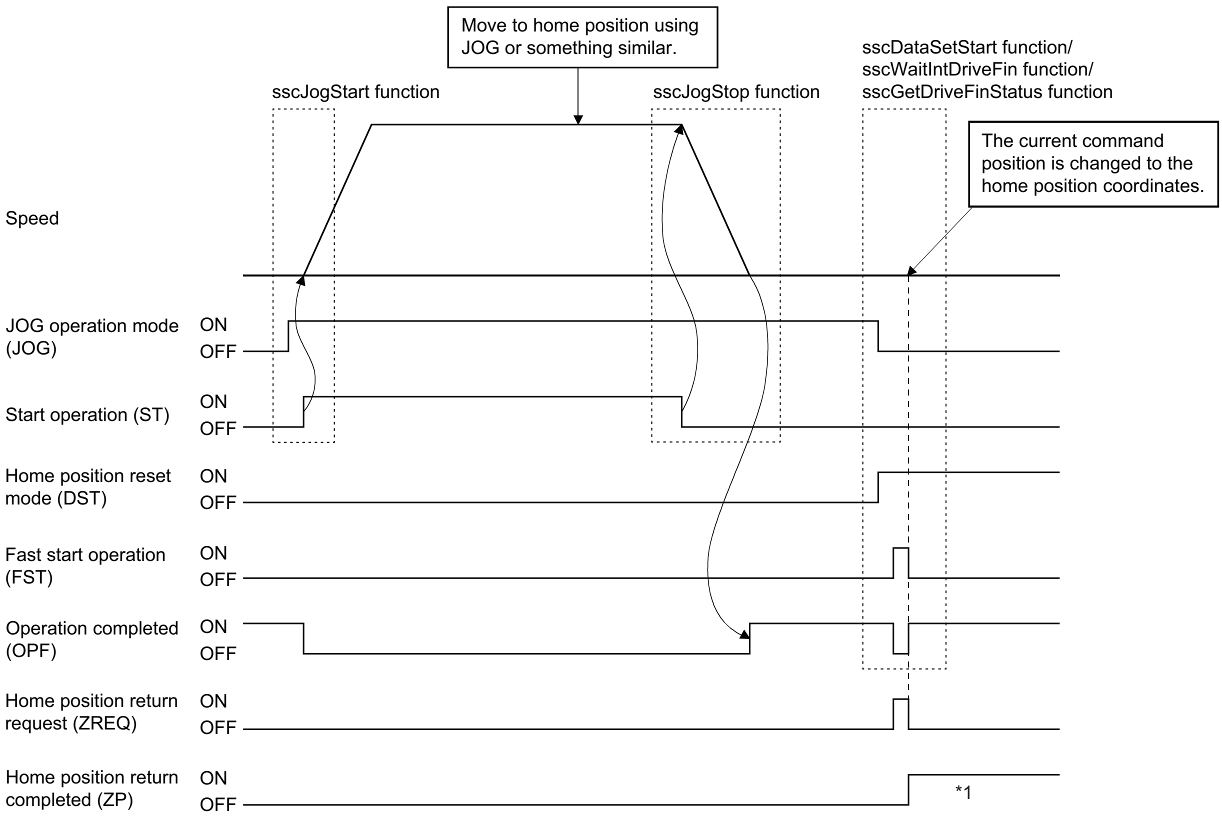
The home position reset function (data set function) is a function that resets the current command position to the home position. Prior to executing the home position reset function, set "Home position coordinates (parameter No.0246, 0247)". The movement is the same as the home position return using a data set method, where the current command position is changed to "Home position coordinates (parameter No.0246, 0247)". This function can be used independently of the home position return method. If absolute position detection system is used, whether or not data for absolute position detection system ("Home position multiple revolution data (parameter No.024D)", "Home position within 1 revolution position (parameter No.024E, 024F)") are changed can be selected using return to "Home position return option 2 (parameter No.0241)".
The home position reset function is valid after the home position return is completed. When the home position reset function is used prior to the home position return finish (the home position return request signal (ZREQ) is ON), "Home Position Return Not Complete (operation alarm 90H, detail 01H)" occurs.

Start operation method

The start operation is performed according to the following procedure.

Operating procedure

1. Move to an arbitrary position using the JOG operation or something similar.
2. Set the home position coordinates for resetting.
3. Turn ON the home position reset mode signal (DST).
4. Turn ON the fast start operation signal (FST).



*1 The home position return completed signal (ZP) is turned OFF at the next start operation.

Point

[API library]

- To perform the procedures 3. to 4., use the sscDataSetStart function.
- To confirm the completion of the operation, use the sscGetDriveFinStatus function/sscWaitIntDriveFin function.

6 APPLICATION FUNCTIONS

6.1 Command Unit

Position command unit - electronic gear

Set the position command (such as the position data of the point table and the incremental movement amount) by the position command unit.

"Electronic gear numerator (parameter No.020A, 020B)" and "Electronic gear denominator (parameter No.020C, 020D)" are used to adjust the position command unit. Through making changes to the electronic gears, it is possible to move the equipment using an arbitrary multiplication constant for the movement amount.

$$\text{Electronic gear} = \frac{\text{Electronic gear numerator (CMX)}}{\text{Electronic gear denominator (CDV)}}$$

Item		Setting range	Number of encoder pulses per revolution [pulse]*1	Maximum revolution speed [r/min]*2*3
Electronic gear	CMX	1 ≤ CMX ≤ 5242879 (When the speed unit is position command unit/s or position command unit/min)	To 67108864 (The resolution of up to 26bit is supported.)	Limit the speed to 2160000 × (262144/number of encoder pulses per revolution) × (CMX/CDV) or less, and to 4893355 × (262144/number of encoder pulses per revolution) or less.
		1 ≤ CMX≤477218 (When the speed unit is r/min)		
	CDV	1 ≤ CDV ≤ 589823		
	CMX/CDV	1/16 ≤ CMX/CDV ≤ 100000		

*1 When a linear servo motor is used, this becomes the value which is set as follows.
MR-J4(W_)-_B: "Stop interval selection at the home position return" of "Linear servo motor/DD motor function selection 1 (parameter No.1300)"
MR-J5(W_)-_B: "Stop interval settings for the home position return" of "Function selection L-1 (parameter No.22E5)" [MC300]

*2 When the command speed output to the servo amplifier from the position board exceeds the motor maximum revolution speed, the speed is limited to "Motor maximum revolution speed (monitor No.0114H)".

*3 When a linear servo motor is used, this is converted into maximum revolution speed [r/min] by the following formula.

$$\text{Maximum revolution speed [r/min]} = \frac{\text{Monitor maximum speed [m/s]} \times 1000 \times 1000 \times 60}{\text{Linear encoder resolution [μm/pulse]} \times \text{Stop interval setting for home position return [pulse]}}$$

However,

$$\text{Linear encoder resolution [μm/pulse]} = \frac{\text{Linear encoder resolution - Numerator (MR-J4(W\_)-B: parameter No.1301, MR-J5(W\_)-\_B: 22E6 [MC300])}}{\text{Linear encoder resolution - Denominator (MR-J4(W\_)-\_B: parameter No.1302, MR-J5(W\_)-\_B: 22E7 [MC300]))}}$$

Point

[MC300]
When replacing from MR-J4(W_)-_B to MR-J5(W_)-_B, set the electronic gear of the servo amplifier equivalent to the encoder resolution 22bit. If the electronic gear is not set appropriately, an error may occur when connecting to the servo amplifier.

Point

[API library]
To set/get the electronic gear, use the sscChange2Parameter function/sscCheck2Parameter function.

Ex.

Relationship between the setting range of the electronic gear and the corresponding maximum revolution speed

Number of encoder pulses per revolution [pulse]	Electronic gear (CMX/CDV)*1	Maximum revolution speed (limited) [r/min]
262144	1/16	135000
	1/1	2160000
	10/1	4893355
	10000/1	4893355
1048576	1/16	33750
	1/1	540000
	10/1	1223338
	10000/1	1223338
4194304	1/16	8437
	1/1	135000
	10/1	305834
	10000/1	305834
16777216	1/16	2109
	1/1	33750
	10/1	76458
	10000/1	76458
67108864	1/16	527
	1/1	8437
	10/1	19114
	10000/1	19114

*1 The smaller the setting value of the electronic gear (CMX/CDV) is, the more the maximum revolution speed is limited. If the maximum revolution speed is limited and the enough speed cannot be output, reexamine the command unit of the user program and make sure the setting value of the electronic gear (CMX/CDV) becomes larger. (The command unit becomes rough.)

Settings

Control parameters

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Function
020A	*CMXL	Electronic gear numerator (lower)	0001h	—	1 to 5242879 (32bit)	Set the numerator of the electronic gear.
020B	*CMXH	Electronic gear numerator (upper)	0000h			
020C	*CDVL	Electronic gear denominator (lower)	0001h	—	1 to 589823 (32bit)	Set the denominator of the electronic gear.
020C	*CDVH	Electronic gear denominator (upper)	0000h			

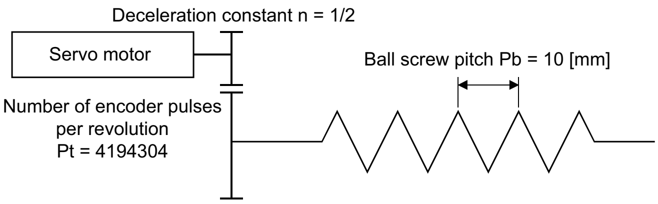
*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Setting example of electronic gears

The following is a setup example for use of "μm" as a command unit for a piece of equipment that uses ball screws.

Equipment specification

Item	Symbol	Value	Unit	Remarks
Ball screw lead	Pb	10	mm	= 10000μm
Deceleration ratio	n	1/2	—	—
Number of encoder pulses per revolution	Pt	4194304	pulse/rev	—



Calculation of the electronic gear

$$\frac{CMX}{CDV} = \frac{Pt}{\Delta S^{*1}} = \frac{Pt}{n \times Pb} = \frac{4194304}{1/2 \times 10000} = \frac{4194304}{5000} = \frac{400000h}{1388h}$$

*1 ΔS is the movement amount for 1 revolution of the servo motor.

Parameter settings

Because the value obtained by calculating the electronic gear is within the setting range, the value can be set without reducing.

Parameter No.	Symbol*1	Name	Setting value
020A	*CMXL	Electronic gear numerator (lower)	0000h
020B	*CMXH	Electronic gear numerator (upper)	0040h
020C	*CDVL	Electronic gear denominator (lower)	1388h
020D	*CDVH	Electronic gear denominator (upper)	0000h

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Restrictions

The restrictions on electronic gears are shown below.

- When the setting of an electronic gear (CMX, CDV, CMX/CDV) is incorrect, "Electronic Gear Setting Error (system error E500H)" occurs at the system startup and the electronic gear setting is treated as "CMX : CDV = 1 : 1". The operation cannot be performed since the electronic gear is in forced stop status at this time. Reexamine the setting of an electronic gear and start the system again.
- When an electronic gear setting error occurs while using the absolute position detection system, the absolute position erased signal (ABSE) and the home position return request signal (ZREQ) turn ON. For the absolute position detection system, refer to the following.
  ☞ Page 203 Absolute Position Detection System
- When an electronic gear setting error occurs, it is possible to confirm which axis was set to an incorrect electronic gear by confirming with "Electronic gear setting error axis information (monitor No.0488H, 0489H)" in the system information.

6.2 Speed Unit

The speed command (the feed speed of the point table, the manual feed speed, etc.) is set by the speed unit.
Speed units are adjusted using "Speed unit" of "Control option 1 (parameter No.0200)" and "Speed units multiplication factor (parameter No.020E, 020F)". Through changing the speed units, movement can be performed at an arbitrary unit and multiplication of speed.

Point

[API library]
To set/get the speed unit, use the sscChange2Parameter function/sscCheck2Parameter function.

Settings

Control parameters

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Function
0200	*OPC1	Control option 1	0000h	—	0000h to 2111h	□■■■ (Speed unit) Set the speed command unit. • 0: Position command unit/min • 1: Position command unit/s • 2: r/min
020E	SUML	Speed units multiplication factor (lower)	2000h	—	1 to 32768 (32bit)	Set the multiplication factor for the speed command.
020F	SUMH	Speed units multiplication factor (upper)	0000h	—		

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Setting example of speed units

The following is a setup example for use of "mm/min" as a speed unit for a piece of equipment that uses ball screws.

Equipment specification

For the equipment specification, refer to the following.
☞ Page 148 Position command unit - electronic gear

Parameter setting for the speed unit

As the position command unit is "μm", set "1000" to the speed units multiplication factor to use "mm/min" as a speed unit.
1000μm/min = 1mm/min

■Control parameters

Parameter No.	Symbol*1	Name	Setting value
0200	*OPC1	Control option 1	0□□□h
020E	SUML	Speed units multiplication factor (lower)	03E8h
020F	SUMH	Speed units multiplication factor (upper)	0000h

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Speed limit

The following restrictions apply to the command speed. Reexamine the command speed according to the following.

- When the speed command exceeds "Speed limit value (parameter No.0222, 0223)", the speed is limited to the speed limit.

Control parameters

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Function
0222	SPLL	Speed limit value (lower)	0BB8h	Speed units	0000h to FFFFh	Set the value for the moving speed limit.
0223	SPLH	Speed limit value (upper)	0000h		0000h to 7FFFh	

- When the command speed output to the servo amplifier exceeds the motor maximum revolution speed, the speed is limited to the motor maximum revolution speed. The motor maximum revolution speed can be confirmed in "Motor maximum revolution speed (monitor No.0114H)" and "Motor permissible pulse rate (monitor No.0120H, 0121H)".
- The position board calculates the command speed of the servo amplifiers using the speed setting, the speed units multiplication factor and the electronic gears; however, if an overflow occurs in the calculation process due to the high command speed etc., the speed is limited to the calculable maximum value. The calculable maximum value is confirmed in "Maximum output pulse rate (monitor No.0122H, 0123H)" of the servo information.

6.3 Acceleration/deceleration

The following methods are available for acceleration/deceleration.

- Linear acceleration/deceleration
- Smoothing filter
- Start up speed enable
- S-curve acceleration/deceleration
- Jerk ratio acceleration/deceleration [MC300]
- Vibration suppression command filter 1 [MC300]

The setting method for acceleration/deceleration differs according to the operation mode.

During automatic operation/interpolation operation

Set with "Speed options (parameter No.0220)" and the point table.

The actual acceleration/deceleration depends on the combinations shown in the table below.

Operation modes other than automatic operation/interpolation operation

Set with speed options.

○: Set, —: Not set

Speed options			S-curve ratio*1	Auxiliary command 2		Auxiliary command	Actual acceleration/ deceleration method
Linear acceleration/ deceleration	Smoothing filter	Start up speed enable		Linear acceleration/ deceleration/ S-curve acceleration/ deceleration	Jerk ratio acceleration/ deceleration *2	Vibration suppression command filter 1	
○	—	—	—	○	—	—	Linear acceleration/ deceleration
○	—	—	○	○	—	—	S-curve acceleration/ deceleration
○	—	—	—	—	○	—	Jerk ratio acceleration/ deceleration
○	—	—	○	—	○	—	
—	○	—	—	○	—	—	Smoothing filter
—	○	—	○	○	—	—	Smoothing filter + S-curve acceleration/deceleration
—	○	—	—	—	○	—	Smoothing filter + jerk ratio acceleration/deceleration
—	○	—	○	—	○	—	
—	—	○	—	○	—	—	Start up speed enable
—	—	○	○	○	—	—	Start up speed enable + S-curve acceleration/deceleration
—	—	○	—	—	○	—	Start up speed enable
—	—	○	○	—	○	—	Start up speed enable + S-curve acceleration/deceleration
○	—	—	—	○	—	○	Vibration suppression command filter 1
○	—	—	○	○	—	○	S-curve acceleration/ deceleration + vibration suppression command filter 1
○	—	—	—	—	○	○	Jerk ratio acceleration/ deceleration + vibration suppression command filter 1
○	—	—	○	—	○	○	
—	○	—	—	○	—	○	Smoothing filter + vibration suppression command filter 1
—	○	—	○	○	—	○	Smoothing filter + S-curve acceleration/deceleration + vibration suppression command filter 1

Speed options			S-curve ratio*1	Auxiliary command 2		Auxiliary command	Actual acceleration/ deceleration method
Linear acceleration/ deceleration	Smoothing filter	Start up speed enable		Linear acceleration/ deceleration/ S-curve acceleration/ deceleration	Jerk ratio acceleration/ deceleration *2	Vibration suppression command filter 1	
—	○	—	—	—	○	○	Smoothing filter + Jerk ratio acceleration/deceleration + vibration suppression command filter 1
—	○	—	○	—	○	○	
—	—	○	—	○	—	○	Start up speed enable
—	—	○	○	○	—	○	Start up speed enable + S-curve acceleration/deceleration
—	—	○	—	—	○	○	Start up speed enable
—	—	○	○	—	○	○	Start up speed enable + S-curve acceleration/deceleration

*1 When the S-curve ratio is less than 30%, the cell is "—". "○" only applies when the S-curve ratio is 30 to 100%.
*2 The jerk ratio acceleration/deceleration cannot be used during the interpolation operation.

Point

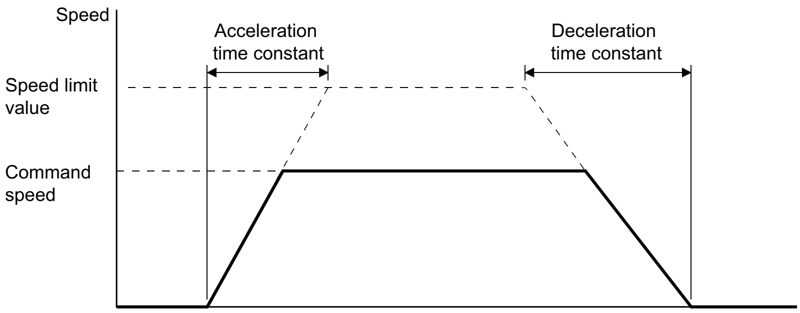
- The setting at starting the operation is valid for the method of acceleration/deceleration of speed options. If the method of acceleration/deceleration is changed during the operation, the change is not made. It is validated (changed) from the next time the operation is started.
- When start up speed enable is specified, jerk ratio acceleration/deceleration and vibration suppression command filter 1 are disabled.
- When the smoothing filter and the vibration suppression command filter 1 are set together, the vibration suppression command filter 1 is processed before processing the smoothing filter.

Point

[API library]
- To set/get the acceleration/deceleration method of speed options, use the sscChange2Parameter function.
- To set the point table, use the sscSetPointDataEx function.

Linear acceleration/deceleration

The linear acceleration/deceleration provides acceleration/deceleration linearly as shown in the following drawing. For the acceleration time constant and the deceleration time constant, set the time before reaching "Speed limit value (parameter No.0222, 0223)".

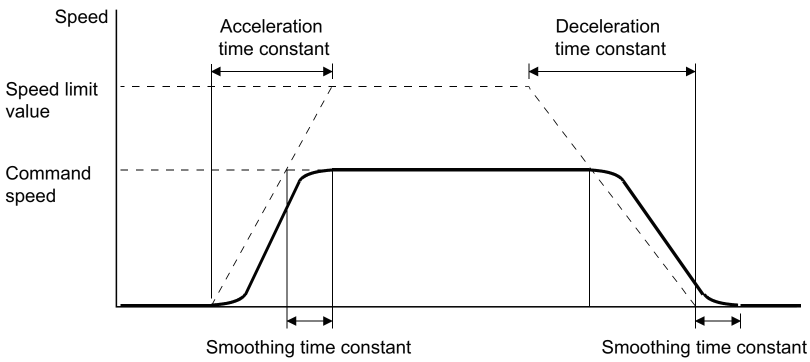


Smoothing filter

Setting the smoothing filter makes smooth acceleration/deceleration.
The smoothing time constants are set using "Smoothing time constant (parameter No.0226)".[MC200]
When "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "0: Use control parameter", set the smoothing time constant to "Smoothing time constant (parameter No.0226)". When the operation mode is the automatic operation or the interpolation operation and "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "1: Use point table", set the smoothing time constant to the point table. When the setting is performed with the point table, the smoothing time constant can be written at high-speed compared when the setting is performed with the control parameter. In addition, the smoothing time constant can be set for every point. [MC300]

Type	Software version	Description
Using MR-MC2_ _	—	Point table setting function of the smoothing time constant is not supported.
Using MR-MC3_ _	A5 or later	
	A6 or later	Point table setting function of the smoothing time constant is supported.

The acceleration time and the deceleration time get longer as much as the smoothing time constant.



Control parameter

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Function
0220	OPS	Speed options	0000h	—	[MC200] 0000h to 0002h [MC300] 0000h to 0012h	■■■□ (Acceleration/deceleration method)) Set the type of acceleration/deceleration. • 0: Linear acceleration/deceleration • 1: Smoothing filter • 2: Start up speed enable ■■□■ (Smoothing time constant setting method) [MC300] Specify the smoothing time constant setting method. • 0: Use control parameter • 1: Use point table When setting the smoothing time constants from the point table, only the automatic operation and the interpolation operation are supported.
0226	STC	Smoothing time constant	0	ms	0 to100	Set the time constant of the smoothing filter.

Point

[MC200]

The setting at starting the operation is valid for the smoothing time constants. If the smoothing time constants are changed during the operation, the change is not made. It is validated (changed) from the next time the operation is started.

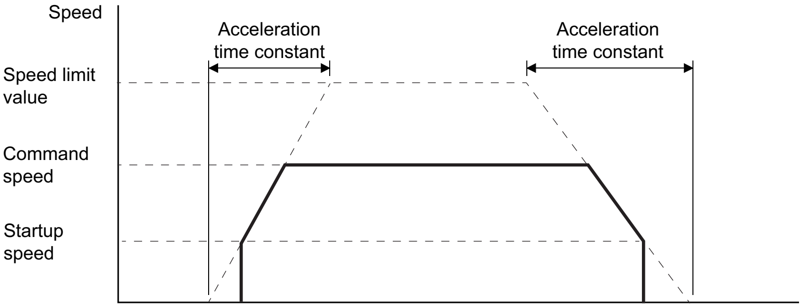
[MC300]

- When "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "0: Use control parameter", the setting at starting the operation is valid for the smoothing time constants. If the smoothing time constants are changed during the operation, the change is not made. It is validated (changed) from the next time the operation is started.
- When "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "1: Use point table", the setting at starting the operation of each point is valid for the smoothing time constants. However, when the deceleration check method of the auxiliary command is set to "2: Continuous operation", it is validated (changed) only for the setting in point 1.

Start up speed enable

By specifying the start up speed enable, the acceleration time and the deceleration time can be shortened because the startup is performed up to the startup speed in steps at the acceleration start, and the stop is performed in steps when the speed decelerates up to the startup speed.

The start up speed is set using "Start up speed (parameter No.0224, 0225)". However, note that a shock may be transmitted to the mechanical system during acceleration or deceleration.

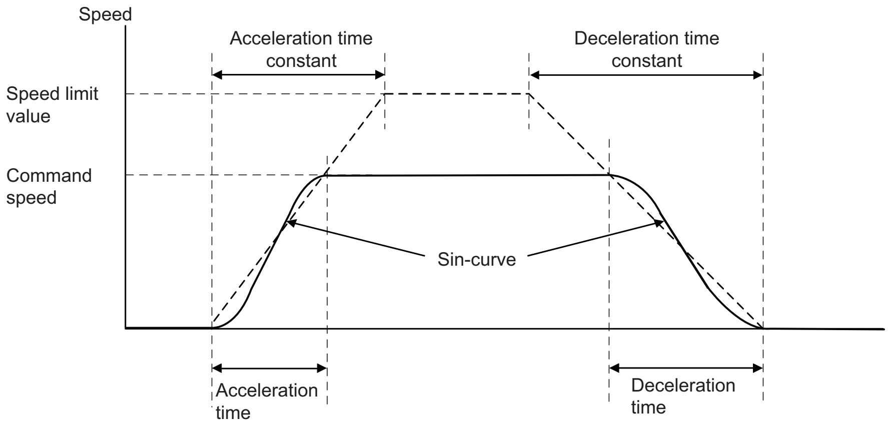


Point

Cannot be used together with smoothing filter.

S-curve acceleration/deceleration (Sine acceleration/deceleration)

This is a method where acceleration/deceleration is performed gradually based on the Sin-curve. To make the S-curve acceleration/deceleration valid, set the S-curve ratio (30 to 100%). At this time, the acceleration time and the deceleration time are the same as in the case of the linear acceleration/deceleration.



Point

When using the S-curve acceleration/deceleration for the JOG operation, the incremental feed operation, and the home position return, set the S-curve ratio in "S-curve ratio (parameter No.0221)". For the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300], set the S-curve ratio in the point table.

Point

[API library]

- When using the S-curve acceleration/deceleration for the JOG operation, the incremental feed operation, and the home position return, use the sscChange2Parameter function/sscCheck2Parameter function to set "S-curve ratio (parameter No.0221)".
- When using the S-curve acceleration/deceleration for the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300], set the S-curve ratio in the point table using the sscSetPointDataEx function.

Control parameters

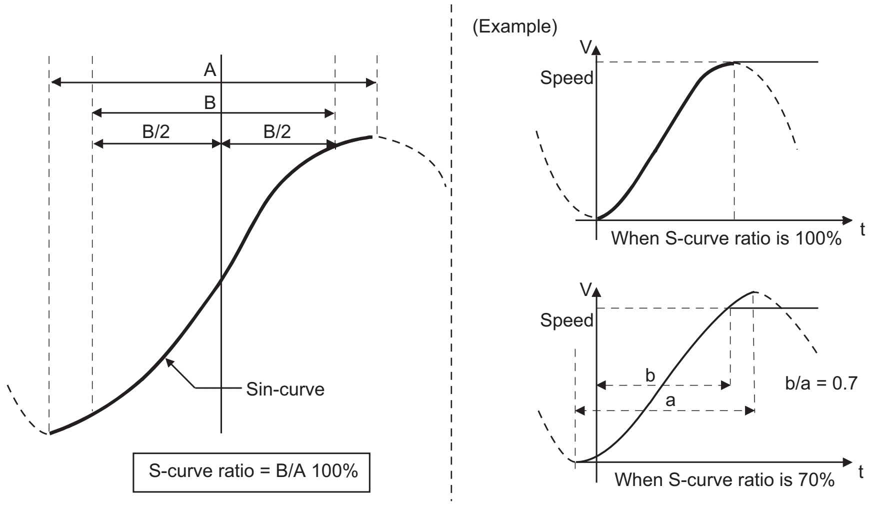
Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Function
0221	SRATE	S-curve ratio	0	%	0 to 100	Set the S-curve ratio of the S-curve acceleration/deceleration (sine acceleration/deceleration).*1*2 • 0 to 29: S-curve acceleration/deceleration invalid • 30 to 100: S-curve acceleration/deceleration

*1 The S-curve acceleration/deceleration is performed for the acceleration/deceleration method selected in "Speed options (parameter No.0220)".

*2 The S-curve ratio set by this parameter is used in the JOG operation, the incremental feed operation, and the home position return. For the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300], set the S-curve ratio in the point table.

S-curve ratio

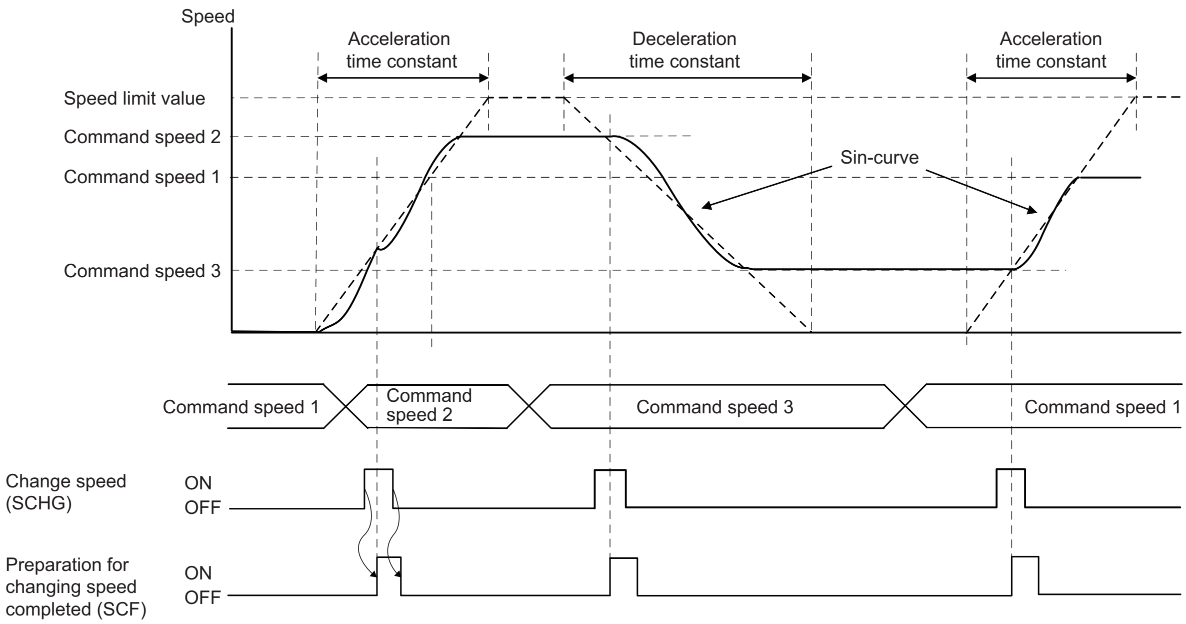
The S-curve ratio indicates which part of the Sin-curve is used to draw the acceleration/deceleration curve as shown in the figure below.



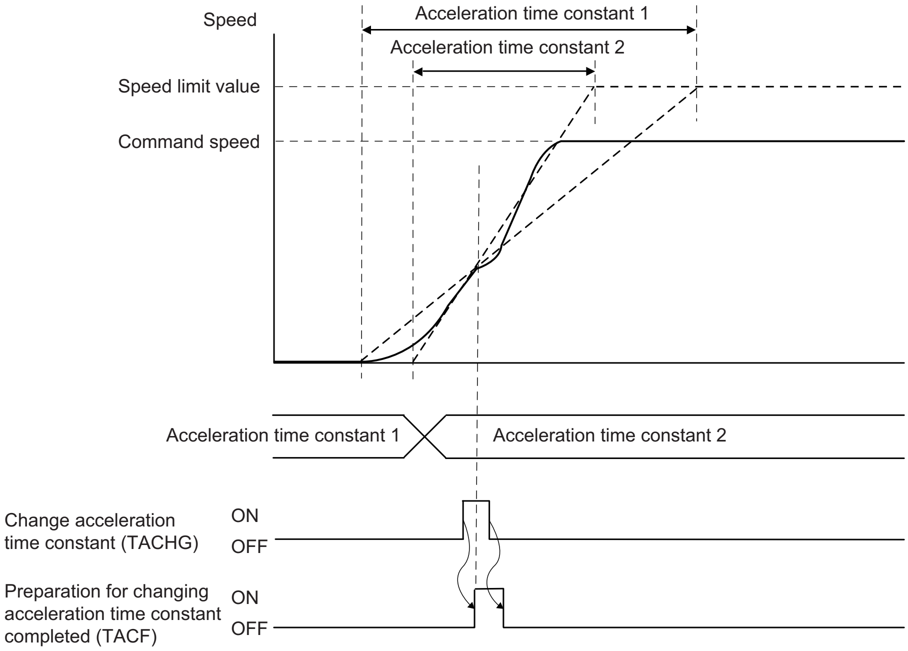
Point

- The valid limits of the S-curve ratio are "30 to 100%". When less than 30% is set, the command waveform is the same as the one of the setting of 0%.
- The setting at starting the operation is valid for the S-curve ratio. If the S-curve ratio is changed during the operation, the change is not made. It is validated (changed) from the next time the operation is started.

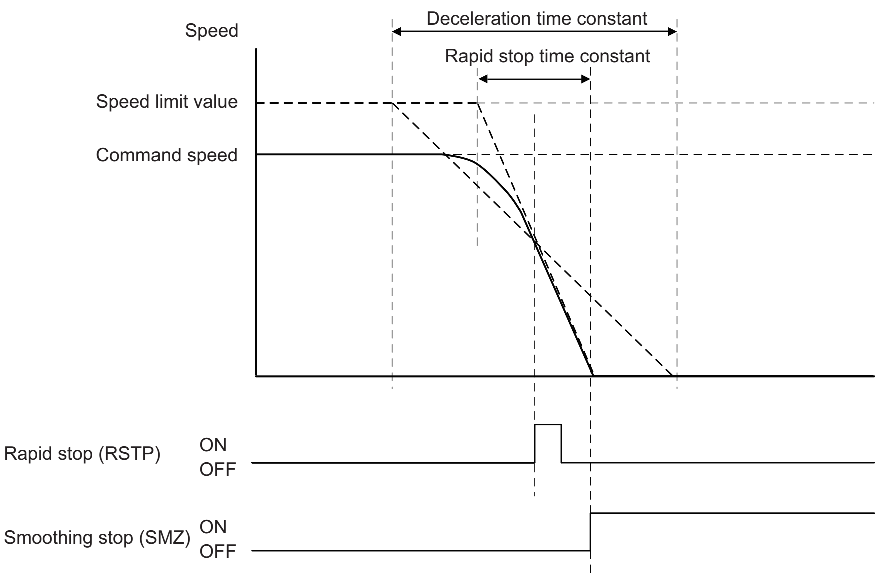
When the change speed is performed, the acceleration/deceleration based on the Sin-curve to the set speed is performed again from the time of the completion of the preparation for changing speed completed.



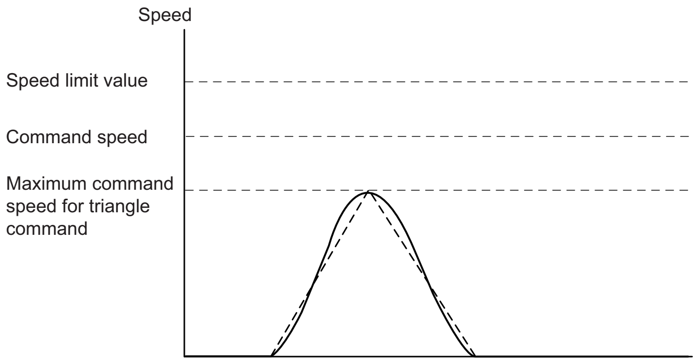
When the change acceleration time constant is performed during the acceleration, the acceleration based on the Sin-curve is performed again from the time of the preparation for changing acceleration time constant completed.



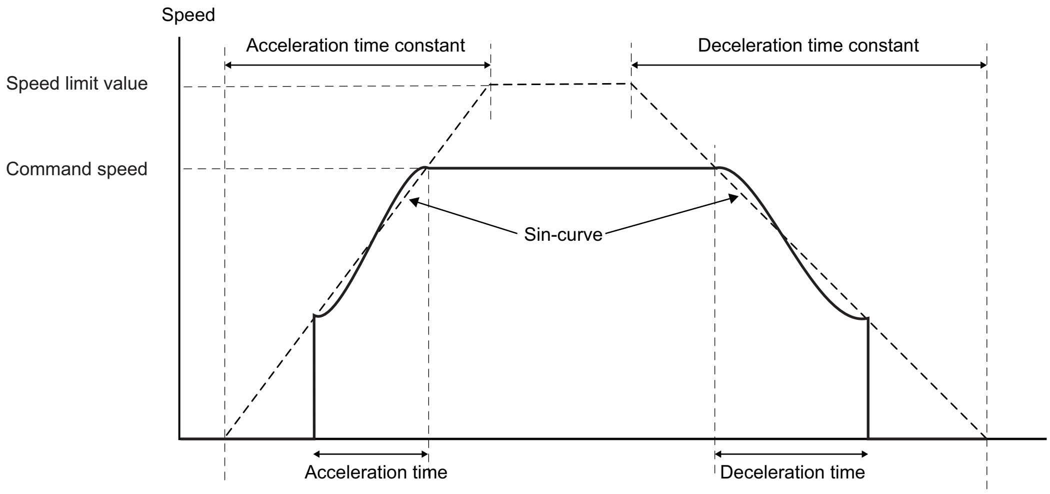
When deceleration stops are made with the rapid stop time constants such as the rapid stop signal (RSTP) and the interlock signal (ITL), the S-curve acceleration/deceleration is canceled and the speed is decelerated with the linear acceleration/ deceleration. When deceleration stops are made with the deceleration time constants such as operation alarms, the speed is decelerated with the S-curve acceleration/deceleration.
However, when the overrun occurs (for example, the rapid stop time constant is longer than the deceleration time constant.), the deceleration stops are performed with the S-curve acceleration/deceleration.



When the original command shape is not trapezoidal but triangle (for example, the movement amount is small.), the acceleration/deceleration is performed based on the Sin-curve at the maximum command speed for the triangle command.



The smoothing filter and the S-curve acceleration/deceleration can be used together. In addition, the S-curve acceleration/deceleration and the start up speed can be used together. When using the S-curve acceleration/deceleration and the start up speed together, the acceleration/deceleration is performed as shown in the figure below.

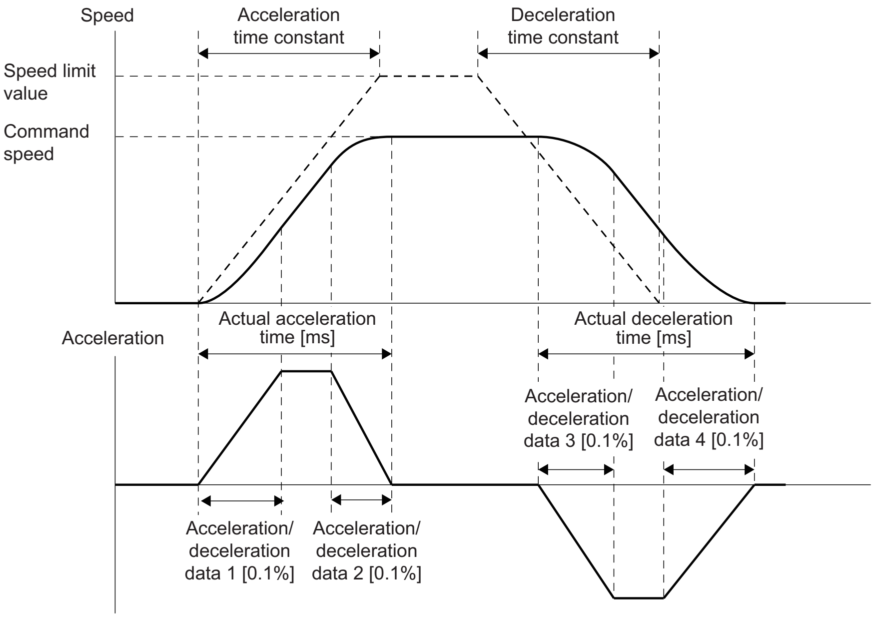


Jerk ratio acceleration/deceleration [MC300]

The jerk ratio acceleration/deceleration is an acceleration/deceleration method that uses a trapezoidal pattern.
When using this function, the acceleration time and the deceleration time are longer compared to the linear acceleration/deceleration.

Point

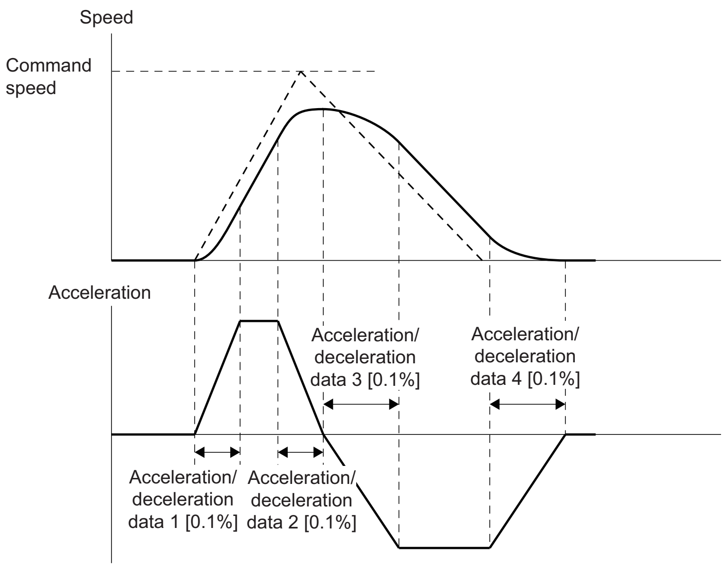
The jerk ratio acceleration/deceleration can only be used in the automatic operation.



The actual acceleration/deceleration time increases for the following amount.

- Actual acceleration time = (1 + (Acceleration/deceleration data 1 + Acceleration/deceleration data 2) ÷ 1000) × Command speed ÷ Speed limit value × Acceleration time constant
- Actual deceleration time = (1 + (Acceleration/deceleration data 3 + Acceleration/deceleration data 4) ÷ 1000) × Command speed ÷ Speed limit value × Deceleration time constant

When the commanded shape is not trapezoidal but triangle, such as when the movement amount is small, the deceleration starts before the command speed is reached. The ratio for each section during the acceleration/deceleration is maintained at the values set to the acceleration/deceleration data area.

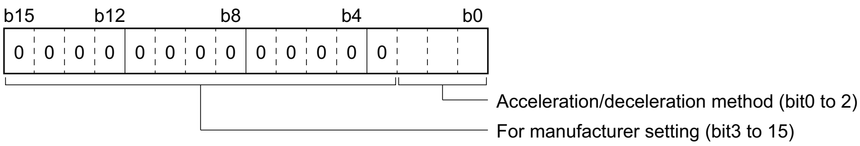


Point table

The jerk ratio acceleration/deceleration sets as follows in the point table.

Point	Position data [command unit]	Feed speed [speed unit]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell/predwell [ms]	Auxiliary command	Other axes start specification	S-curve ratio [%]	For manufacturer setting
0000	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	4bytes	1byte	3bytes
...	**Interpolation axis No.**	**Arc coordinate**	**Acceleration/deceleration data 1**	**Acceleration/deceleration data 2**	**Acceleration/deceleration data 3**	**Acceleration/deceleration data 4**	**Auxiliary command 2**	**Smoothing time constant [ms]**	**For manufacturer setting**
...	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	2bytes	1byte	5bytes

■Auxiliary command 2



Bit	Name	Description
0 to 2	Acceleration/deceleration method	Select the acceleration/deceleration method. • 0: Linear acceleration/deceleration/S-curve acceleration/deceleration • 1: Jerk ratio acceleration/deceleration
3 to 15	For manufacturer setting	—

■Acceleration/deceleration data

Name	Setting range	Description
Acceleration/deceleration data 1	0 to 1000	Set a ratio [0.1%] for the section of increasing acceleration.
Acceleration/deceleration data 2		Set a ratio [0.1%] for the section of decreasing acceleration.
Acceleration/deceleration data 3		Set a ratio [0.1%] for the section of increasing deceleration.
Acceleration/deceleration data 4		Set a ratio [0.1%] for the section of decreasing deceleration.

Point

- The continuous operation cannot be specified in the deceleration check system. When the continuous operation is set, "Point Table Setting Error (operation alarm 25H, detail 02H)" occurs.
- When the acceleration/deceleration method setting value is outside of the setting range, "Point Table Setting Error (operation alarm 25H, detail 12H)" occurs.
- When the value of any of acceleration/deceleration data 1 to 4 is outside of the setting range, "Point Table Setting Error (operation alarm 25H, detail 13H)" occurs.
- When the total of the values of acceleration/deceleration data 1 and 2, or acceleration/deceleration data 3 and 4 exceeds "1000", "Point Table Setting Error (operation alarm 25H, detail 14H)" occurs.
- When the setting values of all acceleration/deceleration data are "0", the jerk ratio acceleration/deceleration is invalid for the applicable sections.
- When the setting values of the acceleration time constant or the deceleration time constant exceeds "1000", the jerk ratio acceleration/deceleration is invalid for the applicable sections.

Operation mode combinations

Only the automatic operation is supported.

The jerk ratio acceleration/deceleration function is invalid in other operation modes.

Operation mode	Availability
JOG operation	×
Incremental feed	×
Automatic operation	○
Interpolation operation	×
Home position return	×
Home position reset	×

Point

When the jerk ratio acceleration/deceleration is set in the acceleration/deceleration method during the interpolation operation, "Point Table Setting Error (operation alarm 25H, detail 15H)" occurs.

Command change combinations

All command changes at points with jerk ratio acceleration/deceleration specified are not available.

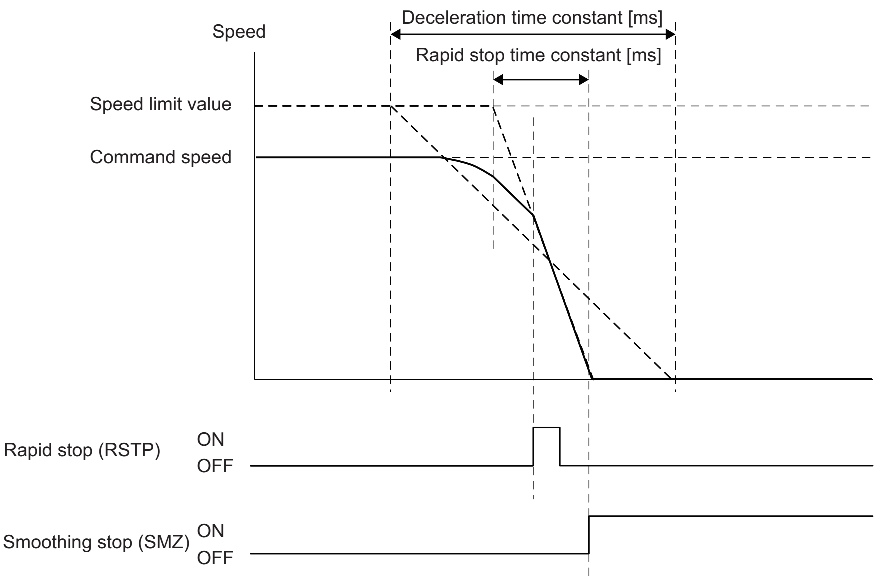
Operation mode	Availability
Speed change	×
Time constant change	×
Position change	×

Operation rapid stop and interlock combinations

When deceleration stops are made with rapid stop time constants such as the rapid stop signal (RSTP) and the interlock signal (ITL), the jerk ratio acceleration/deceleration is canceled, and the acceleration/deceleration method in speed options is used for the deceleration.

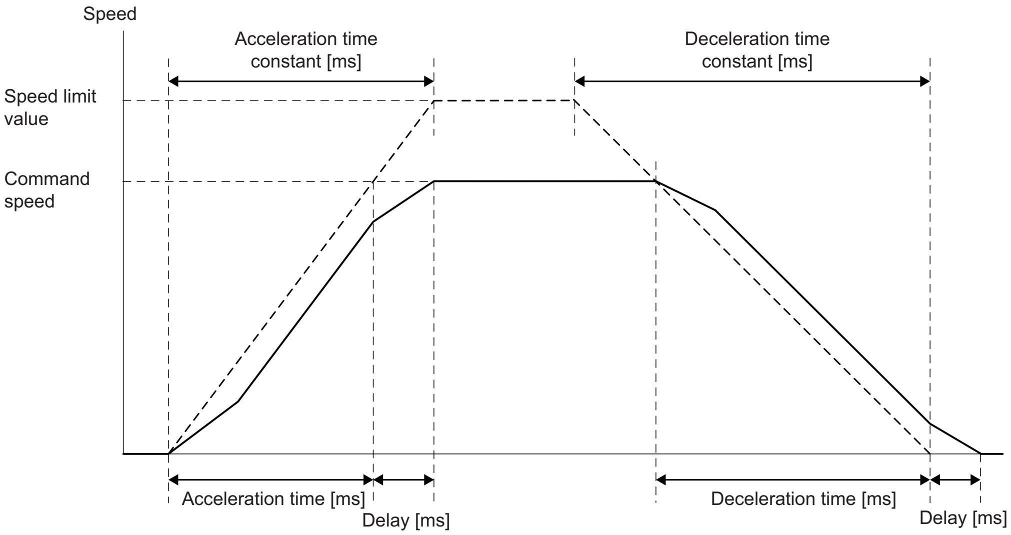
When deceleration stops are made with the deceleration time constant such as operation alarms, the acceleration/deceleration method is used for the deceleration. (☞ Page 153 Acceleration/deceleration)

Speed options	Actual deceleration method
Linear acceleration/deceleration	Linear acceleration/deceleration
Smoothing filter	Smoothing filter



Vibration suppression command filter 1 [MC300]

The vibration suppression command filter 1 removes only designated frequency components by superimposing waveforms whose phase is delayed by only half of the vibration cycle for the position command. Acceleration times and deceleration times are longer by only delay from the filter "1/(frequency × 2) [s]". The attenuation of the filter can be set. When the filter's effect is small, the attenuation can be set to increase the effect of the filter.



Point

While the vibration suppression command filter 1 can be set to an interpolation operation axis, because the mechanical vibration frequency for each axis performing the interpolation operation is generally different, the setting values for parameters are also different. Consequently, the path during the interpolation operation cannot be maintained.

Control parameters

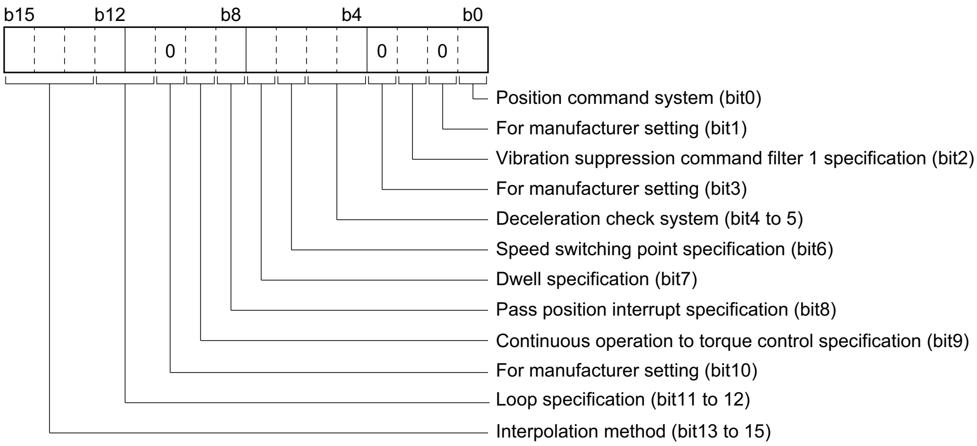
Set the following parameters to use the vibration suppression command filter 1.

When the parameters in the table are changed during the operation, the set values become valid from the next time the operation is started.

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Function	When in tandem drive
025C	FREQ	Vibration suppression command filter 1 frequency	0	0.1Hz	0 to 22500	Set the vibration suppression command filter 1 frequency in increments of 0.1Hz. The setting range for each control cycle is shown below. When a frequency outside the range is set, the vibration suppression command filter 1 becomes invalid. • 0.88ms: 2.2 to 562.5 [Hz] • 0.44s: 4.4 to 1125.0 [Hz] • 0.22s: 8.8 to 2250.0 [Hz]	Master
025D	ATT	Vibration suppression command filter 1 attenuation	0	—	0 to 32	Set the attenuation of the vibration component. • 0: Maximum filter attenuation	Master
025E	EDRP	Vibration suppression command filter 1 operation ending droop	0	pulse	0 to 10000	Set the operation ending droop for when the operation completes. When the amount of droop by the vibration suppression command filter 1 is equal to or less than the set value, all remaining pulses are output and the operation completes. • 0: 5 [pulse]	Master

Point table

The vibration suppression command filter 1 is specified in the auxiliary command of the point table.



■Vibration suppression command filter 1 specification

Select whether to enable/disable the vibration suppression command filter 1.

- 0: Vibration suppression command filter 1 disabled
- 1: Vibration suppression command filter 1 enabled

Point

For continuous operation, point 2 and after on the point table also operate with the vibration suppression command filter 1 specification setting in point 1.

Operation mode combinations

The automatic operation and the interpolation operation are supported.
The vibration suppression command filter 1 function is invalid in other operation modes.

Operation mode	Availability
JOG operation	×
Incremental feed	×
Automatic operation	○
Interpolation operation	○
Home position return	×
Home position reset	×

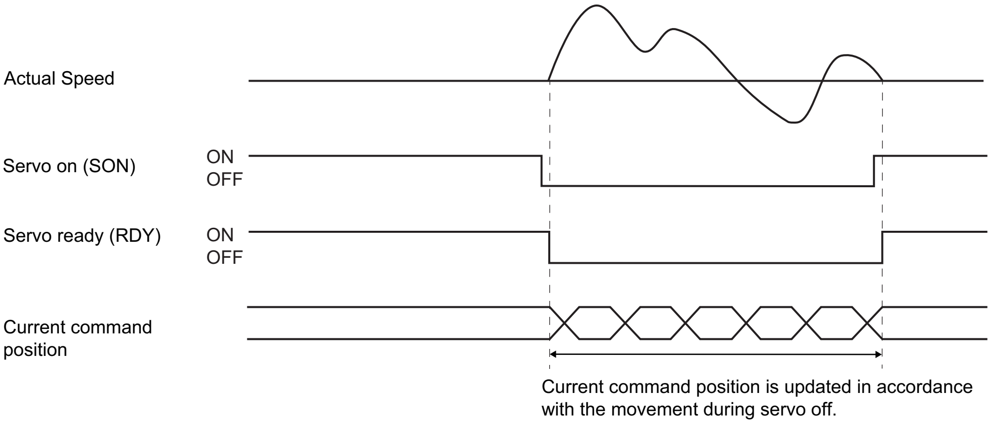
Command change combinations

The speed change, the time constant change, and the position change are all available.

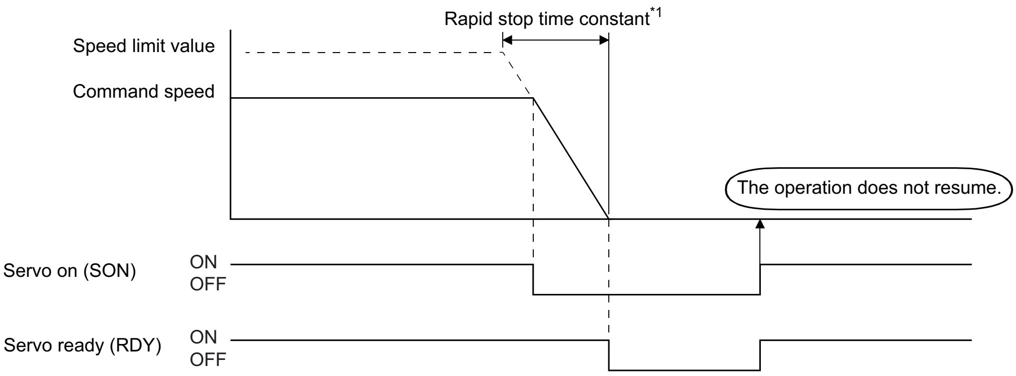
Operation mode	Availability
Speed change	○
Time constant change	○
Position change	○

6.4 Servo Off

If an axis has moved due to an external force during servo off, the current command position is updated in accordance with the movement amount (Current feedback position). After the servo has been off, the coordinate return processing such as returning to the home position is not necessary.



If the servo on signal (SON) is turned OFF during the operation, an alarm occurs, the movement is rapid stopped, and the servo is turned off.
Even if the servo on signal (SON) is turned back ON, the operation does not resume.



*1 If "1: Smoothing filter" is set in "Acceleration/deceleration method" of "Speed options (parameter No.0220)", the smoothing time constant is always valid. Therefore, the rapid stop is performed as well by the deceleration using the smoothing filter.

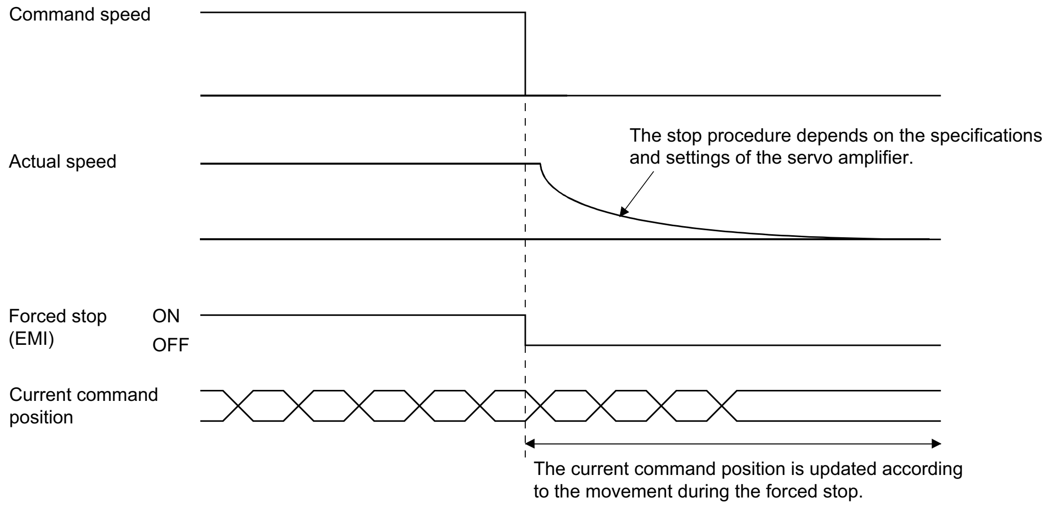
Point

[API library]
- To turn ON/OFF the servo on signal (SON), set "SSC_CMDBIT_AX_SON" to the command bit No. of the sscSetCommandBitSignalEx function.
- To confirm if the servo ready signal (RDY) is ON/OFF, set "SSC_STSBIT_AX_RDY" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

6.5 Forced Stop

Commands are turned to "0" at the forced stop. Servo amplifiers become free from the control of the position board and stop according to their specifications or settings such as the dynamic brake stop and the deceleration stop. For details, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

During the forced stop, the current command position is updated according to the movement (current feedback position). Therefore, after resetting the forced stop, the coordinate return processing such as the home position return is not necessary.



For forced stops, there are an external forced stop using an input signal through the forced stop input connector and a software forced stop signal (SEMI) from a system command bit.

Also, a system error (system status code: E□□□h) such as a SSCNET communication error activates the forced stop. The cause of the forced stop can be confirmed using "Forced stop factor (monitor No.0401H)".

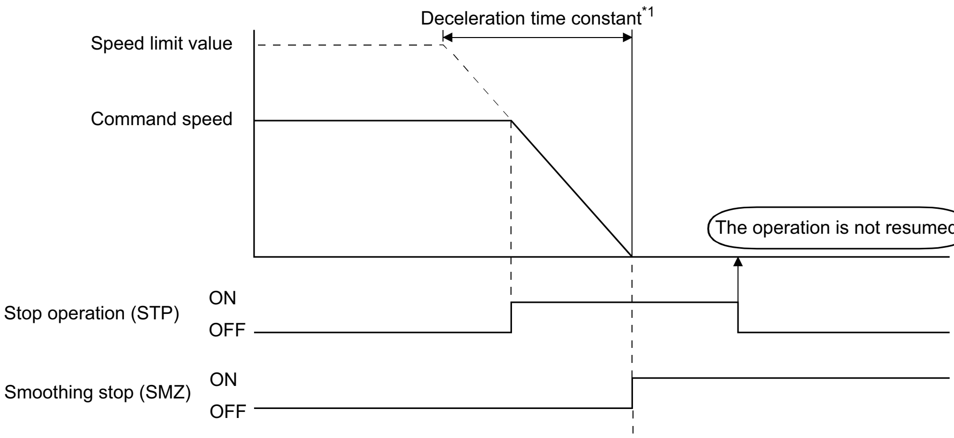
Point

[API library]

- To turn ON/OFF the software forced stop signal (SEMI), set "SSC_CMDBIT_SYS_SEMI" to the command bit No. of the sscSetCommandBitSignalEx function.
- To confirm if the being executed forced stop signal (EMIO) is ON/OFF, set "SSC_STSBIT_SYS_EMIO" with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

6.6 Stop Operation

When the stop operation signal (STP) is turned ON, the movement is stopped. (Alarms and warnings are not output.) Even if the stop operation signal (STP) is turned back OFF, the operation is not resumed. The time constant used for stopping for the stop operation is the deceleration time constant. If the operation is stopped during the automatic operation or linear interpolation operation [MC200]/interpolation operation [MC300], the positioning completed signal (PF) does not turn ON.



*1 If the smoothing filter is set, the smoothing time constant is always valid. Therefore, the deceleration stop is performed as well by the deceleration using the smoothing filter.

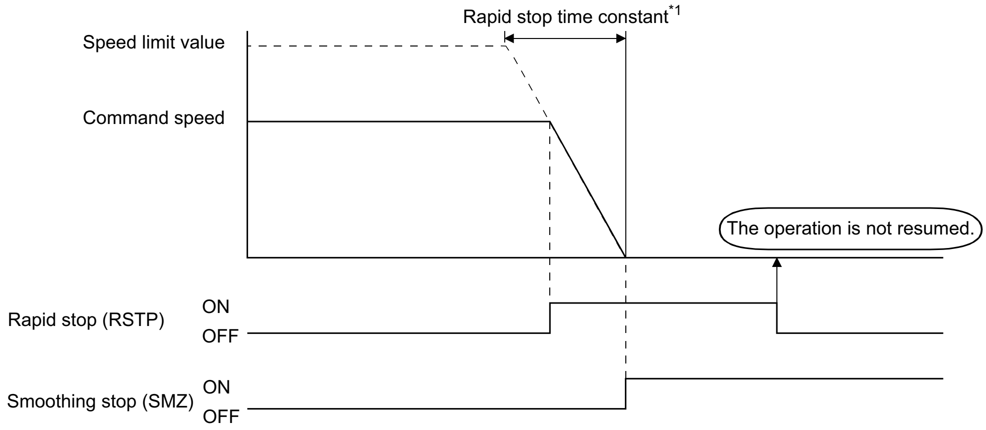
Point

[API library]

To perform the stop operation, use the sscDriveStop function/sscDriveStopNoWait function.

6.7 Rapid Stop Operation

When the rapid stop signal (RSTP) is turned ON, the movement is stopped abruptly. (Alarms and warnings are not output.) Even if the rapid stop signal (RSTP) is turned back OFF, the operation is not resumed. The deceleration time constant used for stopping for the rapid stop operation is "Rapid stop time constant (parameter No.0227)". If the operation is abruptly stopped during the automatic operation or linear interpolation operation [MC200]/interpolation operation [MC300], the positioning completed signal (PF) does not turn ON.



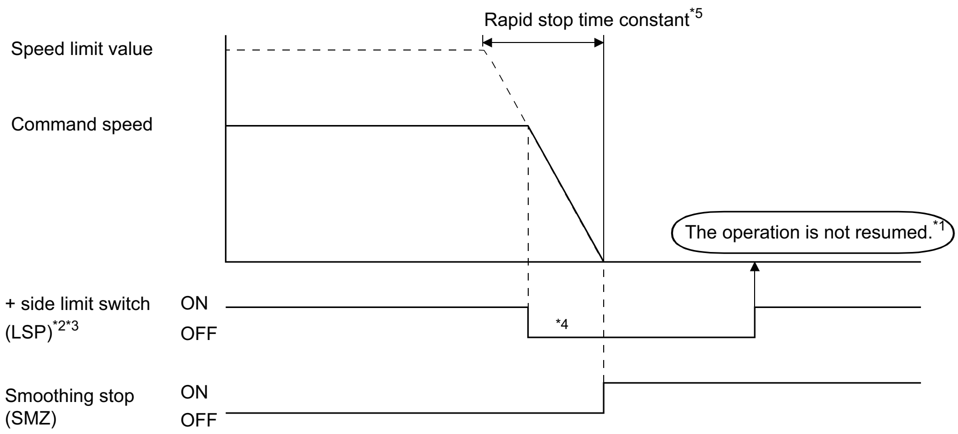
*1 If the smoothing filter is set, the smoothing time constant is always valid. Therefore, the rapid stop is performed as well by the deceleration using the smoothing filter.

Point

[API library]
To perform the rapid stop operation, use the sscDriveRapidStop function/sscDriveRapidStopNoWait function.

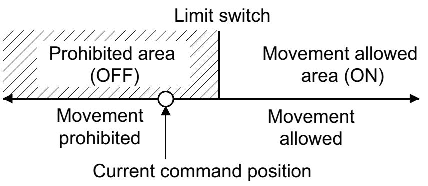
6.8 Limit Switch (Stroke End)

When the limit switch signal corresponding to the movement direction is turned OFF, an alarm occurs and the movement is stopped.
The deceleration time constant used for stopping by the limit switch is the rapid stop time constant.



*1 Even if the limit switch signal is turned back ON, the operation does not resume.
*2 The limit switch signal is a signal that is input through the servo amplifier or something similar. The method for inputting an external signal can be set up using "Sensor input options (parameter No.0219)".
*3 The limit switch signal is a normally-closed contact.
*4 If the operation stopped by the limit switch during the automatic operation or linear operation [MC200]/interpolation operation [MC300], the positioning completed signal (PF) does not turn ON.
*5 If the smoothing filter is set, the smoothing filter time constant is always valid. Therefore, the rapid stop is performed as well by the deceleration using the smoothing filter.

If the stop is performed at the position where the limit switch is OFF (prohibited area), the movement can be performed to the movement allowed area. However, in this case, reset the occurring alarm and then start the operation.



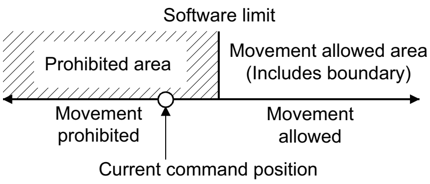
Point

[API library]
To confirm if the limit switch (LSP or LSN) is ON/OFF, use the sscGetIoStatusFast function.

6.9 Software Limit

Operation mode	Description
JOG operation	During the JOG operation, if the software limit is reached, "Reached Software Limit (operation alarm A2H, detail 01H)" occurs, the deceleration of the servo is started, and the servo is stopped not to exceed the software limit.
Incremental feed	If the incremental feed movement amount that exceeds the software limits is designated, "Out of Software Limit Boundaries (operation alarm A1H, detail 01H)" occurs and the start operation is not performed.
Automatic operation	If the point designated by a position command exceeds the software limit, "Out of Software Limit Boundaries (operation alarm A1H, detail 01H)" occurs and the start operation is not performed. Also, if the point is designated during the operation, "Out of Software Limit Boundaries (operation alarm A1H, detail 01H)" occurs when the point is designated and the servo is decelerated and stopped.
Linear interpolation [MC200]/ interpolation operation [MC300]	If the point designated by a position command for an axis within the group exceeds the software limit, "Out of Software Limit Boundaries (operation alarm A1H, detail 01H)" occurs and the start operation is not performed. Also, if the point is designated during the operation, an alarm occurs when the point is designated and the servo is decelerated and stopped.

If the current command position is outside the software limit boundaries (prohibited area), the servo can be moved in the direction of the movement allowed area. However, execute the start operation after resetting the alarm that has been set.



Point

- If the deceleration check method is in the continuous operation and the position command after the point switching exceeds the software limit, "Out of Software Limit Boundaries (operation alarm A1H, detail 01H)" occurs and a deceleration stop occurs. In this case, if the distance to the software limit is shorter than the distance necessary to make a deceleration stop, the operation may stop outside the software limit.
- The software limit boundaries are set using "Software limit Upper limit (parameter No.0228, 0229)" and "Software limit Lower limit (parameter No.022A, 022B)".
- If an alarm is set due to exceeding the software limit, the operation is stopped using the deceleration time constant.
- If the upper boundary and the lower boundary of the software limit are the same value, the software limit is invalid.
- If the lower boundary of the software limit is a higher value than the upper limit, "Software Limit Parameter Error (operation alarm A4H, detail 01H)" occurs upon the start of the operation.
- Software limits are invalid when the home position return has not been completed.

Point

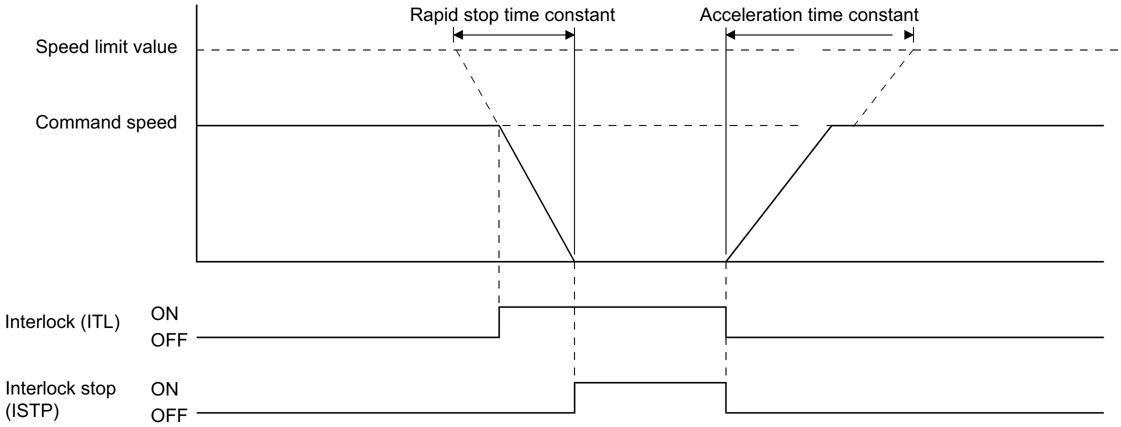
[API library]
To set/get the software limit, use the sscChange2Parameter function/sscCheck2Parameter function.

Precautions

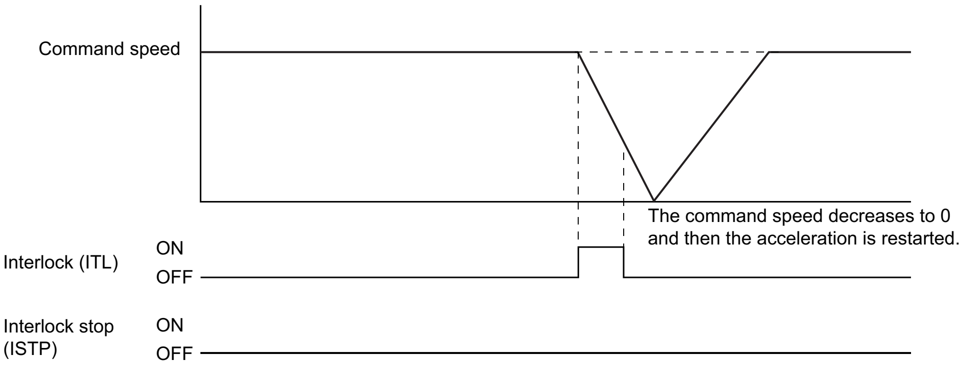
The range of the movement of the position board is "-2147483648 to 2147483647". The movement outside the limits is not covered with the warranty. If the software limits have been disabled, make sure that the operation does not exceed the physical limits.

6.10 Interlock

When the interlock signal (ITL) is turned ON, the movement is temporarily stopped. During the stoppage of movement, the interlock stop signal (ISTP) is turned ON. When the interlock signal (ITL) is turned OFF, the operation is resumed. The interlock signal (ITL) for a normally-open contact or a normally-closed contact can be selected using "Control option 3 (parameter No.0202)". (The explanation in this section is for a normally-open contact.)
When using the interlock to stop the servo, the deceleration is performed using the rapid stop time constant.



If the interlock signal (ITL) is canceled during the deceleration, the operation is re-started after the command speed decreases to 0. For this case, the interlock stop signal (ISTP) does not turn ON.



Point

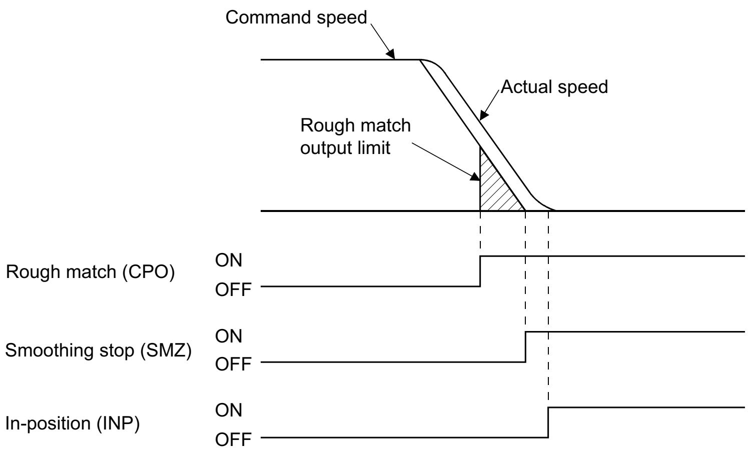
- If the stop operation signal (STP) or the rapid stop signal (RSTP) is turned ON during the interlock stop, the operation is not resumed even if the interlock signal (ITL) is turned OFF.
- If the smoothing filter is set, the smoothing time constant is always valid. Therefore, the rapid stop is performed as well by the deceleration using the smoothing filter.
- If the start up is executed while the interlock signal (ITL) is ON, "Interlock Is On (operation alarm 13H, detail 01H)" occurs and the start operation is not performed. Execute the start operation after canceling the interlock.
- During the linear interpolation [MC200]/interpolation operation [MC300], if the interlock signal (ITL) for any of the axes in the group is turned ON, all of the axes in the group are stopped. Also, when the interlock signal (ITL) for all of the axes within a group is canceled, the operation is resumed.

Point

[API library]
- To turn ON/OFF the interlock signal (ITL), set "SSC_CMDBIT_AX_ITL" to the command bit No. of the sscSetCommandBitSignalEx function.
- To confirm if the interlock stop signal (ISTP) is ON/OFF, set "SSC_STSBIT_AX_ISTP" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

6.11 Rough Match Output

When the command remaining distance (difference between the command position and the current command position) is less than "Rough match output limits (parameter No.0230, 0231)", the rough match signal (CPO) is output. The rough match output is only valid at the end points while operating using the automatic operation or the linear interpolation operation [MC200]/interpolation operation [MC300]. Therefore, it does not turn ON when passing the points on the way.

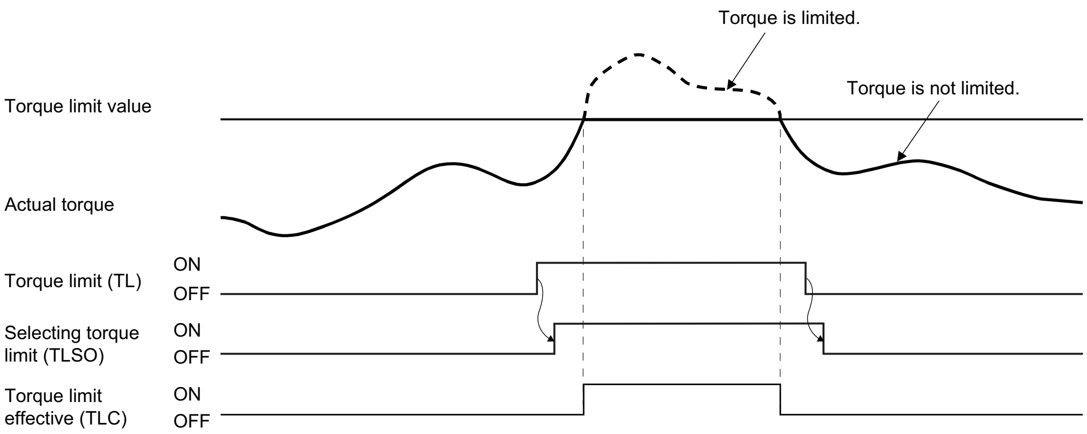


Point

[API library]
To set/get the rough match output limit, use the sscChange2Parameter function/sscCheck2Parameter function.

6.12 Torque Limit

When the torque limit signal (TL) is turned ON, the torque is limited by the torque limit values set in "Forward rotation torque limit value (parameter No.0210)" and "Reverse rotation torque limit value (parameter No.0211)". When the torque is limited by the torque limit values, the torque limit effective signal (TLC) is turned ON. Even if the torque limit signal (TL) is on, if the actual torque is smaller than the torque limit value, the torque limit effective signal (TLC) is not turned ON.



Point

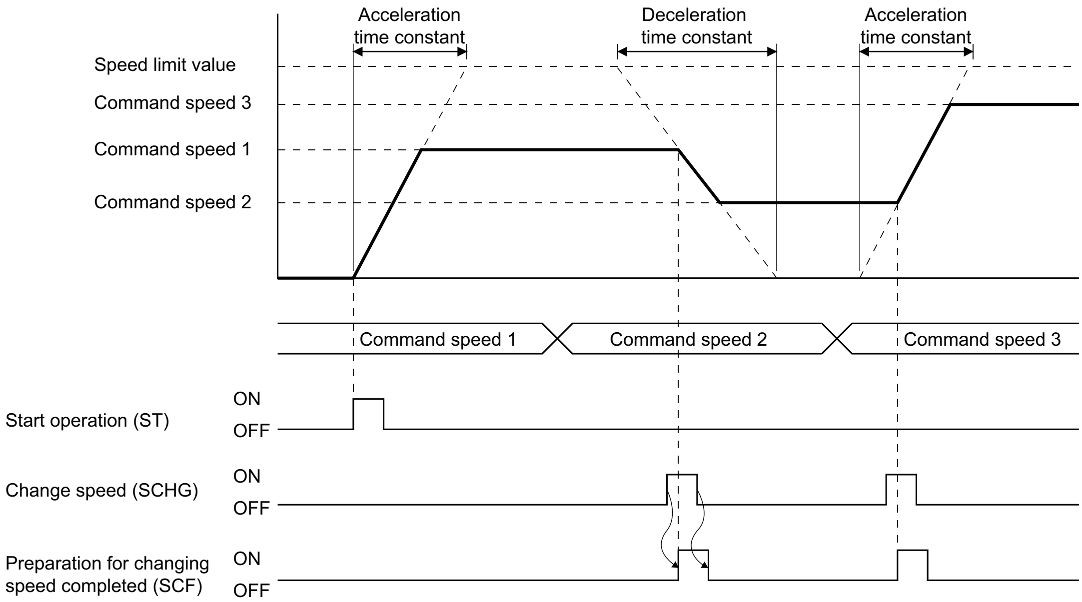
[API library]

- To turn ON/OFF the torque limit signal (TL), set "SSC_CMDBIT_AX_TL" to the command bit number of the sscSetCommandBitSignalEx function.
- To confirm if the selecting torque limit signal (TLSO) and the torque limit effective signal (TLC) are ON/OFF, set "SSC_STSBIT_AX_TLSO", "SSC_STSBIT_AX_TLC" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

6.13 Command Change

Speed change

Rewriting the command speed followed by turning ON the change speed signal (SCHG) changes the speed.
For the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300], rewrite the feed speed in the operating point table and for JOG operation and incremental feed, rewrite the manual feed speed.
The speed change can also be implemented during the acceleration or the deceleration.



During the following cases, the speed change error signal (SCE) turns ON, and the speed is not changed.

- Operation stop
- Deceleration due to the stop command, the rapid stop command, the alarm etc.
- Home position return
- Home position reset
- The command speed after change is zero or below

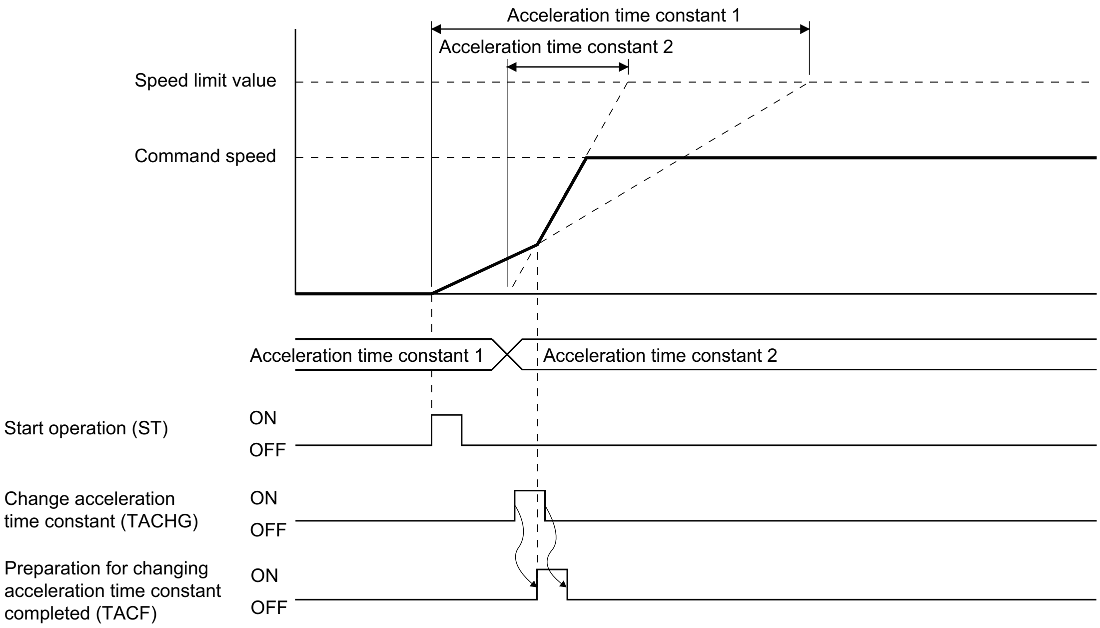
Point

[API library]

- To perform the speed change for the automatic operation and the linear interpolation operation [MC200]/ interpolation operation [MC300], use the sscChangeAutoSpeed function.
- To perform the speed change for the JOG operation and the incremental feed, use the sscChangeManualSpeed function.

Change of time constants

After rewriting the time constant, turning the change time constant signal (TACHG, TDCHG) ON causes the time constant to change. Time constants can be designated separately as the acceleration time constant and the deceleration time constant. For the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300] rewrite the time constant in the operating point table and for JOG operation and incremental feed, rewrite the manual feed time constant.



During the following cases, the acceleration time constant change error signal (TACE) or the deceleration time constant change error signal (TDCE) turns ON, and time constant is not changed.

- Operation stop
- Deceleration
- Home position return
- Home position reset

Point

[API library]

- To perform the change of time constants for the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300], use the sscChangeAutoAccTime function/ sscChangeAutoDecTime function.
- To perform the change of time constants for the JOG operation and the incremental feed, use the sscChangeManualAccTime function/sscChangeManualDecTime function.

Position change

After rewriting the command position, turning the change position signal (PCHG) ON causes the command position to be changed.
For automatic operation rewrite position data in the operating point table and for incremental feed, rewrite the feed movement amount.
During the linear interpolation operation [MC200]/interpolation operation [MC300], rewrite the position data in each point table of the axes in the group.

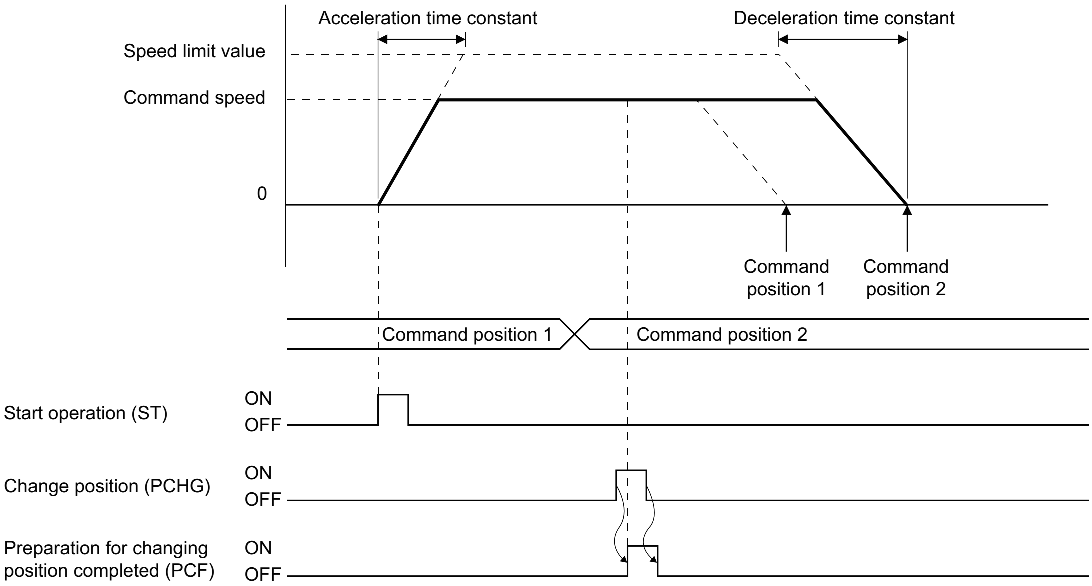
Point

[MC300]
The circular interpolation is not compatible with the position change.

To change the command position to the position which is not yet passed

■For automatic operation and incremental feed

An example of the position change from the command position 1 to the command position 2 is shown below.

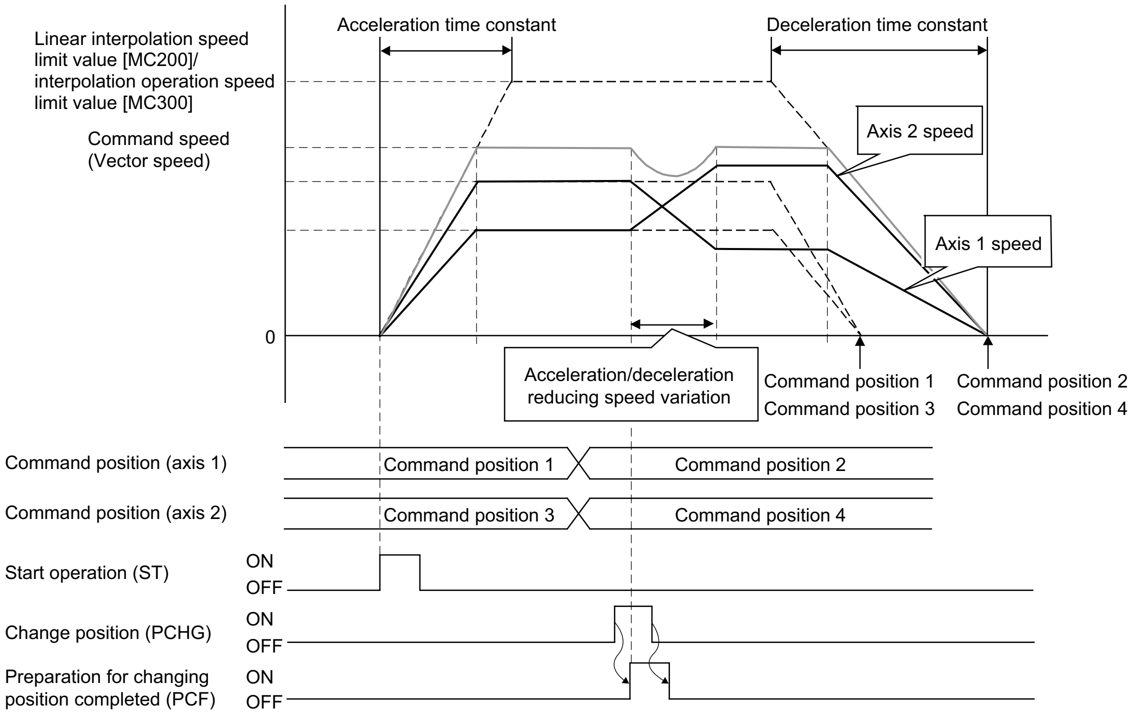


Point

[API library]
- To perform the position change for the automatic operation, use the sscChangeAutoPosition function.
- To perform the position change for the linear interpolation operation, use the sscChangeLinearPosition function.
- To perform the position change for the incremental feed, use the sscChangeManualPosition function.

■For linear interpolation operation [MC200]/interpolation operation [MC300]

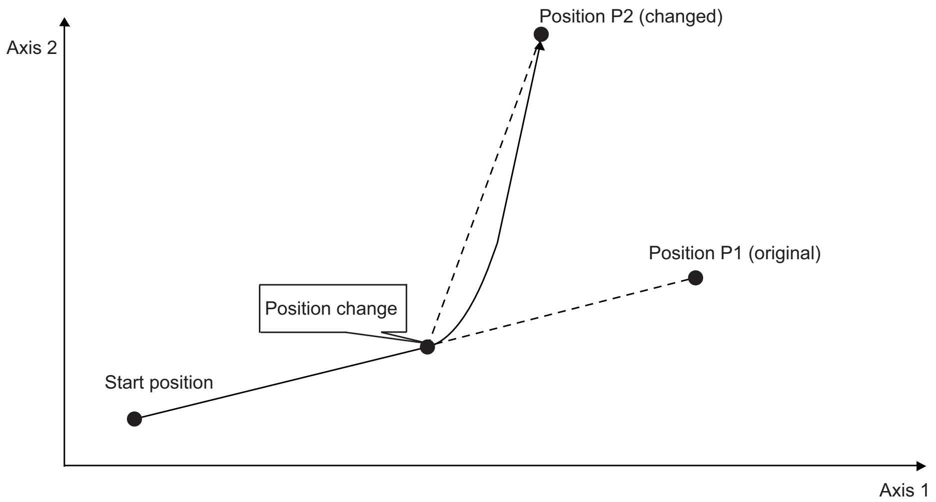
An example of the position change when axis 1 and 2 are linearly interpolated is shown below.



Point

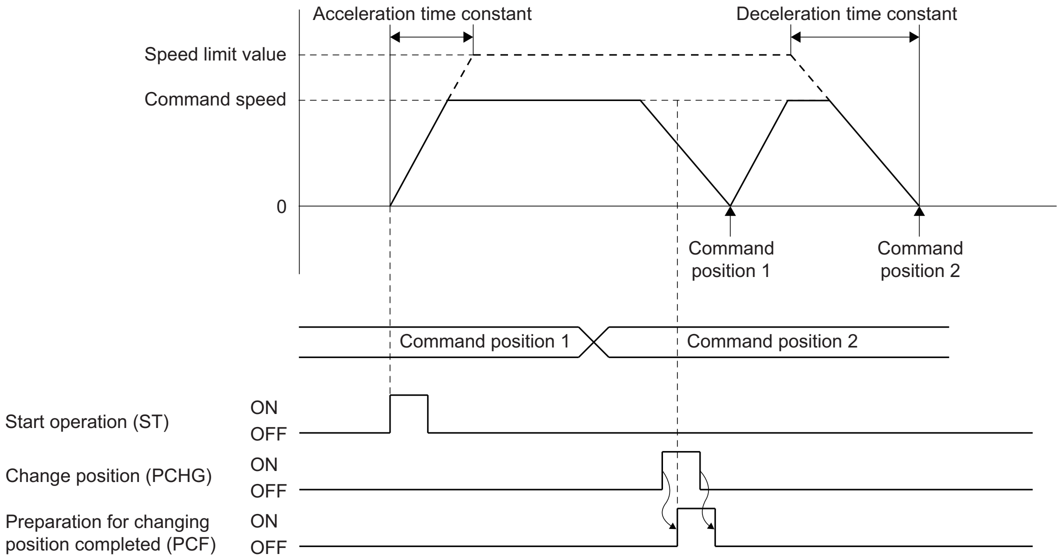
The acceleration/deceleration of each axis from the current command speed to the command speed after the position change is determined by distributing the acceleration amount, which is determined by the acceleration time constant, to each axis according to the speed variation ratio of the axes. During this time, the S-curve acceleration/deceleration and start up speed are invalid, and acceleration/deceleration reducing the speed variation at the position change is performed. (That the acceleration/deceleration is similar to the linear acceleration/deceleration. However, smoothing filter is valid.)

The tracks of axis 1 and 2 to each current command position when the position P1 is changed to the position P2 are shown below. At this time, the tracks move to the end position, forming a curve from the position where the position change is performed, to keep the speed continuity.

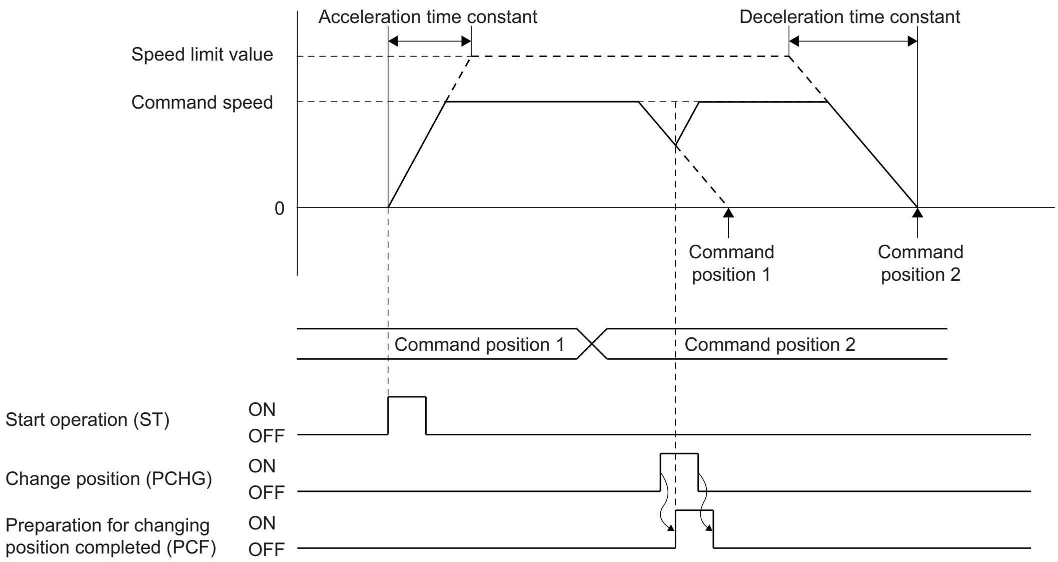


When position change is performed during deceleration

- When setting "Re-acceleration setting for position change during deceleration" of "Control option 4 (parameter No.0206)" is "0: Invalid"
  The deceleration continues, and after the axis stops, the positioning to the new position is performed.



- When setting "Re-acceleration setting for position change during deceleration" of "Control option 4 (parameter No.0206)" is "1: Valid"
  The axis re-accelerates before stopping, and stops after reaching the new position.



Point

The linear interpolation does not support the re-acceleration setting for the position change during the deceleration.

⚠ CAUTION

When conducting the position change during the deceleration with the S-curve acceleration/deceleration enabled and there is only a minor difference between the end points before and after the change, an overrun may occur. In this case, the operation is performed according to "Control option 2 (parameter No.0201)" "Change of position over-bound processing"

When the new position is already passed

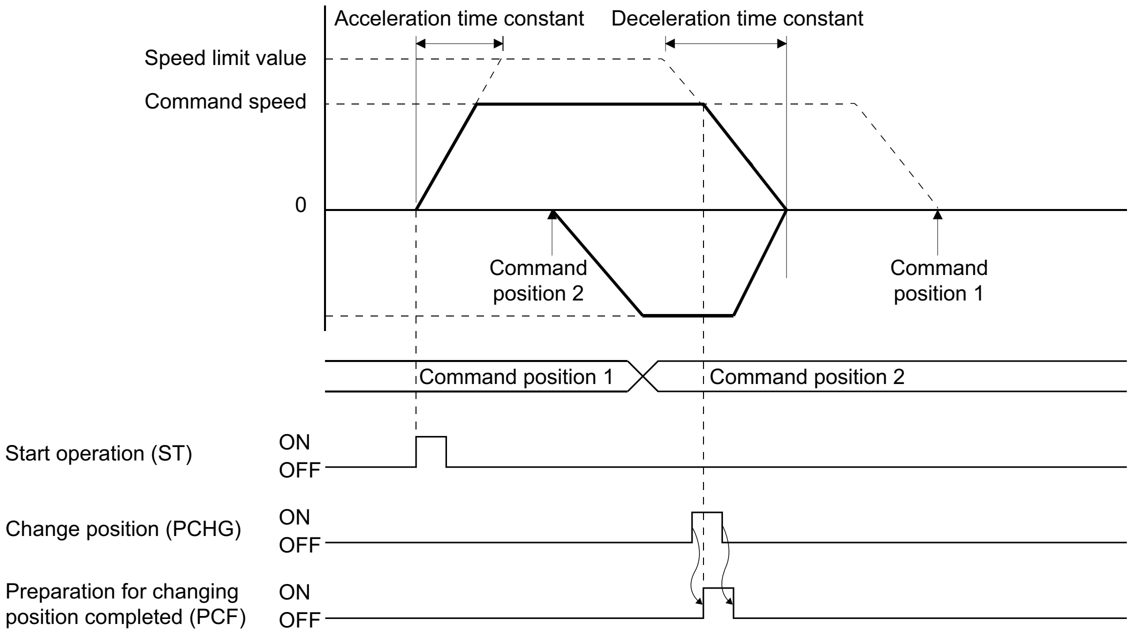
For cases that the new position has already been passed or if the stop position after the deceleration passes the new position, the operation depends on operation modes.

■For automatic operation and incremental feed

The operation can be selected as follows using "Change of position over-bound processing" of "Control option 2 (parameter No.0201)".

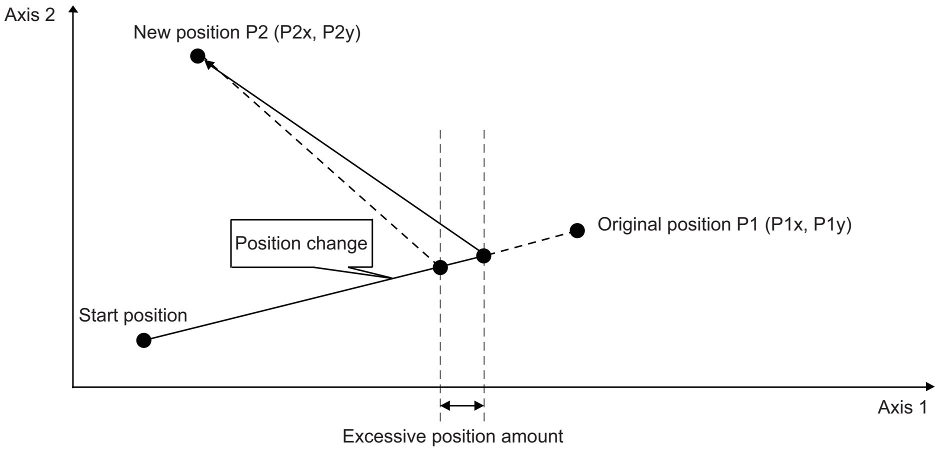
- Stop with an alarm (0: Alarm)
- After deceleration and stop return to new position (1: Return to command position)

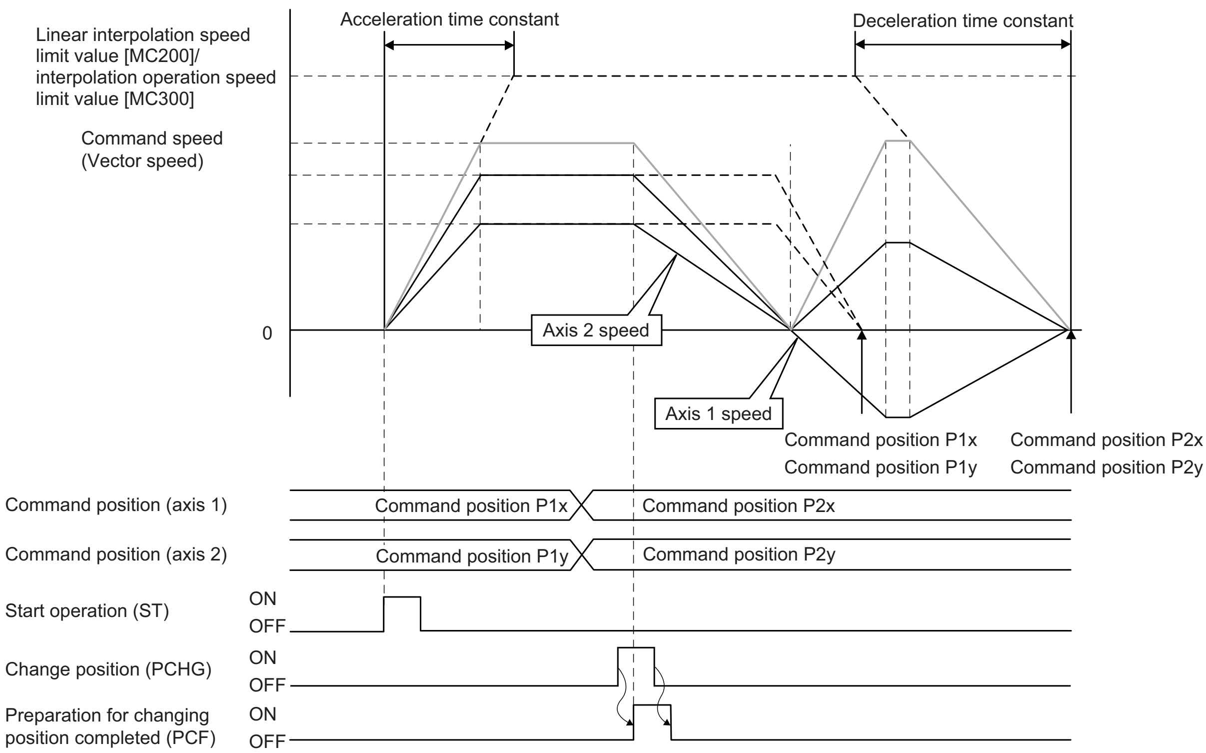
The case for returning to the new position after the deceleration and stopping is shown in the next diagram. At this time, the exceeded stop position signal (POV) is turned ON (the exceeded stop position signal (POV) is turned OFF at the next start up).



■For linear interpolation operation [MC200]/interpolation operation [MC300]

When one or more axes in a group reverse the movement direction because of the position change, all axes in the group automatically decelerate and stop. After the stop, the axes return to the new position. The setting of "Control option 2 (parameter No.0201)" is invalid. At this time, the exceeded stop position signal (POV) remains OFF.





In the example above, the current command position of the axis 1 exceeds the new position. The following formulas provide the approximate calculation of the excessive movement amount (excessive position amount).*1

- Deceleration quantity [speed unit/s] = Linear interpolation speed limit [speed unit] ÷ Deceleration time constant [ms] ÷ 1000
- Deceleration time [s] = Vector speed [speed unit] ÷ Deceleration quantity
- Vector movement amount [command unit] = $\sqrt{(\text{Axis 1 movement amount [command unit]})^2 + (\text{Axis 2 movement amount [command unit]})^2}$
- Axis 1 moving speed [speed unit] = Axis 1 movement amount [command unit] ÷ Vector movement amount × Vector speed [speed unit]
- Axis 1 excessive position amount [command unit] = Axis 1 moving speed × Axis 1 speed units multiplication factor × Deceleration time ÷ 2

*1 The same feature is applied to the linear interpolation for more than 3 axes.

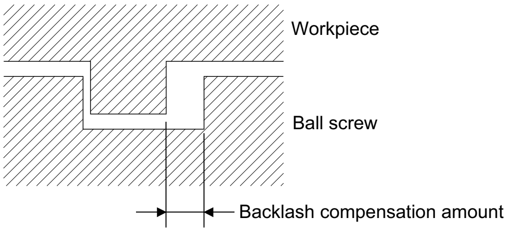
When position change error occurs

During the following cases, the position change error signal (PCE) turns ON, and the position is not changed.

- Operation stop
- JOG operation, home position return, home position reset
- Deceleration due to the stop command, the rapid stop command, the alarm etc.
- The specified value is out of the software limit setting value.
- A position change command is input to an auxiliary axis in the linear interpolation.
- A position change command is input to an axis in the circular interpolation. [MC300]
- A position change command is input to an axis after the interpolation operation (software version A1 or later). [MC300]

6.14 Backlash

A function that corrects the mechanical error (backlash) when the movement direction is reverse.
The compensation amount for backlash is set in "Backlash compensation amount (parameter No.0208)".



Condition	Processing details
Normal	The compensation amount is added at the timing of switching movement direction.
Home position return	The backlash compensation is performed as well as normal.

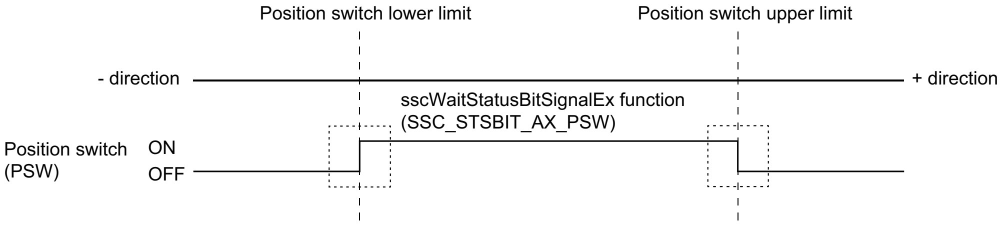
Point

[API library]
To set/get the backlash compensation amount, use the sscChange2Parameter function/sscCheck2Parameter function.

6

6.15 Position Switch

The position switch is the signal turned ON when the axis is within the setting range (including the boundary line) which is set by "Position switch Upper limit (parameter No.022C, 022D)", "Position switch Lower limit: parameter No.022E, 022F)".



For judging the condition for the position switch signal (PSW), "0: Current command position" or "1: Current feedback position" can be selected for "Position switch judgment conditions" of "Control option 2 (parameter No.0201)".

Point

- If the upper limit and the lower limit of the position switch are the same value, the position switch signal (PSW) is invalid.
- If the lower limit of the position switch is a higher value than the upper limit, "Position Switch Parameter Error (operation alarm A5H, detail 01H)" occurs upon the start of the operation.
- The position switch signal (PSW) becomes valid after the completion of the home position return.

Point

[API library]
- To set/get the upper limit or lower limit of the position switch signal (PSW), use the sscChange2Parameter function/sscCheck2Parameter function.
- To confirm if position switch (PSW) is ON/OFF, set "SSC_STSBIT_AX_PSW" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

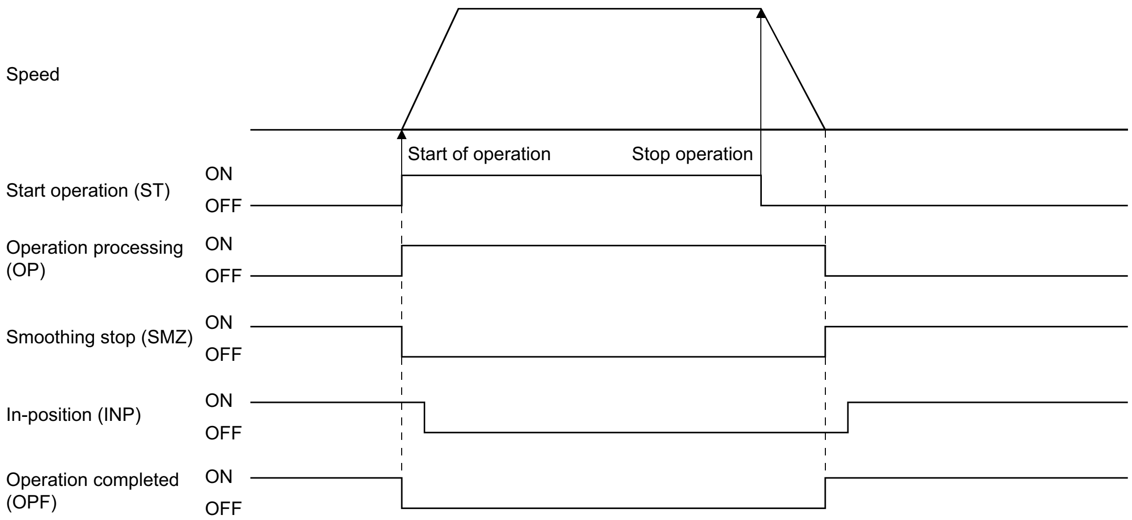
6.16 Completion of Operation Signal

The operation completed signal (OPF) shows a completion of the operation status. At the startup, the operation completed signal (OPF) turns OFF, and the operation completed signal (OPF) turns ON when the positioning operation is complete. The interruption of the operation due to an alarm also turns ON the operation completed signal (OPF).
A summary of the operation for each operation mode is shown as follows.

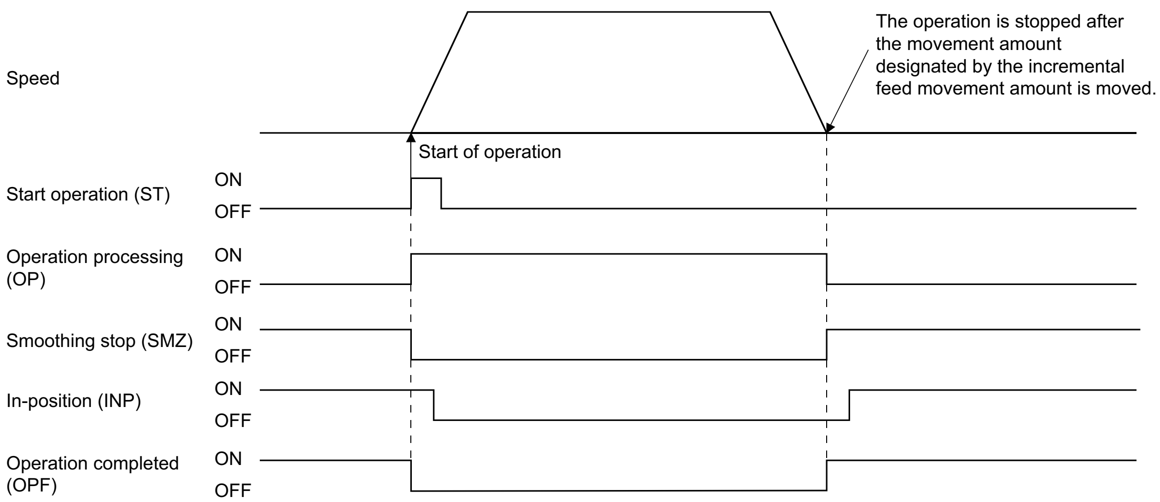
Point

[API library]
To confirm the completion of operation, use the sscWaitIntDriveFin function/sscGetDriveFinStatus function.

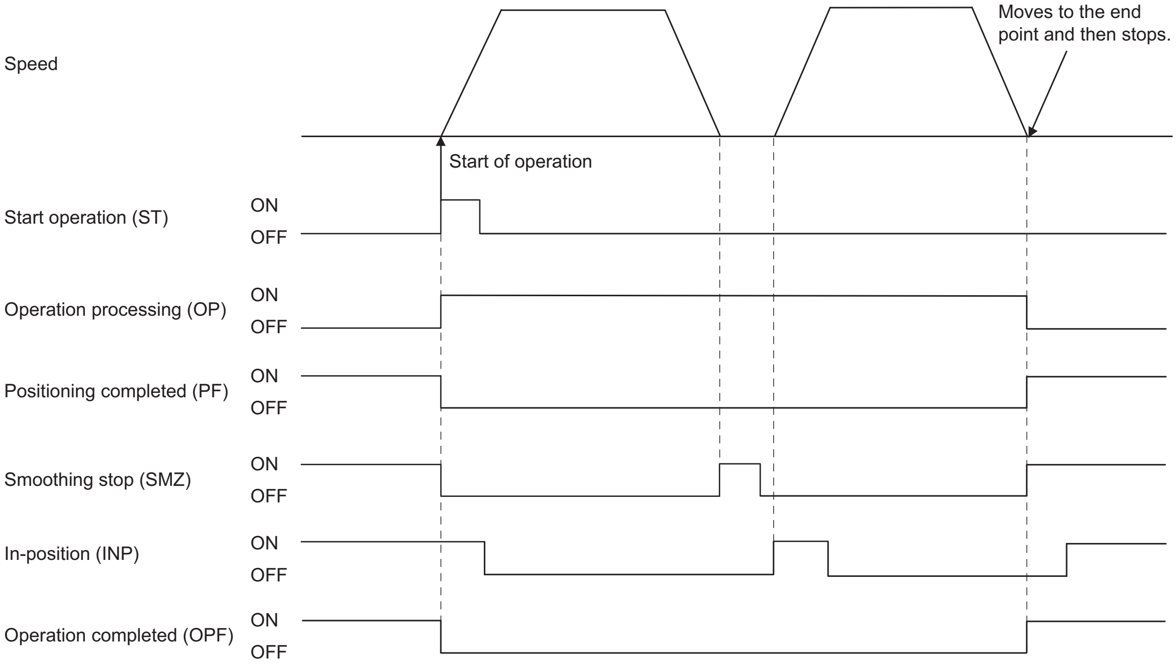
Using a JOG operation



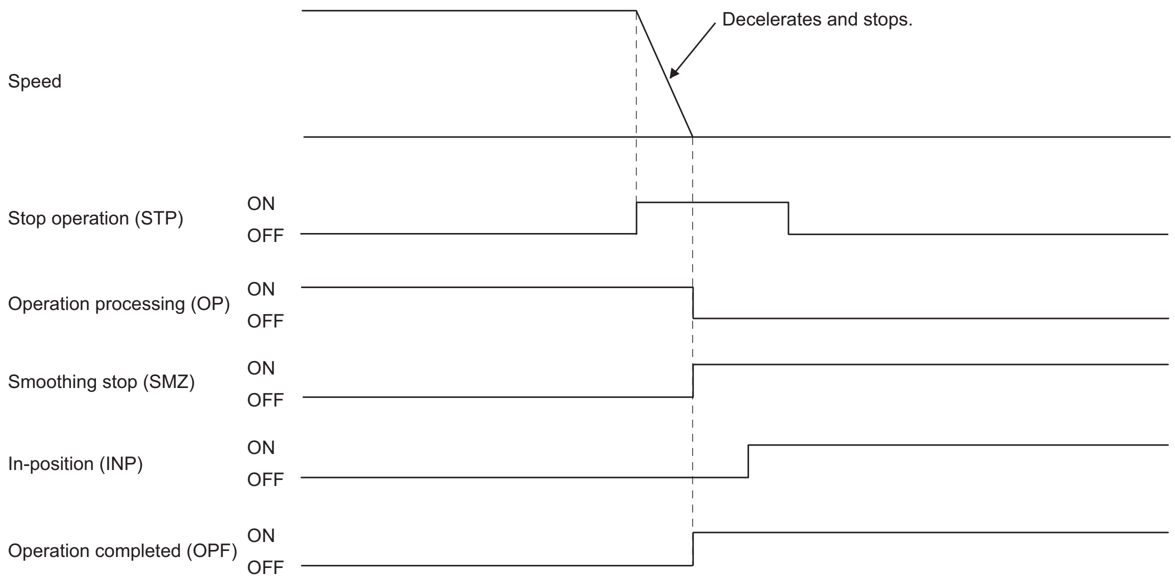
Using an incremental feed



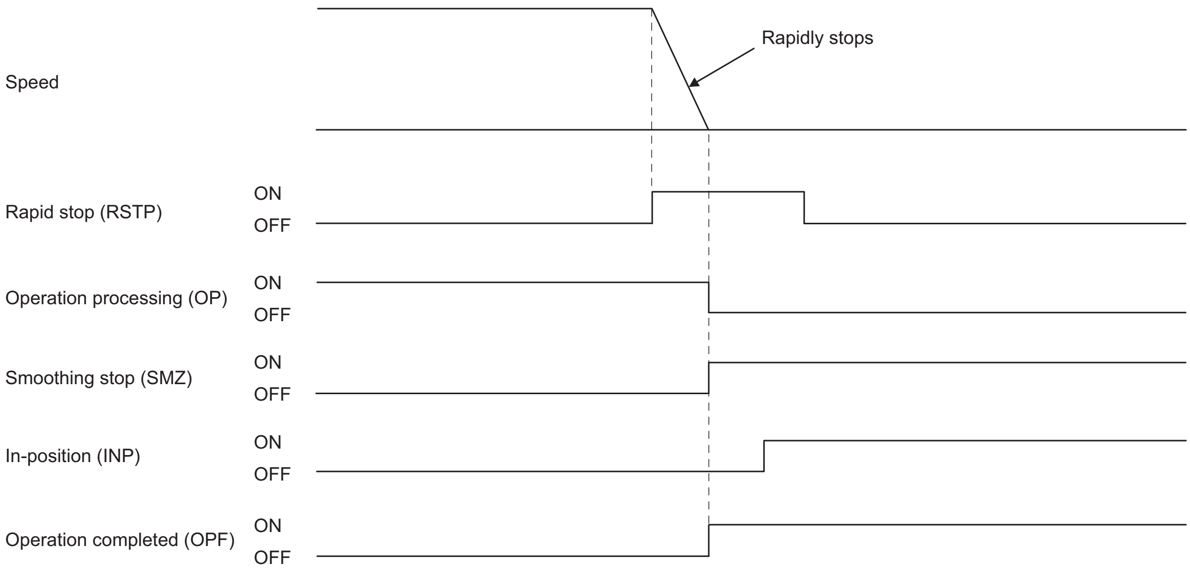
Using an automatic operation



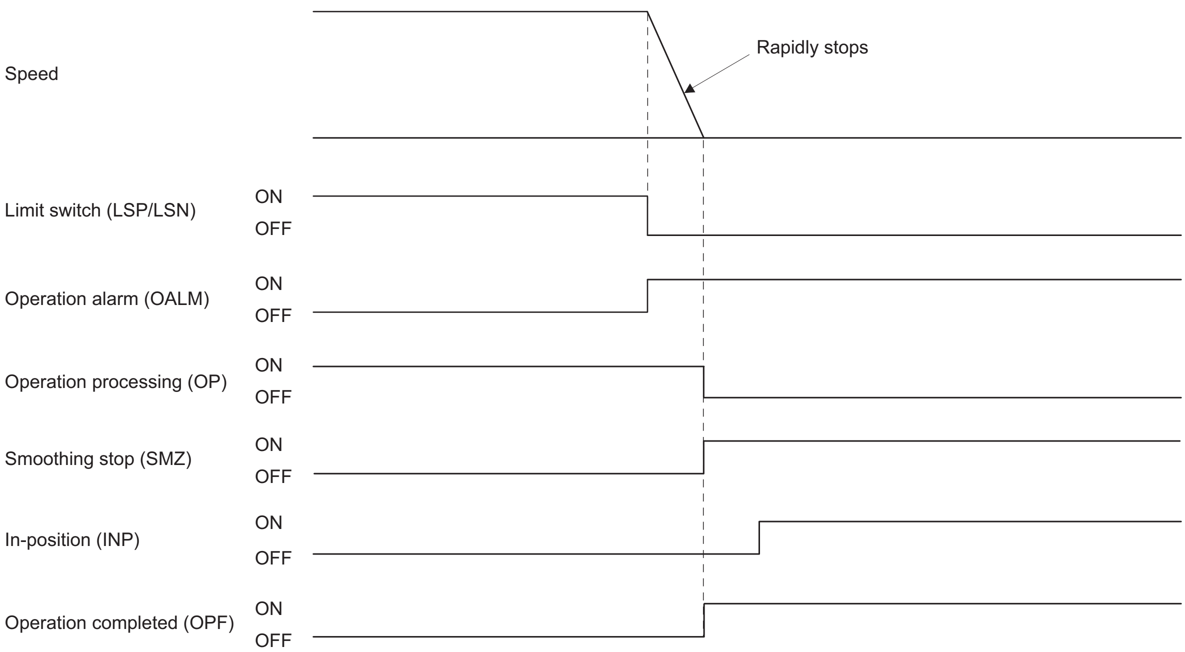
Stop by the stop operation signal



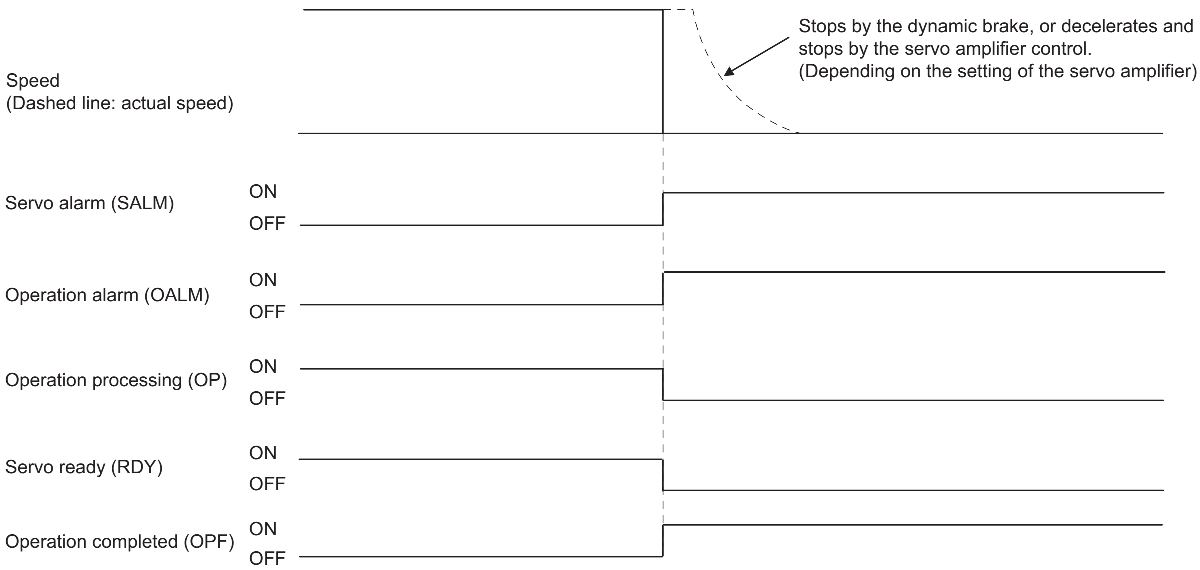
Stop by the rapid stop signal



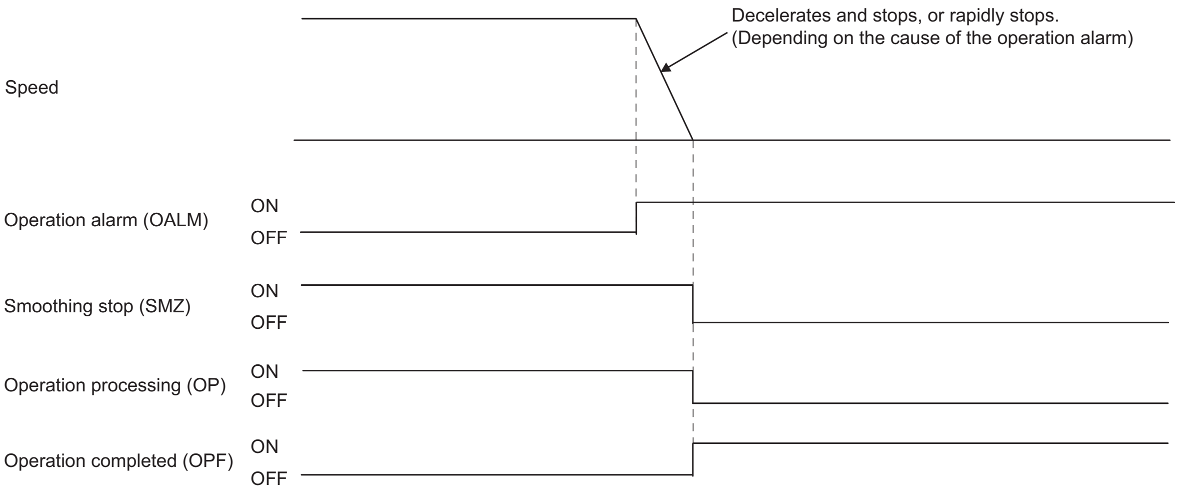
Stop by the limit switch



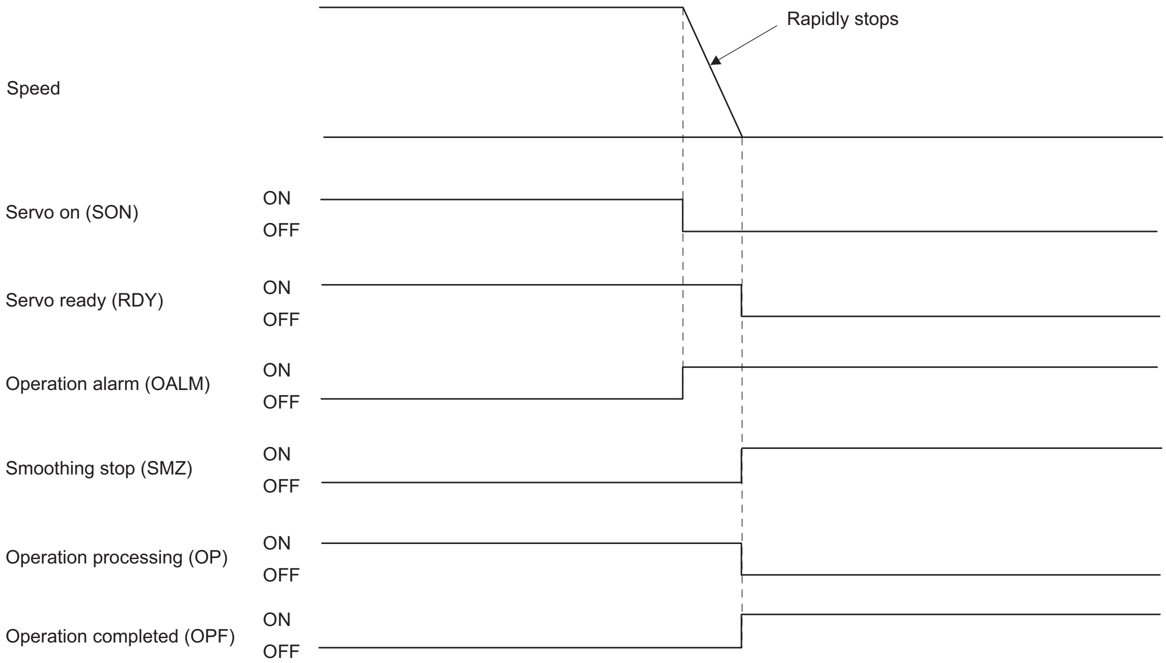
Stop by the servo alarm occurrence



Stop by the operation alarm occurrence



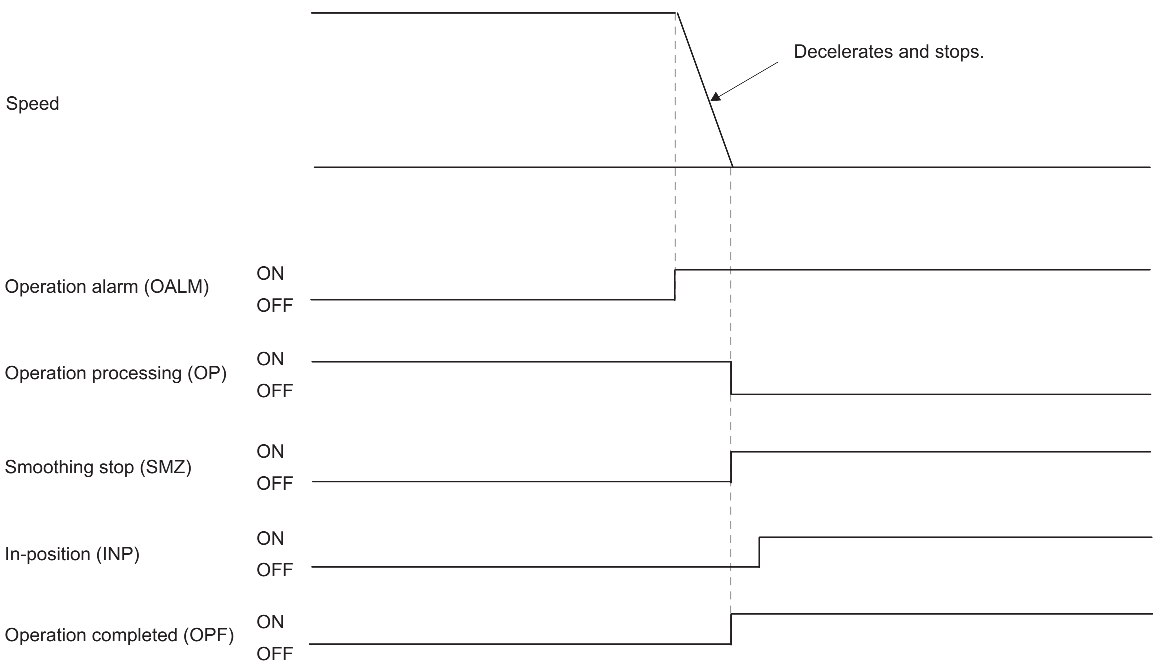
Stop by the servo off



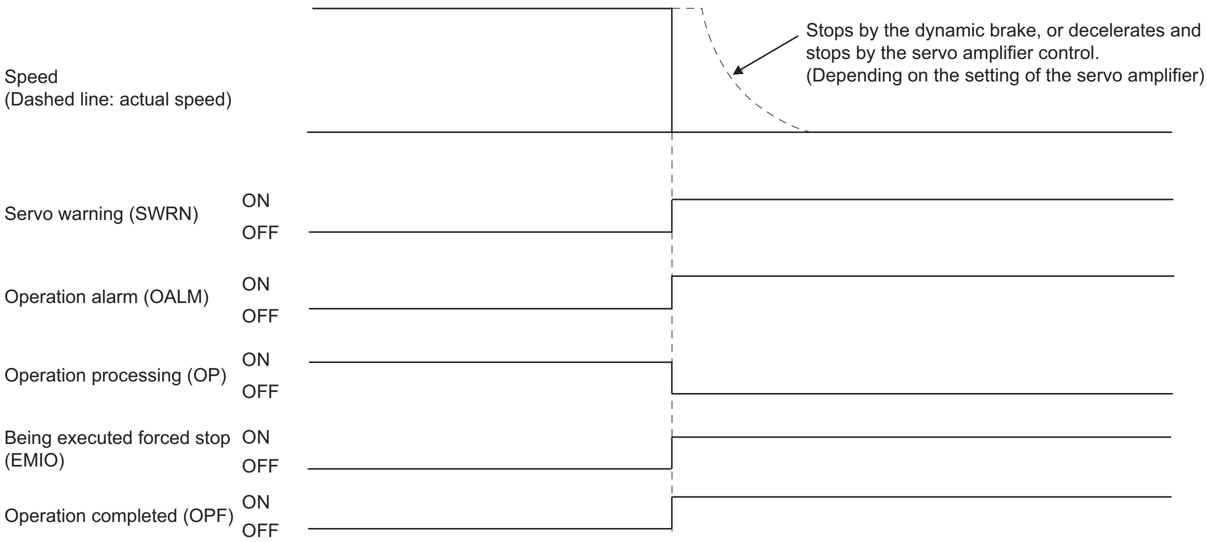
Stop by a software limit

Ex.

In JOG operation



Stop by the forced stop occurrence



6.17 Interference Check Function

Through setting the standard coordinate system for the interference check function, the current command position of all of the axes and movement direction is changed to the standard coordinate system and interference check using relative position is implemented. Therefore, for data used for change of coordinates, the position and direction of the coordinate system with respect to the home position (where the current command position is 0) standard coordinate system can be set using parameters.

Interference checks are performed when operation is started as well as changing of points and if the target position of positioning of the axis is within the interference check area, "Command Error in Interference Area (operation alarm 44H, detail 01H)" is output and start of operation is interrupted. And, for prevention of collision, the current command position is monitored at all times and if the difference of the current command position of the axis and the interference check axis (relative distance) is less than the width for interference checking, an interference standby error (if moving in the same direction) or "Entering Interference Area Error (operation alarm 45H, detail 01H)" occurs and rapid stop is performed.

Point

- To validate or invalidate the interference check, use "Interference check options (parameter No.0281)". The number of axes for which the interference check can be validated differs depending on the control cycle. Up to 8 axes [MC200]/32 axes [MC300] can be set. When the number is set exceeding the maximum number of axes for which the interference check is valid*1, "Parameter Error (operation alarm 37H, detail 01H)" occurs on all the axes for which the interference check is valid.
- Interference check is valid after home position return complete for the axis and interference check.
- Interference standby is only valid for the automatic operation, linear interpolation [MC200]/interpolation operation [MC300] operation and incremental feed. If while in other operation modes, the difference of the current command position of between the axis and the interference check axis is less than the width of interference checking, "Entering Interference Area Error (operation alarm 45H, detail 01H)" occurs and rapid stop is performed.
- Interference check is valid only when the travel direction is the same as the interference check direction.
- Interference check function is not compatible with circular interpolation. "Interference Check Axis Setting Error (operation alarm 43H, detail 0FH)" is output at circular interpolation operation start up and operation start up is stopped. For continuous operation, a deceleration stop occurs. [MC300]

*1 Maximum number of axes for which the interference check is valid is as below.

Control cycle	MR-MC2_ _	MR-MC3_ _
0.88ms	8	32
0.44ms	4	16
0.22ms	0	8

Point

[API library]
To set/get anything relating to interference check, use the sscChange2Parameter function/sscCheck2Parameter function.

CAUTION

When the axis or the interference check axis is free from the control of the position board, such as in the following cases, this function may not prevent axes from collision.
- A servo alarm occurs.
- In torque limit status
- The power line is disconnected.
- In inoperable status due to mechanical factors, etc.

Interface

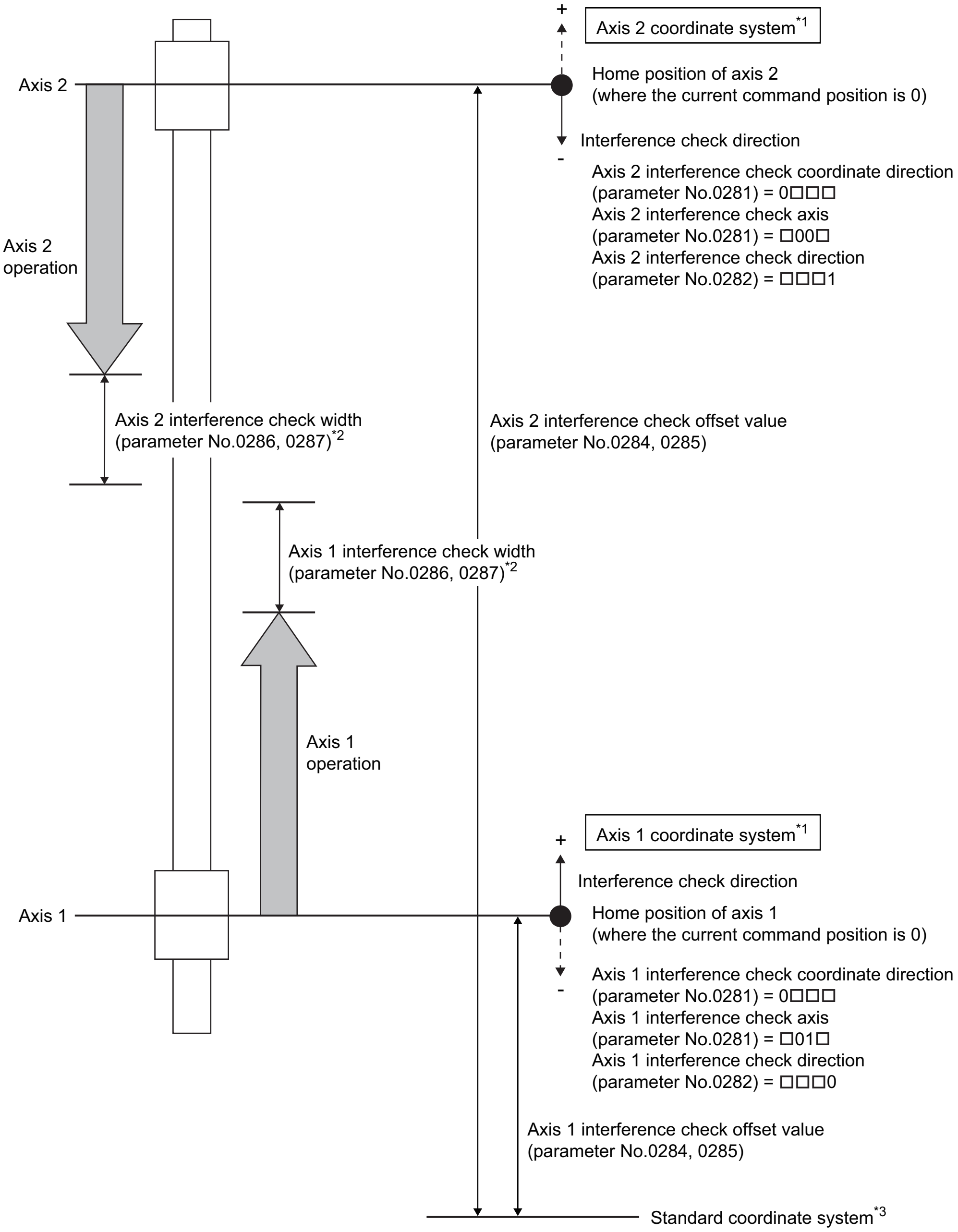
Control parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
0281	*IOP	Interference check options	0000h	—	[MC200] 0000h to 12F1h [MC300] 0000h to 13F1h	■■■□ (Interference check) Set validity/invalidity of interference check. • 0: Invalid • 1: Valid ■□□■ (Interference check axis)*2*3*4 Set the other axis for which interference check is performed. • 00h to 1Fh: Interference check axis -1 [MC200] • 00h to 3Fh: Interference check axis -1 [MC300] <Example> 00h Axis No.1 □■■■ (Interference check coordinate direction) Set the direction of the coordinate system for the axis from the perspective of the standard coordinate system. • 0: Same direction • 1: Opposite direction
0282	*IOP2	Interference check options 2	0000h	—	0000h to 0011h	■■■□ (Interference check direction) Set the direction for which interference check is performed. • 0: + direction of coordinate system for the axis • 1: - direction of coordinate system for the axis ■■□■ (Interference check standby) Set validity/invalidity of interference check standby. • 0: Invalid • 1: Valid
0284	IOFL	Interference check offset (lower)	0000h	Command units	0000h to FFFFh	Set the position on the home position standard coordinate system.
0285	IOFH	Interference check offset (upper)	0000h		0000h to FFFFh	
0286	IWL	Interference check width (lower)	0000h	Command units	0000h to FFFFh	Set the width from the interference check axis target position of the area where interference check is performed.
0287	IWH	Interference check width (upper)	0000h		0000h to FFFFh	

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 If the axis No. is set, "Interference Check Axis Setting Error (operation alarm 43H, detail 01H)" occurs.
*3 If an axis in the same linear interpolation group [MC200]/interpolation group [MC300] as the axis is set, "Interference Check Axis Setting Error (operation alarm 43H, detail 02H)" occurs.
*4 If axes are designated as tandem drive interference check axes, set up a master axis.

Interference check operation image diagram

The following example shows where the direction of the interference check coordinate (the direction of the coordinate system for each axis against the standard coordinate system) is the same direction.



*1 The coordinate system direction is positive (direction to which the coordinate values increase).
*2 Make sure to set the interference check width. Normally, the same value occurs for independent axes and for interference check axes.
*3 The standard coordinate system is virtual, therefore there are not any parameter settings for the standard coordinate system itself.

Point

Interference check is valid when the travel direction is the same as the interference check direction.

Checks prior to start up

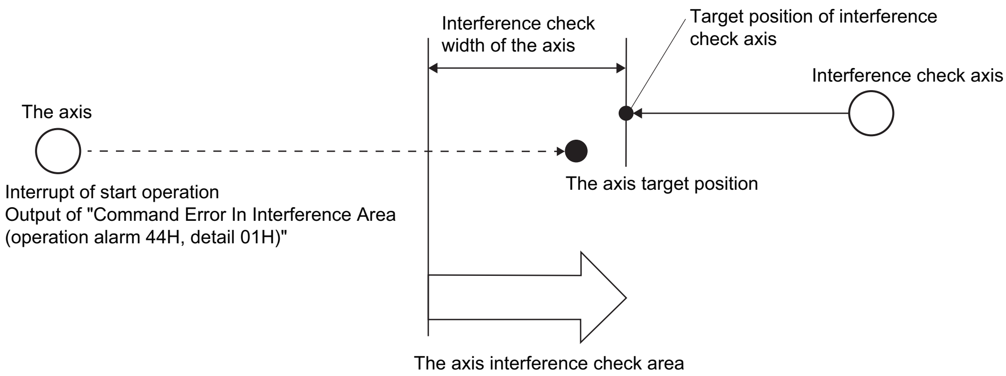
The interference check area is the relative distance from the target position of the interference check axis positioning. Interference checks are performed when operation is started as well as changing of points (automatic operation and linear interpolation operation [MC200]/interpolation operation [MC300], and incremental feed) and if the target position of positioning of the axis is not within the interference check area, "Command Error in Interference Area (operation alarm 44H, detail 01H)" is output and start of operation is interrupted.

Point

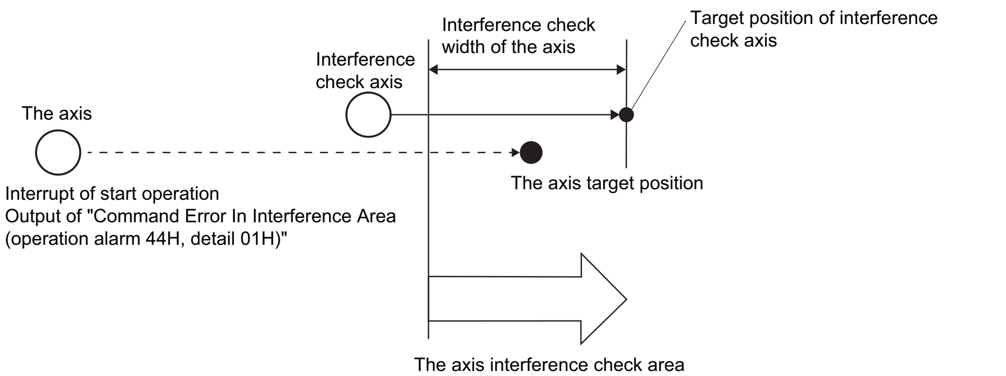
For the following, check prior to start up is not performed.

- When the operation mode is JOG operation, Home position return and Home position reset function (data set function).
- When the axis is stopping for the interference check.

If the interference check axis is moving in the direction such that it is getting closer to the axis.



If the interference check axis is moving in the direction such that it is moving away from the axis.



Operation check

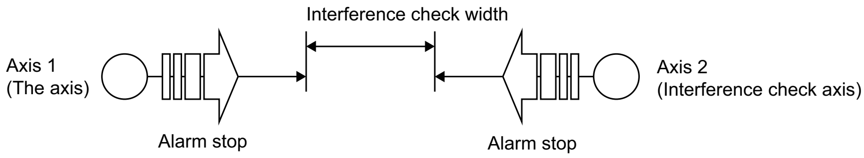
In order to prevent collision, the current command position is monitored at all times and if the difference between the relative distance of the axis and the interference check axis is judged to be less than the interference check width, rapid stop is executed. The movement amount during the rapid stop is considered for the monitored current command position, and a stop is performed so that the distance from the interference check axis does not fall below the interference check width.

If the interference check axis is moving in the relative distance such that it is getting closer to the axis.

If the distance between the axis and the interference check axis is judged to drop below the interference check width, "Entering Interference Area Error (operation alarm 45H, detail 01H)" is output and rapid stop is executed. At the same time, "Entering Interference Area Error (operation alarm 45H, detail 01H)" also occurs in the interference check axis and rapid stop is executed.

For the interference check width set the settings so that the following equation is true.

Interference check width (Lc) > (Offset from axis one coordinate point to load side) + (Offset from axis two coordinate point to load side)

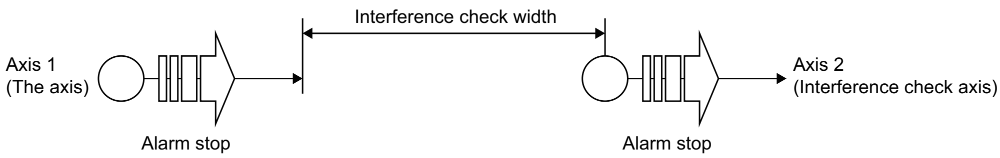


If the interference check axis is moving in the direction such that it is moving away from the axis.

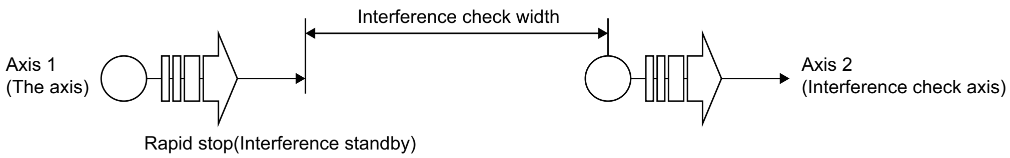
■ For automatic operation, linear interpolation operation [MC200]/interpolation operation [MC300], and for using incremental feed

If the distance between the axis and interference check axis is judged to drop below the interference check width while the interference check axis is moving away from the axis and rapid stop is executed. Then, whether to cancel the operation or to restart the operation automatically by conditions can be selected in "Interference check standby" of "Interference check standby (parameter No.0282)".

- When "Interference check standby" is "0: Invalid"
  If the distance between the axis and interference check axis is judged to drop below the interference check width while the interference check axis is moving away from the axis, output "Entering Interference Area Error (operation alarm 45H, detail 01H)" and execute and rapid stop is executed. At the same time, "Entering Interference Area Error (operation alarm 45H, detail 01H)" also occurs in the interference check axis and rapid stop is executed.



- When "Interference check standby" is "1: valid"
  If the distance between the axis and interference check axis is judged to drop below the interference check width while the interference check axis is moving away from the axis, turn the during the interference check standby signal (IWT) for the axis ON and rapid stop is executed. When the distance between the axis and the interference check axis exceeds the interference check width, operation is automatically resumed and the machine resumes moving to the target position.

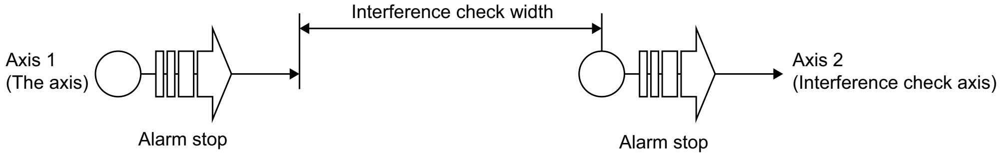


Point

If the interference check axis stops due to an alarm etc. during interference standby, "Entering Interference Area Error (operation alarm 45H, detail 01H)" occurs and operation is terminated.

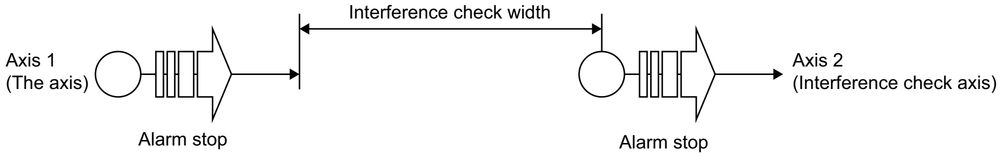
■For other than automatic operation, linear interpolation operation [MC200]/interpolation operation [MC300], and incremental feed

If the distance between the axis and interference check axis is judged to drop below the interference check width while the interference check axis is moving away from the axis, "Entering Interference Area Error (operation alarm 45H, detail 01H)" is output and rapid stop is executed. At the same time, "Entering Interference Area Error (operation alarm 45H, detail 01H)" also occurs in the interference check axis and rapid stop is executed.



While the interference check axis is stopped

If the distance between the axis and the interference check axis is judged to drop below the interference check width, "Entering Interference Area Error (operation alarm 45H, detail 01H)" is output and rapid stop is executed. At the same time, "Entering Interference Area Error (operation alarm 45H, detail 01H)" also occurs in the interference check axis.



The position information for the interference check axis used for making judgment to prevent collision is the following.

- If the interference check axis is getting closer to the axis
  Perform the check using current command position.
- If the interference check axis is getting further away from the axis
  Perform the check using current feedback position.
- While the interference check axis is stopped
  Perform the check using current feedback position.

6.18 Home Position Search Limit

The home position search limit function is that while returning to home position, through movement operation in the opposite direction of home position return, if the movement exceeds the parameter set for "Home position search limit (parameter No.024A, 024B)", "Home Position Search Limit Error (operation alarm 98H, detail 01H)" occurs and home position return operation is terminated. It is a function used to prevent unexpected operation in case the dog signal and limit switch cannot detect correctly due to a failure. The home position search limit function is valid for the following home position return methods.

- Home position return using a dog method
- Home position return using a dog cradle method
- Home position return using a limit switch combined method
- Home position return using a limit switch front end method
- Home position return using a dog front end method
- Home position return using a scale home position signal detection method
- Home position return using a scale home position signal detection method 2

Settings

The following items are set for using the home position search limit function.

Control parameters

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Function
024A	ZLL	Home position search limit (lower)	0000h	Command units	0000h to FFFFh	Set a limit on the movement amount when searching for the home position. If the setting for the home position search limit is 0, this function does not operate.
024B	ZLH	Home position search limit (upper)	0000h		0000h to 7FFFh	

Point

[API library]

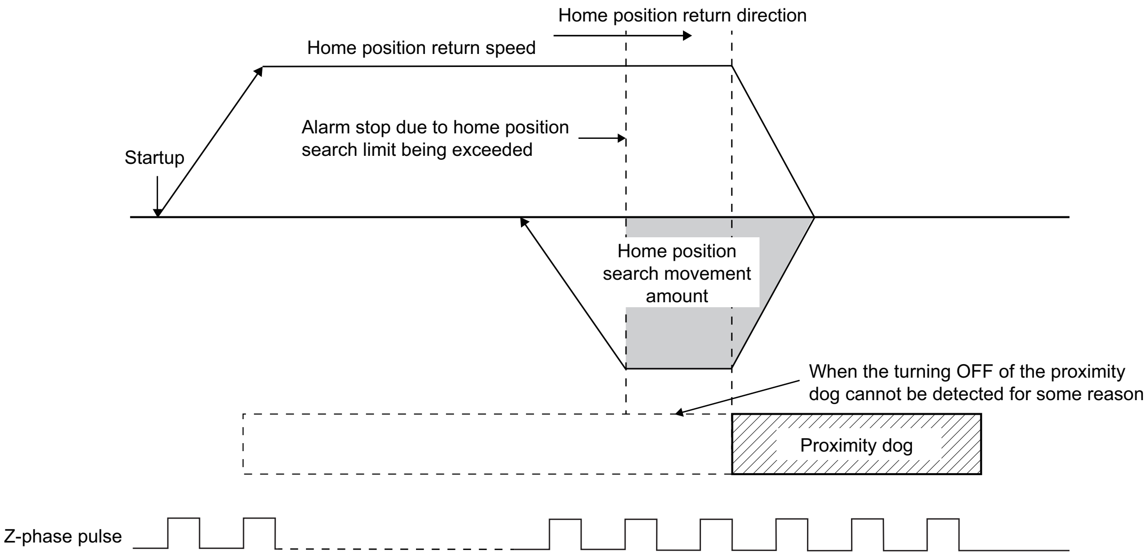
To set/get the home position search limit, use the sscChange2Parameter function/sscCheck2Parameter function.

Home position search limit operation example

For home position return using a dog cradle method

Ex.

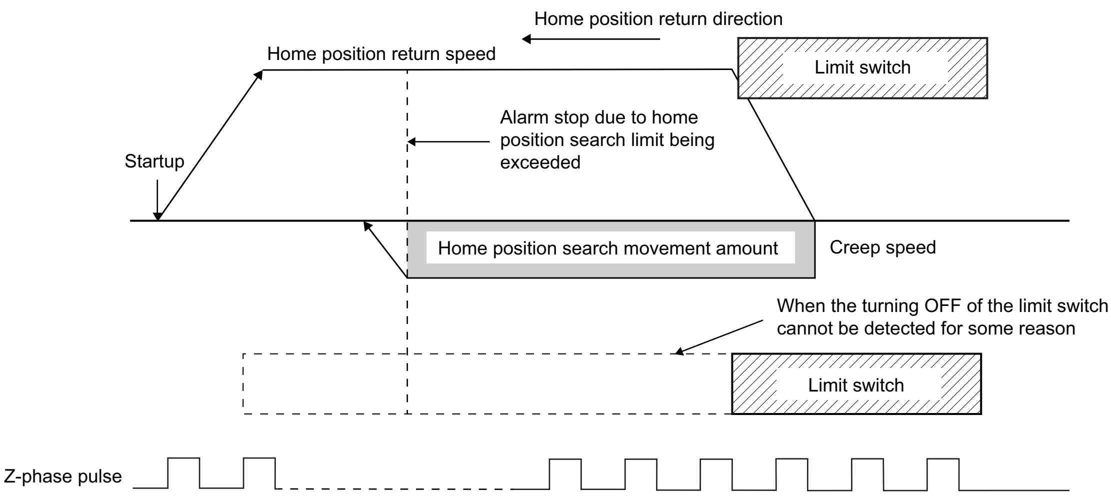
When the turning OFF of the proximity dog cannot be detected



For home position return using a limit switch combined method

Ex.

When the limit switch is not released



6.19 Gain Changing/Gain Changing 2

Through turning ON the gain switching command signal (GAIN), the gain for the servo amplifier can be changed. This is used to change the gain during revolution and while stopped, as well as changing gain according to the movement amount or speed.

Point

[MC300]
For MR-J5(W_)-_B, the gain changing 2 can be used.

When the gain changing function is used, set the following servo parameters.

Servo parameters

■MR-J4(W_)-_B

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol *1	Name	Setting value
1159	PB26	*CDP	Gain switching function	Arbitrary within setting range
115A	PB27	CDL	Gain switching condition	Arbitrary within setting range
115B	PB28	CDT	Gain switching time constant	Arbitrary within setting range
115C	PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching	Arbitrary within setting range
115D	PB30	PG2B	Position loop gain after gain switching	Arbitrary within setting range
115E	PB31	VG2B	Speed loop gain after gain switching	Arbitrary within setting range
115F	PB32	VICB	Speed integral compensation after gain switching	Arbitrary within setting range
1160	PB33	VRF11B	Vibration suppression control 1 - Vibration frequency after gain switching	Arbitrary within setting range
1161	PB34	VRF12B	Vibration suppression control 1 - Resonance frequency after gain switching	Arbitrary within setting range
1162	PB35	VRF13B	Vibration suppression control 1- Vibration frequency damping after gain switching	Arbitrary within setting range
1163	PB36	VRF14B	Vibration suppression control 1- Resonance frequency damping after gain switching	Arbitrary within setting range
1177	PB56	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching	Arbitrary within setting range
1178	PB57	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching	Arbitrary within setting range
1179	PB58	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching	Arbitrary within setting range
117A	PB59	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching	Arbitrary within setting range
117B	PB60	PG1B	Model loop gain after gain switching	Arbitrary within setting range

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

■MR-J5(W_)-_B [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol *1	Name	Setting value
2049	PB26	*CDP	Gain switching function	Arbitrary within setting range
204A	PB27	CDL	Gain switching condition	Arbitrary within setting range
204B	PB28	CDT	Gain switching time constant	Arbitrary within setting range
204C	PB29	GD2B	Gain switching - Load to motor inertia ratio/load to motor mass ratio	Arbitrary within setting range
204D	PB30	PG2B	Gain switching - Position control gain	Arbitrary within setting range
204E	PB31	VG2B	Gain switching - Speed control gain	Arbitrary within setting range
204F	PB32	VICB	Gain switching - Speed integral compensation	Arbitrary within setting range
2050	PB33	VRF11B	Gain switching - Vibration suppression control 1 - Vibration frequency	Arbitrary within setting range
2051	PB34	VRF12B	Gain switching - Vibration suppression control 1 - Resonance frequency	Arbitrary within setting range
2052	PB35	VRF13B	Gain switching - Vibration suppression control 1 - Vibration frequency damping	Arbitrary within setting range
2053	PB36	VRF14B	Gain switching - Vibration suppression control 1 - Resonance frequency damping	Arbitrary within setting range

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol *1	Name	Setting value
2067	PB56	VRF21B	Gain switching - Vibration suppression control 2 - Vibration frequency	Arbitrary within setting range
2068	PB57	VRF22B	Gain switching - Vibration suppression control 2 - Resonance frequency	Arbitrary within setting range
2069	PB58	VRF23B	Gain switching - Vibration suppression control 2 - Vibration frequency damping	Arbitrary within setting range
206A	PB59	VRF24B	Gain switching - Vibration suppression control 2 - Resonance frequency damping	Arbitrary within setting range
206B	PB60	PG1B	Gain switching - Model control gain	Arbitrary within setting range
2072	PB67	GD2C	Gain switching 2 - Load to motor inertia ratio/load to motor mass ratio	Arbitrary within setting range
2073	PB68	PG2C	Gain switching 2 - Position control gain	Arbitrary within setting range
2074	PB69	VG2C	Gain switching 2 - Speed control gain	Arbitrary within setting range
2075	PB70	VICC	Gain switching 2 - Speed integral compensation	Arbitrary within setting range
2076	PB71	VRF11C	Gain switching 2 - Vibration suppression control 1 - Vibration frequency	Arbitrary within setting range
2077	PB72	VRF12C	Gain switching 2 - Vibration suppression control 1 - Resonance frequency	Arbitrary within setting range
2078	PB73	VRF13C	Gain switching 2 - Vibration suppression control 1 - Vibration frequency damping	Arbitrary within setting range
2079	PB74	VRF14C	Gain switching 2 - Vibration suppression control 1 - Resonance frequency damping	Arbitrary within setting range
207A	PB75	VRF21C	Gain switching 2 - Vibration suppression control 2 - Vibration frequency	Arbitrary within setting range
207B	PB76	VRF22C	Gain switching 2 - Vibration suppression control 2 - Resonance frequency	Arbitrary within setting range
207C	PB77	VRF23C	Gain switching 2 - Vibration suppression control 2 - Vibration frequency damping	Arbitrary within setting range
207D	PB78	VRF24C	Gain switching 2 - Vibration suppression control 2 - Resonance frequency damping	Arbitrary within setting range
207E	PB79	PG1C	Gain switching 2 - Model control gain	Arbitrary within setting range

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

Point

- For details about the servo parameters, refer to the servo amplifier instruction manual or the manual for your servo amplifier.
- To use the gain switching function, first set the gain adjustment mode to a manual mode by changing "Auto tuning mode (MR-J4(W_)-_B: parameter No.1107, MR-J5(W_)-_B: parameter No.2007 [MC300])" to "3: Manual mode". If the gain adjustment mode is in auto-tuning mode, the gain changing function cannot be used.

[MC300]

- During continuous operation to torque control mode, the gain switching cannot be performed. For MR-J5(W_)-_B, the gain changing 2 cannot be used either.
- While the servo amplifier is under slight vibration suppression control, switching to the ratio of load inertia moment/load mass ratio, the model control gain, the position control gain, the speed control gain, and the speed integral compensation cannot be performed.

Point

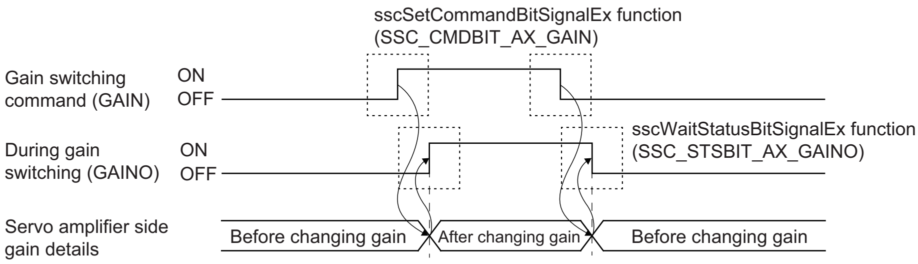
[API library]

- To turn ON/OFF the gain switching command signal (GAIN), set "SSC_CMDBIT_AX_GAIN" to the command bit No. of the sscSetCommandBitSignalEx function.
- To confirm if the during gain switching signal (GAINO) is ON/OFF, set "SSC_STSBIT_AX_GAINO" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

[MC300]

- To turn ON/OFF the gain switching command signal (GAIN2), set "SSC_CMDBIT_AX_GAIN2" to the command bit No. of the sscSetCommandBitSignalEx function.
- To confirm if the during gain switching signal (GAIN2O) is ON/OFF, set "SSC_STSBIT_AX_GAIN2O" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

A timing chart using for gain changing is shown below.



6.20 PI-PID Switching

By turning ON the PID control command signal (CPC), control of the servo amplifier is changed to PID control from PI control. Use this function, for example, to remove any interference (torsion) between tandem drive axes by operating an axis (slave axis) under PID control. When using the PI-PID switching function, set the following servo parameters.

Servo parameters

■MR-J4(W_)-_B

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol[*1]	Name	Setting value
1157	PB24	*MVS	Slight vibration suppression control	■■□■ (PI-PID switching control selection) • 0: PI control enabled (The control can be switched to PID control (proportional control) with the servo system controller command.)

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

■MR-J5(W_)-_B [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol[*1]	Name	Setting value
2047	PB24	*MVS	Slight vibration suppression control	■■■■■■□■ (PI-PID switching control selection) • 0: PI control enabled (The control can be switched by PID switching signal from the controller.)

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

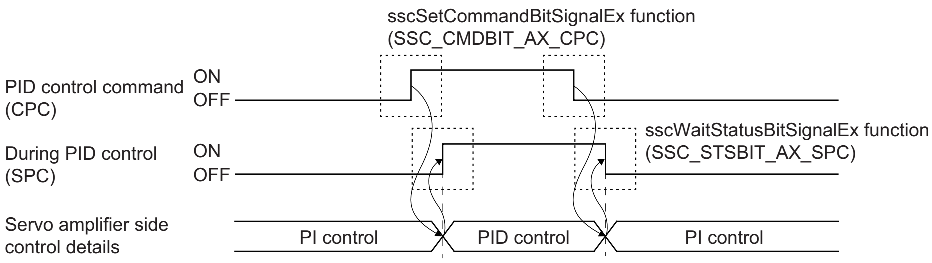
Point

- For details about the servo parameters, refer to the servo amplifier instruction manual or the manual for your servo amplifier.
- To use the PI-PID switching function, first set the gain adjustment mode to a manual mode by changing "Auto tuning mode (MR-J4(W_)-_B: parameter No.1107, MR-J5(W_)-_B: parameter No.2007 [MC300])" to "3: Manual mode". If the gain adjustment mode is in an auto-tuning mode, the PI-PID switching function cannot be used.

Point

[API library]
- To turn ON/OFF the PID control command signal (CPC), set "SSC_CMDBIT_AX_CPC" to the command bit No. of the sscSetCommandBitSignalEx function.
- To confirm if the during PID control signal (SPC) is ON/OFF, set "SSC_STSBIT_AX_SPC" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

A timing chart using for PI-PID switching is shown below.



6.21 Absolute Position Detection System

By using a servo motor compatible with the absolute position detection system, the positioning control can be made by the absolute position detection system. In the absolute position detection system, if the machinery position is determined at the system startup, there is no need to execute the home position return because the absolute position is restored at the system startup.

The determination of the machinery position is made by the home position return. At the home position return and the power on, be sure to execute the operation referring to the procedures (☞ Page 205 Processing procedure).

Point

[API library]

- To set/get the absolute position detection system, use the sscChange2Parameter function/ sscCheck2Parameter function.
- For setting the parameter of MR-J5(W_)-_B, to set/get the absolute position detection system, use the sscChange2ParameterEx function/sscCheck2ParameterEx function.

Parameters

The parameters related to the absolute position detection system are shown below.

Servo parameters

■MR-J4(W_)-_B

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol *1	Name	Initial value	Description
1102	PA03	*ABS	Absolute position detection system	0000h	■■■□ (Absolute position detection system selection) • 0: Disabled (used in incremental system) • 1: Enabled (used in absolute position detection system)

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

■MR-J5(W_)-_B [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol *1	Name	Initial value	Description
2002	PA03	*ABS	Absolute position detection system	0000h	■■■■■■■□ (Absolute position detection system selection) • 0: Disabled (used in incremental system) • 1: Enabled (absolute position detection system)

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

Control parameters

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
0241	*OPZ2	Home position return option 2	0000h	—	0000h to 0001h	■■■□ (Absolute position data) Set the validity/invalidity of restoring the absolute position. • 0: Invalid (The position at the system startup is defined to be 0. The home position return must be executed prior to performing the automatic operation or the linear interpolation operation [MC200]/ interpolation operation [MC300].) • 1: Valid (The absolute position is restored at the system startup based on the home position multiple revolution data and the home position within 1 revolution position.) ■■□■ (Change of absolute position data on home position reset) If "1: Valid" is set, the home position multiple revolution data and home position within 1 revolution position are renewed when the home position is reset. • 0: Invalid • 1: Valid
024D	*LS0	Home position multiple revolution data	0000h	rev	0000h to FFFFh	Set the home position multiple revolution data.
024E	*CY0L	Home position within 1 revolution position (lower)	0000h	pulse	0000h to FFFFh	Set the within 1 revolution home position.
024F	*CY0H	Home position within 1 revolution position (upper)	0000h		0000h to FFFFh	

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Processing procedure

Be sure to execute the operation referring to the following procedures at the home position return and the power on.

Processing procedure for returning to home position

1. For MR-J4(W_)-_B, set "Absolute position detection system (parameter No.1102)" to "1: Enabled (used in absolute position detection system)".
   For MR-J5(W_)-_B, set "Absolute position detection system (parameter No.2002)" to "1: Enabled (absolute position detection system)".
2. If setting the parameter in step 1. for the first time, the servo alarm [AL. 25_Absolute position erased][*1] occurs. After turning OFF the power supply of the servo amplifier, turn the power supply ON again and start the system again.
3. Perform the home position return.
4. When the home position return is completed, the home position return request signal (ZREQ) turns OFF and the home position return completed signal (ZP) turns ON. Then "Home position multiple revolution data (parameter No.024D)" and "Home position within 1 revolution position (parameter No.024E, 024F)" are updated, and "Absolute position data" of "Home position return option 2 (parameter No.0241)" is changed to "1: Valid".
5. After confirming the home position return complete signal (ZP) is ON, read "Home position multiple revolution data (parameter No.024D)" and "Home position within 1 revolution position (parameter No.024E, 024F)" and store a backup copy.

*1 For MR-J5(W_)-_B, the servo alarm [AL. 025_Absolute position erased] [MC300]

Processing procedure for turning on the power

After executing the backup of the home position at the processing procedure for returning to home position, execute the following processing before the system startup (before setting the system command code to "000Ah". Performing of this process restores the system to the absolute positioning at the system startup.

1. Set the home position multiple revolution data and home position within 1 revolution position stored during backup of processing procedure for returning to home position to "Home position multiple revolution data (parameter No.024D)" and "Home position within 1 revolution position (parameter No.024E, 024F)".
2. Set "Absolute position data" of "Home position return option 2 (parameter No.0241)" to "1: Valid".

Cautions for use of absolute position detection system

In the case of the following, the absolute position erased signal (ABSE) is turned ON and "Absolute position data" of "Home position return option 2 (parameter No.0241)" is changed to "0: Invalid". Furthermore, the servo is not yet finished with the home position return, and the home position return request signal (ZREQ) turns ON. Therefore, when performing the automatic operation, execute the home position return again. (In cases other than (1))

- When the following parameters are changed. ··· (1)
  - · Related to the home position return (parameter No.0240, 0246 to 0249, and 024D to 024F)[*1]
  - · Electronic gear numerator/denominator (parameter No.020A to 020D)

  For MR-J4(W_)-_B
  - · Operation mode (parameter No.1100)
  - · Absolute position detection system (parameter No.1102)
  - · Rotation direction selection/travel direction selection (parameter No.110D)

  For MR-J5(W_)-_B [MC300]
  - · Operation mode (parameter No.2000)
  - · Absolute position detection system (parameter No.2002)
  - · Electronic gear - Numerator (parameter No.2005), Electronic gear - Denominator (parameter No.2006)
  - · Travel direction selection (parameter No.200D)
- If the servo alarm [AL. 25_Absolute position erased] or [AL. E3_Absolute position counter warning][*2] occurs, note that these alarms are cleared by power OFF/ON the servo amplifier.
- The servo alarm [AL. 37_Parameter error][*3] occurs.
- The setting value for "Home position multiple revolution data (parameter No.024D)" or "Home position within 1 revolution position (parameter No.024E, 024F)" is incorrect and overflow in calculating absolute position restoration occurs.
- "Tandem Drive Synchronous Alignment Valid Width Error (operation alarm 54H, detail 01H)" or "Tandem Drive Synchronous Alignment Error (operation alarm 58H, detail 01H)" occurs.
- "Electronic Gear Setting Error (system error: E500H)" occurs. This error causes a forced stop status to prevent the operation. Reexamine the setting of an electronic gear and start the system again.
- The servo alarm [AL. 69_Command error][*4] occurs.
- After the absolute position detection system is enabled, the home position return is not performed.
- After the absolute position is restored with the absolute position detection system, the home position return is performed again.

Point

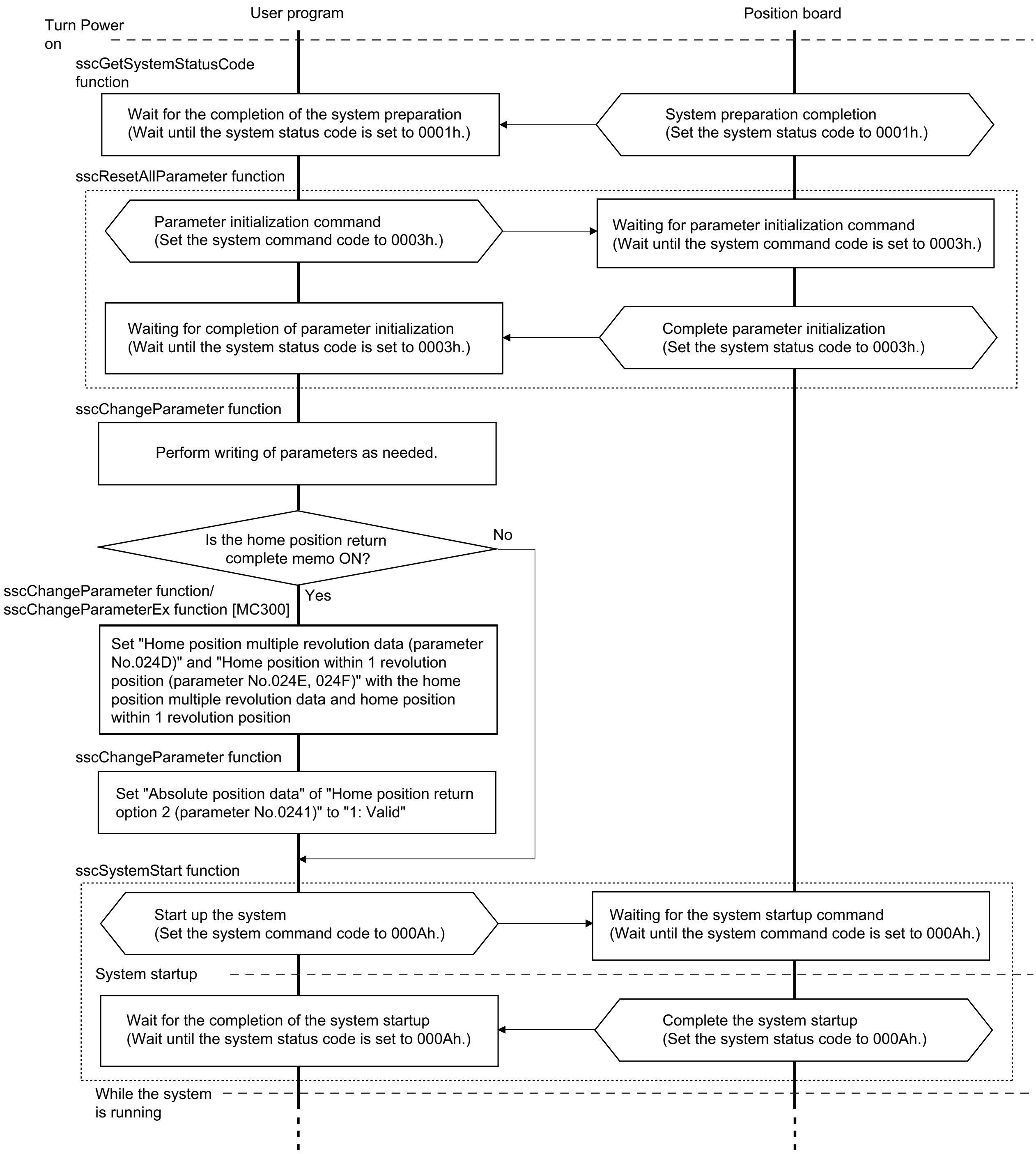
- If the absolute position erased signal (ABSE) is turned ON, perform the home position return again and read the home position multiple revolution data and the home position within 1 revolution position.
- The position after startup (absolute position restoration) is determined using the following.
  Absolute position restoration [pulse] = (within 1 revolution position at system startup - home position within 1 revolution position) + (multiple revolution data at system startup - home position multiple revolution data) × number of encoder pulses per revolution
  Absolute position restoration [command unit] = absolute position restoration [pulse] × reciprocal of number of electronic gears[*5] + home position coordinate

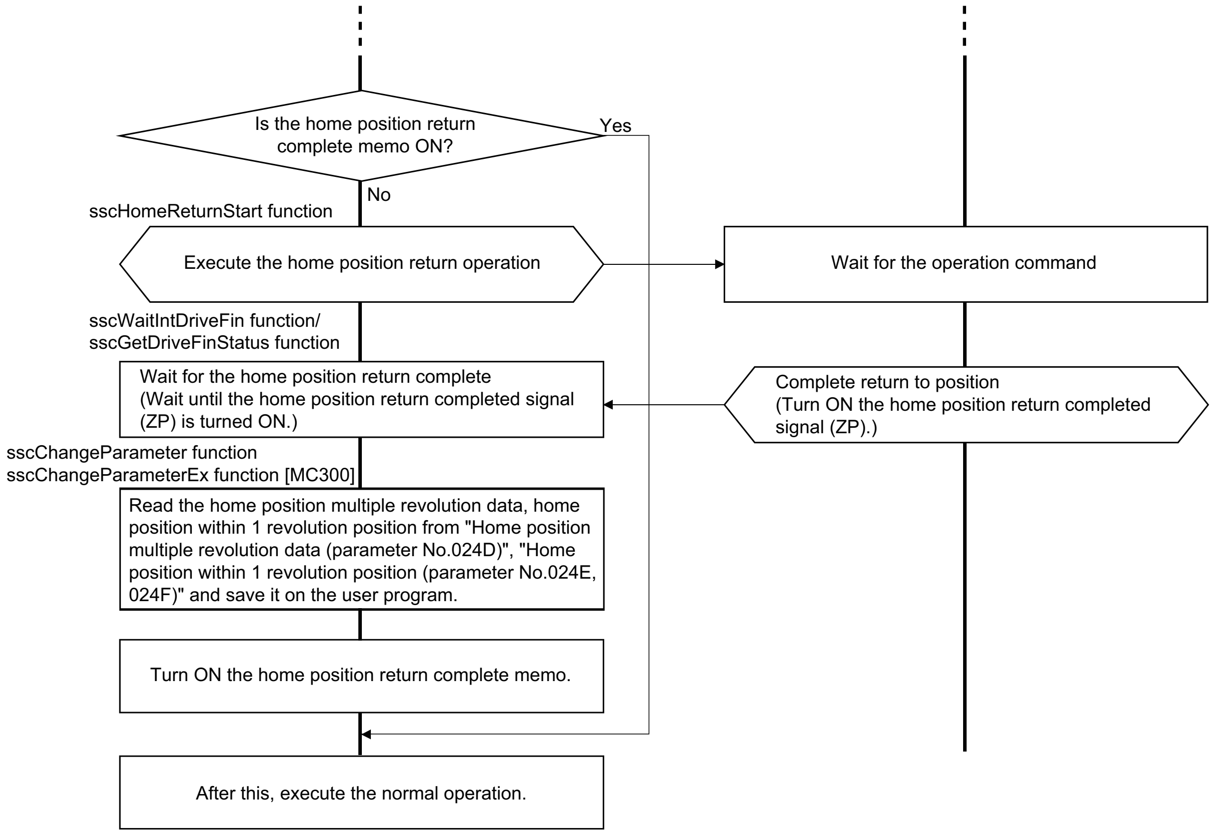
*1 For software version A5 or later, the absolute position erased signal (ABSE) does not turn ON when "Home position return option 1 (parameter No.0240)" is changed.[MC200]
*2 For MR-J5(W_)-_B, the servo alarm [AL. 025_Absolute position erased], the servo warning [AL. 0E3_Absolute position counter warning] [MC300]
*3 For MR-J5(W_)-_B, the servo alarm [AL. 037_Parameter error] [MC300]
*4 For MR-J5(W_)-_B, the servo alarm [AL. 069_Command error] [MC300]
*5 Reciprocal of number of electronic gears = electronic gear denominator (CDV)/electronic gear numerator (CMX)

Sequence example

Prepare a home position return complete memo showing that the home position has been established on the user program. Turn the home position return complete memo ON when the home position return is complete. When the home position return complete memo is turned ON, the execution of the home position return is not necessary. If the absolute position erased signal (ABSE) is turned ON, turn the home position return complete memo OFF, and perform the home position return again.

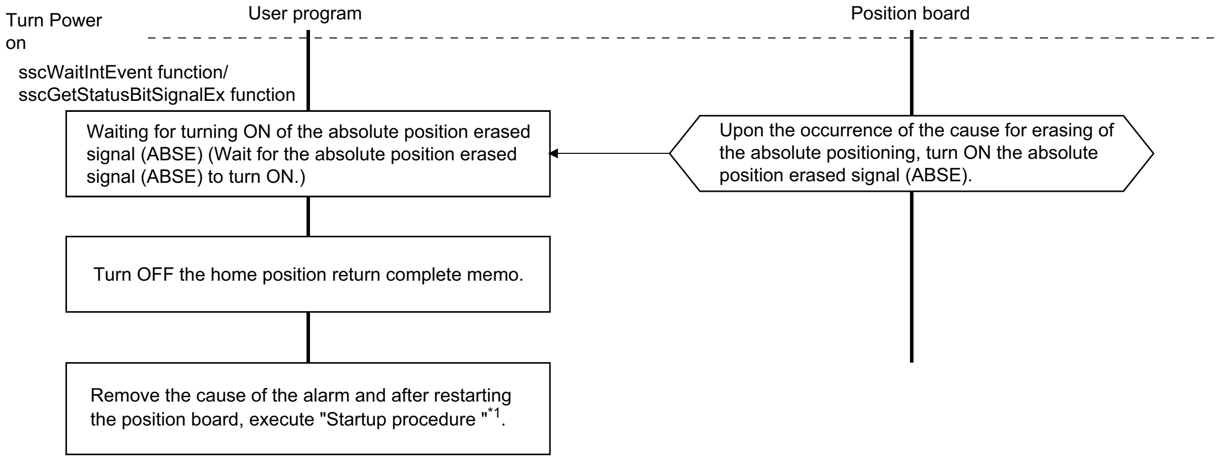
Startup procedure





Procedure for when absolute position erases

If the absolute position erased signal (ABSE) is turned ON, turn OFF the home position return complete memo being held at the user program.



*1 For startup procedure, refer to the following.

☞ Page 207 Startup procedure

6.22 Home Position Return Request

The home position return request signal (ZREQ) shows the home position return incomplete status. In the home position return incomplete status, the home position return request signal (ZREQ) turns ON. When it is necessary to determine the home position, perform the home position return. When the home position return is completed properly and the home position is determined, the home position return request signal (ZREQ) turns OFF.

Axis status bit

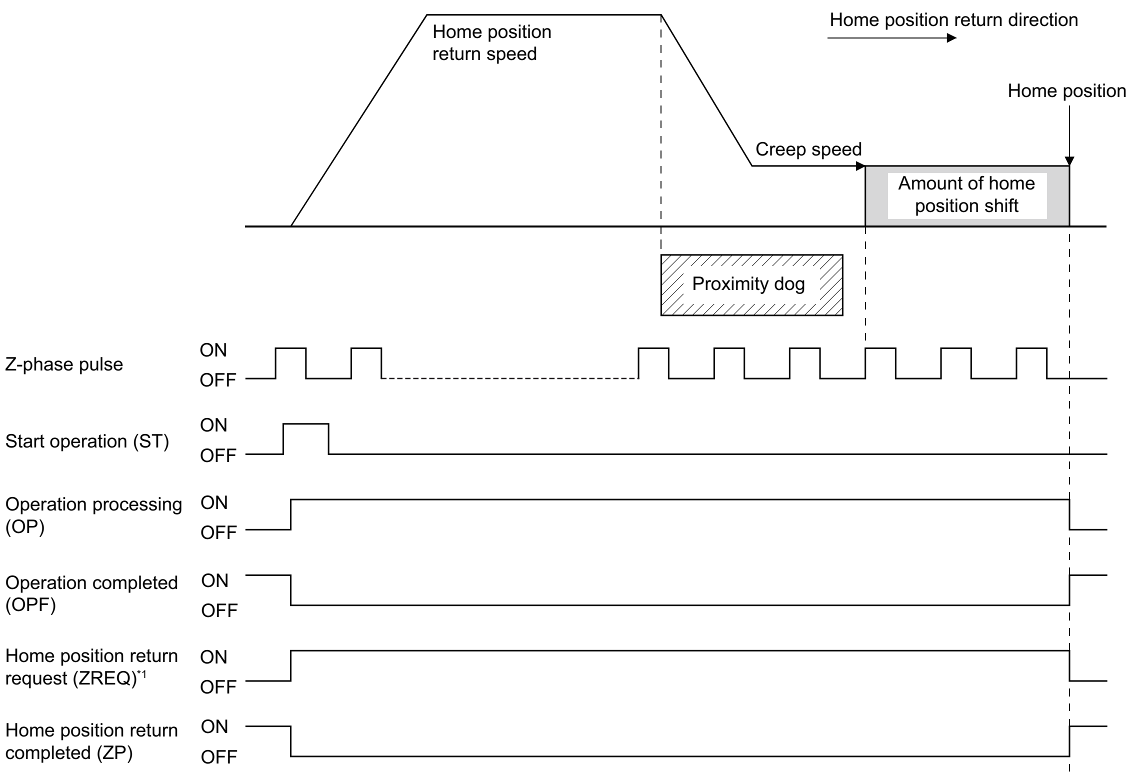
The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1064	0050A4	0	ISTP	Interlock stop	Master
		1	RMRCH	High speed monitor being latched	Each axis
		2	POV	Exceeded stop position	Master
		3	STO	Start up acceptance completed	Master
		4	—	For manufacturer setting	—
		5			
		6	ZREQ	Home position return request	Master
		7	—	For manufacturer setting	—

Ex.

Home position return using a dog method



*1 The home position return request signal (ZREQ) turns ON when a home position return starts.

Point

[API library]

To confirm if the home position return request signal (ZREQ) is ON/OFF, set "SSC_STSBIT_AX_ZREQ" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

Conditions for the home position return request signal (ZREQ) to turns ON/OFF

The following shows the conditions for the home position return request signal (ZREQ) to turns ON/OFF.

At system startup

■Condition of turning ON

- When setting "No home position" of "Control option 1 (parameter No.0200)" to "0: Invalid"
- When the servo alarm [AL. 25_Absolute position erased] or the servo warning [AL. E3_Absolute position counter warning]*1 occurs
- The setting value for "Home position multiple revolution data (parameter No.024D)" or "Home position within 1 revolution position (parameter No.024E, 024F)" is incorrect and overflow in calculating absolute position restoration occurs
- When the servo alarm [AL. 37_Parameter error]*2 occurs
- When "Electronic Gear Setting Error (system error: E500H)" occurs
- When setting "Absolute position data" of "Home position return option 2 (parameter No.0241)" to "0: Invalid" and the system is started

*1 For MR-J5(W_)-_B, the servo alarm [AL. 025_Absolute position erased], the servo warning [AL. 0E3_Absolute position counter warning] [MC300]

*2 For MR-J5(W_)-_B, the servo alarm [AL. 037_Parameter error] [MC300]

■Condition of turning OFF

- When the absolute position is restored properly at the use of the absolute position detection system
- When the axis is a monopodium (not a tandem drive axis) and setting "No home position" of "Control option 1 (parameter No.0200)" to "1: Valid"

While system is running

■Condition of turning ON

- When the home position return is started
- "Tandem Drive Synchronous Alignment Valid Width Error (operation alarm 54H, detail 01H)" or "Tandem Drive Synchronous Alignment Error (operation alarm 58H, detail 01H)" occurs
- When "Condition of turning ON at system startup" (☞ Page 210 Condition of turning ON) is satisfied at SSCNET reconnection

■Condition of turning OFF

- When the home position return is completed properly

Restrictions

The following shows the restrictions at the home position return incomplete status (the home position return request signal (ZREQ) turns ON).

Operational functions

The following operation modes are unavailable. At the start operation, "Home Position Return Not Complete (operation alarm 90H, detail 01H)" occurs and the start operation is canceled.

- Automatic operation
- Linear interpolation
- Home position reset

Application functions

The following function are invalid.

- Software limit
- Rough match output
- Backlash
- Position switch
- Interference check function

Tandem drive

The synchronization for turning the servo on is not performed.

6.23 Other Axes Start

The other axes start function is a function that automatically performs the start operation for other axes, and turns ON/OFF the digital output signal or output device signal according to the conditions for starting other axes (start conditions) and other axes start data consisting of operation (operation content) that is performed when the conditions are satisfied. When using the other axes start, set the other axes start data No. (1 to 32 [MC200]/1 to 64 [MC300]) to the other axes start specification of the point table.
The start operation for other axes internally turns ON the start operation signal (ST). Therefore, before the start operation, set the operation mode and the point table for an axis for which the other axes start is performed.
This function can only be used in the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300].

⚠ CAUTION

If the digital output signal is updated from the user program during controlling of the digital output signal by the other axes start function, the consistency of the data may not be kept. This condition is applied to the case when the host personal computer and position board update the data at the same time to the same digital output area No. In this case, read/write the digital output signal after controlling the possessory right of the digital output signal using the exclusive control function. For the output device signal, use the exclusive control function to perform exclusive control in the same way.

Position board	Software version	Description
Using MR-MC2_ _	A7 or earlier	Output to output device signals is not supported.
	A8 or later	Output to output device signals is supported.
Using MR-MC3_ _	No restriction	

Settings

When using the other axes start function, set the following data.

Point

- For tandem drive axes, set this function for the master axes. This function does not operate when setting to the slave axis. However, the slave axis can be set as an observed axis.
- When "1: Specified position pass specification" is set to the axis judgment condition, a specified position opposite from the movement direction is judged to be already passed, and therefore the condition is satisfied at the start operation.
- When using together with the circular interpolation, segment the arc trajectory and set the point table as necessary so that there is a specified position for the self-axis movement direction. [MC300]

Point table

Set the other axes start data No. for the other axes start specification.

Point	Position data [command unit]	Feed speed [speed unit]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell/ predwell [ms]	Auxiliary command	Other axes start specification	S-curve ratio [%]	For manufacturer setting
	4bytes	4bytes	2bytes	2bytes	2bytes	2bytes	4bytes	1byte	11bytes
0000	2000	2000	20	30	0	0000h	00000000h	100	0
0001	2000	3000	30	50	0	0000h	00000000h	100	0
0002	1000	1000	20	30	0	0000h	00000000h	100	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

■Other axes start specification

b31	b24	b16	b8 b0
For manufacturer setting	For manufacturer setting	Other axes start specification 2	Other axes start specification 1

Bit	Name	Description
0 to 7	Other axes start specification 1	Set the other axis start data No. • 0: Other axis start specification invalid • 1 to 32: Other axis start data No. [MC200] • 1 to 64: Other axis start data No. [MC300]
8 to 15	Other axes start specification 2	
16 to 31	For manufacturer setting	—

Ex.

When setting 1 and 4 for the other axes start specification 1 and 2, respectively

Set "00000401h".

<Cause of alarm>

- When the other axes start data set in the other axes start specification at the point switching or the start of the operation is being used (when the other axes start notice signal (OSOP□) is ON), "Using Other Axes Start Data (operation alarm 5BH, detail 01H)" occurs and the operation is terminated.
- If the setting of the other axes start specification is incorrect, "Point Table Setting Error (operation alarm 25H, detail 09H)" occurs and the operation is stopped.

Point

The setting range of the other axes start data No. differs depending on the control cycle. A maximum of 1 to 32 [MC200]/1 to 64 [MC300] can be set. When the setting is out of the range of the valid other axes start data No., "Point Table Setting Error (operation alarm 25H, detail 09H)" occurs.

- Control cycle 0.88ms: 1 to 32 [MC200]/1 to 64 [MC300]
- Control cycle 0.44ms: 1 to 16 [MC200]/1 to 32 [MC300]
- Control cycle 0.22ms: 1 to 8 [MC200]/1 to 16 [MC300]

Point

[API library]

- To set/get the point table, use the sscSetPointDataEx function/sscCheckPointDataEx function.
- For a detailed procedure for the other axes start, refer to the sample programs (InterruptOas/PollingOas/OasDigitalOutput) contained on the utility software.

Other axes start data

For the other axes start data (1 to 32 [MC200]/1 to 64 [MC300]), set the conditions for starting other axes (start conditions) and the operation (operation content) performed when the condition is satisfied. When the other axes start No. (1 to 32 [MC200]/1 to 64 [MC300]) is set to the other axes start specification (other axes start specification 1 and 2) of the point table, the other axes are started according to the settings of the corresponding other axes start data.

■Other axes start data table

Address (hexadecimal)		Content	
MR-MC2_ _	MR-MC3_ _		
E100 to E117	0FB680 to 0FB6A7	Other axes start data 1	Start condition
E118 to E167	0FB6A8 to 0FB6FF		Operation content
E168 to E17F	0FB700 to 0FB727	Other axes start data 2	Start condition
E180 to E1CF	0FB728 to 0FB77F		Operation content
E1D0 to E1E7	0FB780 to 0FB7A7	Other axes start data 3	Start condition
E1E8 to E237	0FB7A8 to 0FB7FF		Operation content
E238 to E24F	0FB800 to 0FB827	Other axes start data 4	Start condition
E250 to E29F	0FB828 to 0FB87F		Operation content
E2A0 to E2B7	0FB880 to 0FB8A7	Other axes start data 5	Start condition
E2B8 to E307	0FB8A8 to 0FB8FF		Operation content
E308 to E31F	0FB900 to 0FB927	Other axes start data 6	Start condition
E320 to E36F	0FB928 to 0FB97F		Operation content
E370 to E387	0FB980 to 0FB9A7	Other axes start data 7	Start condition
E388 to E3D7	0FB9A8 to 0FB9FF		Operation content
E3D8 to E3EF	0FBA00 to 0FBA27	Other axes start data 8	Start condition
E3F0 to E43F	0FBA28 to 0FBA7F		Operation content
E440 to E457	0FBA80 to 0FBAA7	Other axes start data 9	Operation content
E458 to E4A7	0FBAA8 to 0FBAFF		Start condition
E4A8 to E4BF	0FBB00 to 0FBB27	Other axes start data 10	Operation content
E4C0 to E50F	0FBB28 to 0FBB7F		Start condition
E510 to E527	0FBB80 to 0FBBA7	Other axes start data 11	Start condition
E528 to E577	0FBBA8 to 0FBBFF		Operation content
E578 to E58F	0FBC00 to 0FBC27	Other axes start data 12	Start condition
E590 to E5DF	0FBC28 to 0FBC7F		Operation content
E5E0 to E5F7	0FBC80 to 0FBCA7	Other axes start data 13	Start condition
E5F8 to E647	0FBCA8 to 0FBCFF		Operation content
E648 to E65F	0FBD00 to 0FBD27	Other axes start data 14	Start condition
E660 to E6AF	0FBD28 to 0FBD7F		Operation content
E6B0 to E6C7	0FBD80 to 0FBDA7	Other axes start data 15	Start condition
E6C8 to E717	0FBDA8 to 0FBDFF		Operation content
E718 to E72F	0FBE00 to 0FBE27	Other axes start data 16	Start condition
E730 to E77F	0FBE28 to 0FBE7F		Operation content
E780 to E797	0FBE80 to 0FBEA7	Other axes start data 17	Start condition
E798 to E7E7	0FBEA8 to 0FBEFF		Operation content
E7E8 to E7FF	0FBF00 to 0FBF27	Other axes start data 18	Start condition
E800 to E84F	0FBF28 to 0FBF7F		Operation content
E850 to E867	0FBF80 to 0FBFA7	Other axes start data 19	Operation content
E868 to E8B7	0FBFA8 to 0FBFFF		Start condition
E8B8 to E8CF	0FC000 to 0FC027	Other axes start data 20	Operation content
E8D0 to E91F	0FC028 to 0FC07F		Start condition
E920 to E937	0FC080 to 0FC0A7	Other axes start data 21	Start condition
E938 to E987	0FC0A8 to 0FC0FF		Operation content

Address (hexadecimal)		Content	
MR-MC2_ _	MR-MC3_ _		
E988	0FC100	⋮	
⋮	⋮		
ED97	0FC5FF		
ED98 to EDAF	0FC600 to 0FC627	Other axes start data 32	Start condition
EDB0 to EDFF	0FC628 to 0FC67F		Operation content
—	0FC680 to 0FC0A7	Other axes start data 33	Start condition
	0FC6A8 to 0FC0FF		Operation content
	0FC700	⋮	
	⋮		
	0FD5FF		
	0FD600 to 0FD627	Other axes start data 64	Start condition
	0FD628 to 0FD67F		Operation content

Point

All axes start data specified in the other axes start specification of the point table upon the start of the operation are imported. When the other axes start data is changed after the start operation (after the other axes start notice signal (OSOP□) is turned ON) the changes are invalid.

Point

[API library]
To set/get the other axes start data, use the sscSetOtherAxisStartData function/sscGetOtherAxisStartData function.

■Start condition

The addresses in the table are the addresses for the first other axes start data 1. For the second other axis start data 2 and after, add the following value for each other axis start data

- Using MR-MC2_ _: +68h
- Using MR-MC3_ _: +80h

Address (hexadecimal)		Symbol	Name	Initial value	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _						
E100	0FB680	OSOPN1	Axis option (4bytes)	00000000h	—	00000000h to 00000011h	■■■■■■■□ (Axis judgment condition) Set the judgment condition for the axis. • 0: Remaining distance specification (The condition is satisfied when the axis remaining distance is equal to or shorter than the axis remaining distance data.) • 1: Specified position pass specification (The condition is satisfied when the axis position exceeds the axis pass position data.) ■■■■■■□■ (Axis judgment coordinate) Set the judgment coordinate for the axis. • 0: Current feedback position • 1: Current command position

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Address (hexadecimal) MR-MC2_ _	Address (hexadecimal) MR-MC3_ _	Symbol	Name	Initial value	Unit	Setting range	Description
E104	0FB684	OSOPN2	Observed axis option (4bytes)	00000000h	—	00000000h to 00FF1111h	Set here to monitor axes. ■■■■■■■□ (Observed axis specification) Validate the observed axis. • 0: Invalid • 1: Valid ■■■■■■□■ (Observed axis judgment condition) Set the judgment condition for the observed axis. • 0: Not use • 1: Observed axis specified position pass specification ■■■■■□■■ (Observed axis judgment coordinate) Set the judgment coordinate for the observed axis. • 0: Current feedback position • 1: Current command position ■■■■□■■■ (Observed axis specified position pass judgment condition) Set the specified position pass judgment condition for the observed axis. • 0: The condition is satisfied when the observed axis position is less than or equal to the observed axis specified position data. • 1: The condition is satisfied when the observed axis position is more than or equal to the observed axis specified position data. ■■□□■■■■ (Observed axis No.) Set the observed axis No. • 00h to 1Fh: Axis No. - 1 [MC200] • 00h to 3Fh: Axis No. - 1 [MC300] <Example> 0Ah • Axis No.11
E108	0FB688	OSPP	Axis remaining distance data (4bytes)	0	Command units	0 to 2147483647	Set the remaining distance data for the axis. (When "0: Remaining distance specification" is set to the axis judgment condition.)
			Axis pass position data (4bytes)	0	Command units	-2147483648 to 2147483647	Set the pass position data for the axis. (When "1: Specified position pass specification" is set to the axis judgment condition)
E10C	0FB68C	OSMP	Observed axis specified position data (4bytes)	0	Command units	-2147483648 to 2147483647	Set the specified position data of the observed axis set in the observed axis option.
E110 ⋮ E117	0FB690 ⋮ 0FB697	—	For manufacturer setting (8bytes)	—	—	—	—
—	0FB698 ⋮ 0FB6A7		For manufacturer setting (16bytes)				

<Cause of alarm>

- Using MR-MC2_ _

  An incorrect setting of the other axes start condition causes "Other Axes Start Setting Error (operation alarm 4DH, detail 01H)" at the start operation or the point switching.
  - The setting of the axis option, observed axis option, or axis remaining distance data is outside limits.
  - The position specified in the axis pass position data cannot be passed. (When "1: Specified position pass specification" is set to the axis judgment condition)
    However, the condition above does not cause the error when the specified position is in the opposite direction from the movement direction.
    In this case, the specified position is judged to be already passed, which satisfies the condition.
  - When the observed axis specification is valid, a non-existent axis[*1] is set in the observed axis No.
- Using MR-MC3_ _

  An incorrect setting of the other axes start condition causes "Other Axes Start Setting Error (operation alarm 4DH)" at the start operation or the point switching. The operation alarm detail No. is as follows.
  - The axis judgment condition of the other axes start condition is outside limits. (operation alarm 4DH, detail 10H)
  - The axis remaining distance data of other axes start condition is a negative value. (operation alarm 4DH, detail 11H)
  - The position specified in the axis pass position data of other axes start condition cannot be passed. (operation alarm 4DH, detail 12H)[*2]
  - The axis judgment coordinates of other axes start condition is outside limits. (operation alarm 4DH, detail 13H)
  - The observed axis specification of other axes start condition is outside limits. (operation alarm 4DH, detail 14H)
  - The observe judgment condition of other axes start condition is outside limits. (operation alarm 4DH, detail 15H)
  - The observed axis judgment coordinates of other axes start condition is outside limits. (operation alarm 4DH, detail 16H)
  - The specified position pass judgment condition of observed axis of other axes start condition is outside limits. (operation alarm 4DH, detail 17H)
  - The observed axis No. of other axes start condition is outside limits. (operation alarm 4DH, detail 18H)
  - A non-existent axis[*1] is set in the observed axis No. of other axes start condition. (operation alarm 4DH, detail 19H)

*1 A non-existent axis means an axis for which "0: Not controlled" is set to "Control axis" of "Control option 1 (parameter No.0200)", or a temporarily uncontrollable axis due to, for example, the power OFF of the control power supply of the servo amplifier.

*2 When using the circular interpolation, if "start point coordinate ≤ end point coordinate < axis pass position data" or "axis pass position data < end point coordinate ≤ start point coordinate", the axis judgement coordinate is judged as being outside limits. Segment the arc trajectory and set the point table as necessary.

■Operation content

The addresses in the table are the addresses for the first other axes start data 1. For the second other axis start data 2 and after, add the following value for each other axis start data.

- Using MR-MC2_ _: +68h
- Using MR-MC3_ _: +80h

Address (hexadecimal)		Symbol	Name	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
E118	0FB6A8	OSAX1	Start axis designation 1 (4bytes)	—	00000000h to FFFFFFFFh	Set the axis for which the start operation is performed when the other axes start condition is satisfied. Bit0 to 31: axis 1 to axis 32 • 0: Start operation invalid • 1: Start operation valid
E11C	0FB6AC	OSAX2	Start axis designation 2[*1] (4bytes)	—	00000000h to FFFFFFFFh	Set the axis for which the start operation is performed when the other axes start condition is satisfied. Bit0 to 31: axis 33 to axis 64 • 0: Start operation invalid • 1: Start operation valid
E120	0FB6B0	OSPS	Start axis start point No. (2bytes)	—	[MC200] 0 to 319 [MC300] 0 to 2047	Set the start point No. of the other axes start axis.
E122	0FB6B2	OSPE	Start axis end point No. (2bytes)	—	[MC200] 0 to 319 [MC300] 0 to 2047	Set the end point No. of the other axes start axis.
E124 ⋮ E157	0FB6B4 ⋮ 0FB6E7	—	For manufacturer setting (52bytes)	—	—	—

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Address (hexadecimal)		Symbol	Name	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
E158	0FB6E8	OSDOS	Digital output signal specification (2bytes)	—	0000h to 3F01h	Select the digital output signal (DO_□□□) to control output in units of 16 points when the other axes start conditions are satisfied. [When "0: Use digital I/O table" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] ■■■□ (Digital output signal control) Set valid/invalid for the digital output signal control. • 0: Invalid • 1: Valid □□■■ (Digital output signal No.) Set the digital output signal (DO_□□□) in units of 16 points. • 00 to 3Fh <Example> • 00h: DO_000 to DO_00F • 3Fh: DO_3F0 to DO_3FF
			Output device signal specification (2bytes)		[MC200] 0000h to FF01h [MC300] 0000h to 23F1h	Select the output device signal (DVO_□□□) to control output in units of 16 points when the other axes start conditions are satisfied. [When "1: Use I/O device table (MR-MC2_ _ method)" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] ■■■□ (Output device signal control) Set valid/invalid for the output device signal control. • 0: Invalid • 1: Valid □□■■ (Output device signal No.) Set the output device signal (DVO_□□□) in units of 16 points. • 00 to FFh <Example> • 00h: DVO_000 to DVO_00F • FFh: DVO_FF0 to DVO_FFF [When "2: Use I/O device table (expanded points method)" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] □□□■ (Output device signal No.) Set the output device signal (DVO_□□□) in units of 16 points. • 000 to 23Fh <Example> • 000h: DVO_0000 to DVO_000F • 23Fh: DVO_23F0 to DVO_23FF
E15A	0FB6EA	OSDOE	Digital output signal enable selection (2bytes)	—	0000h to FFFFh	[When "0: Use digital I/O table" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] Set valid/invalid for the digital output signal (DO_□□□) selected in the digital output signal specification. DO_□□0 (bit0) to DO_□□F (bit15) (□□ is set in the digital output signal specification.) • 0: Invalid • 1: Valid
			Output device signal enable selection (2bytes)			[When "1: Use I/O device table (MR-MC2_ _ method)" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] Set valid/invalid for the output device signal (DVO_□□□) selected in the output device signal specification. DVO_□□0 (bit0) to DVO_□□F (bit15) (□□ is set in the output device signal specification.) • 0: Invalid • 1: Valid [When "2: Use I/O device table (expanded points method)" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] Set valid/invalid for the output device signal (DVO_□□□) selected in the output device signal specification. DVO_□□□0 (bit0) to DVO_□□□F (bit15) (□□□ is set in the output device signal specification.) • 0: Invalid • 1: Valid

Address (hexadecimal)		Symbol	Name	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
E15C	0FB6EC	OSDOP	Digital output signal command (2bytes)	—	0000h to FFFFh	[When "0: Use digital I/O table" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] Set the digital output signal command (ON/OFF) of the digital output signal (DO_□□□) selected in the digital output signal enable selection. DO_□□0 (bit0) to DO_□□F (bit15) (□□ is set in the digital output signal specification.) • 0: OFF • 1: ON
			Output device signal command (2bytes)			[When "1: Use I/O device table (MR-MC2_ _ method)" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] Set the digital output signal command (ON/OFF) of the output device signal (DVO_□□□) selected in the output device signal enable selection. DVO_□□0 (bit0) to DVO_□□F (bit15) (□□ is set in the output device signal specification.) • 0: OFF • 1: ON [When "2: Use I/O device table (expanded points method)" is selected in "I/O table selection" of "I/O table (parameter No.004A)"] Set the digital output signal command (ON/OFF) of the output device signal (DVO_□□□) selected in the output device signal enable selection. DVO_□□□0 (bit0) to DVO_□□□F (bit15) (□□□ is set in the output device signal specification.) • 0: Invalid • 1: Valid
E15E	0FB6EE	—	For manufacturer setting (10bytes)	—	—	—
⋮	⋮					
E167	0FB6F7					
—	0FB6F8		For manufacturer setting (8bytes)			
	⋮					
	0FB6FF					

*1 When using MR-MC2_ _, it is "For manufacturer setting".

<Setting example of output signal>

The following is the setting example for when the digital output signals DO_1F0 to DO_1F3 are turned ON after the other axes start conditions are satisfied.

Address (hexadecimal)		Symbol	Name	Setting value	Setting contents
MR-MC2_ _	MR-MC3_ _				
E158	0FB6E8	OSDOS	Digital output signal specification	1F01h	• Digital output signal control: "1: Valid" • Digital output signal No.: "1Fh"
E15A	0FB6EA	OSDOE	Digital output signal enable selection	000Fh	• Bit0 to bit3: "1: Valid" • Bit4 to bit15: "0: Invalid"
E15C	0FB6EC	OSDOP	Digital output signal command	000Fh	Bit0 to bit3: "1: ON"

<Cause of alarm>

- Using MR-MC2_ _

  An incorrect setting of the other axes operation content causes "Other Axes Start Setting Error (operation alarm 4DH, detail 02H)" at the start operation or the point switching.
  - The axis is specified in the start axis designation.
  - A non-existent axis*1 is set in the start axis designation.
  - The setting of the start axis start point No. or the start axis end point No. is outside limits.
  - The setting of the digital output signal specification/output device signal specification is out of the range.
  - The general output of the servo amplifier or output of remote I/O module is not assigned to the digital output signal/output device signal specified in the digital output signal selection/output device signal selection.
- Using MR-MC3_ _

  An incorrect setting of the other axes operation content causes "Other Axes Start Setting Error (operation alarm 4DH)" at the start operation or the point switching. The operation alarm detail No. is as follows.
  - A self-axis or non-existent axis*1 was set in the start axis designation of the other axes operation content. (operation alarm 4DH, detail 20H)
  - The start axis starting point No. and start axis end point No. settings of other axes operation content are outside limits. (operation alarm 4DH, detail 21H)
  - The digital output signal control/output device signal control of other axes operation content is outside limits. (operation alarm 4DH, detail 22H)
  - The output device signal No. of other axes operation content is outside limits. (operation alarm 4DH, detail 23H)
  - The digital output signal/digital device signal designated by digital output signal selection/output device signal selection have not been assigned a servo amplifier general output or remote I/O module output. (operation alarm 4DH, detail 24H)

*1 A non-existent axis means an axis for which "0: Not controlled" is set to "Control axis" of "Control option 1 (parameter No.0200)", or a temporarily uncontrollable axis due to, for example, the power OFF of the control power supply of the servo amplifier.

The settings required for the main uses of the other axes start are as follows.

○: Required, —: Optional

Name	Main use		
	Starting operation of other axis at specified position	**Turning ON/OFF digital output signal or output device signal**	**Using observed axis**
Axis option	○	○	○
Observed axis option	—	—	○
Axis remaining distance data/Axis pass position data	○	○	○
Observed axis specified position data	—	—	○
Start axis designation 1	○	—	○
Start axis start point No.	○	—	○
Start axis end point No.	○	—	○
Output signal specification	—	○	—
Output signal enable selection	—	○	—

Interface

Other axes start command bit/other axes start status bit

The other axes start commands/other axes start statuses related to the other axes start function are shown below.

■Other axes start command/status table

Address (hexadecimal)		Content	
MR-MC2_ _	MR-MC3_ _		
E080, E081	0FB480, 0FB481	Other axes start command/status table 1	Other axes start command
E082, E083	0FB482, 0FB483		Other axes start status
E084, E085	0FB484, 0FB485	Other axes start command/status table 2	Other axes start command
E086, E087	0FB486, 0FB487		Other axes start status
E088, E089	0FB488, 0FB489	Other axes start command/status table 3	Other axes start command
E08A, E08B	0FB48A, 0FB48B		Other axes start status
E08C, E08D	0FB48C, 0FB48D	Other axes start command/status table 4	Other axes start command
E08E, E08F	0FB48E, 0FB48F		Other axes start status
E090, E091	0FB490, 0FB491	Other axes start command/status table 5	Other axes start command
E092, E093	0FB492, 0FB493		Other axes start status
E094, E095	0FB494, 0FB495	Other axes start command/status table 6	Other axes start command
E096, E097	0FB496, 0FB497		Other axes start status
E098, E099	0FB498, 0FB499	Other axes start command/status table 7	Other axes start command
E09A, E09B	0FB49A, 0FB49B		Other axes start status
E09C, E09D	0FB49C, 0FB49D	Other axes start command/status table 8	Other axes start command
E09E, E09F	0FB49E, 0FB49F		Other axes start status
E0A0, E0A1	0FB4A0, 0FB4A1	Other axes start command/status table 9	Other axes start command
E0A2, E0A3	0FB4A2, 0FB4A3		Other axes start status
E0A4, E0A5	0FB4A4, 0FB4A5	Other axes start command/status table 10	Other axes start command
E0A6, E0A7	0FB4A6, 0FB4A7		Other axes start status
E0A8, E0A9	0FB4A8, 0FB4A9	Other axes start command/status table 11	Other axes start command
E0AA, E0AB	0FB4AA, 0FB4AB		Other axes start status
E0AC, E0AD	0FB4AC, 0FB4AD	Other axes start command/status table 12	Other axes start command
E0AE, E0AF	0FB4AE, 0FB4AF		Other axes start status
E0B0, E0B1	0FB4B0, 0FB4B1	Other axes start command/status table 13	Other axes start command
E0B2, E0B3	0FB4B2, 0FB4B3		Other axes start status
E0B4, E0B5	0FB4B4, 0FB4B5	Other axes start command/status table 14	Other axes start command
E0B6, E0B7	0FB4B6, 0FB4B7		Other axes start status
E0B8, E0B9	0FB4B8, 0FB4B9	Other axes start command/status table 15	Other axes start command
E0BA, E0BB	0FB4BA, 0FB4BB		Other axes start status
E0BC, E0BD	0FB4BC, 0FB4BD	Other axes start command/status table 16	Other axes start command
E0BE, E0BF	0FB4BE, 0FB4BF		Other axes start status
E0C0, E0C1	0FB4C0, 0FB4C1	Other axes start command/status table 17	Other axes start command
E0C2, E0C3	0FB4C2, 0FB4C3		Other axes start status
E0C4, E0C5	0FB4C4, 0FB4C5	Other axes start command/status table 18	Other axes start command
E0C6, E0C7	0FB4C6, 0FB4C7		Other axes start status
E0C8, E0C9	0FB4C8, 0FB4C9	Other axes start command/status table 19	Other axes start command
E0CA, E0CB	0FB4CA, 0FB4CB		Other axes start status
E0CC, E0CD	0FB4CC, 0FB4CD	Other axes start command/status table 20	Other axes start command
E0CE, E0CF	0FB4CE, 0FB4CF		Other axes start status
E0D0, E0D1	0FB4D0, 0FB4D1	Other axes start command/status table 21	Other axes start command
E0D2, E0D3	0FB4D2, 0FB4D3		Other axes start status
E0D4, E0D5	0FB4D4, 0FB4D5	Other axes start command/status table 22	Other axes start command
E0D6, E0D7	0FB4D6, 0FB4D7		Other axes start status

Address (hexadecimal)		Content	
MR-MC2_ _	MR-MC3_ _		
E0D8, E0D9	0FB4D8, 0FB4D9	Other axes start command/status table 23	Other axes start command
E0DA, E0DB	0FB4DA, 0FB4DB		Other axes start status
E0DC, E0DD	0FB4DC, 0FB4DD	Other axes start command/status table 24	Other axes start command
E0DE, E0DF	0FB4DE, 0FB4DF		Other axes start status
E0E0, E0E1	0FB4E0, 0FB4E1	Other axes start command/status table 25	Other axes start command
E0E2, E0E3	0FB4E2, 0FB4E3		Other axes start status
E0E4, E0E5	0FB4E4, 0FB4E5	Other axes start command/status table 26	Other axes start command
E0E6, E0E7	0FB4E6, 0FB4E7		Other axes start status
E0E8, E0E9	0FB4E8, 0FB4E9	Other axes start command/status table 27	Other axes start command
E0EA, E0EB	0FB4EA, 0FB4EB		Other axes start status
E0EC, E0ED	0FB4EC, 0FB4ED	Other axes start command/status table 28	Other axes start command
E0EE, E0EF	0FB4EE, 0FB4EF		Other axes start status
E0F0, E0F1	0FB4F0, 0FB4F1	Other axes start command/status table 29	Other axes start command
E0F2, E0F3	0FB4F2, 0FB4F3		Other axes start status
E0F4, E0F5	0FB4F4, 0FB4F5	Other axes start command/status table 30	Other axes start command
E0F6, E0F7	0FB4F6, 0FB4F7		Other axes start status
E0F8, E0F9	0FB4F8, 0FB4F9	Other axes start command/status table 31	Other axes start command
E0FA, E0FB	0FB4FA, 0FB4FB		Other axes start status
E0FC, E0FD	0FB4FC, 0FB4FD	Other axes start command/status table 32	Other axes start command
E0FE, E0FF	0FB4FE, 0FB4FF		Other axes start status
—	0FB500, 0FB501	Other axes start command/status table 33	Other axes start command
	0FB502, 0FB503		Other axes start status
	0FB504, 0FB505	Other axes start command/status table 34	Other axes start command
	0FB506, 0FB507		Other axes start status
	0FB508	⋮	
	⋮		
	0FB57B		
	0FB57C, 0FB57D	Other axes start command/status table 64	Other axes start command
	0FB57E, 0FB57F		Other axes start status

■Other axes start command

The addresses in the table are the addresses for the other axes start command/status table 1. Add "+4h" for each other axes start command/status table 2 and after.

Address (hexadecimal)		Bit	Symbol*1	Signal name
MR-MC2_ _	MR-MC3_ _			
E080	0FB480	0	OSSTP□	Other axes start cancel
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

*1 □: Other axes start No.

- Details concerning other axes start command bits

Symbol*1	Signal name	Function details	
		Function	Operation
OSSTP□	Other axes start cancel	Cancel the other axes start.	Turn ON this signal to cancel the other axes start when the other axes start notice signal (OSOP□) is ON for waiting for the other axes start condition satisfaction.

*1 □: Other axes start No.

Point

[API library]

To turn ON/OFF the other axes start cancel signal (OSSTP□), use the sscOtherAxisStartAbortOn function/ sscOtherAxisStartAbortOff function.

■Other axes start status

The addresses in the table are the addresses for the other axes start command/status table 1. Add "+4h" for each other axes start command/status table 2 and after.

Address (hexadecimal)		Bit	Symbol[*1]	Signal name
MR-MC2_ _	MR-MC3_ _			
E082	0FB482	0	OSOP□	Other axes start notice
		1	OSFIN□	Other axes start completed
		2	OSERR□	Other axes start incompleted
		3	—	For manufacturer setting
		4		
		5		
		6		
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

*1 □: Other axes start No.

- Details concerning other axes start status bits

Symbol[*1]	Signal name[*1]	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
OSOP□	Other axes start notice	Notify of the monitoring for the other axes start condition.	The other axis start data is specified in the other axes start specification in the point table for the automatic operation or the linear interpolation operation [MC200]/interpolation operation [MC300], and the axis is monitored for the other axes start condition.	• The other axes start condition is satisfied. • During monitoring for the other axes start condition (when the other axes start notice signal (OSOP□) is ON), the other axes start cancel signal (OSSTP□) is turned ON.
OSFIN□	Other axes start completed	Notify that the other axes start operation content is executed.	The other axes start condition is satisfied, and the other axes start operation content is executed.	The other axes start data is specified in the other axes start specification in the point table for the automatic operation or the linear interpolation operation [MC200]/interpolation operation [MC300].

Symbol[*1]	Signal name[*1]	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
OSERR☐	Other axes start incompleted	Notify that the other axes start has failed.	• The axis specified in the start axis designation is being operated when the other axes start operation content should be executed. • The operation mode of the axis specified in the start axis designation is other than the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300] when the other axes start operation content should be executed. • During monitoring for the other axes start condition (when the other axes start notice signal (OSOP☐) is ON), the operation is canceled due to an operation alarm on the axis or the stop operation signal (STP)/rapid stop signal (RSTP) turned ON. • During monitoring for the other axes start condition (when the other axes start notice signal (OSOP☐) is ON), the other axes start cancel signal (OSSTP☐) is turned ON. • The number of axes set in the start axis designation exceeds the maximum number of simultaneous start axes.	The other axes start data is specified in the other axes start specification in the point table for the automatic operation or the linear interpolation operation [MC200]/interpolation operation [MC300].

*1 ☐: Other axes start No.

Point

[API library]

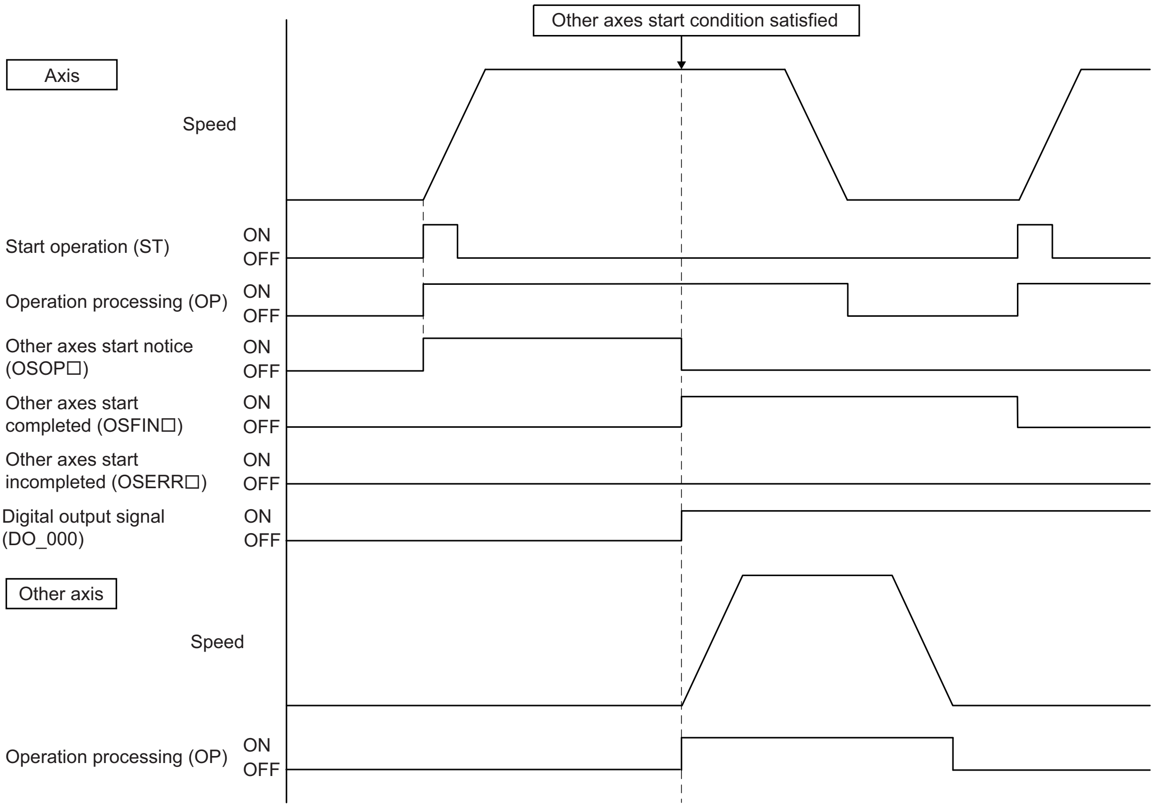
To confirm if the following other axes start statuses are ON/OFF, use the sscGetOtherAxisStartStatus function.

- Other axes start notice signal (OSOP☐)
- Other axes start completed signal (OSFIN☐)
- Other axes start incompleted signal (OSERR☐)

Operation example

When other axes start is complete

The other axes start notice signal (OSOP□) turns ON between the axis start and the completion of the other axis start.
The other axes start completed signal (OSFIN□) turns ON when the other axes start notice signal (OSOP□) is turned OFF on the completion of the other axes start.



- Digital output signal setting example

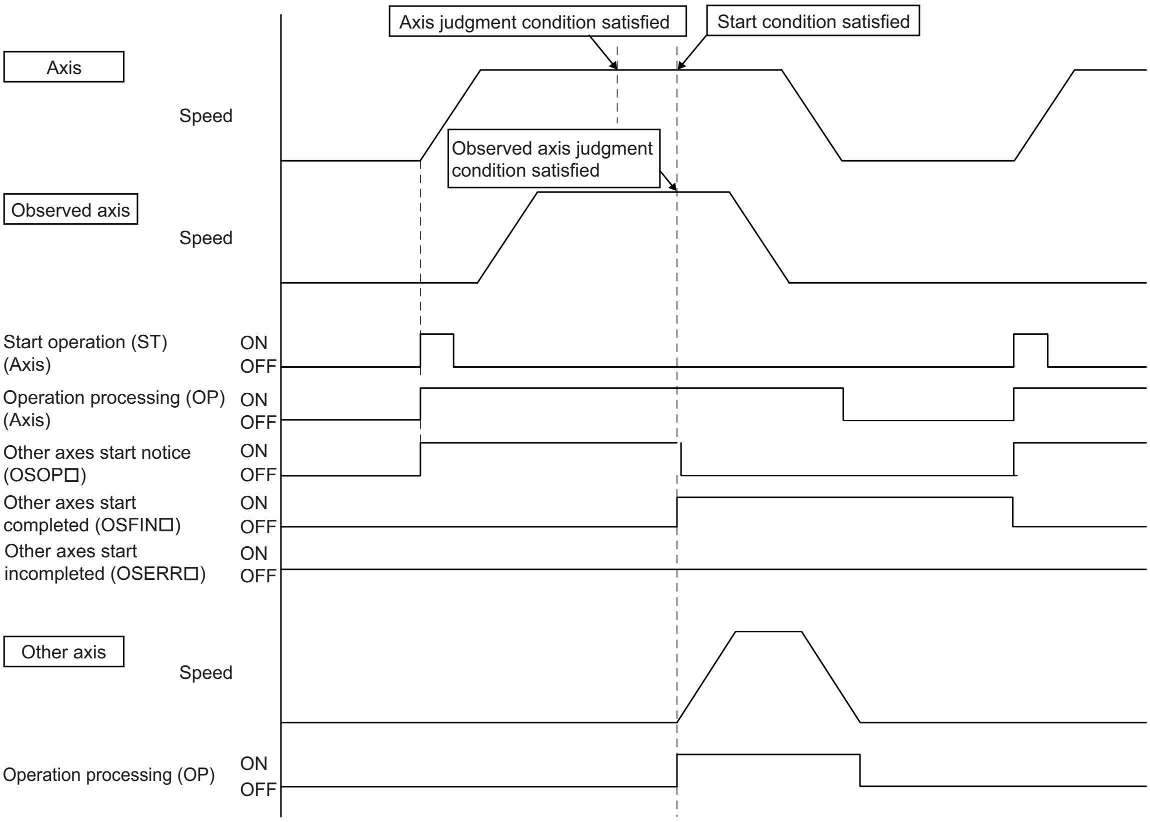
Address (hexadecimal)		Symbol	Name	Setting value	Setting contents
MR-MC2_ _	MR-MC3_ _				
E158	0FB6E8	OSDOS	Digital output signal specification	0001h	• Digital output signal control: "1: Valid" • Digital output signal No.: "00h"
E15A	0FB6EA	OSDOE	Digital output signal enable selection	0001h	• Bit0: "1: Valid" • Bit1 to bit15: "0: Invalid"
E15C	0FB6EC	OSDOP	Digital output signal command	0001h	Bit0: "1: ON"

When the observed axis is valid

When "1: Valid" is set to the observed axis specification (in the observed axis option (OSOPN2) of the other axes start condition), the other axes operation content is not operated until both the axis judgment condition and the observed axis judgment condition are satisfied.

Ex.

Example of when the monitor axis judgment condition are satisfied after the axis judgment condition is satisfied



6

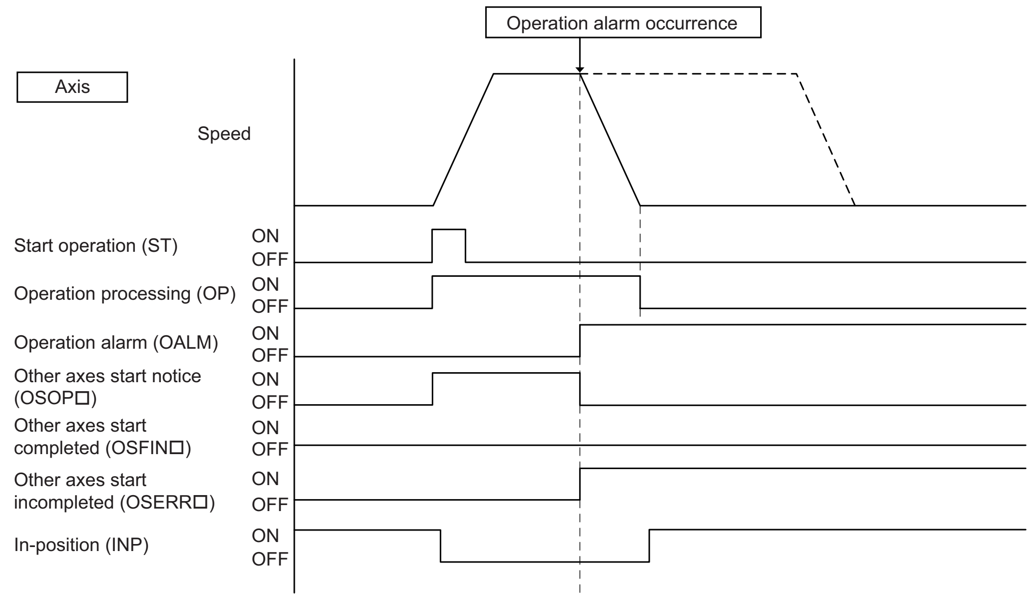
When other axes start fails

When the other axes start fails due to, for example, an operation alarm on the axis preceding the satisfaction of other axes start condition, the other axes start incompleted signal (OSERR□) turns ON. The other axes start incompleted signal (OSERR□) turns ON when:

- The axis set in the start axis designation 1 is being operated when the other axes start condition is satisfied.
- The operation mode of the axis set in the start axis designation 1 is other than the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300] when the other axes start condition is satisfied.
- The operation is canceled by turning ON the stop operation signal (STP) or the rapid stop signal (RSTP) before the other axes start condition is satisfied
- The operation is canceled by an operation alarm, etc. before the other axis start condition is satisfied.
- The operation of the axis is completed and the in-position signal (INP) is turned ON before the other axes start condition is satisfied.

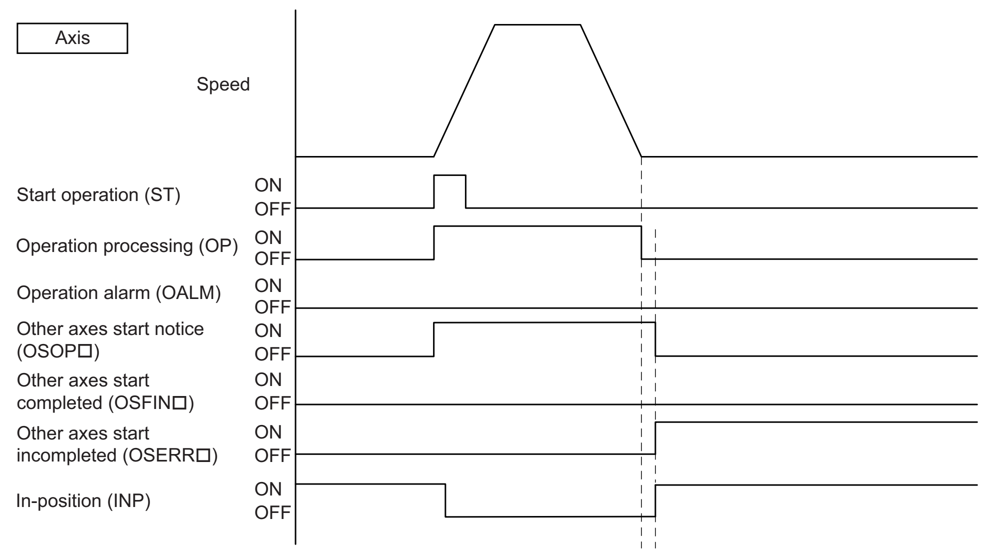
Ex.

When an operation alarm occurs



Ex.

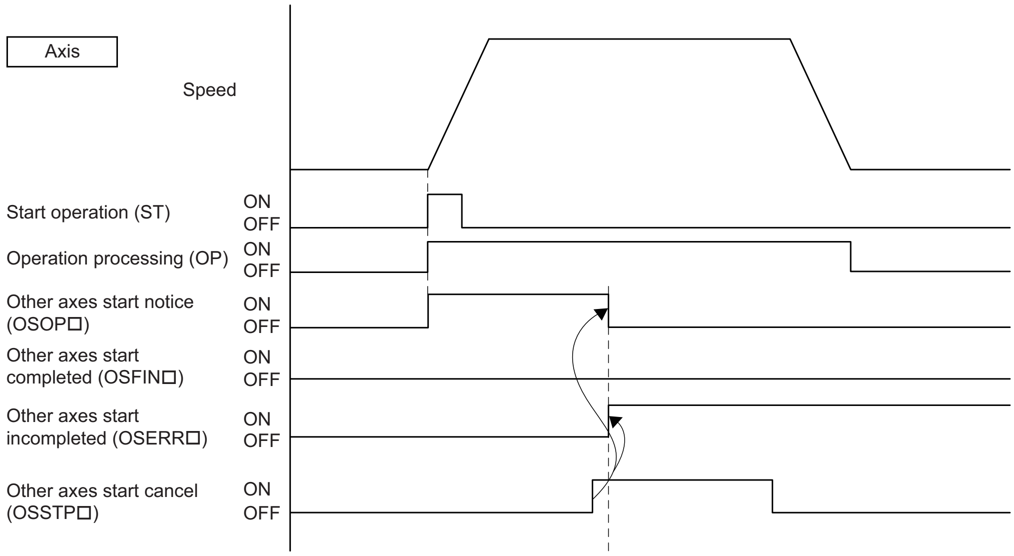
When operation of the axis is completed



When other axes start is canceled

When the other axes start cancel signal (OSSTP□) is turned ON before the other axes start condition is satisfied, the other axes start incompleted signal (OSERR□) turns ON.

Ex.



6

6.24 High Response I/F

The high response I/F function is a function for shortening the time required to confirm commands and statuses by simplifying the process between the position board and the host personal computer. The high response I/F function is always valid.
This function simplifies the following processes.

- Start operation signal (ST)
- Interrupt processing stop signal (ITE)

Point

- The conventional I/F function which uses the start operation signal (ST) and the interrupt processing stop signal (ITE) can also be used. However, use either of the high response I/F function or the conventional I/F function to unify the process between the position board and the host personal computer.
- The API library uses the high response I/F (except for the JOG operation).

Point

[API library]
The high response I/F is implemented by the internal processing of each start operation function (sscAutoStart functions etc.), thus processing by the user program is unnecessary.

Interface

System command bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E4	000B04	0	ITFE	Interrupt processing fast stop
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0450	000BE0	0	ITO	Outputting factor of interrupt
		1	IITO	During interface mode interrupt valid
		2	EVDO	Event detection enabled
		3	HRIF	Highly response I/F enabled
		4	BMA	During system program memory access
		5	PRINF	Continuous operation to torque control compatible information
		6	—	For manufacturer setting
		7	IFMO	In interface mode

Axis command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1006	005006	0	FST	Fast start operation
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Fast start operation

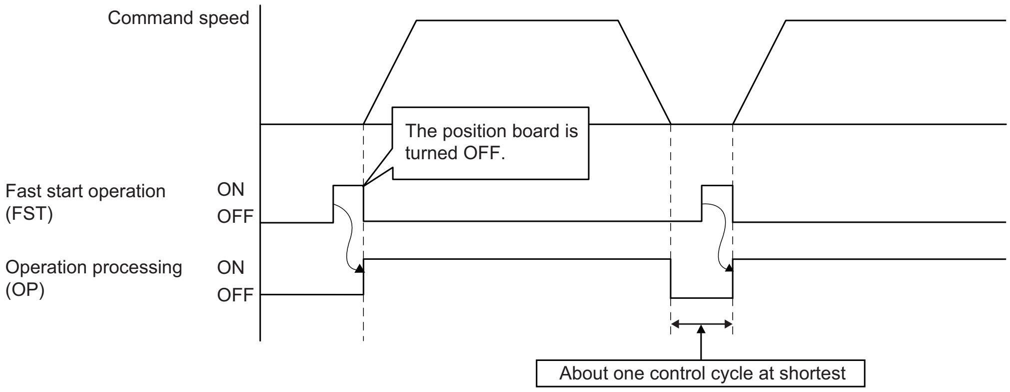
Using the fast start operation signal (FST) as a substitute of the start operation signal (ST) shortens the time required for the second and subsequent start operations.

Point

The fast start operation cannot be used in the JOG operation. Use the start operation signal (ST).

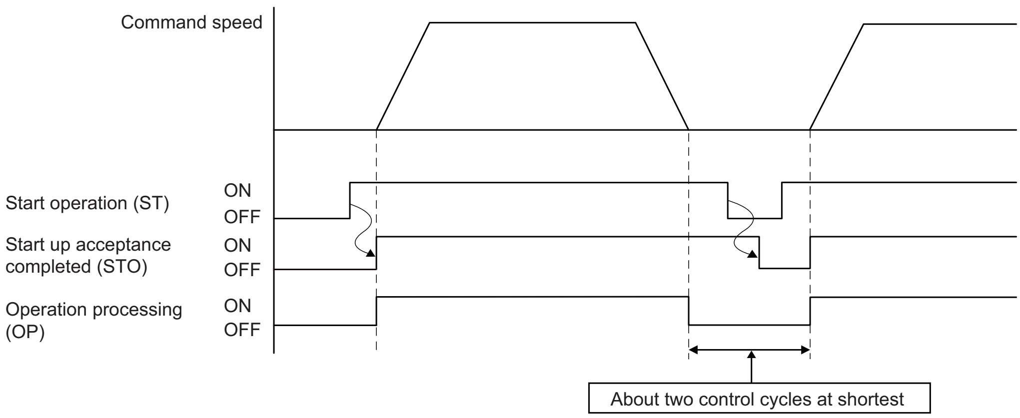
High response start operation using the fast start operation signal (FST)

In the start operation, the user program turns ON the fast start operation signal (FST) as a substitute of the start operation signal (ST). On receiving the fast start operation signal (FST), the position board turns OFF the fast start operation signal (FST), and the operation is started.



Conventional start operation using the start operation signal (ST)

In the conventional start operation, the next start operation cannot be performed until the start up acceptance completed signal (STO) is turned OFF by turning OFF the start operation signal (ST). Therefore, the start operation signal (ST) must be turned OFF before the next start operation. This procedure, when performed after the operation is completed, delays the start operation by about one control cycle until the start up acceptance completed signal (STO) is turned OFF. In addition, when the start operation signal (ST) is turned OFF in the operation, the start up acceptance completed signal (STO) is OFF after the operation is completed, which provides the same responsiveness as in the start operation using the fast start operation signal (FST).

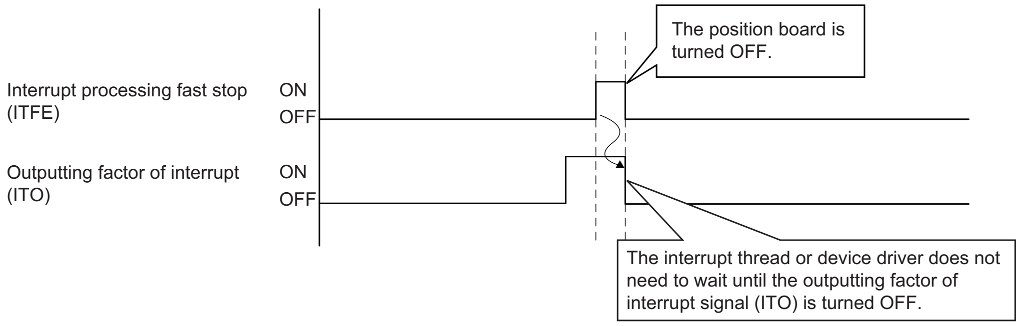


Interrupt processing high speed completion

Using the interrupt processing fast stop signal (ITFE) as a substitute of the interrupt processing stop signal (ITE) shortens the time for the interrupt processing completion.

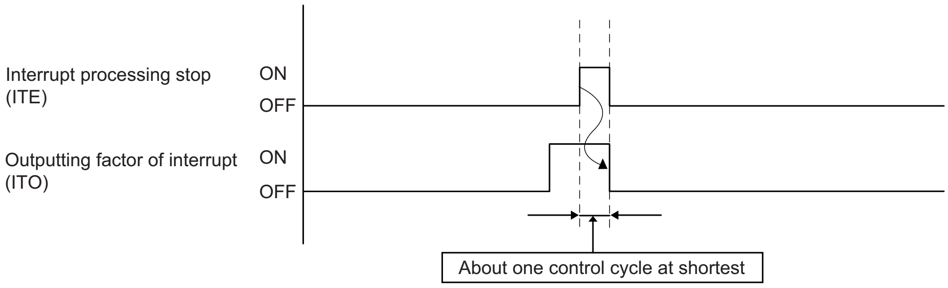
High response interrupt processing completion using the interrupt processing fast stop signal (ITFE)

For the interrupt processing completion, the interrupt thread or device driver turns ON the interrupt processing fast stop signal (ITFE) as a substitute of the interrupt processing stop signal (ITE). On receiving the interrupt processing fast stop signal (ITFE), the position board turns OFF the interrupt processing fast stop signal (ITFE), and the interrupt processing is completed. The interrupt thread or device driver does not need to wait until the outputting factor of interrupt signal (ITO) is turned OFF, and the next operation can be performed.



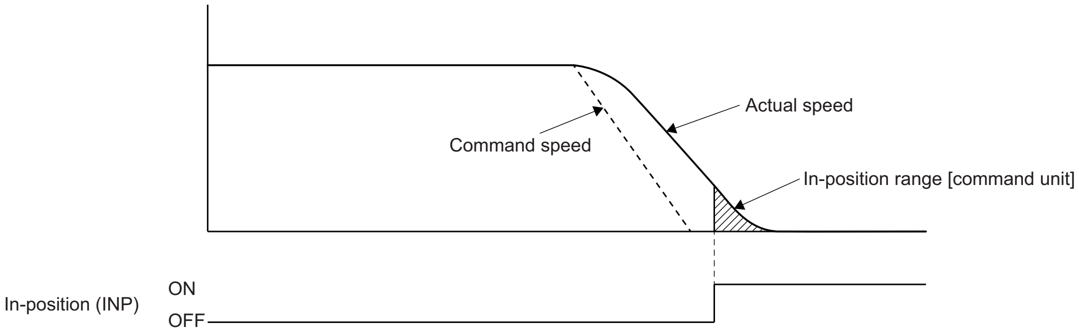
Conventional interrupt processing completion using the interrupt processing stop signal (ITE)

The conventional interrupt processing requires the interrupt processing stop signal (ITE) to be ON, then waiting until the outputting factor of interrupt signal (ITO) is turned OFF, and then the interrupt processing stop signal (ITE) to be OFF. Therefore, the interrupt processing completion is delayed by about one control cycle until the outputting factor of interrupt signal (ITO) is turned OFF.



6.25 In-position Signal

For the in-position signal (INP), the position board checks the in-position range and controls turning ON or OFF the signal. The in-position signal controlled by the servo amplifier is displayed as the servo amplifier in-position signal (SINP).



Point

[API library]

To confirm if the in-position signal (INP) is ON/OFF, confirm whether "SSC_STSBIT_AX_INP" is ON/OFF with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

Servo parameters

■MR-J4(W_)-_B

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1109	PA10	INP	In-position range	1600	pulse

■MR-J5(W_)-_B [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2009	PA10	INP	In-position range	25600	pulse

Axis data status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1060	0050A0	0	RDY	Servo ready	Each axis
		1	INP	In-position	Each axis
		2	ZSP	Zero speed	Each axis
		3	ZPAS	Passed Z-phase	Each axis
		4	TLC	Torque limit effective	Each axis
		5	SALM	Servo alarm	Each axis
		6	SWRN	Servo warning	Each axis
		7	ABSE	Absolute position erased	Each axis

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1069	0050A9	0	IWT	Interference check standby	Each axis
		1	SINP	Servo amplifier in-position	Each axis
		2	—	For manufacturer setting	—
		3			
		4			
		5			
		6			
		7			

6

6.26 Digital I/O

The digital I/O function is a function that controls the general I/O signal of the servo amplifier assigned to the digital I/O table. The user program can confirm whether the digital I/O signals are on/off by using the digital I/O table. The points for the each I/O signal can be assigned up to 1024.
When using the digital I/O function, set "0: Use digital I/O table" in "I/O table selection" of "I/O table (parameter No.004A)".

⚠CAUTION

If the digital output signal is updated from the user program during controlling of the digital output signal by the other axes start function, the consistency of the data may not be kept. This condition is applied to the case when the host personal computer and position board update the data at the same time to the same digital output area No. In this case, read/write the digital output signal after controlling the possessory right of the digital output signal using the exclusive control function.

Point

- For detailed specifications and how to assign the I/O signal to the digital I/O table, refer to the following
  ☞ Page 243 Servo Amplifier General I/O
- When using the digital I/O function, the I/O device function cannot be used.
- In relation to the digital I/O function, the following functions are expanded for the I/O device function. We recommend using the I/O device function.
  · Expansion of I/O points used
  · Supports control of I/O word devices
  For details of the I/O device function, refer to the following.
  ☞ Page 239 I/O Device

Point

[API library]
- To get digital input, use the sscGetDigitalInputDataBit function/sscGetDigitalInputDataWord function.
- To set digital output, use sscSetDigitalOutputDataBit function/sscSetDigitalOutputDataWord function.
- To get digital output, use sscGetDigitalOutputDataBit function/sscGetDigitalOutputDataWord function.

Interface

The following shows the interfaces related to the digital I/O.

System parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
004A	*IOTBL	I/O table	0000h	—	[MC200] 0000h to 0001h [MC300] 0000h to 0002h	■■■□ (I/O table selection) Set the I/O table to be used. • 0: Use digital I/O table • 1: Use I/O device table (MR-MC2_ _ method) • 2: Use I/O device table (expanded points method) [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Digital input table/digital output table [MC200]

■Digital input table

Address (hexadecimal)	Digital input area No.	Digital input No.	Symbol	Remarks
B000	Digital input area 0 (2bytes)	Digital input 0 to digital input 15	DI_000 to DI_00F	Notify the status of the digital input signal. The bits are DI_000 (bit0) to DI_00F (bit15).
B002	Digital input area 1 (2bytes)	Digital input 16 to digital input 31	DI_010 to DI_01F	Notify the status of the digital input signal. The bits are DI_010 (bit0) to DI_01F (bit15).
B004	Digital input area 2 (2bytes)	Digital input 32 to digital input 47	DI_020 to DI_02F	Notify the status of the digital input signal. The bits are DI_020 (bit0) to DI_02F (bit15).
B006	Digital input area 3 (2bytes)	Digital input 48 to digital input 63	DI_030 to DI_03F	Notify the status of the digital input signal. The bits are DI_030 (bit0) to DI_03F (bit15).
B008	Digital input area 4 (2bytes)	Digital input 64 to digital input 79	DI_040 to DI_04F	Notify the status of the digital input signal. The bits are DI_040 (bit0) to DI_04F (bit15).
B00A	Digital input area 5 (2bytes)	Digital input 80 to digital input 95	DI_050 to DI_05F	Notify the status of the digital input signal. The bits are DI_050 (bit0) to DI_05F (bit15).
B00C	Digital input area 6 (2bytes)	Digital input 96 to digital input 111	DI_060 to DI_06F	Notify the status of the digital input signal. The bits are DI_060 (bit0) to DI_06F (bit15).
B00E	Digital input area 7 (2bytes)	Digital input 112 to digital input 127	DI_070 to DI_07F	Notify the status of the digital input signal. The bits are DI_070 (bit0) to DI_07F (bit15).
⋮	⋮	⋮	⋮	⋮
B07E	Digital input area 63 (2bytes)	Digital input 1008 to digital input 1023	DI_3F0 to DI_3FF	Notify the status of the digital input signal. The bits are DI_3F0 (bit0) to DI_3FF (bit15).

■Digital output table

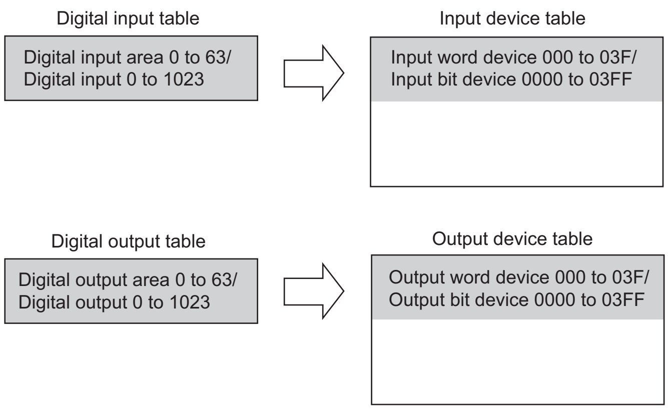
Address (hexadecimal)	Digital output area No.	Digital output No.	Symbol	Remarks
B080	Digital output area 0 (2bytes)	Digital output 0 to digital output 15	DO_000 to DO_00F	Turn ON/OFF the digital output signal. The bits are DO_000 (bit0) to DO_00F (bit15).
B082	Digital output area 1 (2bytes)	Digital output 16 to digital output 31	DO_010 to DO_01F	Turn ON/OFF the digital output signal. The bits are DO_010 (bit0) to DO_01F (bit15).
B084	Digital output area 2 (2bytes)	Digital output 32 to digital output 47	DO_020 to DO_02F	Turn ON/OFF the digital output signal. The bits are DO_020 (bit0) to DO_02F (bit15).
B086	Digital output area 3 (2bytes)	Digital output 48 to digital output 63	DO_030 to DO_03F	Turn ON/OFF the digital output signal. The bits are DO_030 (bit0) to DO_03F (bit15).
B088	Digital output area 4 (2bytes)	Digital output 64 to digital output 79	DO_040 to DO_04F	Turn ON/OFF the digital output signal. The bits are DO_040 (bit0) to DO_04F (bit15).
B08A	Digital output area 5 (2bytes)	Digital output 80 to digital output 95	DO_050 to DO_05F	Turn ON/OFF the digital output signal. The bits are DO_050 (bit0) to DO_05F (bit15).
B08C	Digital output area 6 (2bytes)	Digital output 96 to digital output 111	DO_060 to DO_06F	Turn ON/OFF the digital output signal. The bits are DO_060 (bit0) to DO_06F (bit15).
B08E	Digital output area 7 (2bytes)	Digital output 112 to digital output 127	DO_070 to DO_07F	Turn ON/OFF the digital output signal. The bits are DO_070 (bit0) to DO_07F (bit15).
⋮	⋮	⋮	⋮	⋮
B0FE	Digital output area 63 (2bytes)	Digital output 1008 to digital output 1023	DO_3F0 to DO_3FF	Turn ON/OFF the digital output signal. The bits are DO_3F0 (bit0) to DO_3FF (bit15).

Digital input table/digital output table [MC300]

The digital input table/digital output table is allocated to the input device table/output device table. The digital input (output) area□□ corresponds to the input (output) word device□□, while the digital input (output)□□□□ corresponds to input (output) bit device□□□□.

For details of the input device table/output device table, refer to the following.

☞ Page 239 I/O Device



6.27 I/O Device

The I/O device function controls the general I/O signals of the servo amplifier and I/O devices of the remote I/O module assigned to the I/O device table. When using the I/O device function, set "1: Use I/O device table (MR-MC2_ _ method)", or "2: Use I/O device table (expanded points method) [MC300]" in "I/O table selection" of "I/O table (parameter No.004A)". The user program can confirm the output of output bit devices and output word devices, and confirm the status of input bit devices and input word devices using the I/O device. The number of I/O signals is as follows.

I/O table (parameter No.004A)	Number of I/O signal points			
	Bit device		Word device	
	Input	Output	Input	Output
1: Use I/O device table (MR-MC2_ _ method)	Up to 4096 points		Up to 256 points	
2: Use I/O device table (expanded points method) [MC300]	Up to 9216 points		Up to 576 points	

⚠CAUTION

If the output device signal is updated from the user program during controlling of the output device signal by the other axes start function, the consistency of the data may not be kept. This condition is applied to the case when the host personal computer and position board update the data at the same time to the same output device area No. In this case, read/write the output device signal after controlling the possessory right of the output device signal using the exclusive control function.

Point

- When using the I/O device function, the digital I/O function cannot be used.
- Expanded points method is recommended when using MR-MC3_ _. While some of the parameter settings are different from MR-MC2_ _ method, it provides upper compatibility with functions.
- For how to assign I/O signals to the I/O device table and detailed specifications, refer to the following.

☞ Page 243 Servo Amplifier General I/O
☞ Page 301 SSCNETIII/H Head Module Connection
☞ Page 315 Sensing Module (Station Mode) Connection

Point

[API library]

- To get the input bit device, use the sscGetInputDeviceBit function.
- To get the input word device, use the sscGetInputDeviceWord function.
- To set the output bit device, use the sscSetOutputDeviceBit function.
- To set the output word device, use the sscSetOutputDeviceWord function.
- To get the output bit device, use the sscGetOutputDeviceBit function.
- To get the output word device, use the sscGetOutputDeviceWord function.

Interface

The following shows the interfaces related to the I/O device.

System parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
004A	*IOTBL	I/O table	0000h	—	[MC200] 0000h to 0001h [MC300] 0000h to 0002h	■■■□ (I/O table selection) Set the I/O table to be used. • 0: Use digital I/O table • 1: Use I/O device table (MR-MC2_ _ method) • 2: Use I/O device table (expanded points method) [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Input device table

Address (hexadecimal)		Input word device No.	Input bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DB00	0F9F00	Input word device 00 (2bytes)	Input bit device 000 to input bit device 00F	DVI_000 to DVI_00F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_000 (bit0) to DVI_00F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB02	0F9F02	Input word device 01 (2bytes)	Input bit device 010 to input bit device 01F	DVI_010 to DVI_01F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_010 (bit0) to DVI_01F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB04	0F9F04	Input word device 02 (2bytes)	Input bit device 020 to input bit device 02F	DVI_020 to DVI_02F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_020 (bit0) to DVI_02F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB06	0F9F06	Input word device 03 (2bytes)	Input bit device 030 to input bit device 03F	DVI_030 to DVI_03F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_030 (bit0) to DVI_03F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB08	0F9F08	Input word device 04 (2bytes)	Input bit device 040 to input bit device 04F	DVI_040 to DVI_04F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_040 (bit0) to DVI_04F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB0A	0F9F0A	Input word device 05 (2bytes)	Input bit device 050 to input bit device 05F	DVI_050 to DVI_05F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_050 (bit0) to DVI_05F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB0C	0F9F0C	Input word device 06 (2bytes)	Input bit device 060 to input bit device 06F	DVI_060 to DVI_06F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_060 (bit0) to DVI_06F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB0E	0F9F0E	Input word device 07 (2bytes)	Input bit device 070 to input bit device 07F	DVI_070 to DVI_07F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_070 (bit0) to DVI_07F (bit15). ■When word device is assigned Notify the status of the word device input signal.
⋮	⋮	⋮	⋮	⋮	⋮
DCFE	0FA0FE	Input word device FF (2bytes)	Input bit device FF0 to input bit device FFF	DVI_FF0 to DVI_FFF	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_FF0 (bit0) to DVI_FFF (bit15). ■When word device is assigned Notify the status of the word device input signal.

Address (hexadecimal)		Input word device No.	Input bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
—	0FA100	Input word device 100 (2bytes) (expanded points method)	Input bit device 1000 to input bit device 100F (expanded points method)	DVI_1000 to DVI_100F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_1000 (bit0) to DVI_100F (bit15). ■When word device is assigned Notify the status of the word device input signal.
	⋮	⋮	⋮	⋮	⋮
	0FA37E	Input word device 23F (2bytes) (expanded points method)	Input bit device 23F0 to input bit device 23FF (expanded points method)	DVI_23F0 to DVI_23FF	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_23F0 (bit0) to DVI_23FF (bit15). ■When word device is assigned Notify the status of the word device input signal.

Output device table

Address (hexadecimal)		Output word device No.	Output bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DD00	0FA380	Output word device 00 (2bytes)	Output bit device 000 to output bit device 00F	DVO_000 to DVO_00F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_000 (bit0) to DVO_00F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD02	0FA382	Output word device 01 (2bytes)	Output bit device 010 to output bit device 01F	DVO_010 to DVO_01F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_010 (bit0) to DVO_01F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD04	0FA384	Output word device 02 (2bytes)	Output bit device 020 to output bit device 02F	DVO_020 to DVO_02F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_020 (bit0) to DVO_02F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD06	0FA386	Output word device 03 (2bytes)	Output bit device 030 to output bit device 03F	DVO_030 to DVO_03F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_030 (bit0) to DVO_03F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD08	0FA388	Output word device 04 (2bytes)	Output bit device 040 to output bit device 04F	DVO_040 to DVO_04F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_040 (bit0) to DVO_04F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD0A	0FA38A	Output word device 05 (2bytes)	Output bit device 050 to output bit device 05F	DVO_050 to DVO_05F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_050 (bit0) to DVO_05F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD0C	0FA38C	Output word device 06 (2bytes)	Output bit device 060 to output bit device 06F	DVO_060 to DVO_06F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_060 (bit0) to DVO_06F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD0E	0FA38E	Output word device 07 (2bytes)	Output bit device 070 to output bit device 07F	DVO_070 to DVO_07F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_070 (bit0) to DVO_07F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
⋮	⋮	⋮	⋮	⋮	⋮
DEFE	0FA57E	Output word device FF (2bytes)	Output bit device FF0 to output bit device FFF	DVO_FF0 to DVO_FFF	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_FF0 (bit0) to DVO_FFF (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.

Address (hexadecimal)		Output word device No.	Output bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
—	0FA580	Output word device 100 (2bytes) (expanded points method)	Output bit device 1000 to output bit device 100F (expanded points method)	DVO_1000 to DVO_100F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_1000 (bit0) to DVO_100F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
	⋮	⋮	⋮	⋮	⋮
	0FA7FE	Output word device 23F (2bytes) (expanded points method)	Output bit device 23F0 to output bit device 23FF (expanded points method)	DVO_23F0 to DVO_23FF	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_23F0 (bit0) to DVO_23FF (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.

6.28 Servo Amplifier General I/O

The servo amplifier general I/O function controls the I/O signal connected to the servo amplifier via SSCNET. The user program can control the I/O signal with the digital I/O table or I/O device table, by assigning the servo amplifier general I/O signal to the digital I/O table or I/O device table. The points of the I/O signal differ depending on the servo amplifier model.

Type	Software version	Description
Using MR-MC2_ _	A7 or earlier	Assigning to the I/O device table is not supported.
	A8 or later	Assigning to the I/O device table is supported.
Using MR-MC3_ _	No restriction	

• Compatible servo amplifier

Servo amplifier model	Remarks
MR-J4-_B	Input: 3 points/axis Output: 3 points/axis
MR-J4W_-_B	Input: 3 points/axis Output: 1 points/axis + 2 points (common in each axis)
MR-J5-_B*1	Input: 3 points/axis Output: 3 points/axis
MR-J5W_-_B*1	Input: 3 points/axis Output: 1 points/axis + 2 points (common in each axis)

*1 Only be used in MR-MC3_ _

Point

• When a communication error (system error E401H to E407H) occurs or SSCNET is disconnected, all the general I/O signals of the servo amplifier turn OFF.
• The general input signal of the servo amplifier shares the connector pin with the sensor signal (LSP, LSN, DOG). Therefore, the sensor signal cannot be input if general input signal of the servo amplifier is used as other than the sensor signal. In this case, set "Senser input system" of "Sensor input option (parameter No.0219)" to "2: Digital or input device input" and assign a digital input signal or input device signal as a sensor signal in "Sensor signal connection specification (parameter No.021A to 021C)". The sensor signal can be controlled by a command from the user program (writing of the dual port memory) when "Senser input system" of "Sensor input option (parameter No.0219)" is set to "4: Dual port memory input".
• The delay time from an input of the general I/O signal of the servo amplifier to the update of the digital input table is approx. 0.88ms + (control cycle × 2) (approx. 2.7ms when the control cycle is 0.88ms). The delay time is also the same for when using an input device table.
• The delay time from the update of the digital output table by the user program to the output of the general output signal of the servo amplifier is approx. 0.88ms + (control cycle × 3) (approx. 3.5ms when the control cycle is 0.88ms). In the case of the digital output signal using in the other axes start function, the delay time from other axes start condition satisfaction to the output is approx. 0.88ms + (control cycle × 2) (approx. 2.7ms when the control cycle is 0.88ms). The delay time is also the same for when using an output device table.

Point

[API library]
[MC200]
• To set servo amplifier general I/O, use the sscChangeParameter function/sscChangeParameterEx function.
[MC300]
• For MR-J4(W_)-_B, to set servo amplifier general I/O, use the sscChangeParameter function/ sscChangeParameterEx function.
• For MR-J5(W_)-_B, to set servo amplifier general I/O, use the sscChangeParameterEx function.

The following shows the connectors of the servo amplifier to be connected to the general I/O signals. Each general I/O signal is assigned to the digital input signal (DI_□□□) and the digital output signal (DO_□□□). For details, refer to the following.
☞ Page 245 Settings

MR-J4(W_)-_B

• For MR-J4-_B

General I/O	Signal name	Destination connector pin No.	Symbol
General input	DI_□□0	CN3-2	DI1
	DI_□□1	CN3-12	DI2
	DI_□□2	CN3-19	DI3
General output	DO_□□0	CN3-13	MBR
	DO_□□1	CN3-9	INP
	DO_□□2	CN3-15	ALM

• For MR-J4W_-_B

General I/O	Signal name	Destination connector pin No.			Symbol*1
		Axis A	Axis B	Axis C*2	
General input	DI_□□0	CN3-7	CN3-20	CN3-1	DI1-□
	DI_□□1	CN3-8	CN3-21	CN3-2	DI2-□
	DI_□□2	CN3-9	CN3-22	CN3-15	DI3-□
General output	DO_□□0	CN3-12	CN3-25	CN3-13	MBR-□
	DO_□□1	CN3-24*3			CINP
	DO_□□2	CN3-11*3			CALM

*1 □: A, B, C
*2 Only MR-J4W3-_B is available.
*3 The pin is common for each axis. The axis to be used can be selected by the parameter setting. For details, refer to the following.
☞ Page 245 Settings

MR-J5(W_)-_B [MC300]

• For MR-J5-_B

General I/O	Signal name	Destination connector pin No.	Symbol
General input	DI_□□0	CN3-2	DI1
	DI_□□1	CN3-12	DI2
	DI_□□2	CN3-19	DI3
General output	DO_□□0	CN3-13	MBR
	DO_□□1	CN3-9	INP
	DO_□□2	CN3-15	ALM

• For MR-J5W_-_B

General I/O	Signal name	Destination connector pin No.			Symbol*1
		Axis A	Axis B	Axis C*2	
General input	DI_□□0	CN3-7	CN3-20	CN3-1	DI1-□
	DI_□□1	CN3-8	CN3-21	CN3-2	DI2-□
	DI_□□2	CN3-9	CN3-22	CN3-15	DI3-□
General output	DO_□□0	CN3-12	CN3-25	CN3-13	MBR-□
	DO_□□1	CN3-24*3			CINP
	DO_□□2	CN3-11*3			CALM

*1 □: A, B, C
*2 Only MR-J5W3-_B is available.
*3 The pin is common for each axis. The axis to be used can be selected by the parameter setting. For details, refer to the following.
☞ Page 245 Settings

Settings

Servo parameters

When using the general output function of the servo amplifier, set the parameter of the output device selection as shown below.

■MR-J4(W_)-_B

- For MR-J4-_B

Parameter No.	MR-J4-_B parameter No.	Symbol[*1]	Name	Setting value
11C6	PD07	*DO1	Output device selection 1	0021h
11C7	PD08	*DO2	Output device selection 2	0022h
11C8	PD09	*DO3	Output device selection 3	0023h

- For MR-J4W_-_B

Parameter No.	MR-J4W_-_B parameter No.	Symbol[*1]	Name	Setting value
11C6	PD07	*DO1	Output device selection 1	0021h
11C7	PD08	*DO2	Output device selection 2[*2*3]	1022h (when using axis A) 2022h (when using axis B) 3022h (when using axis C
11C8	PD09	*DO3	Output device selection 3[*2*3]	1023h (when using axis A) 2023h (when using axis B) 3023h (when using axis C)

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
*2 The parameter is shared with the three axes of axis A, B, and C. Always set the same value to all the axes. When the setting value differs, the value of the axis A is valid.
*3 Since the pin is shared by each axis, only one axis can be assigned.

■MR-J5(W_)-_B [MC300]

- For MR-J5-_B

Parameter No.	MR-J5-_B parameter No.	Symbol[*1]	Name	Setting value
20FC	PD07	*DO1	Output device selection 1	00000021h
20FD	PD08	*DO2	Output device selection 2	00000022h
20FE	PD09	*DO3	Output device selection 3	00000023h

- For MR-J5W_-_B

Parameter No.	MR-J5W_-_B parameter No.	Symbol[*1]	Name	Setting value
20FC	PD07	*DO1	Output device selection 1	00000021h
20FD	PD08	*DO2	Output device selection 2[*2*3]	00001022h (when using axis A) 00002022h (when using axis B) 00003022h (when using axis C
20FE	PD09	*DO3	Output device selection 3[*2*3]	00001023h (when using axis A) 00002023h (when using axis B) 00003023h (when using axis C)

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
*2 The parameter is shared with the three axes of axis A, B, and C. Always set the same value to all the axes. When the setting value differs, the value of the axis A is valid.
*3 Since the pin is shared by each axis, only one axis can be assigned.

Control parameter

The control parameters are used to set the general I/O and to assign to the digital I/O No. When "Sensor input system" of "Sensor input options (parameter No.0219)" is "1: Driver input", the input signal of the servo amplifier is used for the sensor (LSP/LSN/DOG). Therefore, the input signal cannot be used as the general input. To use the general input signal of the servo amplifier, set other than "1: Driver input" to "Sensor input system" of "Sensor input options (parameter No.0219)".

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting value	Description
0213	*GIOO	General I/O option	0000h	—	0000h to 0011h	■■■□ (Servo amplifier general input setting) Set whether to use the general input of the servo amplifier. When "1: Used" is set, the limit switch signal and the dog signal cannot be input from the servo amplifier. Set other than "1: Driver input" to "Sensor input system" of "Sensor input options (parameter No.0219)". • 0: Not used • 1: Used ■■□■ (Servo amplifier general output setting) Set whether to use the general output of the servo amplifier. • 0: Not used • 1: Used
0214	*GDNA	General I/O No. assignment	0000h	—	0000h to FFFFh	Set assignment of the general I/O No. The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)".
						[When using "0: Use digital I/O table"] ■■□□ (General input assignment) Specify the first digital input area No. to assign the general input. • 00h to 3Fh: Digital input area 0 to 63 <Example> When the digital input area No.1 is specified Assign 16 points of DI_010 to DI_01F. However, DI_013 to DI_01F are unavailable. □□■■ (General output assignment) Specify the first digital output area No. to assign the general output. • 00h to 3Fh: Digital output area 0 to 63 <Example> When the digital output area No.2 is specified 16 points are assigned from DO_020 to DO_02F. However, DO_023 to DO_02F are unavailable.
						[When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 00h to FFh: Input word device No.00 to FF <Example> When the input word device No.01 is specified 16 points are assigned from DVI_010 to DVI_01F. However, DVI_013 to DVI_01F are unavailable. □□■■ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general input. • 00h to FFh: Output word device No.00 to FF <Example> When the output word device No.02 is specified 16 points are assigned from DVO_020 to DVO_02F. However, DVO_023 to DVO_02F are unavailable.
						[When using "2: Use I/O device table (expanded points method)] [MC300] Set in "General input No. assignment (parameter No.0215)" and "General output No. assignment (parameter No.0216)".
0215	*GDINA	General input No. assignment [MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" setting is "2: Use I/O device table (expanded points method)". ■□□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 000h to 23Fh: Input word device No.000 to 23F <Example> When the input word device No.001 is specified 16 points are assigned from DVI_0010 to DVI_001F. However, DVI_0013 to DVI_001F are unavailable.

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting value	Description
0216	*GDONA	General output No. assignment [MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" setting is "2: Use I/O device table (expanded points method)". ■□□□ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general output. • 000h to 23Fh: Output word device No.000 to 23F <Example> When the output word device No.002 is specified 16 points are assigned from DVO_0020 to DVO_002F. However, DVO_0023 to DVI_002F are unavailable.
0219	*SOP	Sensor input option	0000h	—	0000h to 0304h	■■■□ (Sensor input system) Set the input system of the sensor (LSP/LSN/DOG). • 0: Not use • 1: Driver input • 2: Digital or input device input • 3: Not connected (does not detect LSP/LSN/DOG) • 4: Dual port memory input ■□■■ (Limit switch signal selection) Set valid/invalid of limit switch. • 0: LSP/LSN are valid • 1: LSP is valid, LSN is invalid • 2: LSN is invalid, LSN is valid • 3: LSP/LSN are invalid

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

- Assign the digital I/O table not to overlap other settings. If the assignment is overlapped or exceeds the maximum points of the digital I/O table, "I/O No. Assignment Error (system error E510H)" and "I/O No. Assignment Setting Error (operation alarm 39H, detail 01H and 02H)" occur.
- Assign the I/O device table not to overlap other settings. If the assignment is overlapped or exceeds the maximum points of the I/O device table, "I/O No. Assignment Error (system error E510H)" and "I/O No. Assignment Setting Error (operation alarm 39H, detail 01H and 02H)" occur.

6.29 Dual Port Memory Exclusive Control

The dual port memory exclusive control function is a function that keeps the consistency of the memory data by temporarily limiting the system program and user program to read/write data to the limited area of the dual port memory.
The output signals in this section refer to digital output signals or output device signals. The target output signal is selected in "I/O table (parameter No.004A)".

Exclusive control of output signals

If the output signal is updated from the user program during controlling of the output signal by the other axes start function, the consistency of the data may not be kept. Read/write the output signal using the exclusive control function after controlling the possessory right of the output signal.

Point

[API library]

- The sscSetDigitalOutputDataBit and sscSetDigitalOutputDataWord functions of the API library perform exclusive control of digital output within the function.
- The sscSetOutputDeviceBit function of the API library performs exclusive control of output device within the function.

Interface

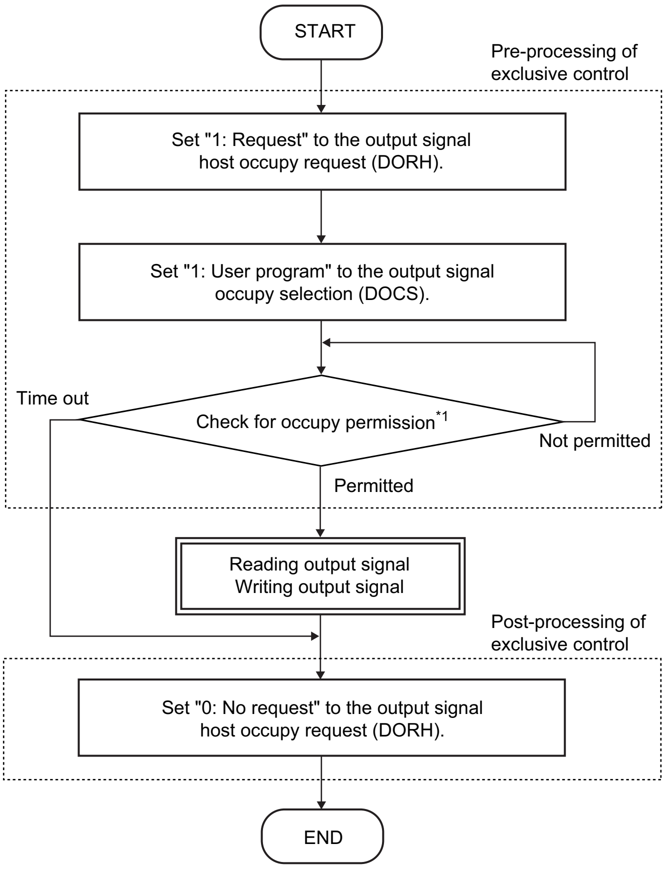
Address (hexadecimal)		Symbol	Description	Detail*1	User program data writing
MR-MC2_ _	MR-MC3_ _				
EF80	0FFA80	DORH	Output signal host occupy request (2bytes)	• 0: No request • 1: Request	○
EF82	0FFA82	DORB	During output signal board occupy request*2 (2bytes)	• 0: No request • 1: Request	×
EF84	0FFA84	DOCS	Output signal occupy selection (2bytes)	• 0: System program • 1: User program	○
EF86 to EF8F	0FFA86 to 0FFA8F	—	For manufacturer setting	—	—

*1 When the data out of the range is written, "Exclusive Control Error (system error E503H)" occurs, which stops the import of the output signal and the control of the output signal by the other axes start function.
*2 This is the area where the data can be written only from the system program. When the data is written from the user program to this area, the exclusive control operates incorrectly.

Exclusive control procedure on user program side

The following shows the procedure to control the output signal exclusively.

■Exclusive control procedure



*1 Condition for occupy permission:
When the during output signal board occupy request (DORB) is "0: No request" or the output signal occupy selection (DOCS) is "0: System program"
Condition for occupy non-permission:
When the during output signal board occupy request (DORB) is "1: Request" and the output signal occupy selection (DOCS) is "1: User program"

■Condition for occupy permission of output signal

DORH	DORB	DOCS	Occupy status of output signal	Occupy permitted/not permitted
0	0	0	No occupy.	No occupy request from user program.
0	0	1		
0	1	0	Occupied by system program.	
0	1	1		
1	0	0	Occupied by user program.	Occupy permitted.
1	0	1		
1	1	0	Occupied by user program. (Waiting for permission from system program)	
1	1	1	Occupied by system program. (Waiting for permission from user program)	Occupy not permitted.

Restrictions

Perform the exclusive control so that the occupy time on the user program side is 5μs or less. If the possessory right is not shifted to the system program even after 5μs at the timing when the system program accesses the output signal, the access to the output signal is stopped. When the access to the output signal is stopped, the access is put on hold until the next control cycle.

6.30 Pass Position Interrupt

The pass position interrupt function is a function that outputs an interrupt when the pass position condition set in the interrupt table is satisfied. Up to 64 [MC200]/128 [MC300] pass position conditions can be specified (total for all 64 [MC200]/128 [MC300] axes) per operation.
To use this function, set the pass position interrupt valid to the auxiliary command of the point table. The pass position condition start and end Nos. are imported when the operation is started. The pass position condition is imported and the pass position is judged for each condition from the pass position condition start No.
When the pass position condition is satisfied, the factor of an interrupt corresponding to the pass position condition No. is output. Then, the next pass position condition is imported and judged.
The pass position condition is judged until the in-position signal (INP) turns ON. [MC200]
The judgement of the pass position condition varies depending on the cancel condition of the pass position option. If "0: In-position signal (INP) is ON" is set to the cancel condition, the pass position condition is judged until the in-position signal (INP) turns ON. If "1: No cancel" is set to the cancel condition, the pass position condition is judged until the pass position interrupt cancel signal (PPISTP) turns ON, or the operation is started again. [MC300]
To output the interrupt, set the pass position interrupt to "System interrupt conditions (system parameter No.0004)" and turn ON the interrupt output start signal (ITS).

Point

- This function can be used only in the automatic operation and the linear interpolation operation [MC200]/ interpolation operation [MC300]. For the linear interpolation operation [MC200]/interpolation operation [MC300], the pass position condition can be set per axis.
- During the pass position interrupt, the pass position interrupt condition Nos. from the start to the end are in use. When the pass position condition is in use in other axes, "Pass Position Interrupt Error (operation alarm 5CH, detail 05H)" occurs and the start operation is stopped.
- When the operation is started again before all the interrupts by the pass position interrupt are output (while the operating pass position interrupt signal (PPIOP) is ON), "Pass Position Interrupt Error (operation alarm 5CH, detail 06H)" occurs and the start operation is stopped. [MC300]
- In the synchronous mode of the tandem drive, only the setting of the master axis is valid and this function outputs the interrupt based on the operation of the master axis.

Pass position interrupt setting method

The pass position interrupt setting procedure is as follows.

Operating procedure

1. Set the pass position conditions.
2. Validate the pass position interrupt specifications of the point data.
3. Set the pass position condition start No. and end No.
4. Start the automatic operation or the linear interpolation operation [MC200]/interpolation operation [MC300].
5. Wait until the conditions of the pass position interrupt are fulfilled.

Point

[API library]
- To set the pass position interrupt in 1., use the sscSetIntPassPositionData function.
- To set the point table in 2., use the sscSetPointDataEx function.
- To set the pass position condition start No. and end No. in 3., use the sscSetStartingPassNumber function.
- To start the automatic operation in 4., use the sscAutoStart function/sscLinearStart function.
- To wait for the pass position interrupt in 5., use the sscWaitIntPassPosition function.
- For details about procedure for pass position interrupt, refer to the sample program (InterruptPassPosition) contained in the utility software.

Interface

Pass position interrupt table

The pass position condition (the pass position option and the pass position data) is set to the pass position interrupt table. The pass position condition is imported when the corresponding pass position condition No. is started to be judged.

Point

When the pass position condition setting is incorrect, "Pass Position Interrupt Error (operation alarm 5CH, detail 04H)" occurs and the operation is stopped.

Point

[API library]
To set/get the pass position interrupt data, use the sscSetIntPassPositionData function/ sscCheckIntPassPositionData function.

■Pass position interrupt table

Address (hexadecimal)		Content	
MR-MC2_ _	MR-MC3_ _		
A640 to A643	0E1000 to 0E1003	Pass position condition 1 (8bytes)	Pass position option
A644 to A647	0E1004 to 0E1007		Pass position data
A648 to A64B	0E1008 to 0E100B	Pass position condition 2 (8bytes)	Pass position option
A64C to A64F	0E100C to 0E100F		Pass position data
A650 to A653	0E1010 to 0E1013	Pass position condition 3 (8bytes)	Pass position option
A654 to A657	0E1014 to 0E1017		Pass position data
A658 to A65B	0E1018 to 0E101B	Pass position condition 4 (8bytes)	Pass position option
A65C to A65F	0E101C to 0E101F		Pass position data
A660 to A663	0E1020 to 0E1023	Pass position condition 5 (8bytes)	Pass position option
A664 to A667	0E1024 to 0E1027		Pass position data
A668 to A66B	0E1028 to 0E102B	Pass position condition 6 (8bytes)	Pass position option
A66C to A66F	0E102C to 0E102F		Pass position data
A670 to A673	0E1030 to 0E1033	Pass position condition 7 (8bytes)	Pass position option
A674 to A677	0E1034 to 0E1037		Pass position data
A678 to A67B	0E1038 to 0E103B	Pass position condition 8 (8bytes)	Pass position option
A67C to A67F	0E103C to 0E103F		Pass position data
A680 to A683	0E1040 to 0E1043	Pass position condition 9 (8bytes)	Pass position option
A684 to A687	0E1044 to 0E1047		Pass position data
A688 to A68B	0E1048 to 0E104B	Pass position condition 10 (8bytes)	Pass position option
A68C to A68F	0E104C to 0E104F		Pass position data
A690 to A693	0E1050 to 0E1053	Pass position condition 11 (8bytes)	Pass position option
A694 to A697	0E1054 to 0E1057		Pass position data
A698	0E1058	⋮	
⋮	⋮		
A837	0E11F7		
A838 to A83B	0E11F8 to 0E11FB	Pass position condition 64 (8bytes)	Pass position option
A83C to A83F	0E11FC to 0E11FF		Pass position data
—	0E1200 to 0E1203	Pass position condition 65 (8bytes)	Pass position option
	0E1204 to 0E1207		Pass position data
	0E1208	⋮	
	⋮		
	0E13F7		
	0E13F8 to 0E13FB	Pass position condition 128 (8bytes)	Pass position option
	0E13FC to 0E13FF		Pass position data

■ Pass position option

The addresses in the table are the addresses for the pass position condition 1. For the pass position condition 2 and after, add "+8h" for each pass position condition.

Address (hexadecimal)		Name	Initial value	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
A640	0E1000	Pass position option (4bytes)	00000000h	—	[MC200] 00000000h to 00000011h [MC300] 00000000h to 00001011h	■■■■■■■□ (Pass direction) Set the pass direction for the pass position data. • 0: + direction pass position interrupt output • 1: - direction pass position interrupt output ■■■■■■□■ (Judgment condition) Set the judgment condition for the pass position data.*1 • 0: Current command position • 1: Current feedback position ■■■■□■■■ (Cancel condition) [MC300] Set the cancel condition for the judgement of the pass position condition. • 0: In-position signal (INP) is ON Cancel the judgement of the pass position condition by turning ON the in-position signal (INP) after the operation is completed. • 1: No cancel The judgement of the pass position condition is not canceled automatically. If the judgement of the pass position condition is canceled, turn ON the pass position interrupt cancel signal (PPISTP).

*1 Only the setting for the pass position condition start No. is valid.

■ Pass position data

The addresses in the table are the addresses for the pass position condition 1. For the pass position condition 2 and after, add "+8h" for each pass position condition.

Address (hexadecimal)		Name	Initial value	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
A644	0E1004	Pass position data (4bytes)	0	Command unit	-2147483648 to 2147483647	Set the pass position data at the pass position interrupt output.

Point

- Set the pass position condition in passing order since the pass position conditions are judged one by one in ascending order of the pass position condition No.
- The interrupt is output only once for each pass position condition.
- When a passed position is the pass position condition, the interrupt is not output until the position is passed again.
- Ensure one control cycle or longer between two pass position conditions.
- Only the judgment condition for the pass position condition start No. is valid only for the pass position option. The judgment condition is used for each pass position data as the common setting. (The judgment condition cannot be set individually for each pass position condition.)

[MC200]

- When the current feedback position is selected as the judgment condition for the pass position data, do not set the pass position data within the in-position range. The pass position interrupt may not be output since the pass position judgment ends when the in-position signal (INP) turns ON.

[MC300]

- When "0: In-position signal (INP) is ON" is selected as the cancel condition of the pass position option and the current feedback position is selected as the judgment condition for the pass position data, do not set the pass position data within the in-position range. The pass position interrupt may not be output since the pass position judgment ends when the in-position signal (INP) turns ON.
- When the pass position interrupt is output within the in-position range, set "1: No cancel" to the cancel condition of the pass position option. The pass position interrupt may not be output if the pass position judgment ends when the in-position signal (INP) turns ON.

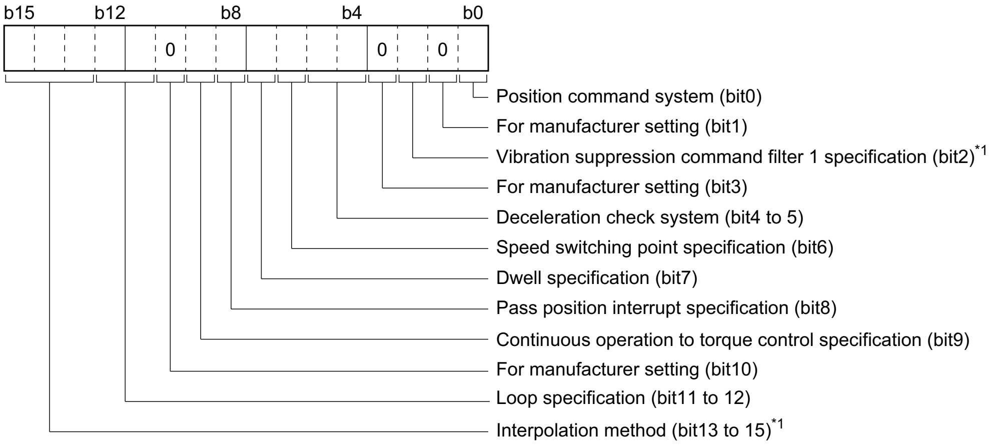
- The setting of "1: No cancel" to the cancel condition of the pass position option is invalid only when the in-position signal (INP) is ON after the operation is completed. The pass position interrupt is canceled when the operation is canceled due to an operation alarm, servo alarm, or operation stop command while the operating pass position interrupt signal (PPIOP) is ON, or the pass position interrupt cancel signal (PPISTP) is turned ON while the operating pass position interrupt signal (PPIOP) is ON.

⚠CAUTION [MC300]

If "1: No cancel" is set to the cancel condition of the pass position option, the pass position interrupt is continued after the operation is completed. The condition judgement of the pass position interrupt is continued even the servo off is performed. Therefore, if the axis movement is performed after the servo off, turn ON the pass position interrupt cancel signal (PPISTP).

Point table

To use the pass position interrupt, set the pass position interrupt specification (bit8) to "1: Pass position interrupt valid" in the auxiliary command of the point table.



*1 When using MR-MC2_ _, it is "For manufacturer setting".

Bit	Name	Description
8	Pass position interrupt specification	Select valid/invalid for the pass position interrupt. • 0: Pass position interrupt invalid • 1: Pass position interrupt valid

Point

This setting is valid in the point data of the start point No. only. If it is set in the point data after the start point No., "Point Table Setting Error (operation alarm 25H, detail 0CH)" occurs and the operation is stopped.

Point

[API library]

To set/get the point data, use the sscSetPointDataEx function/sscCheckPointDataEx function.

Axis command/status data

The pass position is judged according to the pass position condition specified in the start No. and the end No. of the pass position condition.

■Axis command data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

When using only one pass position condition, set the same No. for the start No. and the end No.

Address (hexadecimal)		Name	Setting range		Description
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _	
1034	005044	Pass position condition start No. (2bytes)	1 to 64	1 to 128	Set the start No. of the pass position condition for the pass position interrupt.
1036	005046	Pass position condition end No. (2bytes)	1 to 64	1 to 128	Set the end No. for the pass position condition for the pass position interrupt.

Point

- When the pass position condition used in other axis is imported, "Pass Position Interrupt Error (operation alarm 5CH, detail 05H)" occurs and the operation is stopped. Do not use the same pass position condition No. for multiple axes.
- When the pass position condition start No. is out of range, "Pass Position Interrupt Error (operation alarm 5CH, detail 01H)" occurs and the operation is stopped.
- When the pass position condition end No. is out of range, "Pass Position Interrupt Error (operation alarm 5CH, detail 02H)" occurs and the operation is stopped.
- When the pass position condition start No. is smaller than the pass position condition end No., "Pass Position Interrupt Error (operation alarm 5CH, detail 03H)" occurs and the operation is stopped.

Point

[API library]

To set the pass condition start and end Nos., use the sscSetStartingPassNumber function.

■Axis status data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range		Description
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _	
1094	0050E4	Executing pass position condition No. (2bytes)	0 to 64	0 to 128	Output the executing pass position condition No. After the pass position condition completion, the last pass position condition No. is displayed. When the pass position interrupt processing is canceled due to the pass position condition setting error, an operation alarm, or other factors, the pass position condition No. where an error occurs is displayed. When the operation is started with the pass position interrupt invalid, "0" is output.

Axis command/status bit

The axis command bit and the status bit related to the pass position interrupt function are shown below.

■Axis command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1007	005007	0	PPISTP	Pass position interrupt cancel
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

- Details on axis command bit

Symbol	Signal name	Function details	
		Function	Operation
PPISTP	Pass position interrupt cancel	Cancel the pass position interrupt.	Turn ON this signal to cancel the pass position interrupt when the operating pass position interrupt signal (PPIOP) is ON.

Point

[API library]

To turn the pass position interrupt cancel signal (PPISTP) ON/OFF, set "SSC_CMDBIT_AX_PPISTP" to the command bit No. of the sscSetCommandBitSignalEx function.

■Axis status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1067	0050A7	0	PPIOP	Operating pass position interrupt
		1	PPIFIN	Pass position interrupt completed
		2	PPIERR	Pass position interrupt incompleted
		3	—	For manufacturer setting
		4		
		5		
		6		
		7	AUTLO	In point table loop

- Details on axis status bit

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
PPIOP	Operating pass position interrupt	Notify that the pass position interrupt is being performed.	The start and end No. of the pass position interrupt are specified and the pass position interrupt is performed.	The pass position interrupt completed signal (PPIFIN) is turned ON or the pass position interrupt incompleted signal (PPIERR) is turned ON.
PPIFIN	Pass position interrupt completed	Notify that the pass position interrupt is completed.	All interrupt outputs are completed in the pass position interrupt.	The start and end No. of the pass position interrupt are specified and the pass position interrupt is performed.
PPIERR	Pass position interrupt incompleted	Notify that the pass position interrupt is canceled.	• The operation is canceled due to an operation alarm, servo alarm, or an operation stop command while the operating pass position interrupt signal (PPIOP) is ON. • The pass position interrupt cancel signal (PPISTP) is turned ON while the operating pass position interrupt signal (PPIOP) is ON. [MC200] • Not all pass position interrupt outputs are completed even when the in-position signal (INP) is turned ON after the operation completion while the operating pass position interrupt signal (PPIOP) is ON. [MC300] • Not all pass position interrupt outputs are completed even when the in-position signal (INP) is turned ON after the operation completion when "0: In-position signal (INP) is ON" is selected as the cancel condition of the pass position option and while the operating pass position interrupt signal (PPIOP) is ON.	The start and end No. of the pass position interrupt are specified and the pass position interrupt is performed.

Point

[API library]

To confirm if the following pass position interrupt statuses are ON/OFF, set the following to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

- Operating pass position interrupt signal (PPIOP): SSC_STSBIT_AX_PPIOP
- Pass position interrupt completed signal (PPIFIN): SSC_STSBIT_AX_PPIFIN
- Pass position interrupt incompleted signal (PPIERR): SSC_STSBIT_AX_PPIERR

Interrupt conditions (system parameters)

Set the values that designate ON for the bits that correspond to the factor of pass position interrupt outputting to the parameter "System interrupt conditions (parameter No.0004)" to validate the interrupt output of the pass position interrupt.

■System interrupt conditions (parameter No.0004)

Bit	Symbol	Signal name
0	SYSE	System error
1	CALM	System alarm
2	EMIO	During forced stop
3	—	For manufacturer setting
4		
5		
6		
7	OCME	Operation cycle alarm
8	OASF	Factor of other axes start interrupt is being sent
9	PPI	Factor of pass position interrupt is being sent
10	—	For manufacturer setting
11		
12		
13		
14		
15		

Point

[API library]

To set/get the interrupt conditions, use the sscChange2Parameter function/sscCheck2Parameter function.

Factor of system interrupt

For details about the factor of system interrupt, refer to the following.

☞ Page 582 System interrupt factor

Point

[API library]

To reset/set/wait of the pass position interrupt events, use the sscResetIntPassPosition function/sscSetIntPassPosition function/sscWaitIntPassPosition function.

■Details on factor of system interrupt

When the pass position data is passed, the factor of pass position interrupt is being sent (interrupt) signal (iPPI) of the details on factor of system interrupt is turned ON.

Address (hexadecimal)		Bit*1	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0590, 0591	002220, 002221	0	iSYSE	System error (interrupt)
		1	iCALM	System alarm (interrupt)
		2	iEMIO	During forced stop (interrupt)
		3	—	For manufacturer setting
		4		
		5		
		6		
		7	iOCME	Operation cycle alarm (interrupt)
		8	iOASF	Factor of other axes start interrupt is being sent (interrupt)
		9	iPPI	Factor of pass position interrupt is being sent (interrupt)
		10	—	For manufacturer setting
		11		
		12		
		13		
		14		
		15		

*1 OFF: No factor of interrupt exists.
ON: A factor of interrupt exists.

■Factor of pass position interrupt

When the factor of pass position interrupt is being sent (interrupt) signal (iPPI) is ON, a bit corresponding to the pass position condition No. of the factor of pass position interrupt turns ON.

For details about the factor of the pass position interrupt 1 to 4, refer to the following.

Address (hexadecimal)		Description	Reference
MR-MC2_ _	MR-MC3_ _		
0598 to 059B	002238 to 00223B	Factor of pass position interrupt 1 (condition 1 to 32)	Page 588 Factor of pass position interrupt 1
059C to 059F	00223C to 00223F	Factor of pass position interrupt 2 (condition 33 to 64)	Page 589 Factor of pass position interrupt 2
—	002240 to 002243	Factor of pass position interrupt 3 (condition 65 to 96)	Page 590 Factor of pass position interrupt 3
	002244 to 002247	Factor of pass position interrupt 4 (condition 97 to 128)	Page 591 Factor of pass position interrupt 4

■Details on factor of pass position interrupt

When the outputting with the factor of pass position interrupt □ signal (iPPI□) is ON, the pass position status bit corresponding to the pass position condition No. turns ON.

Address (hexadecimal)		Content	
MR-MC2_ _	MR-MC3_ _		
0FA0	0047E0	Details on factor of pass position interrupt	Details on factor of pass position interrupt 1
0FA1	0047E1		Details on factor of pass position interrupt 2
0FA2	0047E2		Details on factor of pass position interrupt 3
0FA3	0047E3		Details on factor of pass position interrupt 4
⋮	⋮		⋮
0FDF	00481F		Details on factor of pass position interrupt 64
—	004820		Details on factor of pass position interrupt 65
	⋮		⋮
	00485F		Details on factor of pass position interrupt 128

• Details on factor of pass position interrupt □

The addresses in the table are the addresses for the pass position condition No.1. For the pass position condition No.2 and after, add "1h" for each pass position condition No.

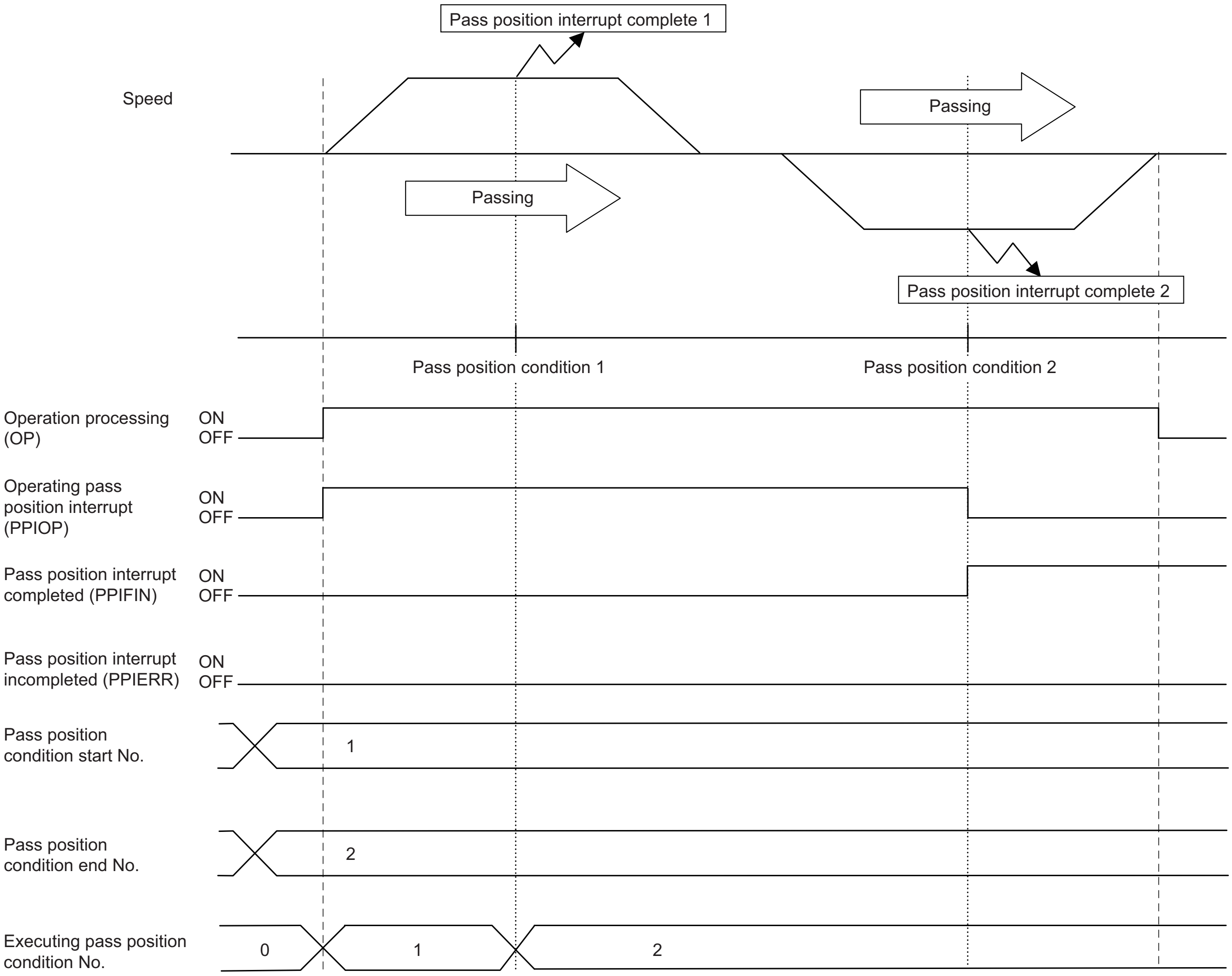
Address (hexadecimal)		Bit	Symbol[*1]	Signal name[*1]
MR-MC2_ _	MR-MC3_ _			
0FE0	0047E0	0	iPPIF□	Pass position interrupt complete □ (interrupt)
		1	iPPIE□	Pass position interrupt incomplete □ (interrupt)
		2	—	For manufacturer setting
		3		
		4		
		5		
		6		
		7		

*1 □: Pass position condition No. (1 to 64 [MC200]/1 to 128 [MC300])

Operation example

When the pass position interrupt is complete

The operating pass position interrupt signal (PPIOP) turns ON between the operation start and the completion of all pass position interrupt outputs. When the pass position condition is satisfied, the factor of interrupt of "pass position interrupt complete □" (□ : pass position condition No.) turns ON and the interrupts are output. The operating pass position interrupt signal (PPIOP) turns OFF and the pass position interrupt completed signal (PPIFIN) turns ON when all of pass position interrupts are output.

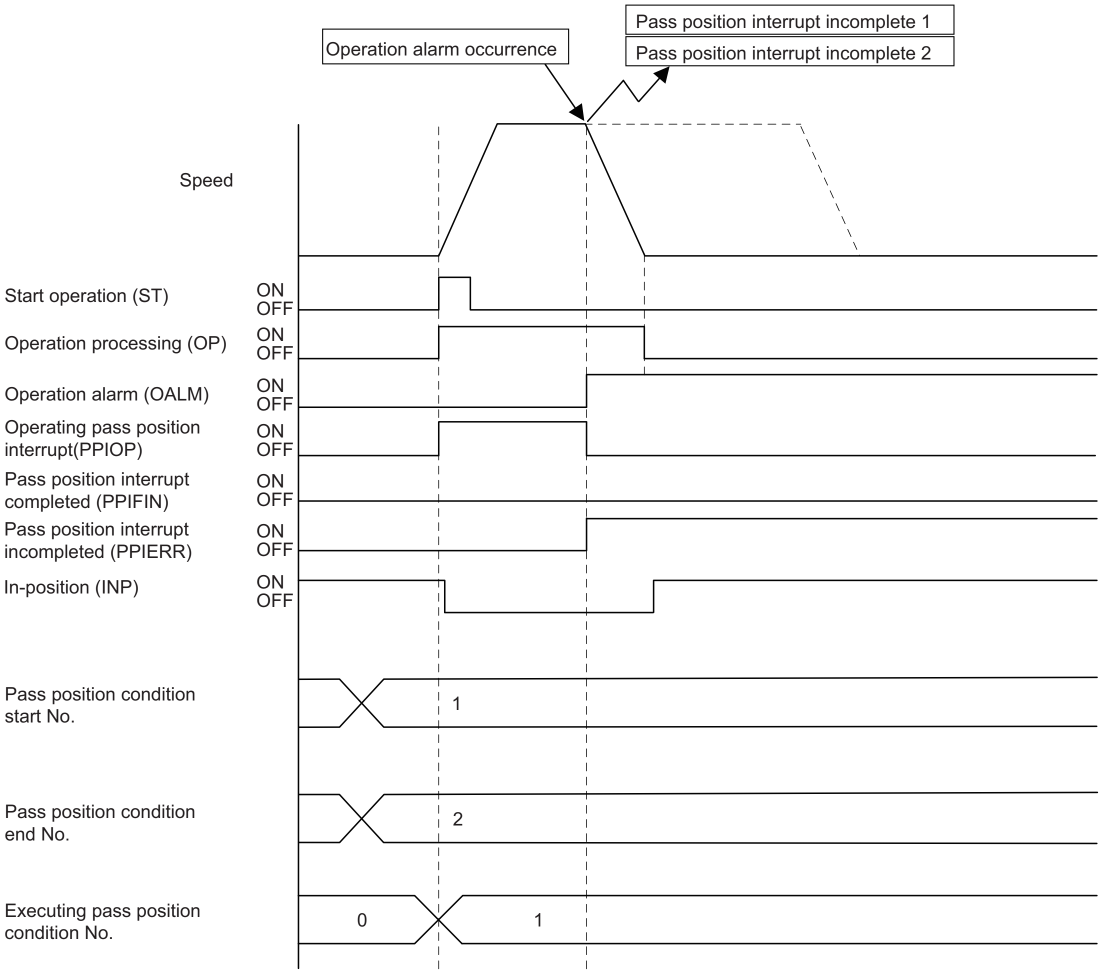


When the pass position interrupt fails

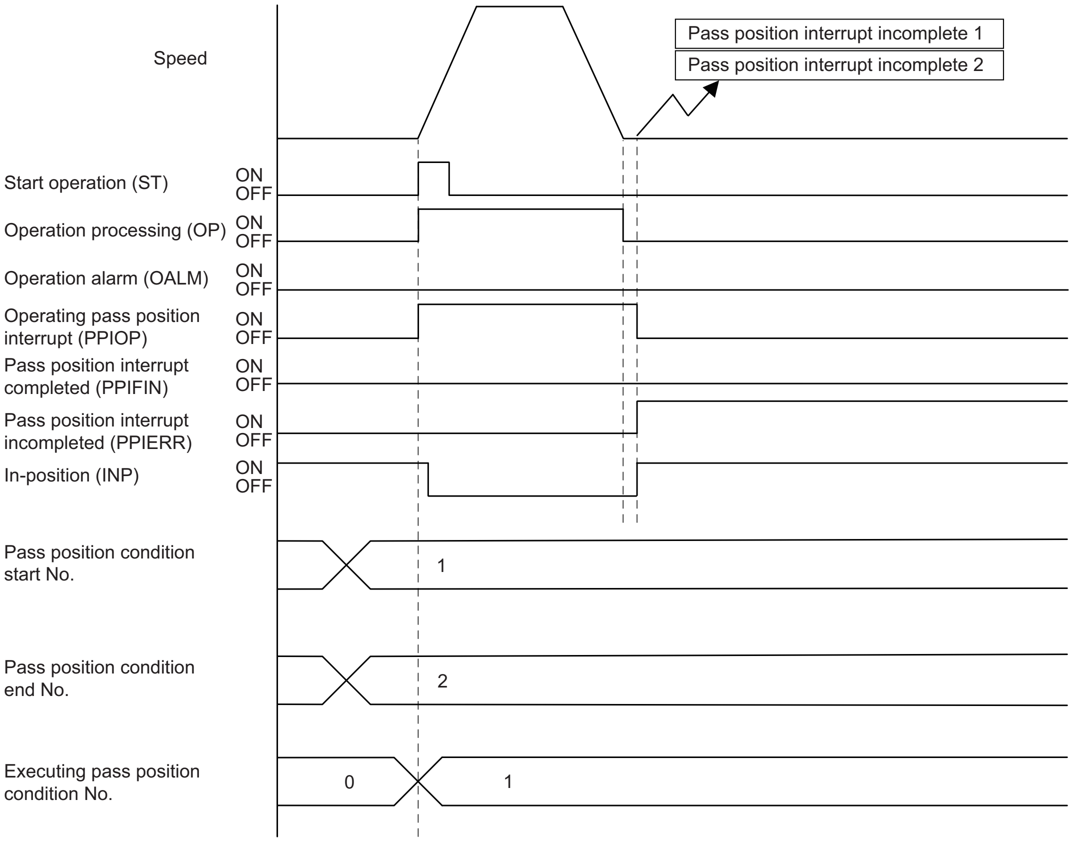
When the operation is canceled due to an operation alarm preceding the satisfaction of the pass position condition, the pass position interrupt incompleted signal (PPIERR) turns ON. The pass position interrupt incompleted signal (PPIERR) turns ON under the following conditions. At this time, the factor of the interrupt of "pass position interrupt error condition □" (□ : pass position condition No.) turns ON to the running and unexecuted pass position interrupt conditions and the interrupt is output.

- The setting of the pass position condition is incorrect.
- The operation is canceled by turning ON the stop operation signal (STP) or the rapid stop signal (RSTP) before the pass position condition is satisfied.
- The operation is canceled by an operation alarm, etc. before the pass position condition is satisfied.
- The operation is completed and the in-position signal (INP) is turned ON before the pass position condition is] satisfied.

■Example of when an operation alarm occurs



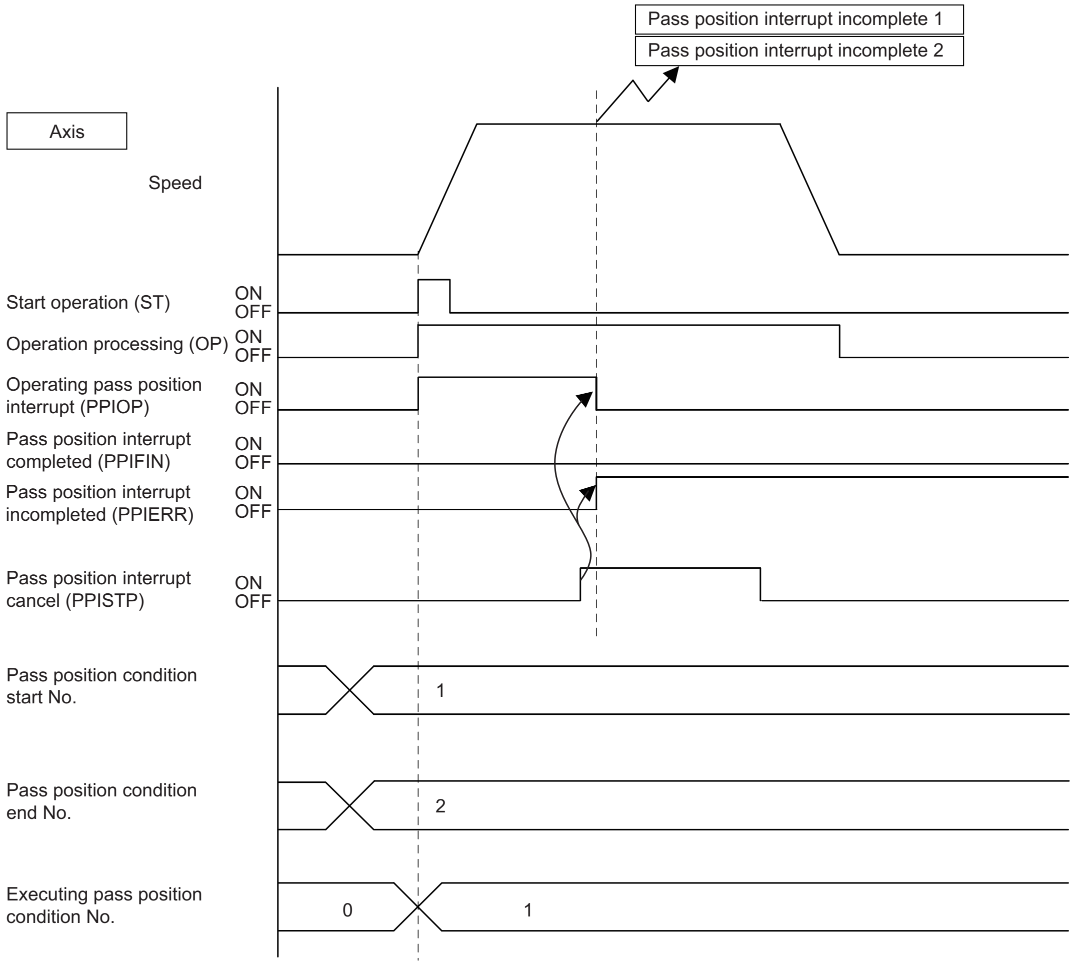
■Example of when operation is completed



When the pass position interrupt is canceled

When the pass position interrupt cancel signal (PPISTP) is turned ON preceding the satisfaction of the pass position condition, the pass position interrupt incompleted signal (PPIERR) turns ON. At this time, the factor of the interrupt of "pass position interrupt error condition □" (□ : pass position condition No.) turns ON to the running and unexecuted pass position interrupt conditions and the interrupt is output.

■Example of when the pass position interrupt is canceled

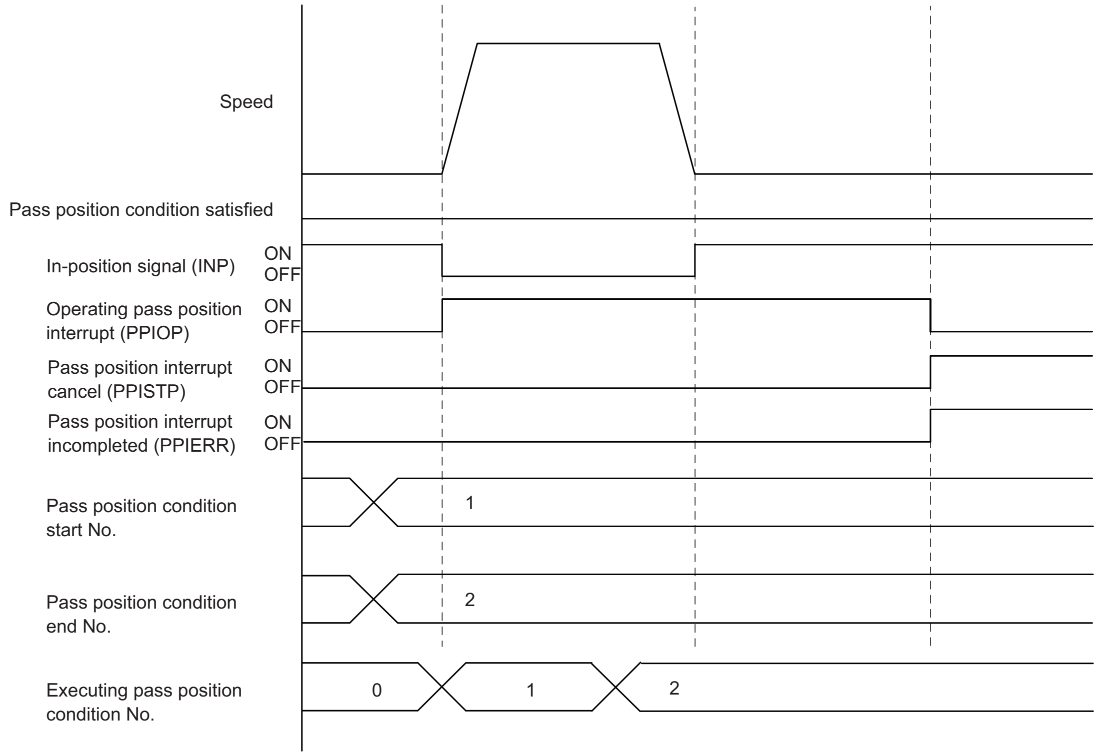


Point

When the operation is started with the pass position specification setting invalid in the auxiliary command of the point table while the pass position interrupt cancel signal (PPISTP) is ON, "Pass Position Interrupt Error (operation alarm 5CH, detail 07H)" occurs and the start operation is canceled. At this time, the pass position interrupt incompleted signal (PPIERR) turns ON.

When "1: No cancel" is set to the cancel condition of the pass position option

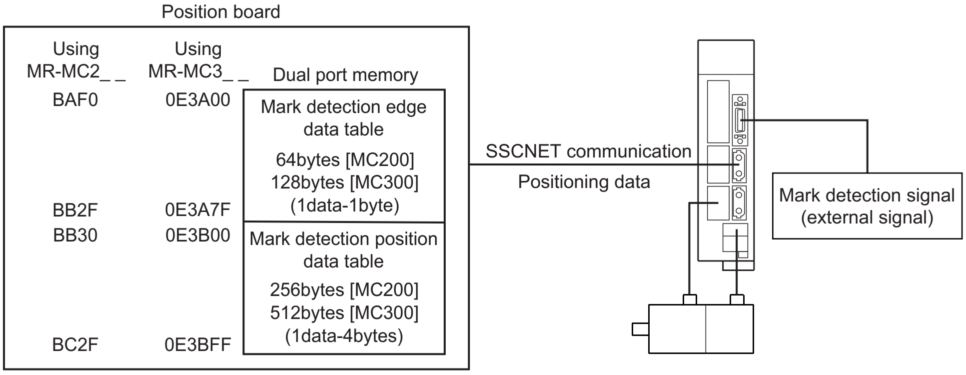
The operating pass position interrupt signal (PPIOP) turns ON between the operation start and the completion of all pass position interrupt outputs. If "1: No cancel" is set to the cancel condition of the pass position option, the pass position interrupt is continued until the completion of the pass position interrupt outputs, the pass position interrupt cancel signal (PPISTP) turns ON, or the operation is started again.



6

6.31 Mark Detection

Mark detection is a function that gets the positioning data at the timing of when a mark detection signal is input to the servo amplifier, and outputs to the dual port memory. This function is compatible with SSCNETⅢ/H communication method only.



Three methods for mark detection modes can be selected.

- Continuous detection mode
- Specified number of detection mode
- Ring buffer mode

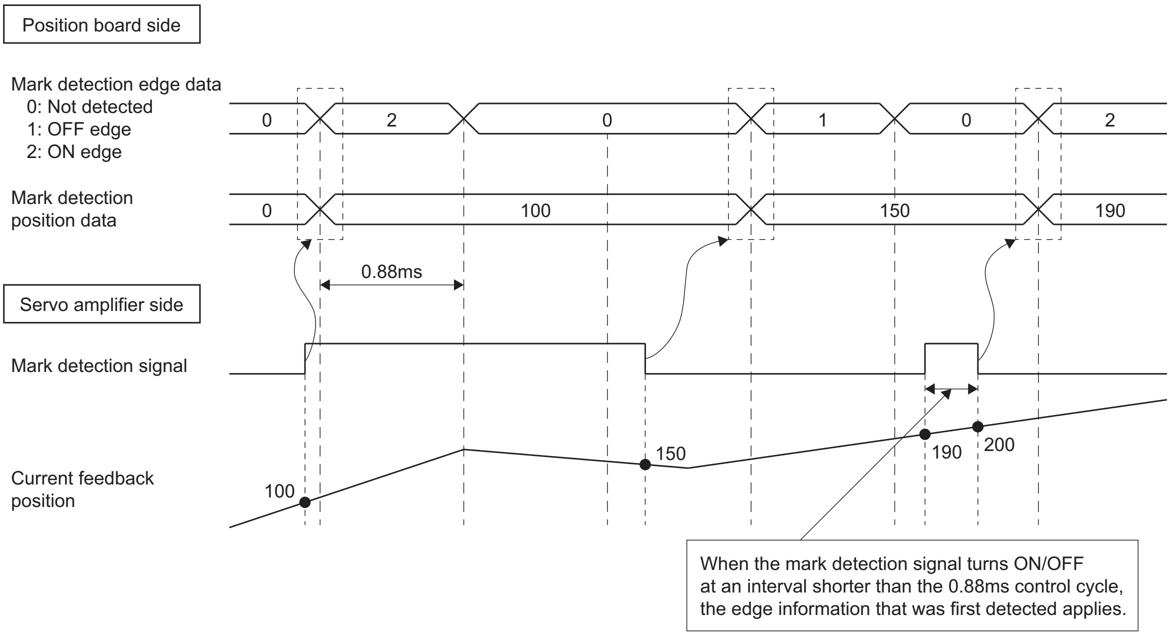
Additionally, the range of the mark detection positioning data can be specified, so only data within the specified range is latched.

When "Interrupt conditions 2 (parameter No.0205)" is enabled and mark detection signal is detected, an interrupt can be generated. However, when not using the interrupt, or in interface mode, the mark detection counter must be monitored at all times.

Item	Performance specifications
Number of mark detection settings	Up to 2 settings for each axis
Input signal	External input signal (within DI1 to DI3, 2 points) of each servo amplifier
Input signal detection direction	Leading edge/trailing edge detection in logic setting (ON edge detection setting, OFF edge detection setting) of external input signal can be selected
Detection accuracy	55μs (input signal filter (0 to 444μs) can be selected in parameter setting)
Detection delay time	0.3ms or less + filter setting value (0 to 0.444ms)*1
Input signal minimum width	0.88ms (make ON/OFF width 0.88ms or more)
Latch data	2 types (current feedback position [command units], current feedback position [pulse])
Number of continuous latch data storages	Up to 64 (the whole system) [MC200]/up to 128 (the whole system) [MC300]
Latch data range	Within the range of -2147483648 to 2147483647 can be specified

*1 Sensor delay time is not included

The following shows the update timing of mark detection positioning data and mark detection edge data when a mark detection signal is detected and both ON/OFF edges are enabled in the mark detection data settings.



Use a software version that supports mark detection for the servo amplifier. Mark detection is compatible with SSCNETⅢ/H communication method only. Servo amplifier software versions that support mark detection are shown in the table below.

Servo amplifier model	Software version
MR-J4-_B_(-RJ)	B4 or later
MR-J4W2-_B	Not supported
MR-J4W3-_B	
MR-J5(W_)-_B[*1]	

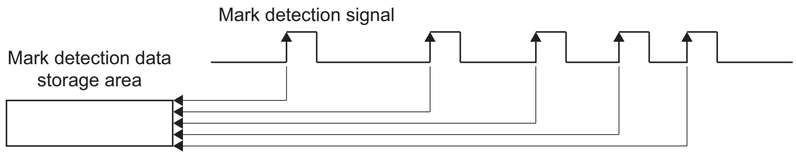
*1 Only be used in MR-MC3_ _

Point

- For communication methods other than SSCNETⅢ/H, "Mark Detection Setting Error (operation alarm 3BH, detail 01H)" occurs.
- When a servo amplifier that does not support mark detection is used, "Mark Detection Setting Error (operation alarm 3BH, detail 02H)" occurs.
- Confirm that the user program does not omit any detections to avoid cases where mark detection signals are not properly detected, and communication errors occurrences etc.
- In the following cases, depending on the specifications of the servo amplifier, the correct positioning data may not be got.
  · The ON/OFF width of mark detection signals is shorter than the control cycle of 0.88ms.
  · Servo alarm has occurred.
- When an input other than "1: Driver input" is set to "Sensor input system" of "Sensor input options (parameter No.0219)", and "Servo amplifier general input setting" is set to "1: Used" for "General I/O option (parameter No.0213)", the current status of mark detection signals can be confirmed with servo amplifier general input.
- When "1: Driver input" is set to "Sensor input system" of "Sensor input options (parameter No.0219)", the current status of mark detection signals can be confirmed with sensors (LSP/LSN/DOG).

Continuous detection mode

Mark detection data is stored in the mark detection data storage area (one buffer) for every mark detection.



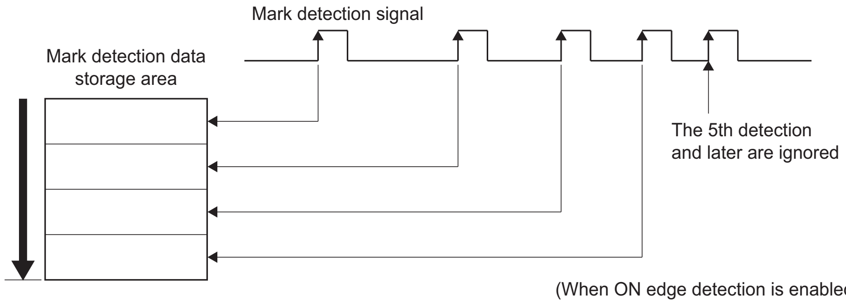
(When ON edge detection is enabled)

Specified number of detection mode

Only the mark detection data for a set number of detections is stored. When the mark detection signal is continuously input at a high frequency, positions for a set number of mark detections can be collected.

Ex.

When the number of detections is 4



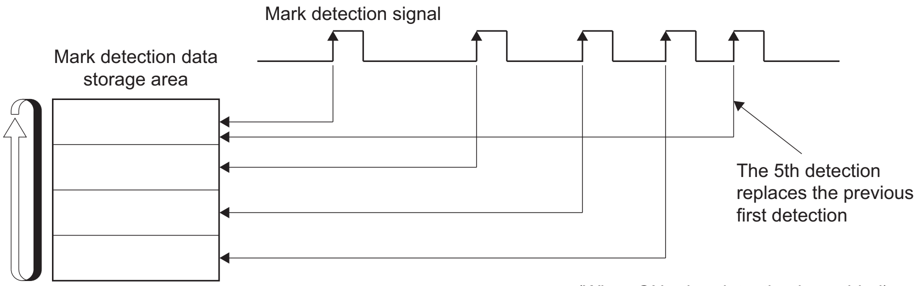
(When ON edge detection is enabled)

Ring buffer mode

Latched data is stored in a ring buffer for the specified number of detections (number of continuous latch data storages in parameter settings).

Ex.

When the number of detections is 4



(When ON edge detection is enabled)

Point

Because of the time taken to get latch data by SSCNET communication, the delay time for the data to reach the user program side is approximately 0.88ms + (control cycle × 2). (Approximately 2.7ms when control cycle is 0.88ms.)

Interface

Control parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
02B0	*MKOP1	Mark detection option 1	0000h	—	[MC200] 0000h to 3F23h [MC300] 0000h to 7F23h	■■■□ (Mark detection signal No. specification 1) Set the mark detection signal No. to be used. • 0: invalid • 1 to 3: Mark detection signal No. (DI1 to DI3) ■■□■ (Mark detection mode) Set the mark detection mode. • 0: Continuous detection • 1: Specified number of detection • 2: Ring buffer □□■■ (Number of continuous latch data storages)*2 Set the number of data that can be latched continuously. • 00h to 3Fh: Number of continuous latch data storages -1 [MC200] • 00h to 7Fh: Number of continuous latch data storages -1 [MC300]
02B1	MKDS1	Mark detection data setting 1	0000h	—	0000h to 0111h	■■■□ (ON edge detection setting) Set enable/disable for detection at ON edge. • 0: Disable • 1: Enable ■■□■ (OFF edge detection setting) Set enable/disable for detection at OFF edge. • 0: Disable • 1: Enable ■□■■ (Mark detection data type) Set the type of data to be stored as mark detection data. • 0: Current feedback position [command units] • 1: Current feedback position [pulse]
02B2	*MKOP2	Mark detection option 2	0000h	—	[MC200] 0000h to 3F23h [MC300] 0000h to 7F23h	Same as "Mark detection option 1 (parameter No.02B0)".
02B3	MKDS2	Mark detection data setting 2	0000h	—	0000h to 0111h	Same as "Mark detection data setting 1 (parameter No.02B1)".
02B4	MKNL1	Latch data range lower limit 1 (lower)	0000h	—	0000h to FFFFh	Specify the range (lower limit) of data to be latched at detection of the mark detection signal of "Mark detection signal No. specification 1" of "Mark detection option 1 (parameter No.02B0)".*3*4
02B5	MKNH1	Latch data range lower limit 1 (upper)	0000h	—	0000h to FFFFh	
02B6	MKXL1	Latch data range upper limit 1 (lower)	0000h	—	0000h to FFFFh	Specify the range (upper limit) of data to be latched at detection of the mark detection signal of "Mark detection signal No. specification 1" of "Mark detection option 1 (parameter No.02B0)".*3*4
02B7	MKXH1	Latch data range upper limit 1 (upper)	0000h	—	0000h to FFFFh	
02B8	MKNL2	Latch data range lower limit 2 (lower)	0000h	—	0000h to FFFFh	Same as "Latch data range lower limit 1 (parameter No.02B4, 02B5)".
02B9	MKNH2	Latch data range lower limit 2 (upper)	0000h	—	0000h to FFFFh	
02BA	MKXL2	Latch data range upper limit 2 (lower)	0000h	—	0000h to FFFFh	Same as "Latch data range upper limit 1 (parameter No.02B6, 02B7)".
02BB	MKXH2	Latch data range upper limit 2 (upper)	0000h	—	0000h to FFFFh	

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 The following number of continuous latch data storages can be set in the whole system.
Using MR-MC2_ _: 64
Using MR-MC3_ _: 128
*3 When changed while system is running, changes are enabled when a mark detection settings enable command is input.
*4 The set units are regarded as command units, or pulse units (the unit set in "Mark detection data type" of "Mark detection data setting 1 (parameter No.02B1)").

Point

[API library]
To set/get mark detection, use the sscChange2Parameter function/sscCheck2Parameter function.

Mark detection command/status data

■Mark detection command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)		Name	Setting range	Remarks	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
B4F0	0E2A00	Read complete buffer No.1	0 to 255	Set the mark detection data table No. that was read after reading the mark detection edge data and mark detection positioning data of mark detection 1.	Each axis
B4F1	0E2A01	Read complete buffer No.2	0 to 255	Same as read complete buffer No.1.	Each axis
B4F2	0E2A02	For manufacturer setting	—	—	—
⋮	⋮				
B4FF	0E2A0F				

■Mark detection status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)		Name	Setting range		Remarks	When in tandem drive
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _		
B500	0E2A10	Start data storage area 1	0 to 63	0 to 127	Store the start No. of latch data storage for the mark detection signal set in "Mark detection signal No. specification 1" of "Mark detection option 1 (parameter No.02B0)".	Each axis
B501	0E2A11	Number of continuous latch data storages 1	0 to 64	0 to 128	Store the number of continuous latch data storages set in "Mark detection signal No. specification 1" of "Mark detection option 1 (parameter No.02B0)". (Stores "0" for axes not using the mark detection function.)	Each axis
B502	0E2A12	Mark detection counter 1	Continuous detection mode: 0 to 255 Specified number of detection mode, Ring buffer mode: 0 to 64	Continuous detection mode: 0 to 255 Specified number of detection mode, Ring buffer mode: 0 to 128	Counter that is incremented when latch data for the mark detection signal set in "Mark detection signal No. specification 1" of "Mark detection option 1 (parameter No.02B0)" is stored. In continuous detection mode, the count starts again from 1 after the 255th count. In ring buffer mode, the count starts again from 1 after the number of continuous latch data storages has been reached. In specified number of detection mode, and ring buffer mode use the mark detection clear command □ signal (MKC□) to clear to 0.	Each axis
B503	0E2A13	Mark detection mode 1	0 to 2		Store the mark detection mode for mark detection set in "Mark detection signal No. specification 1" of "Mark detection option 1 (parameter No.02B0)". • 0: Continuous detection mode • 1: Specified number of detection mode • 2: Ring buffer mode	Each axis
B504	0E2A14	Start data storage area 2	0 to 63	0 to 127	Same as start data storage area 1.	Each axis
B505	0E2A15	Number of continuous latch data storages 2	0 to 64	0 to 128	Same as number of continuous latch data storages 1.	Each axis

Address (hexadecimal)		Name	Setting range		Remarks	When in tandem drive
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _		
B506	0E2A16	Mark detection counter 2	Continuous detection mode: 0 to 255 Specified number of detection mode, Ring buffer mode: 0 to 64	Continuous detection mode: 0 to 255 Specified number of detection mode, Ring buffer mode: 0 to 128	Same as mark detection counter 1.	Each axis
B507	0E2A17	Mark detection mode 2	0 to 2		Same as mark detection mode 1.	Each axis
B508	0E2A18	For manufacturer setting	—	—	—	—
⋮	⋮					
B50F	0E2A1F					

Mark detection data table

■Mark detection edge data table

- 0: Not detected
- 1: OFF edge
- 2: ON edge

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
BAF0	0E3A00	Mark detection edge data 0
BAF1	0E3A01	Mark detection edge data 1
BAF2	0E3A02	Mark detection edge data 2
BAF3	0E3A03	Mark detection edge data 3
BAF4	0E3A04	Mark detection edge data 4
BAF5	0E3A05	Mark detection edge data 5
BAF6	0E3A06	Mark detection edge data 6
BAF7	0E3A07	Mark detection edge data 7
BAF8	0E3A08	Mark detection edge data 8
BAF9	0E3A09	Mark detection edge data 9
BAFA	0E3A0A	Mark detection edge data 10
⋮	⋮	⋮
BB2F	0E3A3F	Mark detection edge data 63
—	0E3A40	Mark detection edge data 64
	⋮	⋮
	0E3A7F	Mark detection edge data 127

■Mark detection positioning data table

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
BB30	0E3B00	Mark detection positioning data 0
BB31	0E3B01	
BB32	0E3B02	
BB33	0E3B03	
BB34	0E3B04	Mark detection positioning data 1
BB35	0E3B05	
BB36	0E3B06	
BB37	0E3B07	
BB38	0E3B08	Mark detection positioning data 2
BB39	0E3B09	
BB3A	0E3B0A	
BB3B	0E3B0B	
BB3C	0E3B0C	Mark detection positioning data 3
BB3D	0E3B0D	
BB3E	0E3B0E	
BB3F	0E3B0F	
BB40	0E3B10	Mark detection positioning data 4
BB41	0E3B11	
BB42	0E3B12	
BB43	0E3B13	
BB44	0E3B14	Mark detection positioning data 5
BB45	0E3B15	
BB46	0E3B16	
BB47	0E3B17	
BB48	0E3B18	Mark detection positioning data 6
BB49	0E3B19	
BB4A	0E3B1A	
BB4B	0E3B1B	
BB4C	0E3B1C	Mark detection positioning data 7
BB4D	0E3B1D	
BB4E	0E3B1E	
BB4F	0E3B1F	
BB50	0E3B20	Mark detection positioning data 8
BB51	0E3B21	
BB52	0E3B22	
BB53	0E3B23	
BB54	0E3B24	Mark detection positioning data 9
BB55	0E3B25	
BB56	0E3B26	
BB57	0E3B27	
BB58	0E3B28	Mark detection positioning data 10
BB59	0E3B29	
BB5A	0E3B2A	
BB5B	0E3B2B	
BB5C	0E3B2C	⋮
⋮	⋮	
BC2B	0E3BFB	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
BC2C	0E3BFC	Mark detection positioning data 63
BC2D	0E3BFD	
BC2E	0E3BFE	
BC2F	0E3BFF	
—	0E3C00	Mark detection positioning data 64
	0E3C01	
	0E3C02	
	0E3C03	
	0E3C04	⋮
	⋮	
	0E3CFB	
	0E3CFC	Mark detection positioning data 127
	0E3CFD	
	0E3CFE	
	0E3CFF	

Point

- The mark detection data table allocates continuous latch data storage area automatically from the lowest axis to the highest axis.
- When the current feedback position set in mark detection data settings is specified in command units, the fraction that comes about when converting from pulse units is round down then stored.
- The lower 32bit of data are latched for data in pulse units that exceeds 32bit.

Point

[API library]
To get mark detection data (mark detection edge data □, mark detection positioning data □), use the sscGetMarkDetectionData function.

Axis command/status bit

■Axis command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100B	00500B	0	—	For manufacturer setting	—
		1	MKC1	Mark detection clear command 1	Each axis
		2	MKD1	Mark detection disable command 1	Each axis
		3	MKSEN1	Mark detection setting enable command 1	Each axis
		4	—	For manufacturer setting	—
		5	MKC2	Mark detection clear command 2	Each axis
		6	MKD2	Mark detection disable command 2	Each axis
		7	MKSEN2	Mark detection setting enable command 2	Each axis

- Details on axis command bit

Symbol	Signal name	Function details	
		Function	Operation
MKC□	Mark detection clear command □	Clears the mark detection positioning data table, mark detection edge data table, and mark detection counter.	When the mark detection clear command □ signal (MKC□) is turned ON, the following data is cleared. • Mark detection positioning data table • Mark detection edge data table • Mark detection counter
MKD□	Mark detection disable command □	Disables data latch at the time of mark detection.	When the mark detection disable command □ signal (MKD□) is turned ON, data is not latched regardless of the latch data range settings.
MKSEN□	Mark detection setting enable command □	Reflects the settings for mark detection.	Reflect the following settings. • Mark detection edge settings • Mark detection data type • Latch data range

Point

In case of receiving the mark detection data while the mark detection clear command □ signal (MKC□) is ON, the mark detection data is discarded.

■Axis status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106B	0050AB	0	MKIF1	Mark detection compatible information 1	Each axis
		1	MKCF1	Mark detection clear complete 1	Each axis
		2	MKDO1	Mark detection disabled 1	Each axis
		3	MKSEF1	Mark detection setting enable complete 1	Each axis
		4	MKIF2	Mark detection compatible information 2	Each axis
		5	MKCF2	Mark detection clear complete 2	Each axis
		6	MKDO2	Mark detection disabled 2	Each axis
		7	MKSEF2	Mark detection setting enable complete 2	Each axis

- Details on axis status bit

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
MKIF☐	Mark detection compatible information ☐	Notifies that mark detection function can be used.	The following conditions are satisfied. • Servo amplifier supports mark detection function. • Mark detections settings are enabled.	One of the following conditions is satisfied. • Servo amplifier does not support mark detection function. • Mark detections settings are disabled. • Mark detection compatible axis is disconnected.
MKCF☐	Mark detection clear complete ☐	Notifies that clearing of mark detection information was completed.	Clearing of mark detection information is complete.	The mark detection clear command ☐ signal (MKC☐) was turned OFF.
MKDO☐	Mark detection disabled ☐	Notifies that data latch at the time of mark detection is disabled.	The mark detection disable command ☐ signal (MKD☐) was turned ON.	The mark detection disable command ☐ signal (MKD☐) was turned OFF.
MKSEF☐	Mark detection setting enable complete ☐	Notifies that the mark detection settings have been applied.	The mark detection setting enable command ☐ signal (MKSEN☐) was turned ON.	The mark detection setting enable command ☐ signal (MKSEN☐) was turned OFF.

Point

[API library]
- To clear mark detection data, use the sscClearMarkDetectionData function.
- To turn ON/OFF the following axis command bits, set the command bit No. of the sscSetCommandBitSignalEx function to the following.
  · Mark detection disable command ☐ signal (MKD☐): SSC_CMDBIT_AX_MKD☐
  · Mark detection setting enable command ☐ signal (MKSEN☐): SSC_CMDBIT_AX_MKSEN☐
- To confirm if the following axis status bits are ON/OFF, set the following to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.
  · Mark detection compatible information ☐ signal (MKIF☐): SSC_STSBIT_AX_MKIF☐
  · Mark detection disabled ☐ signal (MKDO☐): SSC_STSBIT_AX_MKDO☐
  · Mark detection setting enable complete ☐ signal (MKSEF☐): SSC_STSBIT_AX_MKSEF☐

Function details

Combinations with sensor input method

By setting "Sensor input system" of "Sensor input options (parameter No.0219)" to "1: Driver input", and setting the mark detection signal No. (DI1 to DI3), sensors (LSP/LSN/DOG) can be used in combination with the mark detection function.

Ex.

When sensor input method is set to "1: Driver input" and "Mark detection signal No. specification 1" of "Mark detection option 1 (parameter No.02B0)" is set to DI3

Name	Signal allocation
DI1	LSP
DI2	LSN
DI3	DOG (mark detection 1)

Ex.

When sensor input method is set to a setting other than "1: Driver input" and "Mark detection signal No. specification 2" of "Mark detection option 2 (parameter No.02B2)" is set to DI1

Name	Signal allocation
DI1	General input 1 (mark detection 2)
DI2	General input 2
DI3	General input 2

Continuous latch data storage allocation

The mark detection data table (the table where the current feedback position data at the input of the mark detection signal is stored) used by each axis allocates according to "Number of continuous latch data storages" of "Mark detection option 1 (parameter No.02B0, 02B2)" automatically from the lowest axis to the highest axis.

Ex.

The following is an example for when continuous latch data storages is 4 points for axis 1, 1 point for axis 2, and 2 points for axis 3.

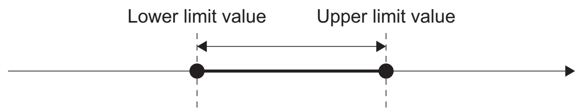
Mark detection data table	Allocation
Mark detection data table 0	Axis 1
Mark detection data table 1	
Mark detection data table 2	
Mark detection data table 3	
Mark detection data table 4	Axis 2
Mark detection data table 5	Axis 3
Mark detection data table 6	
⋮	⋮

Latch data range

When data at mark detection is within the latch data range, the data is stored in the mark detection storage device and the mark detection counter increases by one. When the data is outside of the range the mark detection is not processed. The following explains the upper limit value and lower limit value.

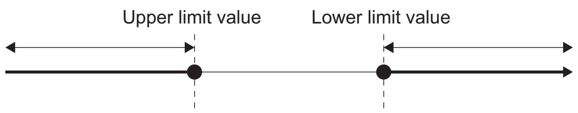
■Upper limit value > lower limit value

When the mark detection data is more than the lower limit value and also less than or equal to the upper limit value, the mark detection is processed.



■Upper limit value < lower limit value

When the mark detection data is less than the upper limit value or more than the lower limit value, the mark detection is processed.



■Upper limit value = lower limit value

The range of the mark detection data is not checked. Mark detection is processed for all ranges.

Mark detection clear command

When a mark detection clear command is input the mark detection counter becomes 0, and mark detection edge data and mark detection positioning data is cleared.

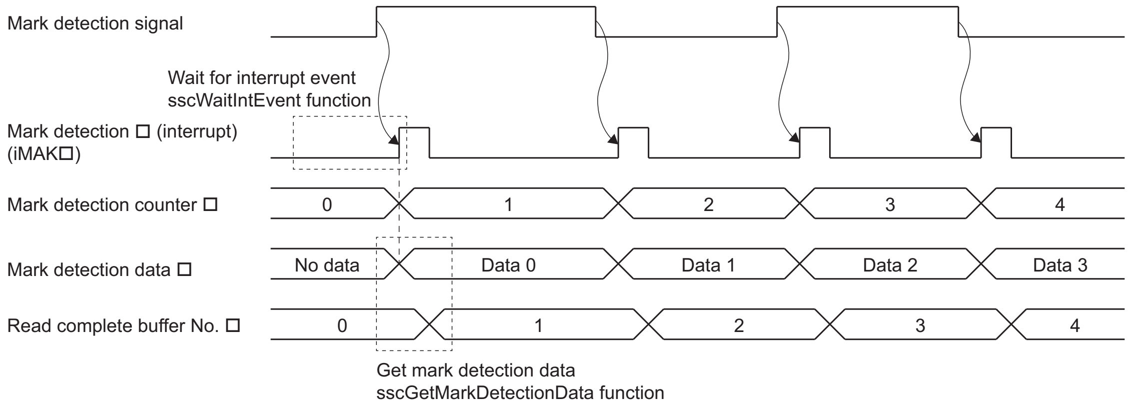
Operation example

Continuous detection mode

The mark detection counter is incremented at mark detection. After mark detection, read the mark detection data and update the read complete buffer No. When mark detection data is not read before the next mark detection, "Mark Detection Write/ Read Error (operation alarm A6H, detail 01H)" occurs, followed by a rapid stop.

Ex.

When both ON/OFF edges are enabled.



Point

Mark detection interrupt cannot be used for interface mode. The mark detection counter can be continuously monitored by polling.

Point

[API library]

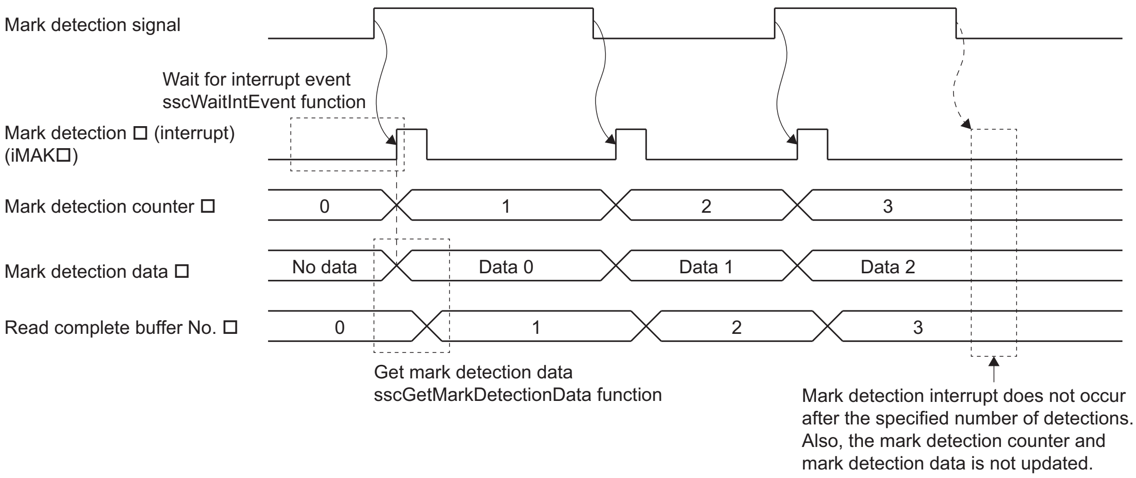
- To get mark detection data, use the sscGetMarkDetectionData function.
- The read No. setting for the read complete buffer No. is conducted within the sscGetMarkDetectionData function therefore user program processing is not required.
- To get the mark detection counter, use the sscGetMarkDetectionCounter function.
- When using mark detection interrupt, use the sscWaitIntEvent function and wait until interrupt is output. If not using mark detection interrupt, use polling. When using polling, use the sscGetMarkDetectionCounter function to periodically confirm that the mark detection counter is updated.

Specified number of detection mode

The mark detection counter is incremented at mark detection. After mark detection, read the mark detection data and update the read complete buffer No. If performing mark detection again after the specified number of mark detections, conduct a mark detection clear. The mark detection data that is detected after the mark detection clear is latched.

Ex.

When both ON/OFF edges are enabled and specified number of mark detections is three.



Point

Data for mark detections after the specified number of detections is not latched.

Point

[API library]

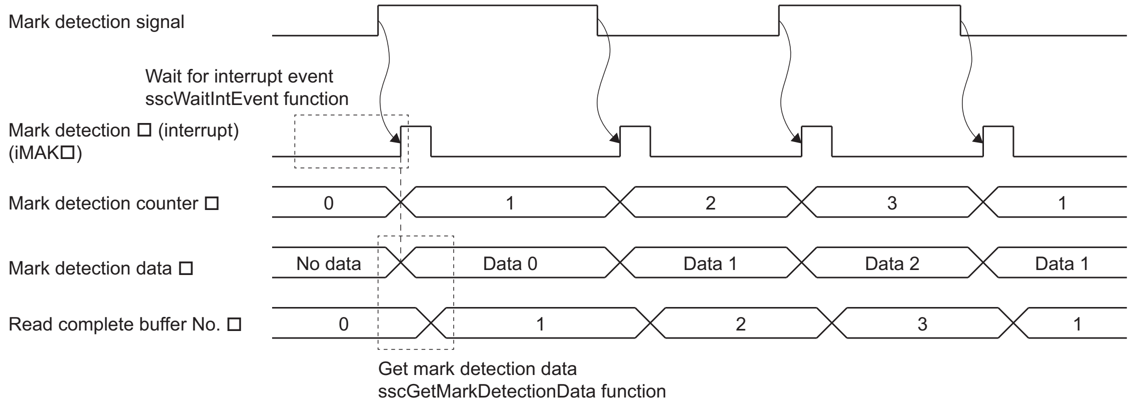
- To get mark detection data, use the sscGetMarkDetectionDat function.
- The read No. setting for the read complete buffer No. is conducted within the sscGetMarkDetectionData function therefore user program processing is not required.
- To get the mark detection counter, use the sscGetMarkDetectionCounter function.
- When using mark detection interrupt, use the sscWaitIntEvent function and wait until interrupt is output. If not using mark detection interrupt, use polling. When using polling, use the sscGetMarkDetectionCounter function to periodically confirm that the mark detection counter is updated.

Ring buffer mode

When using ring buffer mode, the mark detection count is started again from 1 if the number of mark detections exceeds the number of continuous latch data storages. When mark detection data is not read before the next mark detection, "Mark Detection Write/Read Error (operation alarm A6H, detail 01H)" occurs with a rapid stop.

Ex.

When both ON/OFF edges are enabled.



Point

[API library]

- To get mark detection data, use the sscGetMarkDetectionData function.
- The read No. setting for the read complete buffer No. is conducted within the sscGetMarkDetectionData function therefore user program processing is not required.
- To get the mark detection counter, use the sscGetMarkDetectionCounter function.
- When using mark detection interrupt, use the sscWaitIntEvent function and wait until interrupt is output. If not using mark detection interrupt, use the sscGetMarkDetectionCounter function to periodically confirm that the mark detection counter is updated.

6.32 Continuous Operation to Torque Control

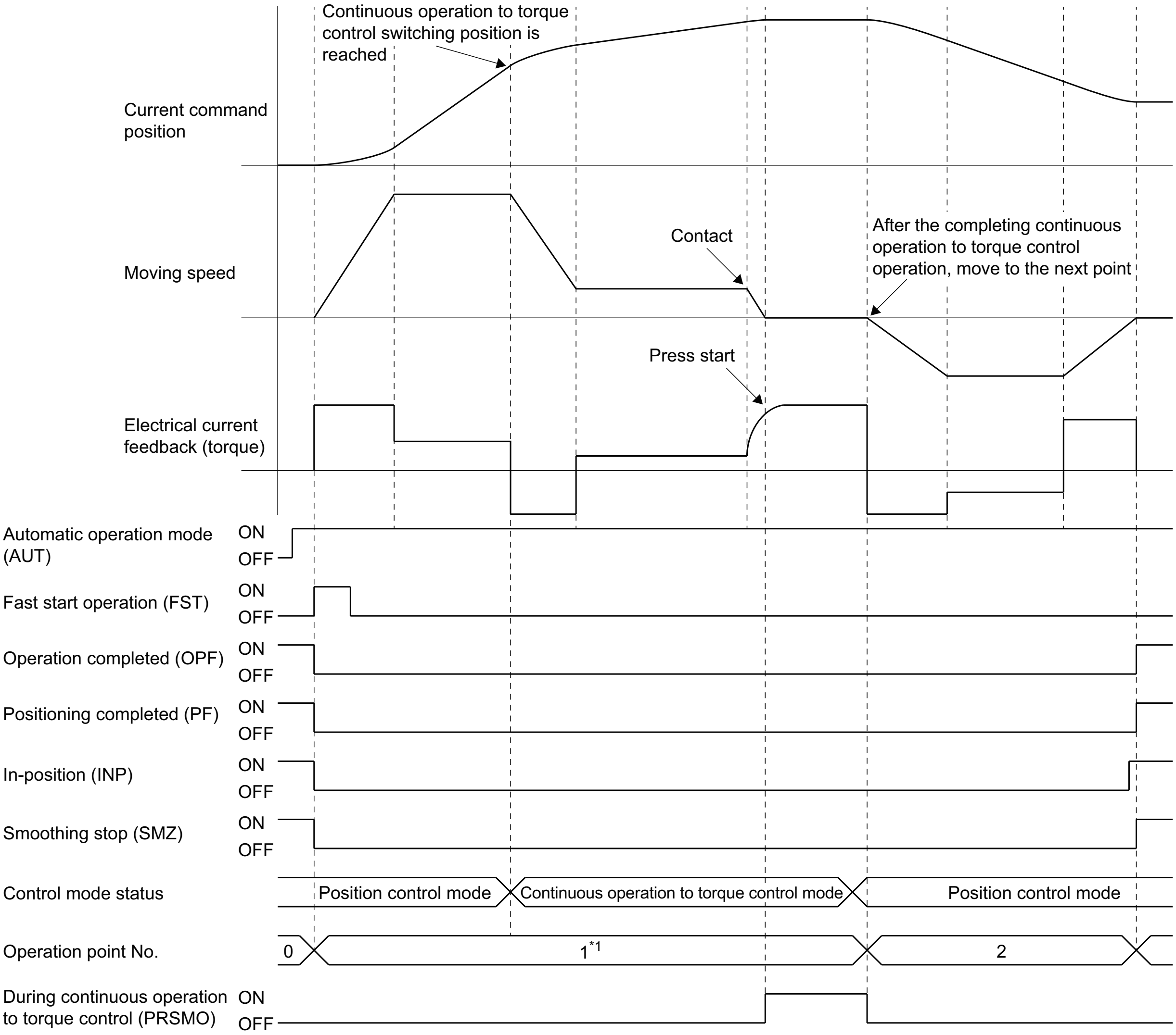
Continuous operation to torque control is a control method that achieves torque control during positioning control without stopping.
To perform continuous operation to torque control, the servo amplifier control mode must be switched to "continuous operation to torque control mode". By setting "continuous operation to torque control valid" to auxiliary command in the point table, torque control is performed from the position (command position or current feedback position) set in the switch conditions without stopping operation. Continuous operation to torque control is completed based on the continuous operation to torque control data, then returned to position control.
Also, when the continuous operation to torque control operating conditions "Start switch to continuous operation to torque control condition" is set to "2: Manual switch", a switch to continuous operation to torque control can be made at any given time.
The continuous operation to torque control data becomes valid at the start of operation for the points set to continuous operation to torque control valid (hereinafter referred to as continuous operation to torque control points).

Point

Continuous operation to torque control data that is changed during the operation of a continuous operation to torque control point becomes valid at the operation of the next continuous operation to torque control point.

Operation example

Two-point operation (deceleration check system: In-position stop) including continuous operation to torque control point.



*1 Returning to position control mode after the completion of continuous operation to torque control operation is part of the continuous operation to torque control point, and is performed as a one-point operation.

Use a software version that supports continuous operation to torque control mode for the servo amplifier. Servo amplifier software versions that support continuous operation to torque control mode are shown in the table below.

Servo amplifier model	Software version
MR-J3-_B	C7 or later
MR-J3-_BS	
MR-J3W-_B	Not supported
MR-J4(W_)-_B	A0 or later
MR-J5(W_)-_B*1	C4 or later

*1 Only be used in MR-MC3_ _

Point

When continuous operation to torque control specification is set to valid and automatic operation is started for a servo amplifier that is not supported, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 06H)" occurs, and operation does not start.

Point

[API library]
For a detailed procedure for the continuous operation to torque control, refer to the sample program (InterruptPressDrive) contained on the utility software.

Interface

Set the following data when using continuous operation to torque control.

Servo parameter

■MR-J4(W_)-_B

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
110D	*POL	Rotation direction selection/ travel direction selection	0	—	0 to 1	Select the rotation direction or travel direction for the command input pulse.
1142	TFBGN	Torque feedback loop gain	18000	rad/s	0 to 18000	Set the torque feedback gain for continuous operation to torque control. By setting a smaller value, the contact load at continuous operation to torque control can be reduced. When setting a value 6 [rad/s] or less, a setting value of 6 [rad/s] is set.

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

■MR-J5(W_)-_B [MC300]

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
200D	*POL	Travel direction selection	0	—	0 to 1	Select the rotation direction or travel direction for the command input pulse.
2032	TFBGN	Torque feedback loop gain	36000	rad/s	0 to 36000	Set the torque feedback gain for continuous operation to torque control. By setting a smaller value, the contact load at continuous operation to torque control can be reduced. When setting a value 6 [rad/s] or less, a setting value of 6 [rad/s] is set.
2187	TOF	Unbalanced torque offset	0	0.01%	-10000 to 10000	Set this to cancel the unbalanced torque of a vertical axis. Set this in relation to the rated torque of the servo motor as 100 %. The torque offset does not need to be set for a machine on which an unbalanced torque is not generated.

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

■Control parameter

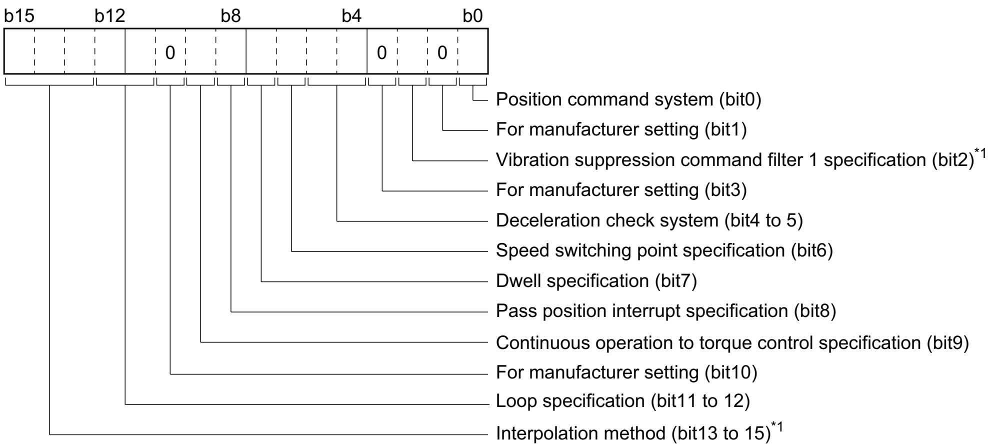
Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0205	ITM2	Interrupt condition 2	0000h	—	0000h to FFFFh	Set interrupt condition 2.
0222	SPLL	Speed limit value (lower)	0BB8h	Speed units	0000h to FFFFh	Set the value for the moving speed limit.
0223	SPLH	Speed limit value (upper)	0000h		0000h to 7FFFh	

Point

[API library]
• To set/get parameters, use the sscChange2Parameter function/sscCheck2Parameter function.
• For MR-J5(W_)-_B, to set/get parameters, use the sscChange2ParamterEx function/ sscCheck2ParamterEx function.

Point table

To use the continuous operation to torque control, set the continuous operation to torque control specification (bit9) to "1: Continuous operation to torque control valid" in the auxiliary command of the point table.



*1 When using MR-MC2_ _, it is "For manufacturer setting".

Bit	Name	Description
0	Position command method	• 0: Absolute position command • 1: Relative position command
4 to 5	Deceleration check system	Operation is complete at the completion of continuous operation to torque control. "2: Continuous operation" is invalid.
6	Speed switching point specification	Speed switching point specification is invalid.
7	Dwell specification	• 0: Dwell (Specify the time for after switching to position control mode) • 1: Predwell (point movement starts when the time specified by predwell has passed.)
8	Pass position interrupt specification	• 0: Pass position interrupt invalid • 1: Pass position interrupt valid
9	Continuous operation to torque control specification	• 0: Continuous operation to torque control invalid • 1: Continuous operation to torque control valid

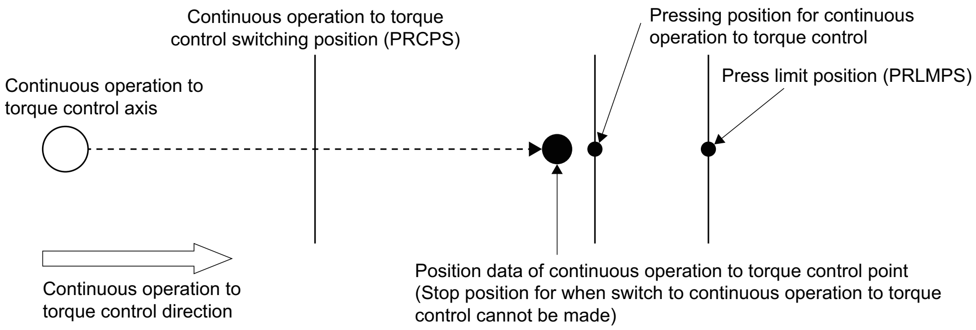
Point

[API library]
To set/get point data, use the sscSetPointDataEx function/sscCheckPointDataEx function.

Point

- Position data is the stopping position when switching to continuous operation to torque control could not be made. Set the position data after the continuous operation to torque control switching position (PRCPS) and before the pressing position in continuous operation to torque control.
- When switching to continuous operation to torque control could not be made, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 02H)" occurs at the completion of position control.
  It is determined that switching to continuous operation to torque control could not be made under the following conditions.
  · When position data is before the continuous operation to torque control switching position.
  · When switching is not performed when manual switch is selected.
- When the control mode switch command signal (CTLMC) turns ON during the time specified by predwell, the control mode switch error signal (CTLMCE) turns ON, and control mode cannot be switched.
- For MR-J5(W_)-_B, the servo motor outputs the torque calculated by adding up the values specified by the command torque and "Unbalanced torque offset (parameter No.2187)". [MC300]

■Setting image



Continuous operation to torque control data

Set the conditions for performing continuous operation to torque control in the continuous operation to torque control data.

■Continuous operation to torque control data

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

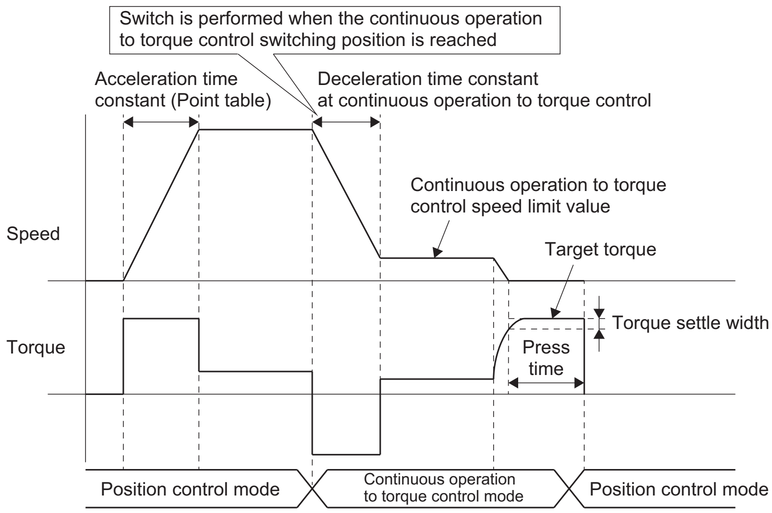
Address (hexadecimal)		Symbol	Name	Unit	Setting range	Description	At manual switch selection
MR-MC2_ _	MR-MC3_ _						
A840	0E1800	PRCPS	Continuous operation to torque control switching position (4bytes)	Command units	-2147483648 to 2147483647	Set the position for switching to continuous operation to torque control. The position command system depends on the setting of the auxiliary command of the point table.	Invalid
A844	0E1804	PRLMPS	Press limit position (4bytes)	Command units	-2147483648 to 2147483647	Set the limit position for which continuous operation to torque control can operate. It is determined by the feedback position. The position command system depends on the setting of the auxiliary command of the point table.	Valid
A848	0E1808	PRCTSP	Continuous operation to torque control speed limit value (4bytes)	Speed Unit	1 to 2147483647	Set the speed limit value during continuous operation to torque control.	Valid
A84C	0E180C	PRTGTR	Target torque (2bytes)	0.1%	0 to 32767	Set the target torque during continuous operation to torque control.	Valid
A84E	0E180E	PRTM	Press time (2bytes)	ms	0 to 65535	Set the press time during continuous operation to torque control.	Invalid
A850	0E1810	PRTRW	Torque settle width (2bytes)	0.1%	0 to 65535	Set the range (difference from the target torque) at which it is regarded that the target torque has been reached during continuous operation to torque control.	Valid
A852	0E1812	PRWTM	Torque settle waiting time (2bytes)	ms	0 to 65535	Set the time where it is determined that press is occurring (from when entering the torque settle width until the during continuous operation to torque control signal (PRSMO) is output.)	Valid
A854	0E1814	PRCA	Continuous operation to torque control acceleration time constant (2bytes)	ms	0 to 20000	Set the acceleration time constant for during continuous operation to torque control.	Valid
A856	0E1816	PRCD	Continuous operation to torque control deceleration time constant (2bytes)	ms	0 to 20000	Set the deceleration time constant for during continuous operation to torque control.	Valid

Address (hexadecimal) MR-MC2_ _	Address (hexadecimal) MR-MC3_ _	Symbol	Name	Unit	Setting range	Description	At manual switch selection
A858	0E1818	PRCOP	Continuous operation to torque control operating conditions (2bytes)	—	0000h to 0012h	■■■□ (Start switch to continuous operation to torque control condition) Set the condition for determining the continuous operation to torque control switching position. • 0: Automatic switch (command position) • 1: Automatic switch (current feedback position) • 2: Manual switch ■■□■ (End switch to continuous operation to torque control condition) Set the condition for determining the control mode switch from continuous operation to torque control. • 0: Automatic switch • 1: Manual switch	Valid
A85A to A85F	0E181A to 0E181F	—	For manufacturer setting	—	—	—	—

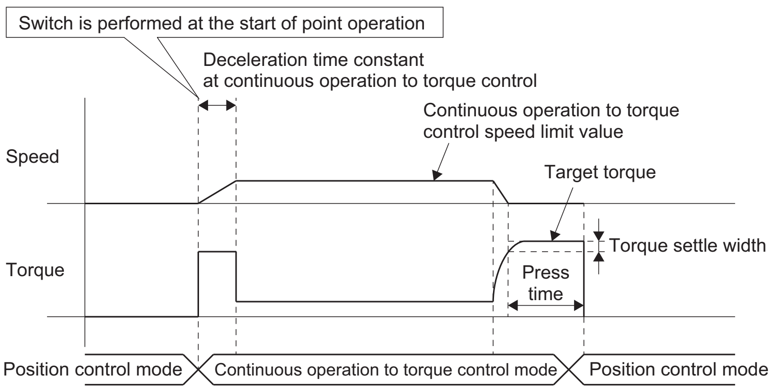
Point

[API library]
To set/get continuous operation to torque control data, use the sscSetPressData function/sscGetPressData function.

- When the continuous operation to torque control switching position has not been reached at the start of operation



- When the continuous operation to torque control switching position has been passed at the start of operation



Point

- The value for continuous operation to control data at the start of operation at the continuous operation to torque control point is valid.
- Continuous operation to torque control data that is changed during the operation of a continuous operation to torque control point becomes valid at the operation of the next continuous operation to torque control point.
- The press time is the time passed since torque within the torque settle width is continuously output during the torque settle waiting time. (The press time continues even if a value outside the torque settle width occurs part of the way through.)
- When a value outside of the range is set to continuous operation to torque control data and automatic operation is startup, "Continuous Operation to Torque Control Setting Error (operation alarm 5EH, detail 01H to 05H)" occurs, and the operation is not started.
- When a press limit position is set in the opposite direction of the position control travel direction, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 05H)" occurs, and the operation is not started.
- When a press limit position is set before the positioning data, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 08H)" occurs, and the operation is not started. (A press limit position is not reached during position control mode)
- The press limit position is determined by the current feedback position. When the press limit position is reached during continuous operation to torque control, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 03H)" occurs, and stops at the position where the press limit position was exceeded.
- When target torque is reached during acceleration, it is determined that press has started and the press time measurement begins.
- When the continuous operation to torque control switching position is in the opposite direction of the movement direction, the continuous operation to torque control switching position is judged to be passed.

System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0450	000BE0	0	ITO	Outputting factor of interrupt
		1	IITO	During interface mode interrupt invalid
		2	EVDO	Event detection enabled
		3	HRIF	Highly response I/F enabled
		4	BMA	During system program memory access
		5	PRINF	Continuous operation to torque control compatible information
		6	—	For manufacturer setting
		7	IFMO	In interface mode

- Details concerning system status bits

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
PRINF	Continuous operation to torque control compatible information	Notify that continuous operation to torque control is compatible.	Continuous operation to torque control is compatible.	Continuous operation to torque control is not compatible.

Point

[API library]
To confirm if the following system status bits are ON/OFF, set the following to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.
- Continuous operation to torque control compatible information signal (PRINF): SSC_STSBIT_SYS_PRINF

Axis command/status bit

The axis command/status bits for continuous operation to torque control are shown below.

■Axis command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.
- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1008	005008	0	GAIN	Gain switching command	Each axis
		1	FCLS	Fully closed loop control change command	Each axis
		2	—	For manufacturer setting	—
		3	CPC	PID control command	Each axis
		4	—	For manufacturer setting	—
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100C	00500C	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	CTLMC	Control mode switch command	Not supported
		5	—	For manufacturer setting	—
		6			
		7			

- Details on axis command bit

Symbol	Signal name	Function details	
		Function	Operation
CTLMC	Control mode switch command	Switch the control mode of the servo amplifier based on the control mode command.	When all of the following conditions are satisfied, the control mode is switched to the specified control mode. • "Continuous operation to torque control specification (bit9)" within the auxiliary command of the point in operation is set to "1: continuous operation to torque control valid". • "Start switch to continuous operation to torque control condition" is set to "2: Manual switch". • "Control mode command" is set to "0000h: Position control mode" or "0010h: Continuous operation to torque control mode (standard mode only)".

■Axis status bits

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1068	0050A8	0	GAINO	During gain switching	Each axis
		1	FCLSO	Fully closed loop control changing	Each axis
		2	TLSO	Selecting torque limit	Each axis
		3	SPC	During PID control	Each axis
		4	—	For manufacturer setting	—
		5			
		6			
		7	PRSMO	During continuous operation to torque control	Not supported

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106C	0050AC	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	CTLMCF	Control mode switch complete	Not supported
		5	CTLMCE	Control mode switch error	Not supported
		6	—	For manufacturer setting	—
		7			

• Details on axis status bit

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
PRSMO	During continuous operation to torque control	Notify that torque within the torque settle width of the target torque has been output during the torque settle waiting time of continuous operation to torque control.	Torque within the torque settle width of the target torque has been output during the torque settle waiting time of continuous operation to torque control.	Control mode was changed to position control mode.
CTLMCF	Control mode switch complete	Notify that switching of control mode of the servo amplifier was completed.	The switching of the control mode of the servo amplifier was completed normally. (Turns ON even when switching to a control mode the same as the current control mode)	The control mode switch command signal (CTLMC) was turned OFF.
CTLMCE	Control mode switch error	Notify that switching of control mode of the servo amplifier could not be performed.	When one of the following conditions below is satisfied and the control mode switch command is turned ON. • Switch command is input during automatic operation during an operation other than continuous operation to torque control points. • A mode other than position control mode and continuous operation to torque control mode, or a mode outside of the range is specified. • A control mode switch command set to other than manual switch was input during operation.	The control mode switch command signal (CTLMC) was turned OFF.

Point

[API library]

- To switch the control mode of the servo amplifier, use the sscChangeControlMode function.
- To confirm if the following axis status bits are ON/OFF, set the following to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.
  · During continuous operation to torque control signal (PRSMO): SSC_STSBIT_AX_PRSMO

Axis command/status data

The axis command/status data for continuous operation to torque control are shown below.

■Axis command data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range	Remarks	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1032	005042	Control mode command	→	Set the mode to switch to. • 0000h: Position control mode • 0001h: Speed control mode (interface mode only) • 0002h: Torque control mode (interface mode only) • 0010h: Continuous operation to torque control mode (standard mode only)	Not supported
1033	005043				

■Axis status data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Output range	Remarks	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1092	0050E2	Control mode status	→	The current control mode is shown below. ■□□□ • 000h: Position control mode • 001h: Speed control mode • 002h: Torque control mode • 010h: Continuous operation to torque control □■■■ • 0: Control mode switch normal • 8: Control mode switch error*1	Not supported
1093	0050E3				

*1 When the control mode switch error signal (CTLMCE) is ON, the status is control mode switch error.

Point

When a selection other than manual switch is selected for the continuous operation to torque control operating conditions, control mode switch is automatically performed by the position board.

Point

[API library]
To switch the control mode of the servo amplifier, use the sscChangeControlMode function.

Control mode switch

For control mode switch, there are the two following methods that can be selected for both "switching from position control mode to continuous operation to torque control mode" and "switching from continuous operation to torque control to position control mode"

- Automatic switch
- Manual switch

Control mode switch setting

The setting contents and setting values required for each switch pattern are shown in the following table.

Switch pattern	Switch method	Setting items	Setting values
Switching from position control mode to continuous operation to torque control mode	Automatic switch	Continuous operation to torque control switching position	Position to switch to continuous operation to torque control mode [command units]
		Start switch to continuous operation to torque control condition	0000h, 0001h: Automatic switch (position command) 0010h, 0011h: Automatic switch (current feedback position)
	Manual switch	Start switch to continuous operation to torque control condition	0002h, 0012h: Manual switch
Switching from continuous operation to torque control mode to position control mode	Automatic switch	End switch to continuous operation to torque control condition	0000h to 0002h: Automatic switch
	Manual switch	End switch to continuous operation to torque control condition	0010h to 0012h: Manual switch

Procedure for switching from position control mode to continuous operation to torque control mode

■Switch method: Automatic switch

1. The position board automatically switches the control mode thus processing by user program is not required.
   (The position board determines the continuous operation to torque control switching position, and automatically switches to continuous operation to torque control mode once the position is reached.)

■Switch method: Manual switch

1. Set the control mode command to "0010h: Continuous operation to torque control mode (standard mode only)".
2. Turn ON the control mode switch command signal (CTLMC). (Have the switch timing determined by user program)
3. After confirming the control mode switch complete signal (CTLMCF) is ON, turn OFF the control mode switch command signal (CTLMC).

Procedure for switching from continuous operation to torque control mode to position control mode

■Switch method: Automatic switch

1. The position board automatically switches the control mode thus processing by user program is not required.
   (Control mode is automatically returned to position control mode after the press time has passed since the starting of torque output within the torque settle width of the target torque.)

■Switch method: Manual switch

1. Set the control mode command to "0000h: Position control mode".
2. Turn ON the control mode switch command signal (CTLMC). (Have the switch timing determined by user program)
3. After confirming the control mode switch complete signal (CTLMCF) is ON, turn OFF the control mode switch command signal (CTLMC).

Point

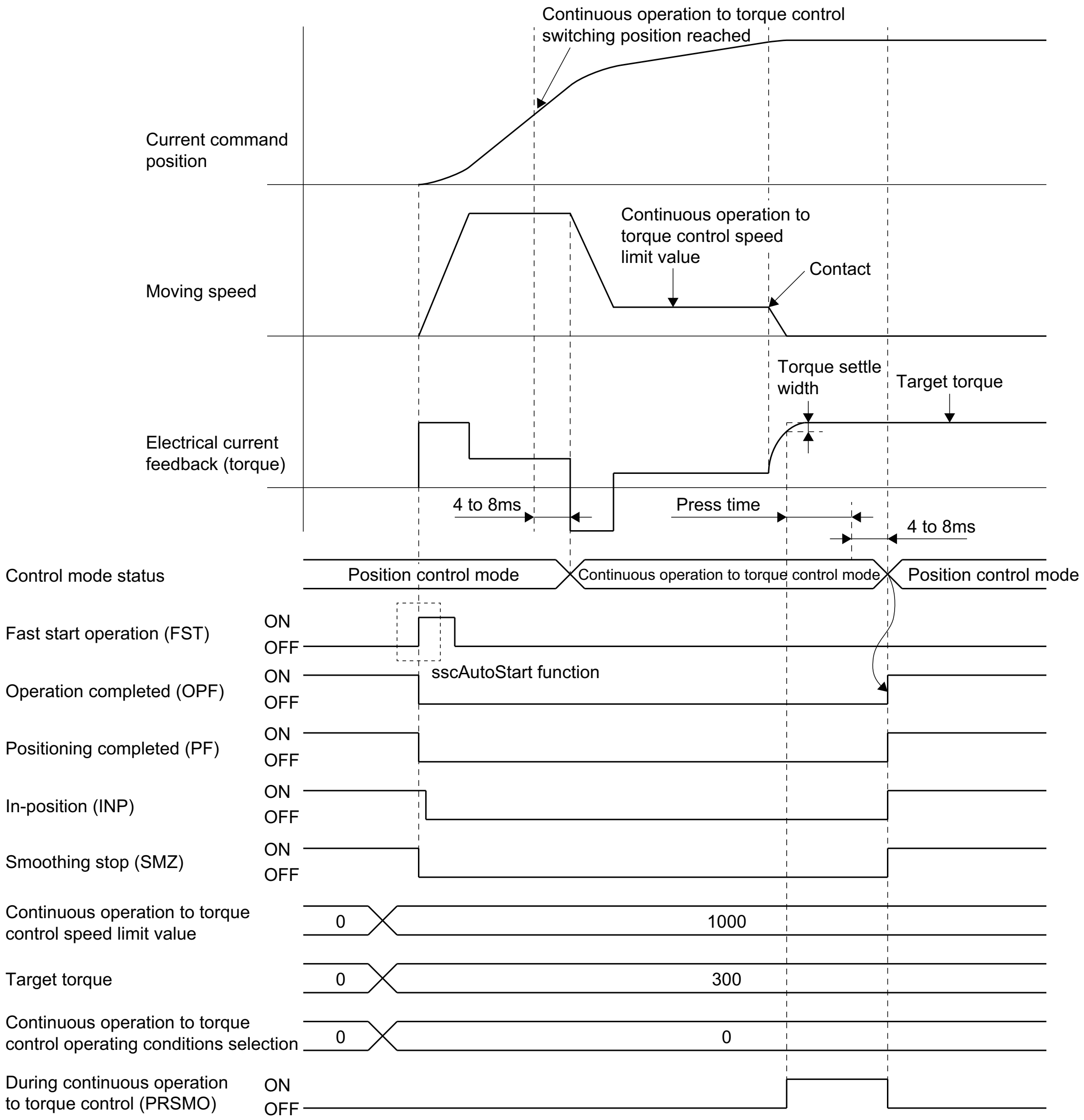
- Operation is completed with the switching completion to position control mode.
- When operation is stopped by forced stop, operation alarms etc., the position board automatically switches to position control mode regardless of "start continuous operation to torque control switch conditions".
- When a control mode that cannot be switched to is input to the control mode command and the control mode switch command signal (CTLMC) is turned ON, "Control Mode Switch Error (operation alarm 2EH, detail 02H or 04H)" occurs, followed by a deceleration stop.

Point

[API library]
To switch the control mode of the servo amplifier, use the sscChangeControlMode function.

Operation timing

Automatic switch (Start switch and end switch)



Point

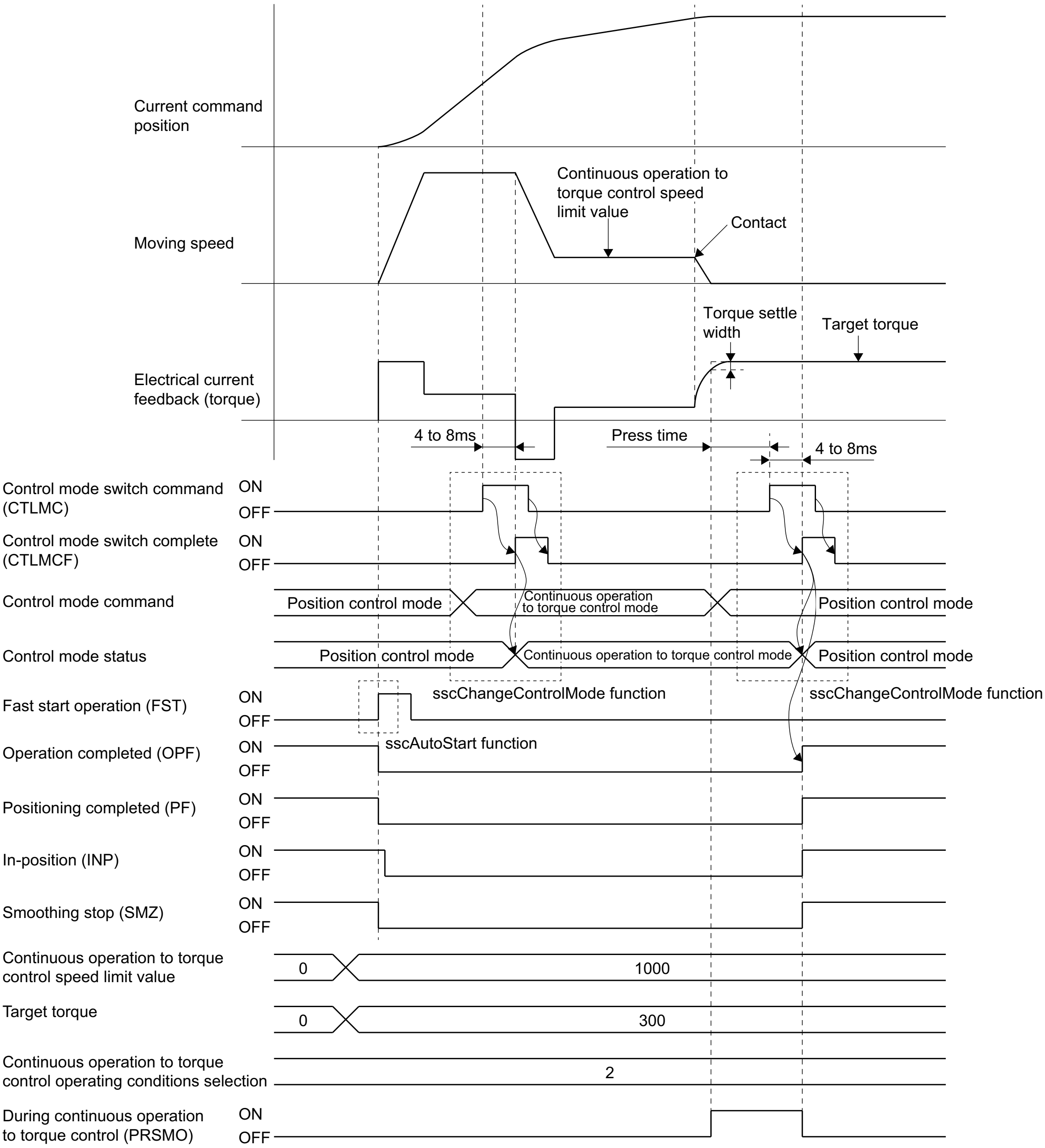
- It takes approximately 4 to 8ms for the servo amplifier to switch modes after reaching the continuous operation to torque control switching position and press time has passed.
- The rough match signal (CPO) turns ON based on the distance remaining to the position data of the point table.
- The positioning completed signal (PF), the smoothing stop signal (SMZ), turn ON at completion of operation.
- The current command position is matched with the current feedback position at the timing of switch to continuous operation to torque control.
- When operation is completed without reaching the continuous operation to torque control switching position, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 02H)" occurs.

Point

[API library]

- To startup operation, use the sscAutoStart function.
- For a detailed procedure for the continuous operation to torque control, refer to the sample program (InterruptPressDrive) contained in the utility software. Operate by automatic switch by setting chg_ctrl_mode_condition to "CHG_CTRL_MODE_AUTO".

Manual switch (Start switch and end switch)



Point

- After confirming the leading edge of the control mode switch complete signal (CTLMCF), turn OFF the control mode switch command signal (CTLMC).
- Switch the control mode command to position control mode before input of the control mode switch command signal (CTLMC). Turn ON the control mode switch command signal (CTLMC) after continuous operation to torque control switching conditions are satisfied (manage press conditions with user program).
- Operation is complete at the completion of switching to position control mode.

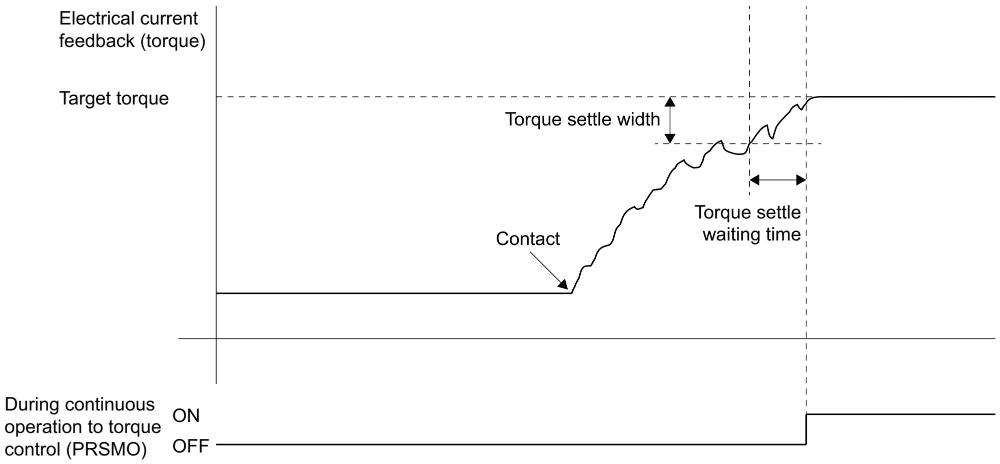
Point

[API library]

- To startup operation, use the sscAutoStart function.
- For a detailed procedure for the continuous operation to torque control, refer to the sample program (InterruptPressDrive) contained in the utility software. Operate by manual switch by setting chg_ctrl_mode_condition to "CHG_CTRL_MODE_MANUAL".
- To switch the control mode of the servo amplifier, use the sscChangeControlMode function.

Timing of during continuous operation to torque control determination

The misjudgment of continuous operation to torque control when the torque fluctuation range is large can be managed by setting the torque settle waiting time. When torque within the torque settle width is continuously output during the torque settle waiting time, the during continuous operation to torque control signal (PRSMO) is turned ON.



Point

When a value outside the torque settle width occurs part of the way through torque settle waiting time, the torque settle waiting time is measured again from the beginning.

Operation during continuous operation to torque control mode

When switching to continuous operation to torque control mode, torque is controlled so that it becomes the torque set as "target torque", while speed is accelerated/decelerated from the current speed to the speed set in "continuous operation to torque control speed limit value". During this time, the command speed immediately after the switch is a value converted from the position command.

While a positive value is set for "continuous operation to torque control speed limit value", the motor rotation direction of the motor conforms to the travel direction specified by the point table.

For the current torque value, confirm the electrical current feedback of the high speed monitor.

The acceleration/deceleration processes are trapezoidal acceleration/deceleration.

"Continuous operation to torque control speed limit value" is restricted by "Speed limit value (parameter No.0222, 0223)".

When a speed that exceeds the speed limit value is commanded, and a continuous operation to torque control point operation is conducted, speed is restricted to the speed limit value.

For the command speed to the servo amplifier, confirm "Moving speed" (monitor No.0304H, 0305H, or No.1304H)".

Stop factors during continuous operation to torque control

Stop factor	Operation	
	Stop method	Alarm/Error
The press limit position was reached.	Immediate stop	Operation alarm 5DH, detail 03H
Control mode was changed to position control mode during travel in continuous operation to torque control mode (before target torque is reached).	Deceleration stop	Operation alarm 5DH, detail 07H
Interference check conditions were satisfied. (Including interference check standby)	Immediate stop	Operation alarm 45H, detail 01H
A control mode that cannot be switched to was input to the control mode command, and control mode switch was conducted.	Deceleration stop	Operation alarm 2EH, detail 02H or 04H
Operation mode was changed.	Deceleration stop	Operation alarm 23H, detail 01H
Servo off was performed.	Rapid stop	Operation alarm B3H, detail 01H
Forced stop (external forced stop or software forced stop) was turned ON.	Immediate stop	Operation alarm 12H, detail 01H
The stop operation signal (STP) was turned ON.	Deceleration stop	—
The rapid stop signal (RSTP) was turned ON.	Rapid stop	—
Limit switch was turned ON.	Immediate stop	Operation alarm A0H, detail 01H or 02H
The interlock signal (ITL) was turned ON.	Rapid stop	Operation alarm 5DH, detail 04H
Control of servo amplifier is no longer possible. (disconnected)	Immediate stop	System error E400H Operation alarm B0H, detail 02H
A servo alarm occurred.	Immediate stop	Operation alarm B1H, detail 01H

Point

- For all patterns, the control mode is automatically changed to position control by the position board after the zero speed signal (ZSP) turns ON.
- The stopping process for each stop factor is a deceleration process in continuous operation to torque control mode. (For immediate stops, control mode switches to position control mode at the current position and stops immediately.)
- The time constant at a rapid stop is that of "Rapid stop time constant (parameter No.0227)".
- The press limit position is determined by the current feedback position. The position after a stop is a position exceeding the press limit position. Therefore, a position that takes into account the operation after exceeding the press limit position should be set.
- The software limit is determined by the current feedback position during continuous operation to torque control. As there is a possibility of stopping at a position that exceeds the software limit, set the press limit position before the software limit. When the software limit is set before the press limit position, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 05H)" occurs, and operation does not start.
- If the interlock signal (ITL) turns ON during position control mode for points with continuous operation to torque control set to valid, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 04H)" occurs.
- The interference check standby is invalid during position control mode in continuous operation to torque control points.
- The above also applies when a stop factor occurs during switching to continuous operation to torque control mode.
- An immediate stop occurs when a stop factor occurs during switching to position control mode from continuous operation to torque control mode.

Combinations of continuous operation to torque control and other functions

The following shows the combinations of continuous operation to torque control with each function.

○: Usable, ×: Unusable, △: Restriction, —: Not applicable

Classification	Function		Compatibility	Remarks
System function	Control mode	Standard mode	○	
		Interface mode	×	
Operational function	JOG operation		—	
	Incremental feed		—	
	Automatic operation		○	Automatic switch/Manual switch can be selected.
	Linear interpolation [MC200] Interpolation operation (linear interpolation, circular interpolation) [MC300]		×	When starting up a continuous operation to torque control point, "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 0AH)" occurs.
	Home position return		—	
	Home position reset function (data set)		—	
Application function	Command unit	Electronic gear	○	
	Speed unit	Speed unit	○	Set the continuous operation to torque control speed limit value in speed units.
		Speed units multiplication factor	○	
		Speed limit	○	The continuous operation to torque control speed limit value is restricted by "Speed limit value (parameter No.0222, No.0223)"
	Acceleration /deceleration	Linear acceleration/ deceleration	○	
		Smoothing filter	△	Invalid during continuous operation to torque control.
		Start up speed enable	△	Valid when starting up operation point. However, it is invalid during continuous operation to torque control.
		S-curve acceleration/ deceleration (Sine acceleration/deceleration)	△	Invalid during continuous operation to torque control.
		Jerk ratio acceleration/ deceleration [MC300]	△	
		Vibration suppression command filter 1 [MC300]	△	
	Servo off		○	Control mode is automatically changed to position control mode after an operation alarm occurrence.
	Forced stop		○	
	Stop operation		○	
	Rapid stop operation		○	
	Limit switch (stroke end)		○	
	Software limit		○	
	Interlock		×	
	Rough match output		△	At continuous operation to torque control points the rough match turns ON when the distance remaining based on the position data of the point table is within the rough match output range.
	Torque limit		×	During continuous operation to torque control and torque limit, torque limit stays OFF.
	Command change	Speed change	×	The speed change error signal (SCE) turns ON.
		Change of time constants	×	The acceleration time constant change error signal (TACE), or the deceleration time constant change error signal (TDCE) turns ON.
		Position change	×	The position change error signal (PCE) turns ON.
	Backlash		○	When following up by current feedback position, a position that takes into account the backlash is followed up.
	Position switch		△	Determined by the current feedback position.
	Completion of operation signal		○	Output after position control switch.
	Interference check		△	Interference check function is invalid.

Classification	Function	Compatibility	Remarks
Application function	Home position search limit	—	
	Gain switching	○	
	PI-PID switching	○	
	Home position set	—	
	Absolute position detection system	○	
	Home position return request	○	
	Other axes start	△	When current command position is set to the axis judgment coordinate of start condition, a current command position matching the current feedback position is determined.
	High response I/F	○	
	Digital I/O	—	
	I/O device	—	
	Servo amplifier general I/O	—	
	Dual port memory exclusive control	—	
	Pass position interrupt	△	When current command position is set to the axis judgment coordinate of start condition, a current command position matching the current feedback position is determined. Therefore, when a current command position is specified, it may not be correctly determined.
	Mark detection	○	
	SSCNETⅢ/H head module connection	—	
	Sensing module connection	—	
Auxiliary function	Reading/writing parameters	—	
	Changing parameters at the servo	—	
	Alarm/system error	○	
	Monitor function	○	The speed limit value output to the servo amplifier is output for "moving speed" during continuous operation to torque control mode.
	High speed monitor function	○	
	Interrupt	○	During continuous operation to torque control is notified from when the output torque reaches the torque settle width and press time passes, until return to position control mode.
	Interrupt output cycle	—	
	Command data update cycle	—	
	User watchdog function	—	
	Software reboot function	—	
	Parameter backup	—	
	Test mode	—	
	Reconnect/disconnect function	○	When reconnecting, startup is in position control mode.
	Sampling	—	
	Log	○	
	Operation cycle monitor function	—	
	External forced stop disable	○	
	Amplifier-less axis function	○	After reaching the continuous operation to torque control speed limit value, it is regarded that the torque settle width has been reached, and operation is completed after the continuous operation to torque control time has passed. For electrical current feedback, torque 0% occurs before reaching the speed limit value, and target torque occurs after reaching the speed limit value.
	Alarm history function	○	
	Transient transmit	—	
Tandem drive		×	When continuous operation to torque control is startup "Continuous Operation to Torque Control Error (operation alarm 5DH, detail 01H)" occurs.
Interface mode	Home position set	—	

Restrictions on servo amplifier functions

The following servo amplifier functions cannot be used during continuous operation to torque control mode.

- Base cut delay time function
- Forced stop deceleration function
- Vertical axis freefall prevention function
- Auto tuning function [MC300]
- Vibration suppression control 1, 2 [MC300]
- Slight vibration suppression control [MC300]
- One-touch tuning [MC300]
- Quick tuning function (MR-J5(W_)-_B only) [MC300]

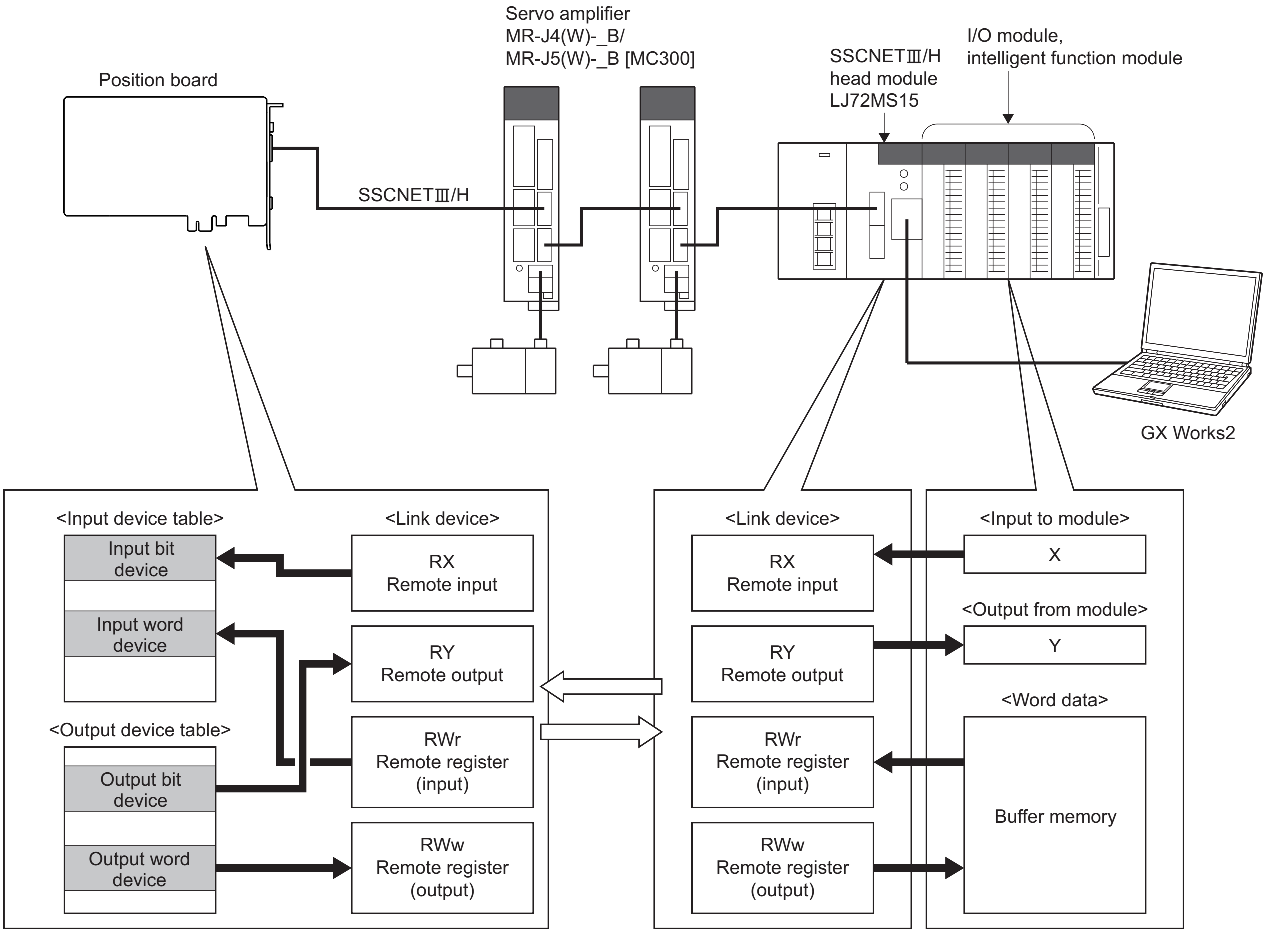
6.33 SSCNETIII/H Head Module Connection

The SSCNETⅢ/H head module can connect MELSEC-L series I/O modules and intelligent function modules on SSCNETⅢ/H. The SSCNETⅢ/H head module controls input and output of I/O modules and intelligent function modules using link devices.

By assigning inputs and outputs of modules mounted to the SSCNETⅢ/H head module to the I/O device table, they can be used as position board inputs and outputs.

Additionally, by using the transient transmit function, the SSCNETⅢ/H head module can access the buffer memory of intelligent function modules.

Settings for the SSCNETⅢ/H head module and modules mounted to the SSCNETⅢ/H head module are made in GX Works2.



Number of connectable stations

The SSCNETⅢ/H head module can use up to 4 stations.

The following shows the number of stations that can be controlled depending on the control cycle.

Position board	Control cycle	Maximum number of stations connected	Maximum number of stations connected for each line	Recommended number of control axes*1
Using MR-MC2_ _	0.88ms	4 stations	4 stations	32 axes
	0.44ms	2 stations	2 stations	12 axes
	0.22ms	1 station	1 station	4 axes
Using MR-MC3_ _	0.88ms	16 stations	8 stations	64 axes
	0.44ms	16 stations	8 stations	38 to 49 axes
	0.22ms	8 stations	4 stations	17 to 23 axes

*1 The recommended number of control axes when the maximum number of stations are connected.

Precautions

Processing times vary depending on the number of axes and functions used.

When the operation cycle alarm signal (OCME), and the operation cycle warning signal (OCMW) turn ON, review the following:

- Make the control cycle longer. (Example: When control cycle is 0.44ms, change it to 0.88ms)
- Reduce the number of control axes.
- Review the operation pattern so that the operation startup times of each axis do not overlap.

Supported functions

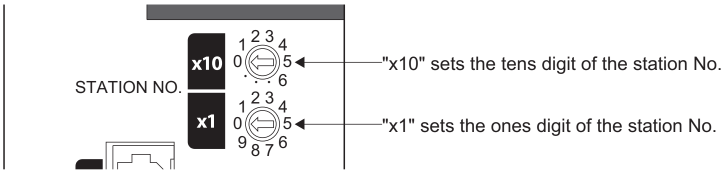
○: Usable, △: Restriction, ×: Unusable

Classification	Function	Compatibility	Remarks
Application function	Forced stop	×	Inputting a forced stop has no affect on the I/O status of bit devices.
	Other axes start	○	Can turn ON/OFF output bit devices in line with other axes start conditions.
Auxiliary function	Reading/writing parameters	△	Support RIO control parameters only (Cannot read/write parameters for the SSCNETⅢ/H head module).
	Alarm and system error	○	Detail RIO module alarm No. are fixed at 0.
	Remote I/O disconnect	○	
	Monitor function	○	
	Interrupt	○	
	Parameter backup	△	Support RIO control parameters only (Cannot backup RIO module parameters).
	Test mode	×	
	Reconnect/disconnect function	○	
	Sampling	△	Sampling of I/O devices is supported in the test tool only.
	log	○	
	Alarm history function	○	When a RIO module alarm occurs, the RIO module alarm No. (upper/lower) is stored in alarm history data. (Detail RIO module alarm No. are not stored)
	Transient transmit	○	

System startup

Station No. setting parameter

Station No. settings are made with the station No. setting switch.



The station No. and station No. setting switch No. are correlated as shown on the table below. Set the station No. so that it is not duplicate in the same line. If it is duplicated, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).

Station No. on remote I/O module	Station No. setting switch	Available/unavailable	
		MR-MC2_ _	MR-MC3_ _
Station 1	1	Unavailable	Unavailable
Station 2	2		
Station 3	3		
Station 4	4		
Station 5	5		
Station 6	6		
Station 7	7		
Station 8	8		
Station 9	9		
Station 10	10		
Station 11	11		
Station 12	12		
Station 13	13		
Station 14	14		
Station 15	15		
Station 16	16		
Station 17	17		
Station 18	18		
Station 19	19		
Station 20	20		
Station 21	21	Available	
Station 22	22		
Station 23	23		
Station 24	24		
Station 25	25	Unavailable	
Station 26	26		
Station 27	27		
Station 28	28		
Station 29	29		
Station 30	30		
Station 31	31		
Station 32	32		
Station 33	33		
Station 34	34		
Station 35	35		
Station 36	36		
Station 37	37		

Station No. on remote I/O module	Station No. setting switch	Available/unavailable	
		MR-MC2_ _	MR-MC3_ _
Station 38	38	Unavailable	Unavailable
Station 39	39		
Station 40	40		
Station 41	41		
Station 42	42		
Station 43	43		
Station 44	44		
Station 45	45		
Station 46	46		
Station 47	47		
Station 48	48		
Station 49	49		Available
Station 50	50		
Station 51	51		
Station 52	52		
Station 53	53		
Station 54	54		
Station 55	55		
Station 56	56		
Station 57	57		Unavailable
Station 58	58		
Station 59	59		
Station 60	60		
Station 61	61		
Station 62	62		
Station 63	63		
Station 64	64		

Station No. assignment

With station No. assignment, station No. (station No. on the position board) are assigned to station No. on remote I/O modules.

Also refer to the following for station No. assignment.

☞ Page 75 Axis No. assignment

When station No. assignment is invalid, correspondence between the station No. on a remote I/O module and the station No. is shown in the following table.

- Using MR-MC2_ _

Station No. on remote I/O module		Line 1			
		21	**22**	**23**	**24**
Station No.	0.88ms	1	2	3	4
	0.44ms	1	2	—	—
	0.22ms	1	—	—	—

- Using MR-MC3_ _

Station No. on remote I/O module		Line 1							
		49	**50**	**51**	**52**	**53**	**54**	**55**	**56**
Station No.	0.88ms	1	2	3	4	5	6	7	8
	0.44ms	1	2	3	4	5	6	7	8
	0.22ms	1	2	3	4	—	—	—	—
Station No. on remote I/O module		**Line 2**							
		49	**50**	**51**	**52**	**53**	**54**	**55**	**56**
Station No.	0.88ms	9	10	11	12	13	14	15	16
	0.44ms	9	10	11	12	13	14	15	16
	0.22ms	5	6	7	8	—	—	—	—

Point

[API library]

When setting the API function argument "Axis No." to a station No., set a negative value.

<Example> Station 1: -1, station 2: -2, station 3: -3, station 4: -4

Remote I/O module I/O setting

When using remote I/O modules, set "I/O table selection" of "I/O table (parameter No.004A)" to "1: Use I/O device table (MR-MC2_ _ method)" or "2: Use I/O device table (expanded points method) [MC300]".

Also, set the points of the I/O devices controller by the position board, and the start No. to be assigned to the I/O device table.

Vendor ID and type code setting

Available functions, parameter settings and ranges vary by remote I/O module type. At the time the communication with the remote I/O module has started, the position board performs consistency check between vendor ID and type code of the module connected and the parameter set. If a consistency check error occurs, "Driver Type Code Error (system error E405H)" is output, therefore set correct "Vendor ID (parameter No.021D)" and "Type code (parameter No.021E)".

Point

If "Driver Type Code Error (system error E405H)" occurred, the station that has set an incorrect type code can be confirmed with "Type code erroneous station information (monitor No.04C1H)".

Interface

System parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
004A	*IOTBL	I/O table	0000h	—	[MC200] 0000h to 0001h [MC300] 0000h to 0002h	■■■□ (I/O table selection)*2 Set the I/O table to be used. • 0: Use digital I/O table • 1: Use I/O device table (MR-MC2_ _ method) • 2: Use I/O device table (expanded points method) [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 For SSCNETⅢ/H head module, set "1: Use I/O device table (MR-MC2_ _ method)", or "2: Use I/O device table (expanded points method) [MC300]".

RIO control parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 0011h	■■■□ (Control station) Set "1: Controlled" when controlling the remote I/O module. • 0: Not controlled • 1: Controlled ■■□■ (Remote I/O disconnect) Set "1: Valid" when not communicating with the remote I/O. When setting "1" with "Control station", the operation without the remote I/O (simulation) is available. • 0: Invalid • 1: Valid
0201	OPC2	Control option 2	0000h	—	0000h to 0001h	■■■□ (RI control at communication error) Set input device control at communication error (system error E401H to E407H) • 0: All points OFF • 1: Maintain status
0202	*UTALC	Station No. assignment	0001h	—	[MC200] 0000h to 011Fh [MC300] 0000h to 013Fh	■■□□ (Remote I/O station No.) Set the remote I/O station No. to be assigned to the station No. on the position board. • 00h: No station No. assignment • 15h to 18h: Station No. [MC200] • 31h to 38h: Station No. [MC300] <Example> 16h Remote I/O station No.22 ■□■■ (Remote I/O line No.) Set the remote I/O line No. to be assigned to the station No. on the position board • 0 to 1: Line No. - 1
0203	ITM	Interrupt condition	0000h	—	0000h to FFFFh	Set interrupt condition.
0210	*BDIO	Input bit device points	0000h	—	0000h to 0200h	Set the points used for input bit device. (Only a multiple of 16 can be selected.) • 0000h to 0200h: 0 to 512
0211	*BDINA	Input bit device start No.	0000h	—	[MC200] 0000h to 0FF0h [MC300] 0000h to 2FF0h	Set the start of the input bit device No. assigned to RX. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. (Only a multiple of 16 can be selected.) [When "1: Use I/O device table (MR-MC2_ _ method)" is set] • 0000h to 0FF0h: DVI_000 to DVI_FF0 [When "2: Use I/O device table (expanded points method)" is set] [MC300] • 0000h to 23F0h: DVI_000 to DVI_23F0 <Example> When the input points are 64, and input bit device 020 is specified as the start Assign the 64 points of DVI_020 to DVI_05F.
0212	*WDIO	Input word device points	0000h	—	0000h to 0020h	Set the points used for input word device. (The size used is 1 word × set value.) • 0000h to 0020h: 0 to 32

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
0213	*WDINA	Input word device start No.	0000h	—	[MC200] 0000h to 00FFh [MC300] 0000h to 02FFh	Set the start of the input word device No. assigned to RWr. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. [When "1: Use I/O device table (MR-MC2_ _ method)" is set] • 0000h to 00FFh: Input word device 00 to input word device FF [When "2: Use I/O device table (expanded points method)" is set] [MC300] • 0000h to 023Fh: Input word device 00 to input word device 23F <Example> When the input points are 2, and input word device 06 is specified as the start Assign input word devices 06 to 07.
0214	*BDOO	Output bit device points	0000h	—	0000h to 0200h	Set the points used for output bit device. (Only a multiple of 16 can be selected.) • 0000h to 0200h: 0 to 512
0215	*BDONA	Output bit device start No.	0000h	—	[MC200] 0000h to 0FF0h [MC300] 0000h to 2FF0h	Set the start of the output bit device No. assigned to RY. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. (Only a multiple of 16 can be selected.) [When "1: Use I/O device table (MR-MC2_ _ method)" is set] • 0000h to 0FF0h: DVO_000 to DVO_FF0 [When "2: Use I/O device table (expanded points method)" is set] [MC300] • 0000h to 23F0h: DVO_000 to DVO_23F0 <Example> When the output points are 64, and output bit device 040 is specified as the start Assign the 64 points of DVO_040 to DVO_07F.
0216	*WDOO	Output word device points	0000h	—	0000h to 0020h	Set the points used for output word device. (The size used is 1 word × set value.) • 0000h to 0020h: 0 to 32
0217	*WDONA	Output word device start No.	0000h	—	[MC200] 0000h to 00FFh [MC300] 0000h to 02FFh	Set the start of the output word device No. assigned to RWw. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. [When "1: Use I/O device table (MR-MC2_ _ method)" is set] • 0000h to 00FFh: Output word device 00 to output word device FF [When "2: Use I/O device table (expanded points method)" is set] [MC300] • 0000h to 023Fh: Output word device 00 to output word device 23F <Example> When the output points are 2, and output word device 08 is specified as the start Assign output word devices 08 to 09.
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. • 0000h: Mitsubishi Electric
021E	*CODE	Type code	3000h	—	0000h to FFFFh	Set the type code • 3000h: SSCNETⅢ/H head module

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

- Set "1: Use I/O device table (MR-MC2_ _ method)" or "2: Use I/O device table (expanded points method) [MC300]" for "I/O table selection" of "I/O table (parameter No.004A)". When "0: Use digital I/O table" is set, "System Setting Error (operation alarm 38H, detail 05H to 06H)" occurs.
- Assign the I/O device table not to overlap other settings. If the assignment is overlapped or exceeds the maximum points of the I/O device table, "I/O No. Assignment Error (system error E510H)" and "I/O No. Assignment Setting Error (RIO control alarm 39H, detail 01H to 02H)" occur.

RIO status bit

The addresses in the table are the addresses for the first station. For the second station and after, add the following value for each station.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +C0h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3440	00F060	0	RURDY	Receiving controller ready on
		1	RUA	Outputting DO
		2	—	For manufacturer setting
		3		
		4		
		5	RUALM	RIO module alarm
		6	RUWRN	RIO module warning
		7	—	For manufacturer setting

■Details on RIO status bit

Symbol	Signal name	Function details
RURDY	Receiving controller ready on	Show the operating status of remote I/O module. • RURDY: OFF, RUA: OFF No communication • RURDY: ON, RUA: OFF Stop • RURDY: ON, RUA: ON Run • RURDY: OFF, RUA: ON Error
RUA	Outputting DO	

I/O device table

■Input device table

Address (hexadecimal)		Input word device No.	Input bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DB00	0F9F00	Input word device 00 (2bytes)	Input bit device 000 to input bit device 00F	DVI_000 to DVI_00F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_000 (bit0) to DVI_00F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB02	0F9F02	Input word device 01 (2bytes)	Input bit device 010 to input bit device 01F	DVI_010 to DVI_01F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_010 (bit0) to DVI_01F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB04	0F9F04	Input word device 02 (2bytes)	Input bit device 020 to input bit device 02F	DVI_020 to DVI_02F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_020 (bit0) to DVI_02F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB06	0F9F06	Input word device 03 (2bytes)	Input bit device 030 to input bit device 03F	DVI_030 to DVI_03F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_030 (bit0) to DVI_03F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB08	0F9F08	Input word device 04 (2bytes)	Input bit device 040 to input bit device 04F	DVI_040 to DVI_04F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_040 (bit0) to DVI_04F (bit15). ■When word device is assigned Notify the status of the word device input signal.

Address (hexadecimal)		Input word device No.	Input bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DB0A	0F9F0A	Input word device 05 (2bytes)	Input bit device 050 to input bit device 05F	DVI_050 to DVI_05F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_050 (bit0) to DVI_05F (bit15). ■When word device is assigned Notify the status of the word device input signal.
⋮	⋮	⋮	⋮	⋮	⋮
DCFE	0FA0FE	Input word device FF (2bytes)	Input bit device FF0 to input bit device FFF	DVI_FF0 to DVI_FFF	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_FF0 (bit0) to DVI_FFF (bit15). ■When word device is assigned Notify the status of the word device input signal.
—	0FA100	Input word device 100 (2bytes) (expanded points method)	Input bit device 1000 to input bit device 100F (expanded points method)	DVI_1000 to DVI_100F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_1000 (bit0) to DVI_100F (bit15). ■When word device is assigned Notify the status of the word device input signal.
	⋮	⋮	⋮	⋮	⋮
	0FA37E	Input word device 23F (2bytes) (expanded points method)	Input bit device 23F0 to input bit device 23FF (expanded points method)	DVI_23F0 to DVI_23FF	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_23F0 (bit0) to DVI_23FF (bit15). ■When word device is assigned Notify the status of the word device input signal.

■Output device table

Address (hexadecimal)		Output word device No.	Output bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DD00	0FA380	Output word device 00 (2bytes)	Output bit device 000 to output bit device 00F	DVO_000 to DVO_00F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_000 (bit0) to DVO_00F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD02	0FA382	Output word device 01 (2bytes)	Output bit device 010 to output bit device 01F	DVO_010 to DVO_01F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_010 (bit0) to DVO_01F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD04	0FA384	Output word device 02 (2bytes)	Output bit device 020 to output bit device 02F	DVO_020 to DVO_02F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_020 (bit0) to DVO_02F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD06	0FA386	Output word device 03 (2bytes)	Output bit device 030 to output bit device 03F	DVO_030 to DVO_03F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_030 (bit0) to DVO_03F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD08	0FA388	Output word device 04 (2bytes)	Output bit device 040 to output bit device 04F	DVO_040 to DVO_04F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_040 (bit0) to DVO_04F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD0A	0FA38A	Output word device 05 (2bytes)	Output bit device 050 to output bit device 05F	DVO_050 to DVO_05F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_050 (bit0) to DVO_05F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
⋮	⋮	⋮	⋮	⋮	⋮

Address (hexadecimal)		Output word device No.	Output bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DEFE	0FA57E	Output word device FF (2bytes)	Output bit device FF0 to output bit device FFF	DVO_FF0 to DVO_FFF	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_FF0 (bit0) to DVO_FFF (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
—	0FA580	Output word device 100 (2bytes) (expanded points method)	Output bit device 1000 to output bit device 100F (expanded points method)	DVO_1000 to DVO_100F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_1000 (bit0) to DVO_100F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
	⋮	⋮	⋮	⋮	⋮
	0FA7FE	Output word device 23F (2bytes) (expanded points method)	Output bit device 23F0 to output bit device 23FF (expanded points method)	DVO_23F0 to DVO_23FF	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_23F0 (bit0) to DVO_23FF (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.

Point

- When a communication error (system error E401H to E407H) occurs or SSCNET is disconnected, the status of the input device table is the same as "RI control at communication error" of "Control option 2 (parameter No.0201)". The status of the output device table is maintained.
- When using remote I/O modules, set "I/O table selection" of "I/O table (parameter No.004A)" to "1: Use I/O device table (MR-MC2_ _ method)" or "2: Use I/O device table (expanded points method) [MC300]". When "0: Use digital I/O table" is set and I/O devices are assigned, "I/O Table Select Error (system error E511H)", and "System Setting Error (RIO control alarm 38H, detail 05H to 06H)" occur.
- Assign the I/O device not to overlap other settings. If the assignment is overlapped or exceeds the range of the I/O device table, "I/O No. Assignment Error (system error E510H)" and "I/O No. Assignment Setting Error (RIO control alarm 39H, detail 01H and 02H)" occur.
- Set the total points of the I/O devices assigned to remote I/O when setting the I/O device points (parameter No.0210, 0212, 0214, 0216).
- The delay time for the input device table to be updated after the signals of an input module or intelligent function module are input is SSCNETⅢ/H head module input response time + (control cycle × 2). For input response time of SSCNETⅢ/H head module, refer to the following manual.
  📖MELSEC-L SSCNETⅢ/H Head Module User's Manual
- The delay time for the host personal computer to update the output device table, and signals of an output module or intelligent function module to be output is SSCNETⅢ/H head module output response time + (control cycle × 3). Also, for output of output bit devices using the other axes start function, the delay time from when other axes start conditions are established is SSCNETⅢ/H head module output response time + (control cycle × 2). For output response time of SSCNETⅢ/H head module, refer to the following manual.
  📖MELSEC-L SSCNETⅢ/H Head Module User's Manual
- When using I/O modules and intelligent function modules the I/O status may not be updated every control cycle depending on the control cycle setting and points used. For I/O status update times, refer to the following manual.
  📖MELSEC-L SSCNETⅢ/H Head Module User's Manual
  When the time for the I/O status of the SSCNETⅢ/H head module to be updated does not fit in the control cycle, the I/O status of I/O devices may not be updated every control cycle. When the I/O status is not updated every control cycle, perform any of the following.
  · Change the control cycle.
  · If more than one SSCNETⅢ/H head module is being used, change the distribution of I/O modules and intelligent function modules.
  · Increase the number of SSCNETⅢ/H head modules.

Point

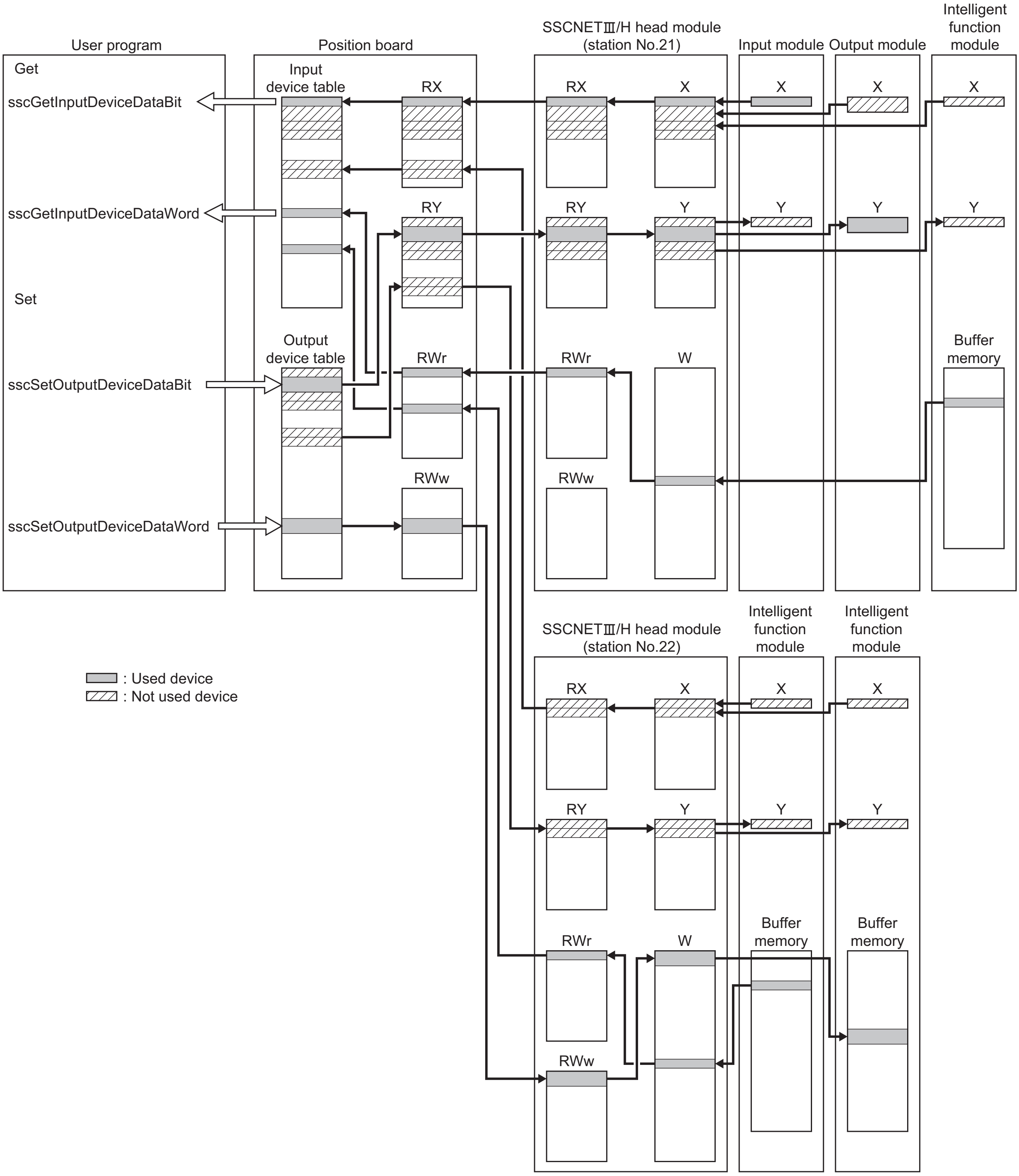
[API library]

- To get input bit device, use the sscGetInputDeviceBit function.
- To get input word device, use the sscGetInputDeviceWord function.
- To set output bit device, use the sscSetOutputDeviceBit function.
- To set output word device, use the sscSetOutputDeviceWord function.
- To get output bit device, use the sscGetOutputDeviceBit function.
- To get output word device, use the sscGetOutputDeviceWord function.

Example of setting procedure

The following shows the settings for two SSCNETⅢ/H head modules (station 21 and station 22).

Entire system configuration diagram



Station No.	Input/Output	Setting for SSCNETIII/H head module (link device assignment)			I/O device table	
		Device name	Points		Points	Start
1	Input	RX	64	→	64	Input bit device 000
		RWr	1 (1 word)	→	1 (1 word)	Input word device 0A
	Output	RY	64	←	64	Output bit device 000
2	Input	RX	32	→	32	Input bit device 070
		RWr	1 (1 word)	→	1 (1 word)	Input word device 10
	Output	RY	32	←	32	Output bit device 080
		RWw	2 (2 word)	←	2 (2 word)	Output word device 14

SSCNETIII/H head module setting

Use GX Works2 to assign I/O of modules and buffer memory to the SSCNETⅢ/H head module link devices. For SSCNETⅢ/H head module settings, refer to the following manual.

📖MELSEC-L SSCNETⅢ/H Head Module User's Manual

Point

When setting SSCNETⅢ/H head module in GX Works2, confirm that the mode of "SSCNETⅢ/H Network Setting" on "Communication Head Setting" tab is set to "Online". If the mode is not set to "Online", the position board cannot communicate with the SSCNETⅢ/H head module. If the system is startup in this state, it stays in a waiting for SSCNET response (system status code: 0009h) state, or "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs.

Position board setting

In order to allocate SSCNETⅢ/H head module link devices to the position board I/O device table, set the total number of points (in units of 16) of each link device, and the start I/O device No. to be assigned.

■Station parameter

Module No.	Parameter No.	Symbol[*1]	Name	Setting value
1	0210	*BDIO	Input bit device points	64
	0211	*BDINA	Input bit device start No.	0000h
	0212	*WDIO	Input word device points	1
	0213	*WDINA	Input word device start No.	000Ah
	0214	*BDOO	Output bit device points	64
	0215	*BDONA	Output bit device start No.	0000h
	0216	*WDOO	Output word device points	0
	0217	*WDONA	Output word device start No.	0000h
2	0210	*BDIO	Input bit device points	32
	0211	*BDINA	Input bit device start No.	0070h
	0212	*WDIO	Input word device points	1
	0213	*WDINA	Input word device start No.	0010h
	0214	*BDOO	Output bit device points	32
	0215	*BDONA	Output bit device start No.	0080h
	0216	*WDOO	Output word device points	2
	0217	*WDONA	Output word device start No.	0014h

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Setting/getting I/O devices with API functions

Examples of getting input devices and setting/getting output devices are shown in the table below.
Note that the board ID No. is 0, and channel No. is 1.

Module No.	Device name	Set/get	Setting value
1	RX	Get input bit device 002	sscGetInputDeviceBit(0, 1, 0x0002, &data);
	RWr	Get one word of input word device 0A	sscGetInputDeviceWord(0, 1, 0x000A, 1, &data);
	RY	Set output bit device 087 to ON	sscSetOutputDeviceBit(0, 1, 0x0087, SSC_ON);
2	RWw	Set output word device 14 to 000Ah (1 word)	sscSetOutputDeviceWord(0, 1, 0x0014, 1, 0x000A);

SSCNETIII/H head module disconnect

The system can be startup with the SSCNETⅢ/H head module disconnected, and simulate can be performed by setting "1: valid" for "Remote I/O disconnect" of "Control option 1 (parameter No.0200)" of the RIO module parameter.
However, the input bit devices allocated to SSCNETⅢ/H head module are OFF, and input word devices are 0 and are not updated. Also, any changes made to the status of output bit devices and output word devices allocated to SSCNETⅢ/H head module are not output to the SSCNETⅢ/H head module. (The status of output bit devices and output word devices can only be confirmed.)

6.34 Sensing Module (Station Mode) Connection

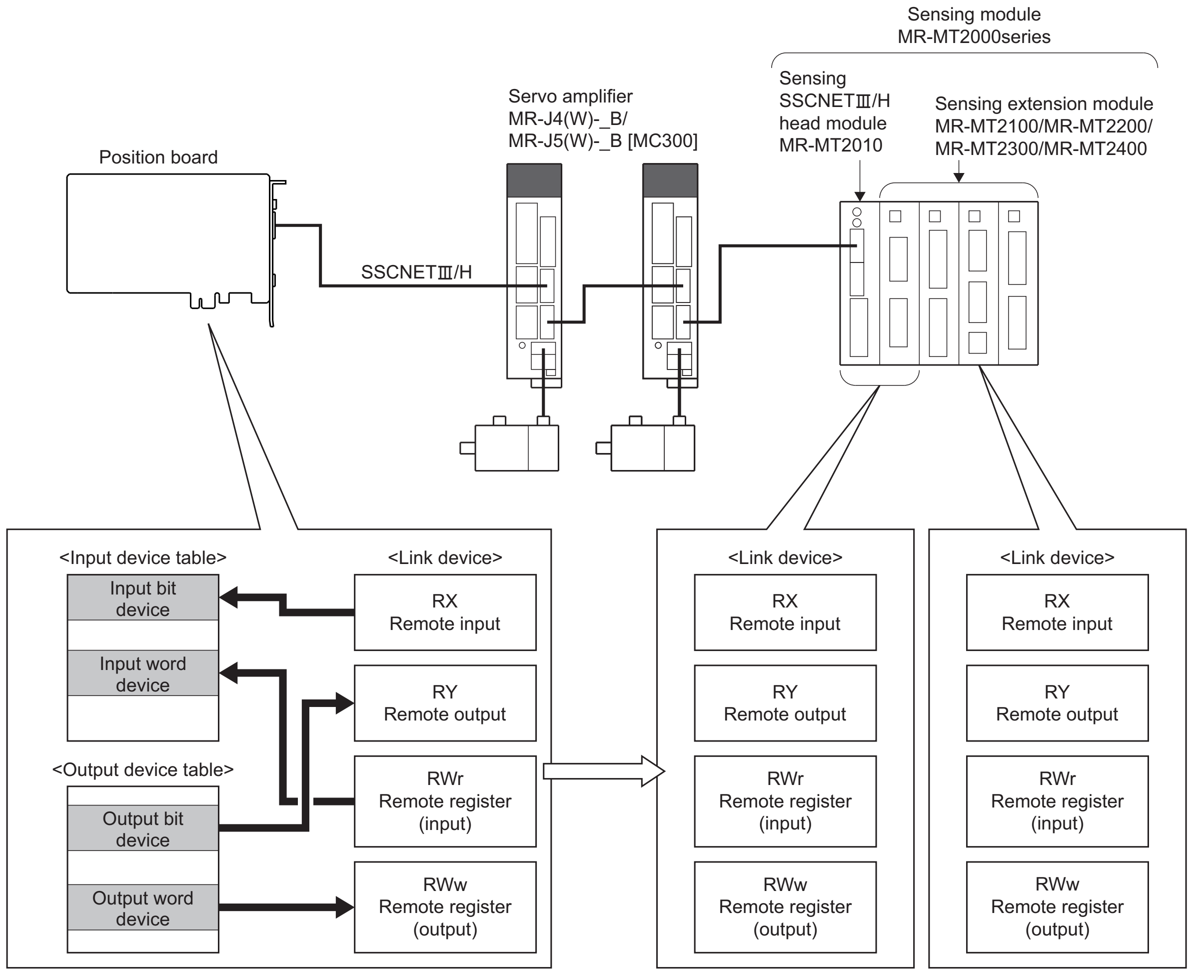
The sensing module consists of a SSCNETⅢ/H communication module (sensing SSCNETⅢ/H head module), and sensing extension modules (sensing I/O module, sensing pulse I/O module, sensing analog I/O module, sensing encoder I/F module) and fetches and outputs signals synchronized with SSCNETⅢ/H communication.

The sensing module controls input and output of sensing SSCNETⅢ/H head module and sensing extension module I/O using link devices.

By assigning inputs and outputs of sensing SSCNETⅢ/H head module and sensing extension modules to the I/O device table, they can be used as position board inputs and outputs.

This section is for sensing module station mode. For sensing module axis mode, refer to the following.

☞ Page 344 Sensing Module (Axis Mode) Connection



Number of connectable stations

The sensing module can use up to 4 stations.

The following shows the number of stations that can be controlled depending on the control cycle.

Position board	Control cycle	Maximum number of stations connected	Maximum number of stations connected for each line	Recommended number of control axes[*1]
Using MR-MC2_ _	0.88ms	4 stations	4 stations	32 axes
	0.44ms	2 stations	2 stations	12 axes
	0.22ms	1 station	1 station	4 axes
Using MR-MC3_ _	0.88ms	16 stations	8 stations	64 axes
	0.44ms	16 stations	8 stations	38 to 49 axes
	0.22ms	8 stations	4 stations	17 to 23 axes

*1 The recommended number of control axes when the maximum number of stations are connected.

Precautions

Processing times vary depending on the number of axes and functions used.

When the operation cycle alarm signal (OCME), and the operation cycle warning signal (OCMW) turn ON, review the following.

- Make the control cycle longer. (Example: When control cycle is 0.44ms, change it to 0.88ms)
- Reduce the number of control axes.
- Review the operation pattern so that the operation startup times of each axis do not overlap.

Point

- For how stations of the sensing units are counted, refer to the sensing module instruction manual.
- When using the sensing module and SSCNETⅢ/H head module at the same time, the maximum number of stations connected is the total number of stations connected by the sensing module and SSCNETⅢ/H head module combined.
- When 2 or more sensing extension modules are connected to a sensing SSCNETⅢ/H head module, set "Control station" to "1: Controlled" for the RIO module parameter "Control option 1 (parameter No.0200)" of all connected stations.
  If "Control station" is not set to "1: Controlled" for the RIO module parameter "Control option 1 (parameter No.0200)" of all connected stations, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs.

Supported functions

The following sensing module and position board functions are supported when the sensing module is used.

Sensing module functions supported by the position board

○: Usable, ×: Unusable

Classification	Function	Compatibility	Remarks
Sensing SSCNETⅢ/H head module	Digital input function	○	Return the current ON/OFF state of the DI signals (12 points) to the position board.
	Timing-latch input function	×	
	Digital output function	○	Turn ON/OFF the DO signal (2 points) according to the command from the position board.
	Level output function	○	Provide digital output according to the level of the monitor values of the sensing pulse I/O module, sensing analog I/O module, and sensing encoder I/F module. Digital output is provided without going through the position board.
	Output CLEAR/HOLD function	○	Specify the state of output of external DO signals of the sensing module when communication is disconnected.
Sensing I/O module	Digital input function	○	Return the current ON/OFF state of the DI signals (16 points) to the position board.
	Timing-latch input function	×	
	Digital output function	○	Turn ON/OFF the DO signal (16 points) according to the command from the position board.
	Level output function	○	Provide digital output according to the level of the monitor values of the sensing pulse I/O module, sensing analog I/O module, and sensing encoder I/F module. Digital output is provided without going through the position board.
	Output CLEAR/HOLD function	○	Specify the state of output of external DO signals of the sensing module when communication is disconnected.
Sensing pulse I/O module	Axis mode	○	Available for the following software versions. • MR-MC2_ _: Software version B3 or later. • MR-MC3_ _: No software restrictions.
	Pulse input function	○	Enable the sending of feedback pulses to the position board. (Maximum 2 points)
	Pulse output function	○	Enable the output of pulses. (Maximum 2 points)
	Digital input function	○	Return the current ON/OFF state of the DI signals (14 points) to the position board.
	Digital output function	○	Turn ON/OFF the DO signal (maximum 10 points) according to the command from the position board.
	Pulse coincidence output function	○	Control the DO signal when pulse output coincides with the pulse counter value specified by the position board. (Maximum 2 points)
	Output CLEAR/HOLD function	○	Specify the state of output of external DO signals of the sensing module when communication is disconnected.
Sensing analog I/O module	Analog input function	○	Enable the sending of analog input to the position board. (Maximum 4 channels)
	Analog output function	○	Enable the output of analog signals. (Maximum 4 channels)
	Analog input averaging function	○	Average multiple analog channel data, and notifies the position board. (Maximum 2 groups)
	Maximum/minimum value holding function	○	Enable confirming of the values held in the analog I/O module with the position board.
Sensing encoder I/F module	Encoder input function	○	Send the position data from the encoder to the position board. Compatible with open specification encoder interface.

Supported position board functions

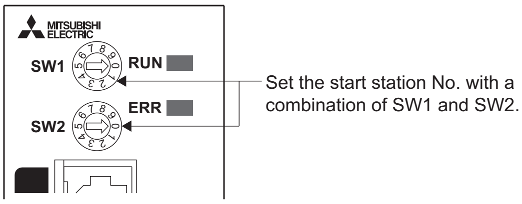
○: Usable, ×: Restriction, △: Unusable, —: Not applicable

Classification	Function	Compatibility	Remarks
Application functions	Forced stop	○	"Controller forced stop warning (RIO module warning E7)" occurs. For the operation at a controller forced stop warning occurrence, refer to the sensing module instruction manual.
	Other axes start	○	
	Digital I/O	×	
	I/O device	○	
	Dual port memory exclusive control	○	
	SSCNETⅢ/H head module	—	
Auxiliary functions	Reading/writing parameters	△	Do not write RIO module parameters when the system is running.
	Changing parameters at the servo	×	
	Alarm and system error	○	
	Remote I/O disconnect	○	
	Monitor function	○	
	Interrupt	○	
	User watchdog function	—	When user watchdog function is used, there is no effect on the state of the link device I/O.
	Software reboot function	—	The I/O devices on the dual port memory are cleared to 0 regardless of "Control option 2 (parameter No.0201)" setting. The output state of the external DO signal of the sensing module depends on the output CLEAR/HOLD function.
	Parameter backup	○	
	Test mode	×	
	Reconnect/disconnect function	△	Only the start station of the sensing module can be specified as disconnecting axis No.
	Sampling	△	Only the test tool supports the sampling of I/O device.
	Log	○	
	Operation cycle monitor function	—	
	Alarm history function	○	
	Transient transmission	×	

System startup

Station No. setting parameter

Station No. settings are made with the station No. selection rotary switch.



The station No. and station No. selection rotary switch combinations are correlated as shown on the table below. Set the station No. so that it is not duplicate in the same line. If it is duplicated, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).

Station No. selection rotary switch		Station No. on remote I/O module[*1]				Available/unavailable	
SW1	**SW2**	**Start station**	**2nd station**	**3rd station**	**4th station**	**MR-MC2_ _**	**MR-MC3_ _**
0	0	Station 1	Station 2	Station 3	Station 4	Unavailable	Unavailable
	1	Station 2	Station 3	Station 4	Station 5		
	⋮	⋮	⋮	⋮	⋮		
	8	Station 9	Station 10	Station 11	Station 12		
	9	Station 10	Station 11	Station 12	Station 13		
1	0	Station 11	Station 12	Station 13	Station 14		
	1	Station 12	Station 13	Station 14	Station 15		
	⋮	⋮	⋮	⋮	⋮		
	8	Station 19	Station 20	Station 21	Station 22		
	9	Station 20	Station 21	Station 22	Station 23		
2	0	Station 21	Station 22	Station 23	Station 24	Available	
	1	Station 22	Station 23	Station 24	[*2]		
	2	Station 23	Station 24	[*2]			
	3	Station 24	[*2]				
	4	Station 25	Station 26	Station 27	Station 28	Unavailable	
	5	Station 26	Station 27	Station 28	Station 29		
	⋮	⋮	⋮	⋮	⋮		
	8	Station 29	Station 30	Station 31	Station 32		
	9	Station 30	Station 31	Station 32	Station 33		
3	0	Station 31	Station 32	Station 33	Station 34		
	1	Station 32	Station 33	Station 34	Station 35		
	⋮	⋮	⋮	⋮	⋮		
	8	Station 39	Station 40	Station 41	Station 42		
	9	Station 40	Station 41	Station 42	Station 43		
4	0	Station 41	Station 42	Station 43	Station 44		
	1	Station 42	Station 43	Station 44	Station 45		
	⋮	⋮	⋮	⋮	⋮		
	7	Station 48	Station 49	Station 50	Station 51		
	8	Station 49	Station 50	Station 51	Station 52		Available
	9	Station 50	Station 51	Station 52	Station 53		

Station No. selection rotary switch		Station No. on remote I/O module*1				Available/unavailable	
SW1	SW2	Start station	2nd station	3rd station	4th station	MR-MC2_ _	MR-MC3_ _
5	0	Station 51	Station 52	Station 53	Station 54	Unavailable	Available
	1	Station 52	Station 53	Station 54	Station 55		
	2	Station 53	Station 54	Station 55	Station 56		
	3	Station 54	Station 55	Station 56	*2		
	4	Station 55	Station 56	*2			
	5	Station 56	*2				
	6	Station 57	Station 58	Station 59	Station 60		Unavailable
	7	Station 58	Station 59	Station 60	Station 61		
	8	Station 59	Station 60	Station 61	Station 62		
	9	Station 60	Station 61	Station 62	Station 63		
6	0	Station 61	Station 62	Station 63	Station 64		
	1	Station 62	Station 63	Station 64	—		
	2	Station 63	Station 64	—	—		
	3	Station 64	—	—	—		

*1 When connecting sensing SSCNETⅢ/H head module + sensing extension module, the station No. for the second sensing extension module and after is assigned in ascending order from the sensing SSCNETⅢ/H head module.

*2 Set so that the remote I/O station No. of last connected sensing extension module does not exceed the station below. If the station below is exceeded, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).
Using MR-MC2_ _: Station 24
Using MR-MC3_ _: Station 56

Station No. assignment

With station No. assignment, station No. (station No. on the position board) are assigned to station No. on remote I/O modules.

Also refer to the following for station No. assignment.

☞ Page 75 Axis No. assignment

When station No. assignment is invalid, correspondence between the station No. on a remote I/O module and the station No. is shown in the following table.

- Using MR-MC2_ _

Station No. on remote I/O module		Line 1			
		21	22	23	24
Station No.	0.88ms	1	2	3	4
	0.44ms	1	2	—	—
	0.22ms	1	—	—	—

- Using MR-MC3_ _

Station No. on remote I/O module		Line 1							
		49	50	51	52	53	54	55	56
Station No.	0.88ms	1	2	3	4	5	6	7	8
	0.44ms	1	2	3	4	5	6	7	8
	0.22ms	1	2	3	4	—	—	—	—

Station No. on remote I/O module		Line 2							
		49	50	51	52	53	54	55	56
Station No.	0.88ms	9	10	11	12	13	14	15	16
	0.44ms	9	10	11	12	13	14	15	16
	0.22ms	5	6	7	8	—	—	—	—

Point

[API library]
When setting the API function argument "Axis No." to a station No., set a negative value.
<Example> Station 1: -1, station 2: -2, station 3: -3, station 4: -4

Remote I/O module I/O setting

When using remote I/O modules, set "I/O table selection" of "I/O table (parameter No.004A)" to "1: Use I/O device table (MR-MC2_ _ method)", or "2: Use I/O device table (expanded points method) [MC300]".
Also, set the points of the I/O devices controller by the position board, and the start No. to be assigned to the I/O device table.

Vendor ID and type code setting

Available functions, parameter settings and ranges vary by remote I/O module type. At the time the communication with the remote I/O module has started, the position board performs consistency check between vendor ID and type code of the module connected and the parameter set. If a consistency check error occurs, "Driver Type Code Error (system error E405H)" is output, therefore set correct "Vendor ID (parameter No.021D)" and "Type code (parameter No.021E)".

Point

If "Driver Type Code Error (system error E405H)" occurred, the station that has set an incorrect type code can be confirmed with "Type code erroneous station information (monitor No.04C1H)".

Interface

Parameter

■System parameter

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
004A	*IOTBL	I/O table	0000h	—	[MC200] 0000h to 0001h [MC300] 0000h to 0002h	■■■□ (I/O table selection)[*2] Set the I/O table to be used. • 0: Use digital I/O table • 1: Use I/O device table (MR-MC2_ _ method) • 2: Use I/O device table (expanded points method) [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 For sensing module, set "1: Use I/O device table (MR-MC2_ _ method)", or "2: Use I/O device table (expanded points method) [MC300]".

■RIO module parameter

Module	Parameter No.	Sensing module parameter No.
Sensing SSCNETⅢ/H head module	1100 to 117F	PTA001 to PTA128
Sensing I/O module	1180 to 127F	PTB001 to PTB256
Sensing pulse I/O module	1280 to 12FF	PTC001 to PTC128
Sensing analog I/O module	1300 to 137F	PTD001 to PTD128
Sensing encoder I/F module	1380 to 13FF	PTE001 to PTE128

Point

Do not write RIO module parameters when the system is running.

■RIO control parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 0011h	■■■□ (Control station) Set "1: Controlled" when controlling the remote I/O module. • 0: Not controlled • 1: Controlled ■■□■ (Remote I/O disconnect) Set "1: Valid" when not communicating with the remote I/O. When setting "1" with "Control station", the operation without the remote I/O (simulation) is available. • 0: Invalid • 1: Valid
0201	OPC2	Control option 2	0000h	—	0000h to 0001h	■■■□ (RI control at communication error) Set input device control at communication error (system error E401H to E407H) • 0: All points OFF • 1: Maintain status
0202	*UTALC	Station No. assignment	0001h	—	[MC200] 0000h to 011Fh [MC300] 0000h to 013Fh	■■■□ (Remote I/O station No.) Set the remote I/O station No. to be assigned to the station No. on the position board. • 00h: No station No. assignment • 15h to 18h: Station No. [MC200] • 31h to 38h: Station No. [MC300] <Example>16h Remote I/O station No.22 ■■□■ (Remote I/O line No.) Set the remote I/O line No. to be assigned to the station No. on the position board • 0 to 1: Line No. -1
0210	*BDIO	Input bit device points	0000h	—	0000h to 0200h	Set the points used for input bit device. (Only a multiple of 16 can be selected.) • 0000h to 0200h: 0 to 512
0211	*BDINA	Input bit device start No.	0000h	—	[MC200] 0000h to 0FF0h [MC300] 0000h to 2FF0h	Set the start of the input bit device No. assigned to RX. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. (Only a multiple of 16 can be selected.) [When use "1: I/O device table (MR-MC2_ _ method)" is set]] • 0000h to 0FF0h: DVI_000 to DVI_FF0 [When use "2: I/O device table (expanded points method)" is set] [MC300] • 0000h to 23F0h: DVI_000 to DVI_23F0 <Example> When the input points are 64, and input bit device 020 is specified as the start Assign the 64 points of DVI_020 to DVI_05F.
0212	*WDIO	Input word device points	0000h	—	0000h to 0020h	Set the points used for input word device. (The size used is 1 word × set value.) • 0000h to 0020h: 0 to 32
0213	*WDINA	Input word device start No.	0000h	—	[MC200] 0000h to 00FFh [MC300] 0000h to 02FFh	Set the start of the input word device No. assigned to RWr. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. [When use "1: I/O device table (MR-MC2_ _ method)" is set]] • 0000h to 00FFh: Input word device 00 to Input word device FF [When use "2: I/O device table (expanded points method)" is set] [MC300] • 0000h to 023Fh: Input word device 00 to Input word device 23F <Example> When the input points are 2, and input word device 06 is specified as the start Assign input word devices 06 to 07.
0214	*BDOO	Output bit device points	0000h	—	0000h to 0200h	Set the points used for output bit device. (Only a multiple of 16 can be selected.) • 0000h to 0200h: 0 to 512

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
0215	*BDONA	Output bit device start No.	0000h	—	[MC200] 0000h to 0FF0h [MC300] 0000h to 2FF0h	Set the start of the output bit device No. assigned to RY. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. (Only a multiple of 16 can be selected.) [When use "1: I/O device table (MR-MC2_ _ method)" is set]] • 0000h to 0FF0h: DVO_000 to DVO_FF0 [When use "2: I/O device table (expanded points method)" is set] [MC300] • 0000h to 23F0h: DVO_000 to DVO_23F0 <Example> When the output points are 64, and output bit device 040 is specified as the start Assign the 64 points of DVO_040 to DVO_07F.
0216	*WDOO	Output word device points	0000h	—	0000h to 0020h	Set the points used for output word device. (The size used is 1 word × set value.) • 0000h to 0020h: 0 to 32
0217	*WDONA	Output word device start No.	0000h	—	[MC200] 0000h to 00FFh [MC300] 0000h to 02FFh	Set the start of the output word device No. assigned to RWw. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. [When use "1: I/O device table (MR-MC2_ _ method)" is set]] • 0000h to 00FFh: Output word device 00 to Input word device FF [When use "2: I/O device table (expanded points method)" is set] [MC300] • 0000h to 023Fh: Output word device 00 to Output word device 23F <Example> When the output points are 2, and output word device 08 is specified as the start Assign output word devices 08 to 09.
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. • 0000h: Mitsubishi Electric
021E	*CODE	Type code	3000h	—	0000h to FFFFh	Set the type code. • 3000h: SSCNETⅢ/H head module • 3010h: Sensing SSCNETⅢ/H head module • 3011h: Sensing SSCNETⅢ/H head module + Sensing I/O module • 3012h: Sensing SSCNETⅢ/H head module + Sensing pulse I/O module • 3013h: Sensing SSCNETⅢ/H head module + Sensing analog I/O module • 3014h: Sensing SSCNETⅢ/H head module + Sensing encoder I/F module • 3021h: Sensing I/O module • 3022h: Sensing pulse I/O module • 3023h: Sensing analog I/O module • 3024h: Sensing encoder I/F module

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

- Set "1: Use I/O device table (MR-MC2_ _ method)" or "2: Use I/O device table (expanded points method) [MC300]" for "I/O table selection" of "I/O table (parameter No.004A)". When "0: Use digital I/O table" is set, "System Setting Error (operation alarm 38H, detail 05H to 06H)" occurs.
- Assign the I/O device table not to overlap other settings. If the assignment is overlapped or exceeds the maximum points of the I/O device table, "I/O No. Assignment Error (system error E510H)" and "I/O No. Assignment Setting Error (RIO control alarm 39H, detail 01H and 02H)" occur.
- For the points used for I/O devices, refer to the sensing module instruction manual.

RIO status bit

The addresses in the table are the addresses for the first station. For the second station and after, add the following value for each station.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +C0h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3440	00F060	0	RURDY	Receiving controller ready on
		1	RUA	Outputting DO
		2	—	For manufacturer setting
		3		
		4		
		5	RUALM	RIO module alarm
		6	RUWRN	RIO module warning
		7	—	For manufacturer setting

■Details on RIO status bit

Symbol	Signal name	Function details
RURDY	Receiving controller ready on	Show the operating status of remote I/O module. • RURDY: OFF, RUA: OFF No communication • RURDY: ON, RUA: OFF Stop • RURDY: ON, RUA: ON Run • RURDY: OFF, RUA: ON Error
RUA	Outputting DO	

Point

When "I/O No. Assignment Error (system error E510H)", and "I/O Table Select Error (system error E511H)" have occurred, the outputting DO signal (RUA) does not turn ON.

I/O device table

■Input device table

Address (hexadecimal)		Input word device No.	Input bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DB00	0F9F00	Input word device 00 (2bytes)	Input bit device 000 to input bit device 00F	DVI_000 to DVI_00F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_000 (bit0) to DVI_00F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB02	0F9F02	Input word device 01 (2bytes)	Input bit device 010 to input bit device 01F	DVI_010 to DVI_01F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_010 (bit0) to DVI_01F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB04	0F9F04	Input word device 02 (2bytes)	Input bit device 020 to input bit device 02F	DVI_020 to DVI_02F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_020 (bit0) to DVI_02F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB06	0F9F06	Input word device 03 (2bytes)	Input bit device 030 to input bit device 03F	DVI_030 to DVI_03F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_030 (bit0) to DVI_03F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB08	0F9F08	Input word device 04 (2bytes)	Input bit device 040 to input bit device 04F	DVI_040 to DVI_04F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_040 (bit0) to DVI_04F (bit15). ■When word device is assigned Notify the status of the word device input signal.
DB0A	0F9F0A	Input word device 05 (2bytes)	Input bit device 050 to input bit device 05F	DVI_050 to DVI_05F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_050 (bit0) to DVI_05F (bit15). ■When word device is assigned Notify the status of the word device input signal.
⋮	⋮	⋮	⋮	⋮	⋮
DCFE	0FA0FE	Input word device FF (2bytes)	Input bit device FF0 to input bit device FFF	DVI_FF0 to DVI_FFF	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_FF0 (bit0) to DVI_FFF (bit15). ■When word device is assigned Notify the status of the word device input signal.
—	0FA100	Input word device 100 (2bytes) (expanded points method)	Input bit device 1000 to input bit device 100F (expanded points method)	DVI_1000 to DVI_100F	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_1000 (bit0) to DVI_100F (bit15). ■When word device is assigned Notify the status of the word device input signal.
	⋮	⋮	⋮	⋮	⋮
	0FA37E	Input word device 23F (2bytes) (expanded points method)	Input bit device 23F0 to input bit device 23FF (expanded points method)	DVI_23F0 to DVI_23FF	■When bit device is assigned Notify the status of the bit device input signal. The bits are DVI_23F0 (bit0) to DVI_23FF (bit15). ■When word device is assigned Notify the status of the word device input signal.

■Output device table

Address (hexadecimal)		Output word device No.	Output bit device No.	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _				
DD00	0FA380	Output word device 00 (2bytes)	Output bit device 000 to output bit device 00F	DVO_000 to DVO_00F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_000 (bit0) to DVO_00F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD02	0FA382	Output word device 01 (2bytes)	Output bit device 010 to output bit device 01F	DVO_010 to DVO_01F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_010 (bit0) to DVO_01F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD04	0FA384	Output word device 02 (2bytes)	Output bit device 020 to output bit device 02F	DVO_020 to DVO_02F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_020 (bit0) to DVO_02F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD06	0FA386	Output word device 03 (2bytes)	Output bit device 030 to output bit device 03F	DVO_030 to DVO_03F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_030 (bit0) to DVO_03F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD08	0FA388	Output word device 04 (2bytes)	Output bit device 040 to output bit device 04F	DVO_040 to DVO_04F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_040 (bit0) to DVO_04F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
DD0A	0FA38A	Output word device 05 (2bytes)	Output bit device 050 to output bit device 05F	DVO_050 to DVO_05F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_050 (bit0) to DVO_05F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
⋮	⋮	⋮	⋮	⋮	⋮
DEFE	0FA57E	Output word device FF (2bytes)	Output bit device FF0 to output bit device FFF	DVO_FF0 to DVO_FFF	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_FF0 (bit0) to DVO_FFF (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
—	0FA580	Output word device 100 (2bytes) (expanded points method)	Output bit device 1000 to output bit device 100F (expanded points method)	DVO_1000 to DVO_100F	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_1000 (bit0) to DVO_100F (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.
	⋮	⋮	⋮	⋮	⋮
	0FA7FE	Output word device 23F (2bytes) (expanded points method)	Output bit device 23F0 to output bit device 23FF (expanded points method)	DVO_23F0 to DVO_23FF	■When bit device is assigned Turn ON/OFF the bit device output signal. The bits are DVO_23F0 (bit0) to DVO_23FF (bit15). ■When word device is assigned Turn ON/OFF the word device output signal.

Sensing module link devices

The contents of the devices (input: RX, RWr/output: RY, RWw) for storage of link data for communicating between the position board and sensing module (station mode) are different for each module. The contents of the devices for storage of link data for each module are shown below.

■Sensing SSCNETⅢ/H head module

- Input device: bit data area (RX)

Offset*1	Signal name	Description
+0	External input DI1	Store the input state of DI1 to DI12 of sensing SSCNETⅢ/H head module. • 0: OFF • 1: ON
+1	External input DI2	
+2	External input DI3	
+3	External input DI4	
+4	External input DI5	
+5	External input DI6	
+6	External input DI7	
+7	External input DI8	
+8	External input DI9	
+9	External input DI10	
+10	External input DI11	
+11	External input DI12	
+12	Unusable	—
⋮		
+15		
+16	DO1 output enabling	Store the output enable state of DO1 and DO2 of sensing SSCNETⅢ/H head module. • 0: Disable • 1: Enable
+17	DO2 output enabling	
+18	Unusable	—
⋮		
+31		

*1 The offset is the bit units from the start of the input device table that assigned the input bit device.

- Input device: word data area (RWr)

Offset*1	Signal name	Description
+0	DO output state (for each DO signal)	Store the DO output state of the sensing SSCNETⅢ/H head module.
+1	Unusable	—
⋮		
+31		

*1 The offset is the word units from the start of the input device table that assigned the input bit device.

- Output device: bit data area (RY)

Offset[*1]	Signal name	Description
+0	External output DO1	Set the command for DO1, DO2 of sensing SSCNETⅢ/H head module. • 0: OFF • 1: ON
+1	External output DO2	
+2	Unusable	—
⋮		
+15		
+16	DO1 output enable	Enable output of DO1, DO2 of the sensing SSCNETⅢ/H head module. • 0: Disable • 1: Enable
+17	DO2 output enable	
+18	Unusable	—
⋮		
+31		

*1 The offset is the bit units from the start of the output device table that assigned the output bit device.

- Output device: word data area (RWw)

Offset[*1]	Signal name	Description
+0	Unusable	—
⋮		
+31		

*1 The offset is the word units from the start of the output device table that assigned the output bit device.

■Sensing SSCNETⅢ/H head module + Sensing extension module

- Input device: bit data area (RX)

Offset*1	Signal name	Description
+0	External input DI1	Store the input state of DI1 to DI12 of sensing SSCNETⅢ/H head module. • 0: OFF • 1: ON
+1	External input DI2	
+2	External input DI3	
+3	External input DI4	
+4	External input DI5	
+5	External input DI6	
+6	External input DI7	
+7	External input DI8	
+8	External input DI9	
+9	External input DI10	
+10	External input DI11	
+11	External input DI12	
+12	Unusable	—
⋮		
+15		
+16	DO1output enabling	Store the output enable state of DO1 and DO2 of sensing SSCNETⅢ/H head module. • 0: Disable • 1: Enable
+17	DO2output enabling	
+18	Unusable	—
⋮		
+31		
+32	Sensing extension module bit data area	Store the bit data area (RX) of the sensing extension module set to first station.
⋮		
+63		

*1 The offset is the bit units from the start of the input device table that assigned the input bit device.

- Input device: word data area (RWr)

Offset*1	Signal name	Description
+0	DO output state(for each DO signal)	Store the DO output state of the sensing SSCNETⅢ/H head module.
+1	Unusable	—
⋮		
+5		
+6	Sensing extension module word data area	Store the word data area (RWr) of the sensing extension module set to first station.
⋮		
+27		

*1 The offset is the word units from the start of the input device table that assigned the input bit device.

• Output device: bit data area (RY)

Offset[*1]	Signal name	Description
+0	External output DO1	Set the command for DO1, DO2 of sensing SSCNETⅢ/H head module. • 0: OFF • 1: ON
+1	External output DO2	
+2	Unusable	—
⋮		
+15		
+16	DO1 output enable	Enable output of DO1, DO2 of the sensing SSCNETⅢ/H head module. • 0: Disable • 1: Enable
+17	DO2 output enable	
+18	Unusable	—
⋮		
+31		
+32	Sensing extension module bit data area	Store the bit data area (RY) of the sensing extension module set to first station.
⋮		
+63		

*1 The offset is the bit units from the start of the output device table that assigned the output bit device.

• Output device: word data area (RWw)

Offset[*1]	Signal name	Description
+0	Unusable	—
⋮		
+5		
+6	Sensing extension module word data area	Store the word data area (RWw) of the sensing extension module set to first station.
⋮		
+27		

*1 The offset is the word units from the start of the output device table that assigned the output bit device.

■Sensing I/O module

- Input device: bit data area (RX)

Offset*1	Signal name	Description
+0	External input DI1	Store the input state of DI1 to DI16 of sensing I/O module. • 0: OFF • 1: ON
+1	External input DI2	
+2	External input DI3	
+3	External input DI4	
+4	External input DI5	
+5	External input DI6	
+6	External input DI7	
+7	External input DI8	
+8	External input DI9	
+9	External input DI10	
+10	External input DI11	
+11	External input DI12	
+12	External input DI13	
+13	External input DI14	
+14	External input DI15	
+15	External input DI16	
+16	DO1 output enabling	Store the output enable state of DO1 to DO16 of sensing I/O module. • 0: Disable • 1: Enable
+17	DO2 output enabling	
+18	DO3 output enabling	
+19	DO4 output enabling	
+20	DO5 output enabling	
+21	DO6 output enabling	
+22	DO7 output enabling	
+23	DO8 output enabling	
+24	DO9 output enabling	
+25	DO10 output enabling	
+26	DO11 output enabling	
+27	DO12 output enabling	
+28	DO13 output enabling	
+29	DO14 output enabling	
+30	DO15 output enabling	
+31	DO16 output enabling	

*1 The offset is the bit units from the start of the input device table that assigned the input bit device.

- Input device: word data area (RWr)

Offset*1	Signal name	Description
+0	DO output state (for each DO signal)	Store the DO output state of the sensing I/O module.
+1	Unusable	—
⋮		
+21		

*1 The offset is the word units from the start of the input device table that assigned the input bit device.

- Output device: bit data area (RY)

Offset[*1]	Signal name	Description
+0	External output DO1	Set the command for DO1 to DO16 of sensing I/O module. • 0: OFF • 1: ON
+1	External output DO2	
+2	External output DO3	
+3	External output DO4	
+4	External output DO5	
+5	External output DO6	
+6	External output DO7	
+7	External output DO8	
+8	External output DO9	
+9	External output DO10	
+10	External output DO11	
+11	External output DO12	
+12	External output DO13	
+13	External output DO14	
+14	External output DO15	
+15	External output DO16	
+16	DO1 output enable	Enable output of DO1 to DO16 of the sensing I/O module. • 0: Disable • 1: Enable
+17	DO2 output enable	
+18	DO3 output enable	
+19	DO4 output enable	
+20	DO5 output enable	
+21	DO6 output enable	
+22	DO7 output enable	
+23	DO8 output enable	
+24	DO9 output enable	
+25	DO10 output enable	
+26	DO11 output enable	
+27	DO12 output enable	
+28	DO13 output enable	
+29	DO14 output enable	
+30	DO15 output enable	
+31	DO16 output enable	

*1 The offset is the bit units from the start of the output device table that assigned the output bit device.

- Output device: word data area (RWw)

Offset[*1]	Signal name	Description
+0	Unusable	—
⋮		
+21		

*1 The offset is the word units from the start of the output device table that assigned the output bit device.

■Sensing pulse I/O module

- Input device: bit data area (RX)

Offset*1	Signal name		Description
+0	CN1	External input DI1A	Store the input state of CN1-DI1A to CN1-DI7A of sensing pulse I/O module. • 0: OFF • 1: ON
+1		External input DI2A	
+2		External input DI3A	
+3		External input DI4A	
+4		External input DI5A	
+5		External input DI6A	
+6		External input DI7A	
+7		Unusable	—
+8		DO1A output enabling	Store the output enable state of CN1-DO1A to CN1-DO5A of sensing pulse I/O module. • 0: Disable • 1: Enable
+9		DO2A output enabling	
+10		DO3A output enabling	
+11		DO4A output enabling	
+12		DO5A output enabling	
+13		Unusable	—
+14			
+15			
+16	CN2	External input DI1B	Store the input state of CN2-DI1B to CN2-DI7B of sensing pulse I/O module. • 0: OFF • 1: ON
+17		External input DI2B	
+18		External input DI3B	
+19		External input DI4B	
+20		External input DI5B	
+21		External input DI6B	
+22		External input DI7B	
+23		Unusable	—
+24		DO1B output enabling	Store the output enable state of CN2-DO1B to CN2-DO5B sensing pulse I/O module. • 0: Disable • 1: Enable
+25		DO2B output enabling	
+26		DO3B output enabling	
+27		DO4B output enabling	
+28		DO5B output enabling	
+29		Unusable	—
+30			
+31			

*1 The offset is the bit units from the start of the input device table that assigned the input bit device.

• Input device: word data area (RWr)

Offset[*1]	Signal name		Description
+0	CN1	Pulse accumulated value	Store the pulse accumulated value input to CN1 of sensing pulse I/O module.
+1			
+2		Latch counter DI4A (pulse counter value)	Store the pulse count value when the CN1-DI4A of sensing pulse I/O module were input.
+3			
+4		DO output state (for each DO signal)	Store the output state of CN1-DO of sensing pulse I/O module.
+5		Unusable	—
+6			
+7			
+8	CN2	Pulse accumulated value	Store the pulse accumulated value input to CN2 of sensing pulse I/O module.
+9			
+10		Latch counter DI4B (pulse counter value)	Store the pulse count value when the CN2-DI4B of sensing pulse I/O module were input.
+11			
+12		DO output state (for each DO signal)	Store the output state of CN2-DO of sensing pulse I/O module.
+13		Unusable	—
+14			
+15			
+16	Unusable		—
⋮			
+21			

*1 The offset is the word units from the start of the input device table that assigned the input bit device.

- Output device: bit data area (RY)

Offset[*1]	Signal name		Description
+0	CN1	External output DO1A	Set the command for CN1-DO1A to CN1-DO5A of sensing pulse I/O module. • 0: OFF • 1: ON
+1		External output DO2A	
+2		External output DO3A	
+3		External output DO4A	
+4		External output DO5A	
+5		Unusable	—
+6			
+7			
+8		DO1A output enable	Enable output of CN1-DO1A to CN1-DO5A of sensing pulse I/O module. • 0: Disable • 1: Enable
+9		DO2A output enable	
+10		DO3A output enable	
+11		DO4A output enable	
+12		DO5A output enable	
+13		Unusable	—
+14			
+15			
+16	CN2	External output DO1B	Set the command for CN2-DO1B to CN2-DO5B of sensing pulse I/O module. • 0: OFF • 1: ON
+17		External output DO2B	
+18		External output DO3B	
+19		External output DO4B	
+20		External output DO5B	
+21		Unusable	—
+22			
+23			
+24		DO1B output enable	Enable output of CN2-DO1B to CN2-DO5B of sensing pulse I/O module. • 0: Disable • 1: Enable
+25		DO2B output enable	
+26		DO3B output enable	
+27		DO4B output enable	
+28		DO5B output enable	
+29		Unusable	—
+30			
+31			

*1 The offset is the bit units from the start of the output device table that assigned the output bit device.

- Output device: word data area (RWw)

Offset[*1]	Signal name		Description
+0	CN1	Pulse command value	Set the accumulated pulses since the power supply ON of the control circuit that are output from CN1 of sensing pulse I/O module.
+1			
+2		ON timing (For pulse coincidence output function)	Set the ON timing when counter coincidence DO output is enabled.
+3			
+4		OFF timing (For pulse coincidence output function)	Set the OFF timing when counter coincidence DO output is enabled.
+5			
+6		Unusable	—
+7			
+8	CN2	Pulse command value	Set the accumulated pulses since the power supply ON of the control circuit that are output from CN2 of sensing pulse I/O module.
+9			
+10		ON timing (For pulse coincidence output function)	Set the ON timing when counter coincidence DO output is enabled.
+11			
+12		OFF timing (For pulse coincidence output function)	Set the OFF timing when counter coincidence DO output is enabled.
+13			
+14		Unusable	—
+15			
+16	Unusable		—
⋮			
+21			

*1 The offset is the word units from the start of the output device table that assigned the output bit device.

■Sensing analog I/O module

- Input device: bit data area (RX)

Offset[*1]	Signal name	Description
+0	Analog output signal CH1	Store the output state of analog output CH1 to CH4 of sensing analog I/O module. • 0: Stopped • 1: Outputting
+1	Analog output signal CH2	
+2	Analog output signal CH3	
+3	Analog output signal CH4	
+4	Unusable	—
⋮		
+31		

*1 The offset is the bit units from the start of the input device table that assigned the input bit device.

- Input device: word data area (RWr)

Offset[*1]	Signal name	Description
+0	Maximum/Minimum value reset complete	Store the reset state of maximum/minimum value. • b0 ··· 0: CH1 resetting, 1: CH1 reset complete • b1 ··· 0: CH2 resetting, 1: CH2 reset complete • b2 ··· 0: CH3 resetting, 1: CH3 reset complete • b3 ··· 0: CH4 resetting, 1: CH4 reset complete
+1	Unusable	—
+2	Digital value of analog input CH1	Convert the scaled value of voltage input to analog input CH1 to CH4 of sensing analog I/O module, and transfer to the position board.
+3	Digital value of analog input CH2	
+4	Digital value of analog input CH3	
+5	Digital value of analog input CH4	
+6	Analog input channel average value Setting 1	Store the average value of data for the CH set to analog input average 1 and 2.
+7	Analog input channel average value Setting 2	
+8	Analog input maximum CH1	Store the maximum value of voltage input to analog input CH1 to CH4 of sensing analog I/O module.
+9	Analog input maximum CH2	
+10	Analog input maximum CH3	
+11	Analog input maximum CH4	
+12	Analog input minimum CH1	Store the minimum value of voltage input to analog input CH1 to CH4 of sensing analog I/O module.
+13	Analog input minimum CH2	
+14	Analog input minimum CH3	
+15	Analog input minimum CH4	
+16	Unusable	—
⋮		
+21		

*1 The offset is the word units from the start of the input device table that assigned the input bit device.

- Output device: bit data area (RY)

Offset[*1]	Signal name	Description
+0	Analog output enable CH1	Enable output of CH1 to CH4 of the sensing analog I/O module. • 0: Disable • 1: Enable
+1	Analog output enable CH2	
+2	Analog output enable CH3	
+3	Analog output enable CH4	
+4	Unusable	—
⋮		
+31		

*1 The offset is the bit units from the start of the output device table that assigned the output bit device.

- Output device: word data area (RWw)

Offset[*1]	Signal name	Description
+0	Maximum/Minimum value reset request	Store the reset state of maximum/minimum value. • b0 ··· 0: CH1 reset command OFF, 1: CH1 reset command ON • b1 ··· 0: CH2 reset command OFF, 1: CH2 reset command ON • b2 ··· 0: CH3 reset command OFF, 1: CH3 reset command ON • b3 ··· 0: CH4 reset command OFF, 1: CH4 reset command ON
+1	Unusable	—
+2	Digital value of analog output CH1	Set the voltage output by CH1 to CH4 of sensing analog I/O module with the scaled internal value.
+3	Digital value of analog output CH2	
+4	Digital value of analog output CH3	
+5	Digital value of analog output CH4	
+6	Unusable	—
⋮		
+21		

*1 The offset is the word units from the start of the output device table that assigned the output bit device.

■Sensing encoder I/F module

- Input device: bit data area (RX)

Offset[*1]	Signal name	Description
+0	Unusable	—
⋮		
+31		

*1 The offset is the bit units from the start of the input device table that assigned the input bit device.

- Input device: word data area (RWr)

Offset[*1]	Signal name		Description
+0	CH.A	Encoder information 1	Transfer all data acquired from the encoder connected to CH.A of sensing encoder input I/F module. The information that can be acquired differs by encoder.
+1			
+2		Encoder information 2	
+3			
+4		Encoder information 3	
+5			
+6		Encoder current value (signed 32-bit data)	Transfer the current position data of the encoder connected to CH.A of sensing encoder input I/F module.
+7			
+8		Encoder error information	Transfer the alarm information of the encoder connected to CH.A of sensing encoder input I/F module. • b0 to b1 ··· Not used • b2 ··· 0: No alarm, 1: Alarm • b3 to bF ··· Not used
+9		Unusable	—
+10	CH.B	Encoder information 1	Transfer all data acquired from the encoder connected to CH.B of sensing encoder input I/F module. The information that can be acquired differs by encoder.
+11		Encoder information 2	
+12		Encoder information 3	
+13		External input signal DI2 latch counter	
+14		External input signal DI3 latch counter	
+15		External input signal DI4 latch counter	
+16		Encoder current value (signed 32-bit data)	Transfer the current position data of the encoder connected to CH.B of sensing encoder input I/F module.
+17			
+18		Encoder error information	Transfer the alarm information of the encoder connected to CH.B of sensing encoder input I/F module. • b0 to b1 ··· Not used • b2 ··· 0: No alarm, 1: Alarm • b3 to bF ··· Not used
+19		Unusable	—
+20	Unusable		—
+21			

*1 The offset is the word units from the start of the input device table that assigned the input bit device.

- Output device: bit data area (RY)

Offset[*1]	Signal name	Description
+0	Unusable	—
⋮		
+31		

*1 The offset is the bit units from the start of the output device table that assigned the output bit device.

- Output device: word data area (RWw)

Offset[*1]	Signal name	Description
+0	Unusable	—
⋮		
+21		

*1 The offset is the word units from the start of the output device table that assigned the output bit device.

Point

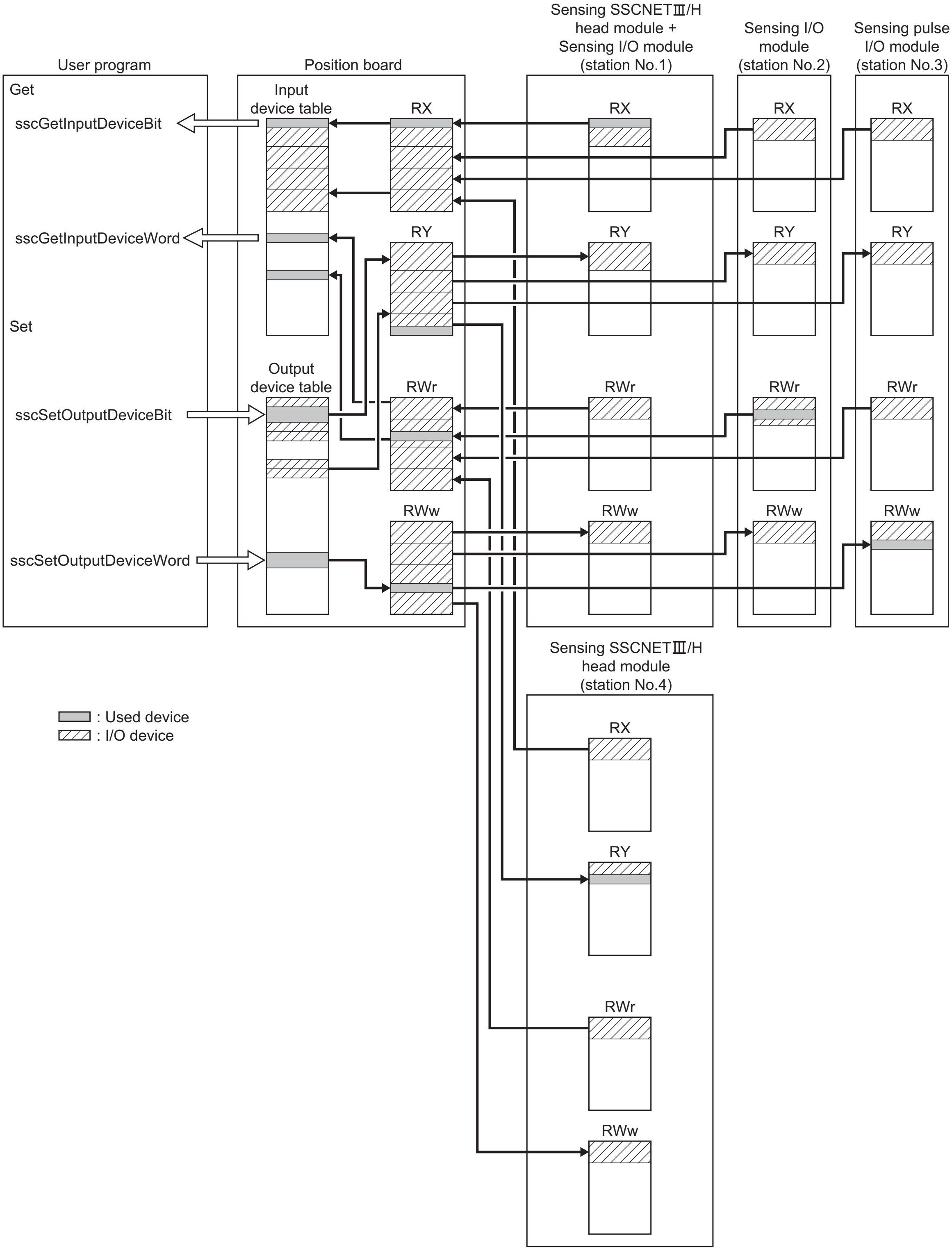
- When a communication error (system error E401H to E407H) occurs or SSCNET is disconnected, the status of the input device table is the same as "RI control at communication error" of "Control option 2 (parameter No.0201)". Also, for a sensing module that supports the output CLEAR/HOLD function, the status of the external DO signals of the sensing module is the same as the operation selection when communication is disconnected for DO☐ setting 1. For the output CLEAR/HOLD function settings, refer to the sensing module instruction manual.
- When "RI control at communication error" of "Control option 2 (parameter No.0201)" is set to "1: Maintain status", and the sensing module power supply is cut while the sensing module and position board are communicating, an incorrect value may be held in the input device table.
- When using remote I/O modules, set "I/O table selection" of "I/O table (parameter No.004A)" to "1: Use I/O device table (MR-MC2_ _ method)" or "2: Use I/O device table (expanded points method) [MC300]". When "0: Use digital I/O table" is set and I/O devices are assigned, "I/O Table Select Error (system error E511H)", and "System Setting Error (RIO control alarm 38H, detail 05H to 06H)" occur.
- Assign the I/O device not to overlap with other settings. If the assignment is overlapped or exceeds the range of the I/O device table, "I/O No. Assignment Error (system error E510H)" and "I/O No. Assignment Setting Error (RIO control alarm 39H, detail 01 and 02H)" occur.
- Set the total points of the I/O devices assigned to the remote I/O module when setting "I/O device points (parameter No.0210, 0212, 0214, and 0216)".
- The delay time for the input device table to be updated after the signals of a sensing module are input is the sensing module input response time + (control cycle × 2). For the input response time of sensing module, refer to the sensing module instruction manual.
- The delay time for the host personal computer to update the output device table, and signals of a sensing module to be output is the sensing module output response time + (control cycle × 3). Also, for output of output bit devices using the other axes start function, the delay time from when other axes start conditions are established is sensing module output response time + (control cycle × 2). For the output response time of sensing module, refer to the sensing module instruction manual.

Point

[API library]
- To get input bit device, use the sscGetInputDeviceBit function.
- To get input word device, use the sscGetInputDeviceWord function.
- To set output bit device, use the sscSetOutputDeviceBit function.
- To set output word device, use the sscSetOutputDeviceWord function.
- To get output bit device, use the sscGetOutputDeviceBit function.
- To get output word device, use the sscGetOutputDeviceWord function.

Example of setting procedure

The following shows the settings for two sensing modules (stations 1 to 3 and station 4).



6

Position board setting

■Type code setting

Set the type code and vendor ID according to the system configuration.

Station No.	Module	Parameter No.	Symbol[*1]	Name	Setting value
1	Sensing SSCNETⅢ/H head module + sensing I/O module	021D	*VEND	Vendor ID	0000h
		021E	*CODE	Type code	3011h
2	Sensing I/O module	021D	*VEND	Vendor ID	0000h
		021E	*CODE	Type code	3021h
3	Sensing pulse I/O module	021D	*VEND	Vendor ID	0000h
		021E	*CODE	Type code	3022h
4	Sensing SSCNETⅢ/H head module	021D	*VEND	Vendor ID	0000h
		021E	*CODE	Type code	3010h

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

■Link device setting

To allocate sensing module link devices to the position board I/O table, set the total number of points (in units of 16) of each link device, and the start I/O device No. to be assigned

- Station parameter

Module No.	Parameter No.	Symbol[*1]	Name	Setting value
1	0210	*BDIO	Input bit device points	0040h
	0211	*BDINA	Input bit device start No.	0000h
	0212	*WDIO	Input word device points	001Ch
	0213	*WDINA	Input word device start No.	0004h
	0214	*BDOO	Output bit device points	0040h
	0215	*BDONA	Output bit device start No.	0000h
	0216	*WDOO	Output word device points	001Ch
	0217	*WDONA	Output word device start No.	0004h
2	0210	*BDIO	Input bit device points	0040h
	0211	*BDINA	Input bit device start No.	0400h
	0212	*WDIO	Input word device points	0016h
	0213	*WDINA	Input word device start No.	0044h
	0214	*BDOO	Output bit device points	0040h
	0215	*BDONA	Output bit device start No.	0400h
	0216	*WDOO	Output word device points	0016h
	0217	*WDONA	Output word device start No.	0044h
3	0210	*BDIO	Input bit device points	0020h
	0211	*BDINA	Input bit device start No.	0800h
	0212	*WDIO	Input word device points	0016h
	0213	*WDINA	Input word device start No.	0084h
	0214	*BDOO	Output bit device points	0020h
	0215	*BDONA	Output bit device start No.	0800h
	0216	*WDOO	Output word device points	0016h
	0217	*WDONA	Output word device start No.	0084h
4	0210	*BDIO	Input bit device points	0020h
	0211	*BDINA	Input bit device start No.	0C00h
	0212	*WDIO	Input word device points	0016h
	0213	*WDINA	Input word device start No.	00C4h
	0214	*BDOO	Output bit device points	0020h
	0215	*BDONA	Output bit device start No.	0C00h
	0216	*WDOO	Output word device points	0016h
	0217	*WDONA	Output word device start No.	00C4h

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

■Setting/getting I/O devices with API functions

Examples of getting input devices and setting/getting output devices are shown in the table below.

Note that the board ID No. is 0, and channel No. is 1.

Station No.	Device name	Set/get	Setting value
1	RX	Get input bit device 000	int data; sscGetInputDeviceBit(0, 1, 0x0000, &data);
2	RWr	Get one word of input word device 3C	unsigned short data; sscGetInputDeviceWord(0, 1, 0x003C, 1, &data);
3	RY	Set output bit device 608 to ON	sscSetOutputDeviceBit(0, 1, 0x0608, SSC_ON);
4	RWw	Set output word device 52 to 000Ah (1 word)	sscSetOutputDeviceWord(0, 1, 0x0052, 1, 0x000A);

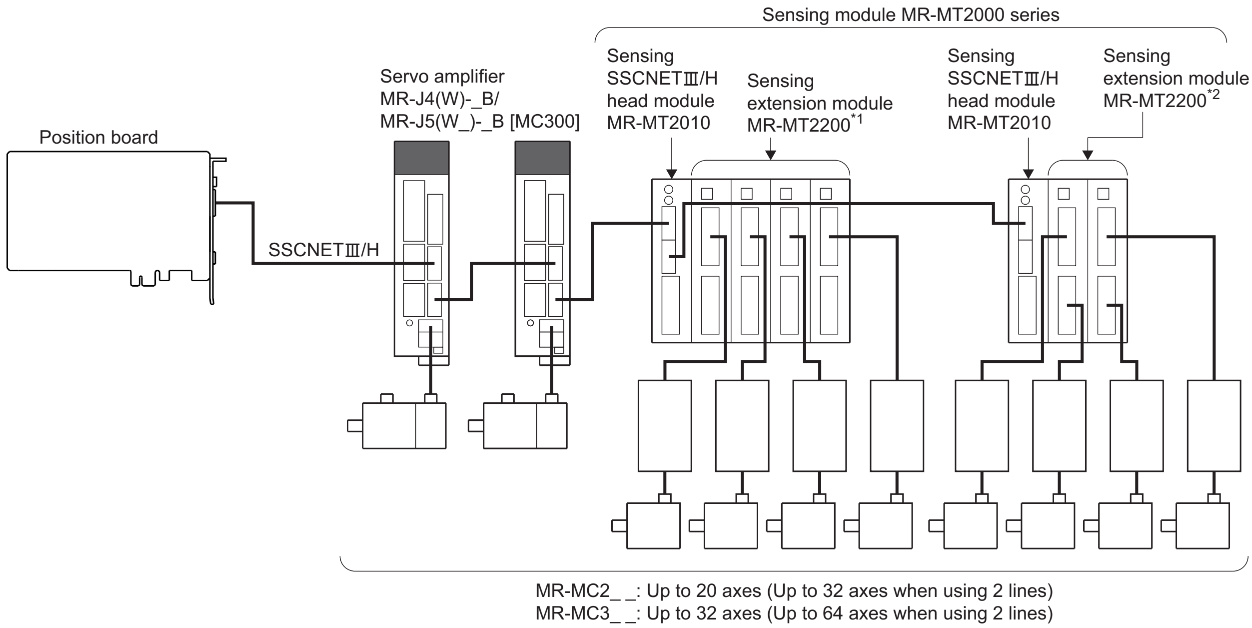
Sensing module disconnect

The system can be startup with the sensing module disconnected, and simulate can be performed by setting "1: Valid" for "Remote I/O disconnect" of "Control option 1 (parameter No.0200)" of the RIO module parameter.

However, the input bit devices allocated to sensing module are OFF, and input word devices are 0 and are not updated. Also, any changes made to the status of output bit devices and output word devices allocated to sensing module are not output to the sensing module. (The status of output bit devices and output word devices can only be confirmed.)

6.35 Sensing Module (Axis Mode) Connection

The sensing pulse I/O module of the sensing module can be connected as axis mode. By connecting as axis mode, the position board automatic operation etc. can be used to control pulses as if controlling a servo amplifier.
This section is for sensing module axis mode. Refer to the following when using the sensing module in station mode.
☞ Page 315 Sensing Module (Station Mode) Connection



*1 Feedback pulse input enabled
*2 Feedback pulse input disabled

Number of connecting axes on the sensing pulse I/O module

For sensing pulse I/O modules being used in axis mode, up to 4 axes can be connected per sensing SSCNETⅢ/H head module.
The number of axes that can be connected to a sensing pulse I/O module varies according to whether feedback pulse inputs are enabled/disabled. The number of axes that can be connected to a sensing pulse I/O module according to whether feedback pulse inputs are enabled/disabled are shown in the table below.

Feedback pulse input	Number of axes connected per sensing pulse I/O module
Enabled	1 axis
Disabled	2 axes

Specifications comparison with servo amplifier MR-J4(W_)-_B

The following is a table comparing the specifications when using a sensing pulse I/O module (axis mode) and servo amplifier (MR-J4(W_)-_B).

Classification	Function	Sensing pulse I/O module (axis mode)	Servo amplifier MR-J4(W_)-_B
Operational function	JOG operation	Available	Available
	Incremental feed	Available	Available
	Automatic operation	Available	Available
	Linear interpolation	Some restrictions	Available
	Circular interpolation [MC300]	Some restrictions	Available
	Home position return	Dog method, data set method, dog cradle method, limit switch combined method, limit switch front end method, dog front end method, Z-phase detection method (with restrictions)	Dog method, data set method, stopper method, dog cradle method, limit switch combined method, limit switch front end method, dog front end method, Z-phase detection method, scale home position signal detection method, scale home position signal detection method 2
	Home position reset function	Available	Available
Application function	Electronic gear	Available	Available
	Speed unit	Command units/min, Command units/s, r/min	Command units/min, Command units/s, r/min
	Acceleration/deceleration	Linear acceleration/deceleration, start up speed enable, S-curve acceleration/deceleration (sine acceleration/deceleration), jerk ratio acceleration/deceleration [MC300], vibration suppression command filter 1 [MC300]	Linear acceleration/deceleration, start up speed enable, S-curve acceleration/deceleration (sine acceleration/deceleration), jerk ratio acceleration/deceleration [MC300], vibration suppression command filter 1 [MC300]
	Servo off	Some restrictions	Available
	Stop function	Forced stop*1, stop operation, rapid stop operation	Forced stop, stop operation, rapid stop operation
	Limit switch	Available	Available
	Software limit	Available	Available
	Interlock	Available	Available
	Rough match output	Available	Available
	Torque limit	Not available	Available
	Command change	Position, speed, time constant	Position, speed, time constant
	Backlash	Available	Available
	Position switch	Some restrictions*2	Available
	Completion of operation signal	Available	Available
	Interference check	Some restrictions*2	Available
	Home position search limit	Available	Available
	Gain switching	Not available	Available
	PI-PID switching	Not available	Available
	Absolute position detection system	Not available	Available
	Home position return request	Available	Available
	Other axes start	Some restrictions*2	Available
	Pass position interrupt	Some restrictions*2	Available
	High response I/F	Available	Available
	In-position signal	Some restrictions	Available
	Digital I/O	Available	Available
	I/O device	Available	Available
	Servo amplifier general I/O	Some restrictions (start axis only)	Available
	Mark detection	Not available	Available
	Continuous operation to torque control	Not available	Available

Classification	Function	Sensing pulse I/O module (axis mode)	Servo amplifier MR-J4(W_)-_B
Auxiliary function	Reading/writing parameters	Available	Available
	Changing parameters at the servo	Not available	Available
	Alarm/system error	Available	Available
	Monitor	Some restrictions	Available
	High speed monitor	Some restrictions*3	Available
	Interrupt	Some restrictions	Available
	User watchdog function	Some restrictions*1	Available
	Parameter backup	Available	Available
	Test mode (with MR Configurator2)	Not available	Connection to MR Configurator2 via position board is available
	Reconnect/disconnect function	Available	Available
	Sampling	Available	Available
	Log	Available	Available
	Amplifier-less axis function	Some restrictions	Available
	Alarm history function	Available	Available
	Transient transmit	Available	Available
Tandem drive	Tandem drive	Not available	Available
Interface mode	Control mode switch	Not available (position control only)	Available
	Event detection	Some restrictions	Available
	Home position set	Not available	Available

*1 The operation at a forced stop input depends on the specifications of the sensing pulse I/O module (axis mode).

*2 When there is no feedback pulse input, the feedback position is determined as the position output to the driver by the sensing pulse I/O module.

*3 Electrical current feedback and position droop are not supported.

System startup

Power supply ON/power supply OFF

- At system startup, turn ON the control circuit power supply of all modules connected to the position board (servo amplifiers, sensing pulse I/O modules). Modules connected after modules whose control circuit power supply is not turned ON are unable to communicate with the position board. "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs in the position board, and the servo amplifiers and sensing pulse I/O modules are in a forced stop status.*1
- If the control circuit power supply of modules (servo amplifiers, sensing pulse I/O modules) is turned OFF while the system is running, communication with all the modules connected after the module whose control circuit power supply was turned OFF is disconnected, and "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs in the position board. Also, the axes connected to the sensing pulse I/O module stop according to the settings and specifications of the sensing pulse I/O module and drivers being used.

*1 Turn ON the control circuit power supply for modules even when they are not being controlled partially through operation ("Control axis" of "Control option 1 (parameter No.0200)" is "0: Not controlled").

Axis mode settings/feedback pulse input settings

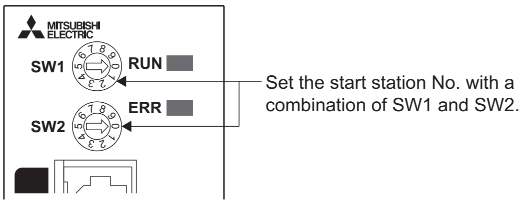
The axis mode setting of the sensing pulse I/O module and the feedback pulse input enable/disable setting are made with the mode select switch (SW1).

Mode select switch		Mode	Occupied axes	Description
SW1-1	SW1-2			
OFF	OFF	Axis mode	2 axes	A axis and B axis can be used in axis mode. Feedback pulse input cannot be used. (factory default) • CN1: A axis pulse output • CN2: B axis pulse output
ON	OFF	Axis mode	1 axis	A axis can be used in axis mode. • CN1: A axis pulse output • CN2: A axis feedback pulse input
OFF	ON	Axis mode	1 axis	B axis can be used in axis mode. • CN1: B axis feedback pulse input • CN2: B axis pulse output
ON	ON	Station mode	0 axes	A axis and B axis can be used in station mode.*1

*1 For the station mode connection method, refer to the following.
☞ Page 315 Sensing Module (Station Mode) Connection

Axis No. setting parameter

Axis No. settings are made with the sensing SSCNETⅢ/H head module station No. selection rotary switch.



The axis No. and station No. selection rotary switch combinations are correlated as shown on the table below. Set the axis No. so that it is not duplicate in the same line. If it is duplicated, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).

Station No. selection rotary switch		Sensing pulse I/O module (axis mode) axis No.[*1]			
SW1	SW2	Start axis	2nd axis	3rd axis	4th axis
0	0	d1	d2	d3	d4
	1	d2	d3	d4	d5
	2	d3	d4	d5	d6
	3	d4	d5	d6	d7
	4	d5	d6	d7	d8
	5	d6	d7	d8	d9
	6	d7	d8	d9	d10
	7	d8	d9	d10	d11
	8	d9	d10	d11	d12
	9	d10	d11	d12	d13
1	0	d11	d12	d12	d14
	1	d12	d13	d13	d15
	2	d13	d14	d14	d16
	3	d14	d15	d15	d17
	4	d15	d16	d16	d18
	5	d16	d17	d17	d19
	6	d17	d18	d18	d20
	7	d18	d19	d19	d21
	8	d19	d20	d10	d22
	9	d20	d21	d22	d23
2 [MC300]	0	d21	d22	d23	d24
	1	d22	d23	d24	d25
	2	d23	d24	d25	d26
	3	d24	d25	d26	d27
	4	d25	d26	d27	d28
	5	d26	d27	d28	d29
	6	d27	d28	d29	d30
	7	d28	d29	d30	d31
	8	d29	d30	d31	d32
	9	d30	d31	d32	*2
3 [MC300]	0	d31	d32	*2	
	1	d32	*2		

*1 When connecting sensing SSCNETⅢ/H head module + sensing extension module, the axis No. for the second sensing extension module and after is assigned in ascending order from the sensing SSCNETⅢ/H head module.

*2 Set so that the axis No. of last connected sensing extension module does not exceed the axis below. If the axis below is exceeded, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).
Using MR-MC2_ _: d20
Using MR-MC3_ _: d32

Point

The sensing I/O module (axis mode) axis No. and the axis No. to be managed on the position board are different. For details, refer to the following.

☞ Page 75 Axis No. assignment

Parameter setting

After parameter initialization, set the parameters according to the system such as for control cycle and external signal (sensor) input option.

■System option 1 setting

SSCNET communication method and control cycle are set by "System option 1 (parameter No.0001)". Set the SSCNET communication method to SSCNETⅢ/H method.

The number of axes that can be connected depends on the control cycle setting. The number of axes that can be connected (maximum number of axes connected) is the same as when a servo amplifier is used. For details, refer to the following.

☞ Page 72 System option 1 setting

Make sure the total number of axes used by the servo amplifier and sensing pulse I/O module (axis mode) do not exceed maximum number of axes connected.

■System option 2 setting

Set control mode (standard mode or interface mode) by "System option 2 (parameter No.0002)".

■Servo parameter setting

When the power supply is turned ON or after parameter initialization (system command code: 0003h), all of the servo parameters in the position board are the servo amplifier MR-J4(W_)-_B/MR-J5(W_)-_B [MC300] parameter initial values. Change all of the servo parameter settings for axis mode.

■Control option 1 setting

When controlling sensing pulse I/O module (axis mode), set "1: Control" for "Control axis" of "Control option 1 (parameter No.0200)" for all axes to be controlled.

When the axis No. is set out of the controllable range, "System Setting Error (operation alarm 38H, detail 01H)" occurs at the corresponding station, and the station cannot be controlled. If a module set to "1: Control" is in a state where communication cannot be made, such as not connected or control circuit power is OFF, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs the system startup (system command code: 000Ah), and the module is in a forced stop state.

Point

If "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs, it is possible to confirm which axis was set using an incorrect axis No. by confirming the information concerning axis that is not mounted (monitor No.0480H, 0481H) in the system information.

• Control parameter

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 2101h	■■■□ (Control axis) Set "1: Controlled" when controlling the servo amplifier. • 0: Not controlled • 1: Controlled ■□■■ (No home position) Set "1: Valid" when setting the position at the time of power on as the home position. After returning to the home position, the home position becomes the position where the home position return is performed. • 0: Invalid • 1: Valid □■■■ (Speed unit) Set the speed command unit. • 0: Position command unit/min • 1: Position command unit/s • 2: r/min

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

■Sensor input option setting

External signal (sensor) is connected by setting "Sensor input system" of "Sensor input options (parameter No.0219)". Setting is the same as when using a servo amplifier. For details, refer to the following.

☞ Page 78 Sensor input option setting

- When selecting "1: Driver input"

  The sensor (LSP, LSN, DOG) status connected to the driver is imported via SSCNET.

  When using sensing pulse I/O module, the sensor signal is connected to the following connectors.

Signal name	Destination connector pin No.		Symbol[*1]
	A-axis	B-axis	
LSP	CN1-9	CN2-9	FLS□
LSN	CN1-21	CN2-21	RLS□
DOG	CN1-10	CN2-10	DOG□

*1 □: A, B

Point

- For the sensor connection to the driver, refer to the instruction manual of the driver.
- If the communication error (system error E401H to E407H) occurs, the sensor (LSP, LSN, DOG) input status turns OFF.
- If the communication error (system error E400H) occurs, the input status of the corresponding axis turns OFF.

⚠CAUTION

When "1: Driver input" is selected as sensor destination for "Sensor input system" of "Sensor input options (parameter No.0219)", a delay occurs due to the communication to detect the signal status. Take the delay time due to communication into consideration when installing each sensor.

- Communication delay when control cycle is 0.88ms: approx. 2ms
- Communication delay when control cycle is 0.44ms: approx. 1.5ms
- Communication delay when control cycle is 0.22ms: approx. 1.3ms

- When selecting " 2: Digital or input device input"

  Same as when servo amplifier is used.
- When selecting "3: Not connected"

  Same as when servo amplifier is used.
- When selecting "4: Dual port memory input"

  Same as when servo amplifier is used.

■Vendor ID and type code setting

Available functions, parameter settings and ranges vary by servo amplifier, sensing pulse I/O module (axis mode), and the connected driver type.

At the time the communication with the sensing pulse I/O module has started, the position board performs consistency check between vendor ID and type code of the sensing pulse I/O module connected and the parameter set. If a consistency check error occurs, "Driver Type Code Error (system error E405H)" is output. Therefore, set the correct "Vendor ID (parameter No.021D)" or "Type code (parameter No.021E)".

- Control parameter

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. (SSCNETⅢ/H communication) • 0000h: Mitsubishi Electric
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Set the type code. • 3015h: Sensing SSCNETⅢ/H head module + sensing pulse I/O module (axis mode) • 3025h: Sensing pulse I/O module (axis mode)

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

- If "Driver Type Code Error (system error E405H)" occurred, the axis that has set an incorrect type code can be confirmed with "Type code erroneous axis information (monitor No.0484H, 0485H)".
- Set "Control axis" of "Control option 1 (parameter No.0200)" to "1: Controlled" to match the sensing pulse I/O module connected. When the connection status does not match, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs.

Operational function

When using a sensing pulse I/O module (axis mode), unlike when using a servo amplifier, there are restrictions in some operational functions.
The following describes details regarding restrictions.

Function	Restriction details
JOG operation	☞ Page 351 Interval time
Incremental feed	
Automatic operation	
Linear interpolation	
Circular interpolation [MC300]	
Home position return	☞ Page 352 Home position return
Home position reset	☞ Page 355 Home position reset function

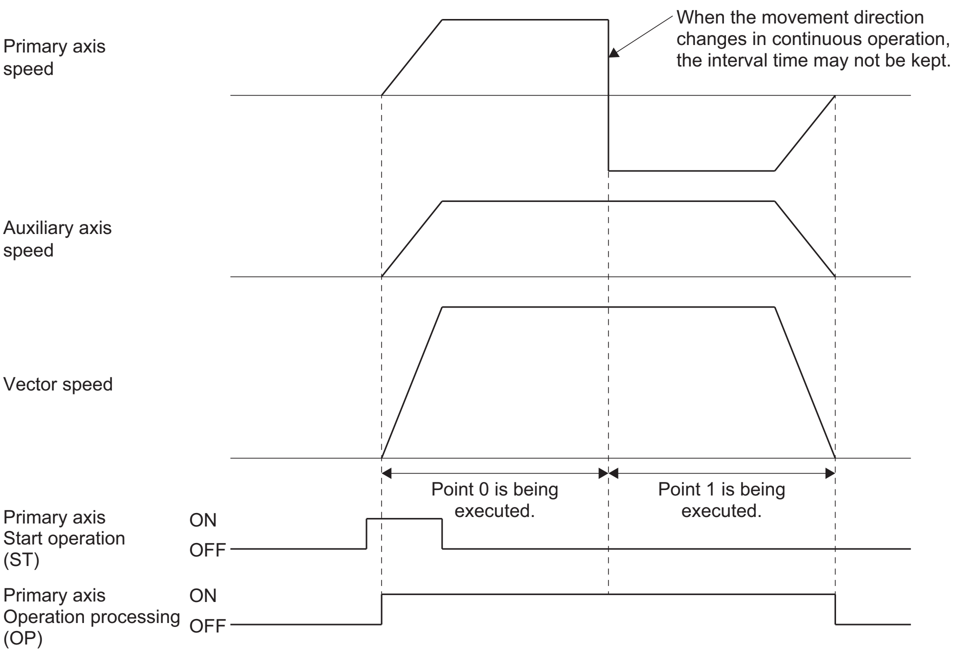
6

Interval time

When switching rotation direction for drivers such as stepping motors, there are normally restrictions on command pulse timing (interval time). Take the restrictions of the driver you are using into consideration when switching rotation direction and set a dwell time (the time when pulses are not output).

Ex.

When the movement direction changes in linear interpolation continuous operation
When the movement direction changes in continuous operation, the interval time may not be kept. Continuous operation cannot be used in this case. Instead, use the smoothing stop or in-position stop and adjust the interval time through dwell time.



Home position return

When using sensing pulse I/O module (axis mode), the methods that can be used and the operation of home position return are different from when a servo amplifier is used.

Method	Characteristics	Remarks
Home position return using a dog method	A method that starts deceleration at the front end dog, and uses the first zero point signal after the rear end dog for home position.	Because this method uses the zero point signal for home position, make sure to input the zero point signal to the sensing pulse I/O module.
Home position return using a data set method	A method that uses the current position as the home position when moving to a given position in JOG operation etc.	Dog and zero point signal are not required.
Home position return using a stopper method	A method that uses the position after a collision stop caused by JOG operation etc., as the home position.	Not supported.
Home position return using a dog cradle method	A method that starts deceleration at dog front end, returns to the dog front end once, and moves at creep speed again, using the first zero point signal after passing the dog front end as the home position.	Because this method uses the zero point signal for home position, make sure to input the zero point signal to the sensing pulse I/O module.
Home position return using a limit switch combined method	A method that uses the zero point signal prior to the limit switch of the opposite direction to the home position return direction as the home position.	
Home position return using a limit switch front end method	A method that uses the limit switch front end of the opposite direction to the home position return direction as the home position.	Dog and zero point signal are not required.
Home position return using a dog front end method	A method that starts deceleration at the dog front end, moves at creep speed in the opposite direction, and uses the position where dog front end is detected as the home position.	Zero point signal is not required.
Home position return using a Z-phase detection method	A method that uses the first zero point signal in the direction of the home position return as the home position. The shortcut direction for home position return cannot be used. Z-phase mask amount cannot be used.	Because this method uses the zero point signal for home position, make sure to input the zero point signal to the sensing pulse I/O module.
Home position return using a scale home position signal detection method	A method that uses the linear scale home position signal as the home position.	Not supported.
Home position return using a scale home position signal detection method 2		

Point

Home position return that uses an incremental linear scale is not supported. Unlike when using a servo amplifier, "Home position signal re-search" of "Home position return option 1 (parameter No.0240)" cannot be set to "1: Search again."

■Standby time after clear signal output

The standby time until the position for home position return is settled can be adjusted by setting "Standby time after clear signal output (parameter No.0252)". When feedback pulse input is enabled, and the position reference for home position is established before the position is settled, the home position return is completed with a discrepancy between the current position and the feedback position. In such cases, set "Standby time after clear signal output (parameter No.0252)" for both the system configuration and operation pattern.

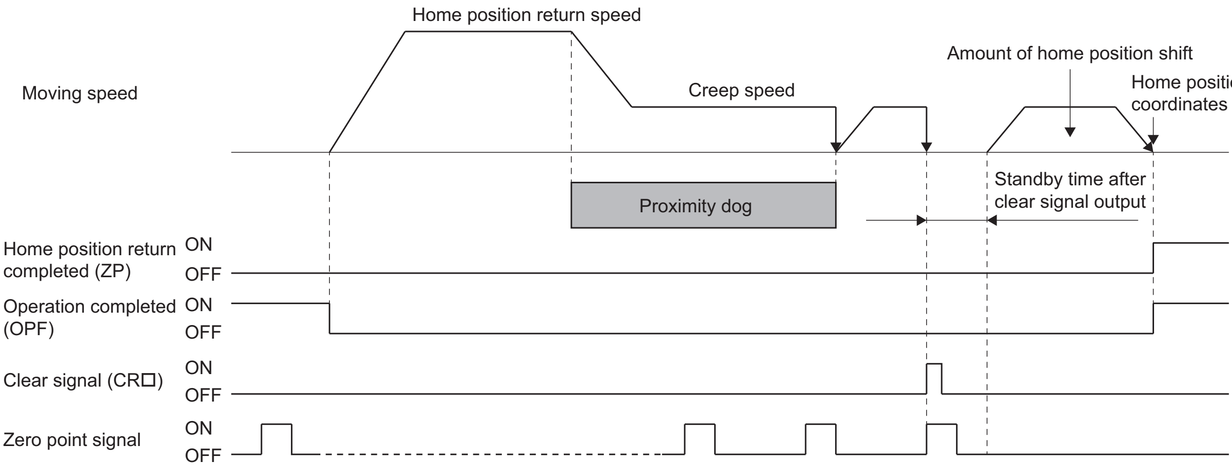
Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0252	COW	Standby time after clear signal output*1	0	ms	0 to 1000	Set the standby time from the clear signal output until position settling is completed during home position return. • 0: 100ms • 1 to 1000: 1 to 1000ms

*1 Set the standby time after clear signal output to a longer time than "Clear signal output pulse width time (parameter No.114B)" of the sensing pulse I/O module.

■Operation example for standby time after clear signal output

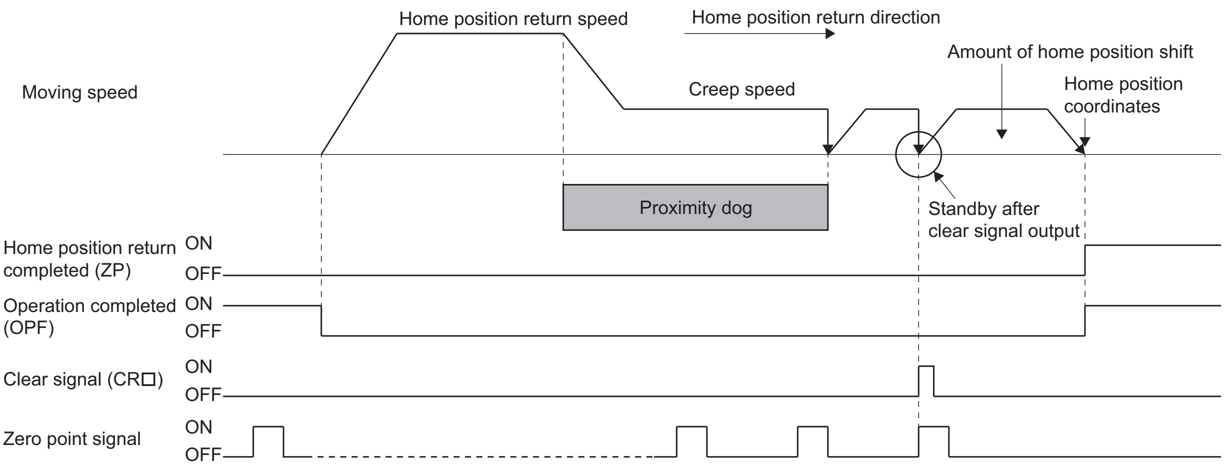
Standby time after clear signal output is the time it takes for position settling to be completed after the clear signal is output.

The operation example for standby time after clear signal output of home position return using a dog method is shown below.

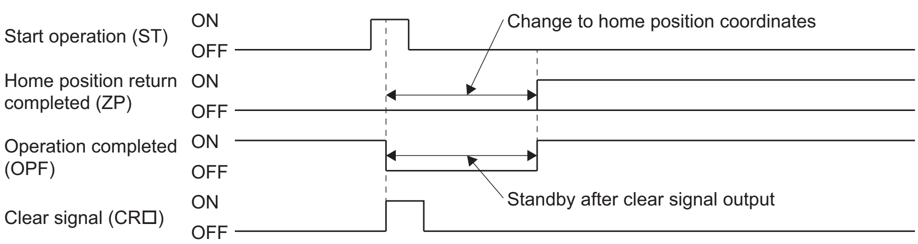


The operation example for standby after clear signal output for each home position return is shown below.

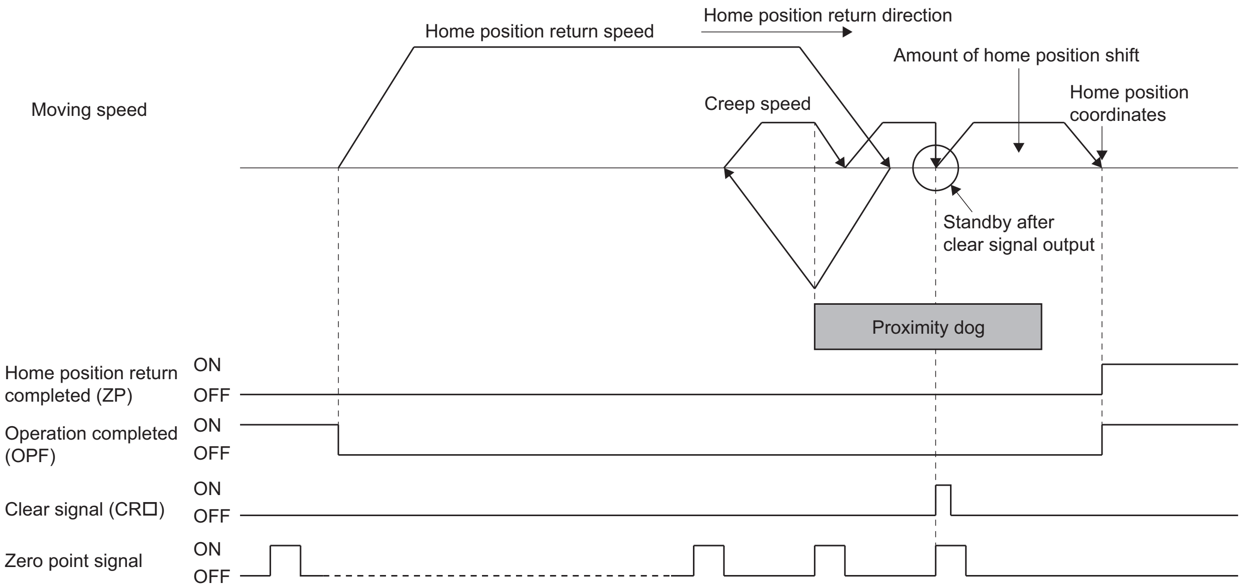
- Home position return using a dog method



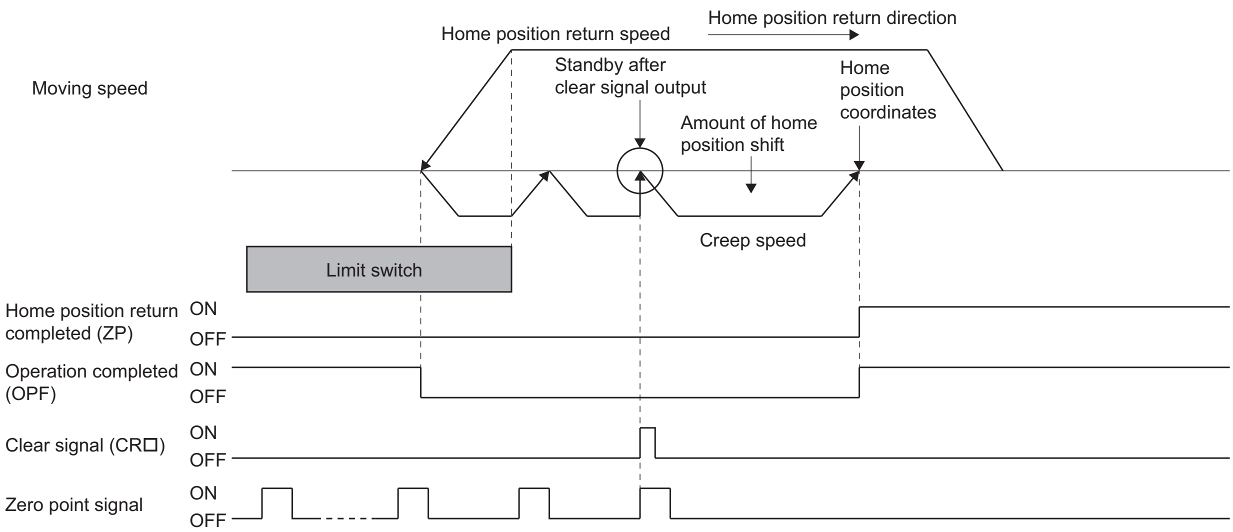
- Home position return using a data set method



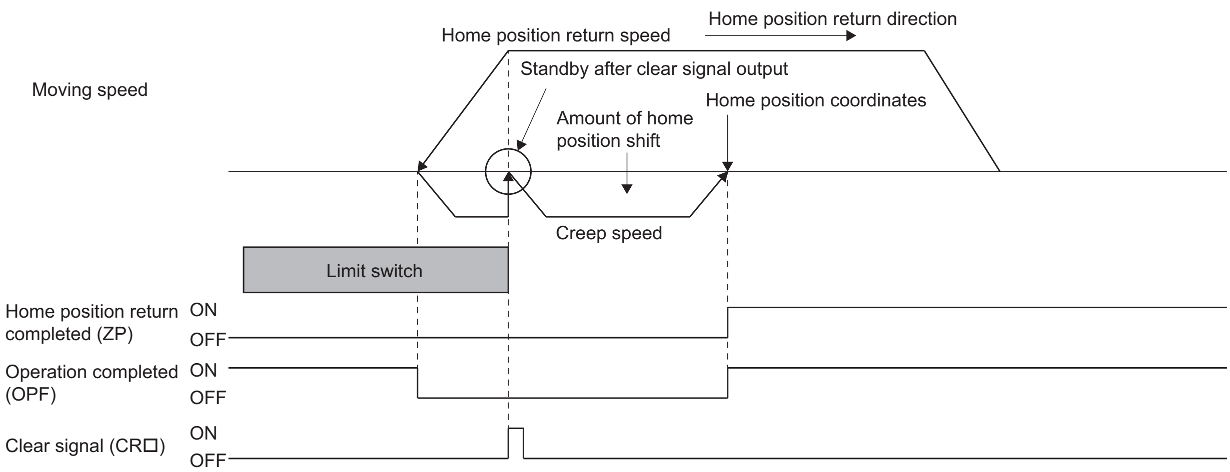
• Home position return using a dog cradle method



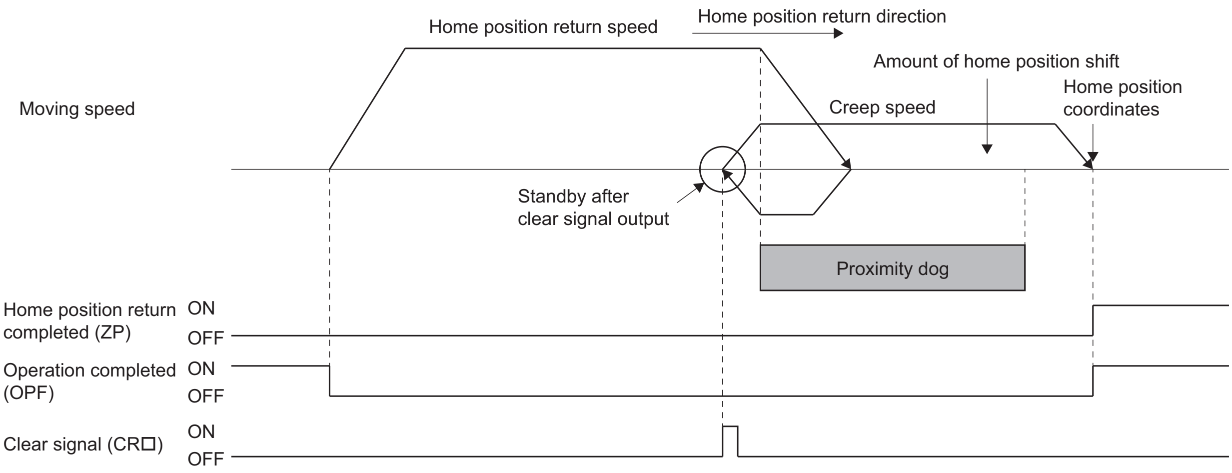
• Home position return using a limit switch combined method



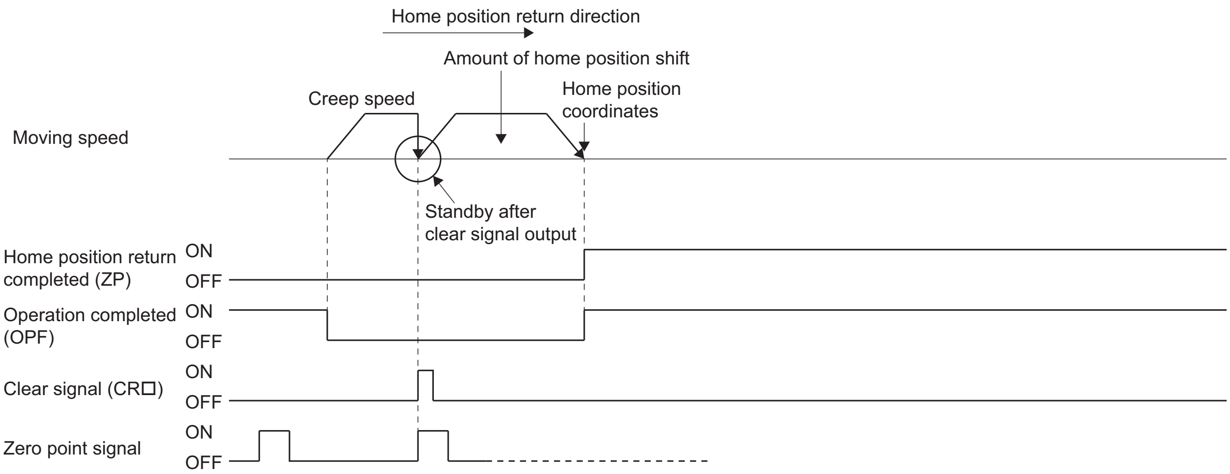
• Home position return using a limit switch front end method



• Home position return using a dog front end method



• Home position return using a Z-phase detection method



Home position reset function

When feedback pulse input is enabled, if home position reset is executed before position is settled such as immediately after operation, the home position reset is completed with a discrepancy between the current position and the feedback position. In such cases, "Standby time after clear signal output (parameter No.0252)" can be set in the same way as the home position return using a data set method to adjust the standby time until position settling of home position reset is completed.

Application functions

Servo off

If a motor is rotated due to an external force during servo off (such as during servo alarms and while the servo on signal (SON) is OFF), a position discrepancy occurs, and correct positioning cannot be executed until home position return is made again.*1

By setting "Incompletion of home position return after servo off" of "Control option 3 (parameter No.0202)" to "1: Make home position return incomplete", incorrect operation when there are position discrepancies can be prevented.*2

Also, when a position discrepancy during servo off does not need to be considered, setting "Incompletion of home position return after servo off" of "Control option 3 (parameter No.0202)" to "0: Do not make home position return incomplete", enables operation without home position return after servo off.

*1 Position discrepancy occurs regardless of the feedback pulse input enable/disable setting.

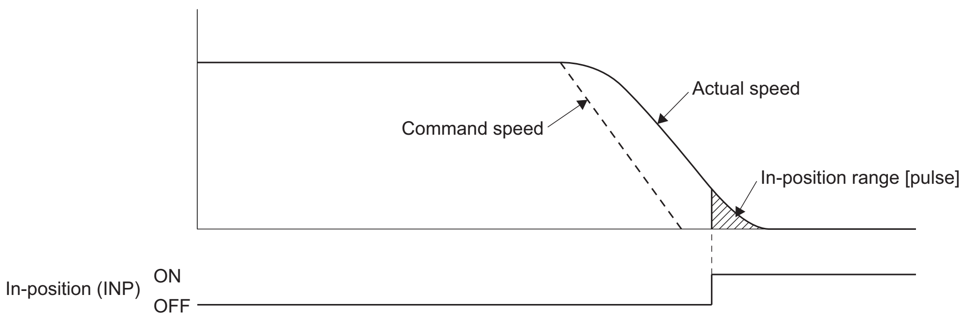
*2 After servo off, "Home Position Return Not Complete (operation alarm 90H, detail 01H)" occurs at startup for operations that require home position return (automatic operation, linear interpolation operation [MC200]/interpolation operation [MC300], and data set function) until the home position return is performed again.

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0202	*OPC3	Control option 3	0001h	—	0000h to 1001h	■■■□ (Interlock signal polarity) Set the polarity of the Interlock signal. • 0: B-contact • 1: A-contact □■■■ (Incompletion of home position return after servo off) Set 1 to make the home position return incomplete after servo off. • 0: Do not make home position return incomplete • 1: Make home position return incomplete

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

In-position signal

For the in-position signal (INP), the position board checks the in-position range and controls turning ON or OFF the signal. The in-position signal controlled by the driver is displayed as the servo amplifier in-position signal (SINP). Match the position board and driver in-position range settings.



Point

When there is no feedback pulse input, the speed is the speed output by the sensing pulse I/O module.

■Control parameter

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0232	INPC	In-position range (controller)	0	pulse	0 to 65535	Set the in-position range to be determined by the position board.*1

*1 When there is no feedback pulse input, the position is determined with the position output to the driver by the sensing pulse I/O module.

■Axis data status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1060	0050A0	0	RDY	Servo ready	Each axis
		1	INP	In-position	Each axis
		2	—	For manufacturer setting	—
		3	ZPAS	Passed Z-phase	Each axis
		4	—	For manufacturer setting	—
		5	SALM	Servo alarm	Each axis
		6	SWRN	Servo warning	Each axis
		7	—	For manufacturer setting	—

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1069	0050A9	0	IWT	Interference check standby	Each axis
		1	SINP	Servo amplifier in-position	Each axis
		2	—	For manufacturer setting	—
		3			
		4			
		5			
		6			
		7			

Servo amplifier general I/O

The servo amplifier general I/O function controls the I/O signal connected to the sensing SSCNETⅢ/H head module via SSCNET. The user program can control the I/O signal with the digital I/O table or I/O device table, by assigning the I/O signal connected to the sensing SSCNETⅢ/H head module to the digital I/O table or I/O device table.

Point

- When a communication error (system error E401H to E407H) occurs or SSCNET is disconnected, all the general I/O signals of the servo amplifier turn OFF.
- The delay time from an input of the general I/O signal of the sensing SSCNETⅢ/H head module to the update of the digital input table is approx. 0.88ms + (control cycle × 2) (approx. 2.7ms when the control cycle is 0.88ms). The delay time is also the same for when using an input device table.
- The delay time from the update of the output device table by the host personal computer to the output of the sensing module signal is the sensing module output response time + (control cycle × 3).
  In the case of the output bit device output using in the other axes start function, the delay time from other axes start condition satisfaction to the output is the sensing module output response time + (control cycle × 2).
  For the output response time of sensing module, refer to the sensing module instruction manual.

- Compatible models

Model	Remarks
Sensing SSCNETⅢ/H head module	Input : 12 points Output: 2 points

The following shows the connectors of the sensing SSCNETⅢ/H head module to be connected to the general I/O signals.
Each general I/O signal is assigned to the digital input signal (DI_□□□) and the digital output signal (DO_□□□).

General I/O	Signal name	Destination connector pin No.	Symbol
General input	DI_□□1	CN2-13	DI1
	DI_□□2	CN2-1	DI2
	DI_□□3	CN2-14	DI3
	DI_□□4	CN2-2	DI4
	DI_□□5	CN2-15	DI5
	DI_□□6	CN2-3	DI6
	DI_□□7	CN2-16	DI7
	DI_□□8	CN2-4	DI8
	DI_□□9	CN2-17	DI9
	DI_□□10	CN2-5	DI10
	DI_□□11	CN2-18	DI11
	DI_□□12	CN2-6	DI12
General output	DO_□□1	CN2-20	DO1
	DO_□□2	CN2-8	DO2

Settings

When using the general I/O function of the sensing SSCNETⅢ/H head module, set the following parameters.
Set the parameters to the axes whose "Type code (parameter No.021E)" is set to "3015h: Sensing SSCNETⅢ/H head module + Sensing pulse I/O module (axis mode)".

■Servo parameter

Parameter No.	Sensing pulse I/O module parameter No.	Symbol*1	Name
11A0	PC33	*HDI1	Head module DI1 (CN2-13) setting
11A1	PC34	*HDI2	Head module DI2 (CN2-1) setting
11A2	PC35	*HDI3	Head module DI3 (CN2-14) setting
11A3	PC36	*HDI4	Head module DI4 (CN2-2) setting
11A4	PC37	*HDI5	Head module DI5 (CN2-15) setting
11A5	PC38	*HDI6	Head module DI6 (CN2-3) setting
11A6	PC39	*HDI7	Head module DI7 (CN2-16) setting
11A7	PC40	*HDI8	Head module DI8 (CN2-4) setting
11A8	PC41	*HDI9	Head module DI9 (CN2-17) setting
11A9	PC42	*HDI10	Head module DI10 (CN2-5) setting
11AA	PC43	*HDI11	Head module DI11 (CN2-18) setting
11AB	PC44	*HDI12	Head module DI12 (CN2-6) setting
11AE	PC47	*HDO1	Head module DO1 (CN2-20) setting
11AF	PC48	*HDO2	Head module DO2 (CN2-8) setting

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

■Control parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
0213	*GIOO	General I/O option	0000h	—	0000h to 0011h	■■■□ (Servo amplifier general input setting) Set whether to use the general input of the servo amplifier. • 0: Not used • 1: Used ■■□■ (Servo amplifier general output setting) Set whether to use the general output of the servo amplifier. • 0: Not used • 1: Used
0214	*GDNA	General I/O No. assignment	0000h	—	0000h to FFFFh	Set assignment of the general I/O No. The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)" setting. [When using "0: Use digital I/O table"] ■■□□ (General input assignment) Specify the first digital input area No. to assign the general input. • 00h to 3Fh: Digital input area 0 to 63 <Example> When the digital input area No.1 is specified Assign 16 points of DI_010 to DI_01F. However, DI_013 to DI_01F are unavailable. □□■■ (General output assignment) Specify the first digital output area No. to assign the general output. • 00h to 3Fh: Digital output area 0 to 63 <Example> When the digital output area No.2 is specified Assign 16 points of DO_020 to DO_02F. However, DO_023 to DO_02F are unavailable. [When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 00h to FFh: Input word device No.00 to FF <Example> When the input word device No.01 is specified Assign 16 points of DVI_010 to DVI_01F. However, DVI_013 to DVI_01F are unavailable. □□■■ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general input. • 00h to FFh: Output word device No.00 to FF <Example> When the output word device No.02 is specified Assign 16 points of DVO_020 to DVO_02F. However, DVO_023 to DVO_02F are unavailable. [When using "1: Use I/O device table (expanded points method)"] [MC300] Set in "General input No. assignment (parameter No.0215)" and "General output No. assignment (parameter No.0216)".
0215	*GDINA	General input No. assignment [MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" setting is "2: Use I/O device table (expanded points method)". ■□□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 000h to 23Fh: Input word device No.000 to 23F <Example> When the input word device No.001 is specified Assign 16 points of DVI_0010 to DVI_001F. However, DVI_0013 to DVI_001F are unavailable.
0216	*GDONA	General output No. assignment [MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" setting is "2: Use I/O device table (expanded points method)". ■□□□ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general output. • 000h to 23Fh: Output word device No.000 to 23F <Example>When the output word device No.002 is specified Assign 16 points of DVO_0020 to DVO_002F. However, DVO_0023 to DVI_002F are unavailable.

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
0219	*SOP	Sensor input option	0000h	—	0000h to 0304h	■■■□ (Sensor input system) Set the input system of the sensor (LSP/LSN/DOG). • 0: Not use • 1: Driver input • 2: Digital or input device input • 3: Not connected (does not detect LSP, LSN, DOG) • 4: Dual port memory input ■□■■ (Limit switch signal selection) Set valid/invalid of limit switch. • 0: LSP/LSN are valid • 1: LSP is valid, LSN is invalid • 2: LSP is invalid, LSN is valid • 3: LSP/LSN are invalid

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Auxiliary functions

Interrupt

■Interrupt conditions

The interrupt conditions that can be used with a servo amplifier and in axis mode vary.

The interrupt conditions that can be used with sensing pulse I/O module (axis mode) are shown below.

- Interrupt conditions 1 (parameter No.0204)

Bit	Symbol	Signal name
0	RDY	Servo ready
1	INP	In-position
2	—	For manufacturer setting
3	ZPAS	Passed Z-phase
4	—	For manufacturer setting
5	SALM	Servo alarm
6	SWRN	Servo warning
7	—	For manufacturer setting
8	OP	Operation processing
9	CPO	Rough match
10	PF	Positioning completed
11	ZP	Home position return completed
12	SMZ	Smoothing stop
13	OALM	Operation alarm
14	OPF	Operation completed
15	PSW	Position switch

- Interrupt conditions 1 (parameter No.0205)

Bit	Symbol	Signal name
0	—	For manufacturer setting
1		
2		
3		
4		
5		
6		
7		
8	IWT	Interference check standby
9	SINP	Servo amplifier in-position
10	—	For manufacturer setting
11		
12		
13		
14		
15		

Interface mode

Servo off

If a motor is rotated due to an external force during servo off in interface mode, a position discrepancy can occur. When a position discrepancy occurs, the current position is matched with the feedback position automatically at servo on. However, if servo on is executed with the motor operating, the current position and feedback position discrepancy could remain. Do not execute servo on when the motor is operating.

Event detection function

The event factors that can be used with a servo amplifier and in axis mode vary. The event factors that can be used in axis mode are shown below.

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +4h
- Using MR-MC3_ _: +8h

Address (hexadecimal)		Bit	Symbol[*1]	Signal name
MR-MC2_ _	MR-MC3_ _			
0EE0 to 0EE3	0043E0 to 0043E7	0	iRDYON	Servo ready (ON edge)
		1	iINPON	In-position (ON edge)
		2	—	For manufacturer setting
		3		
		4	iSALMON	Servo alarm (ON edge)
		5	iSWRNON	Servo warning (ON edge)
		6	—	For manufacturer setting
		7	iOALMON	Operation alarm (ON edge)
		8	—	For manufacturer setting
		9		
		10		
		11		
		12		
		13	iLSPON	+ side limit switch (ON edge)
		14	iLSPON	- side limit switch (ON edge)
		15	iDOGON	Proximity dog (ON edge)
		16	iRDYOF	Servo ready (OFF edge)
		17	iINPOF	In-position (OFF edge)
		18	—	For manufacturer setting
		19		
		20	iSALMOF	Servo alarm (OFF edge)
		21	iSWRNOF	Servo warning (OFF edge)
		22	—	For manufacturer setting
		23	iOALMOF	Operation alarm (OFF edge)
		24	—	For manufacturer setting
		25		
		26		
		27		
		28		
		29	iLSPOF	+ side limit switch (OFF edge)
		30	iLSPOF	- side limit switch (OFF edge)
		31	iDOGOF	Proximity dog (OFF edge)
—		32	—	For manufacturer setting
		⋮		
		63		

*1 OFF: No factor of event exists. ON: A factor of event exists.

7 AUXILIARY FUNCTION

7.1 Reading/Writing Parameters

The parameter data in the position board is accessed using the parameter read/write function. Types of parameters include system parameters, control parameters, and servo parameters. The parameter read/write function can be used after system preparation completion (system status code: 0001h).

Interface

Axis command/status bit

The following is the bit unit interface to operate the servo parameter, control parameter, RIO module parameter, RIO control parameter and to confirm the status of these parameters.

■Axis command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1014	005014	0	PWRT	Parameter write command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7	PSF	Servo parameter read complete

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1015	005015	0	PRD	Parameter read command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

■Axis status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	**MR-MC3_ _**			
1074	0050B4	0	PWFIN1	Parameter write complete 1
		1	PWEN1	Parameter No. error 1
		2	PWED1	Parameter data out of bounds 1
		3	—	For manufacturer setting
		4	PWFIN2	Parameter write complete 2
		5	PWEN2	Parameter No. error 2
		6	PWED2	Parameter data out of bounds 2
		7	PSCHG	Changes to servo parameters exist

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	**MR-MC3_ _**			
1075	0050B5	0	PRFIN1	Parameter read complete 1
		1	PREN1	Parameter No. error 1
		2	PRFIN2	Parameter read complete 2
		3	PREN2	Parameter No. error 2
		4	—	For manufacturer setting
		5		
		6		
		7		

Axis command/status data

The following is the data to operate the servo parameter, control parameter, RIO module parameter, RIO control parameter and to confirm the status of these parameters.

For MR-J5(W_)-_B, use the expanded parameter table for the parameters written to/read from the servo parameter. [MC300]

■Axis command data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
1050	005060	Parameter write No.1 (2bytes)	0000h to FFFFh	Store the parameter No. to write.
1051	005061			
1052	005062	Parameter write data 1 (2bytes)	0000h to FFFFh	Store the data to be written to the parameter.
1053	005063			
1054	005064	Parameter write No.2 (2bytes)	0000h to FFFFh	Store the parameter No. to write.
1055	005065			
1056	005066	Parameter write data 2 (2bytes)	0000h to FFFFh	Store the data to be written to the parameter.
1057	005067			
1058	005068	Parameter read No.1 (2bytes)	0000h to FFFFh	Store the parameter No. to read.
1059	005069			
105A	00506A	For manufacturer setting	—	—
105B	00506B			
105C	00506C	Parameter read No.2 (2bytes)	0000h to FFFFh	Store the parameter No. to read.
105D	00506D			
105E	00506E	For manufacturer setting	—	—
105F	00506F			
—	005070			
	⋮			
	00509F			

■Axis status data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
10B0	005100	Parameter write No.1 (2bytes)	0000h to FFFFh	Output the parameter No. that was written.
10B1	005101			
10B2	005102	Parameter write data 1 (2bytes)	0000h to FFFFh	Output the parameter data that was written.
10B3	005103			
10B4	005104	Parameter write No.2 (2bytes)	0000h to FFFFh	Output the parameter No. that was written.
10B5	005105			
10B6	005106	Parameter write data 2 (2bytes)	0000h to FFFFh	Output the parameter data that was written.
10B7	005107			
10B8	005108	Parameter read No.1 (2bytes)	0000h to FFFFh	Output the parameter No. to read.
10B9	005109			
10BA	00510A	Parameter read data 1 (2bytes)	0000h to FFFFh	Output the parameter data that was read.
10BB	00510B			
10BC	00510C	Parameter read No.2 (2bytes)	0000h to FFFFh	Output the parameter No. to read.
10BD	00510D			

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
10BE	00510E	Parameter read data 2 (2bytes)	0000h to FFFFh	Output the parameter data that was read.
10BF	00510F			
—	005110	For manufacturer setting	—	—
	⋮			
	00513E			

Expanded parameter table [MC300]

The following is the data to operate the servo parameter of MR-J5(W_)-_B and confirm the status of the parameter.

■Expanded parameter data command data

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

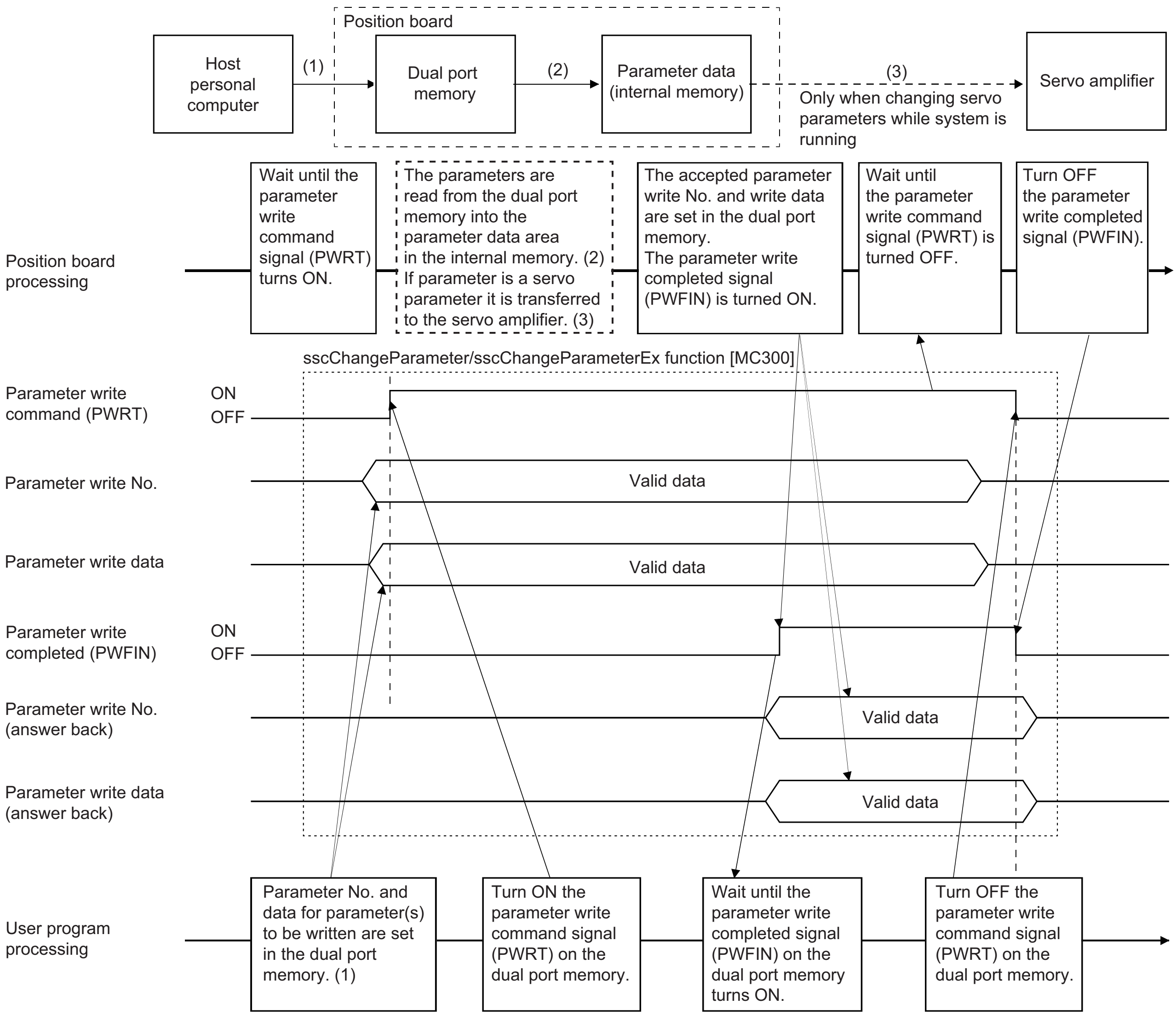
Address (hexadecimal)	Description
11A000	Expanded parameter write data 1 (Axis 1)
11A001	
11A002	
11A003	
11A004	Expanded parameter write data 2 (Axis 1)
11A005	
11A006	
11A007	
11A008	For manufacturer setting
⋮	
11A00F	

■Expanded parameter data status data

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)	Description
11A010	Expanded parameter write data 1 (Axis 1)
11A011	
11A012	
11A013	
11A014	Expanded parameter write data 2 (Axis 1)
11A015	
11A016	
11A017	
11A018	Expanded parameter read data 1 (Axis 1)
11A019	
11A01A	
11A01B	
11A01C	Expanded parameter read data 2 (Axis 1)
11A01D	
11A01E	
11A01F	

Writing parameters



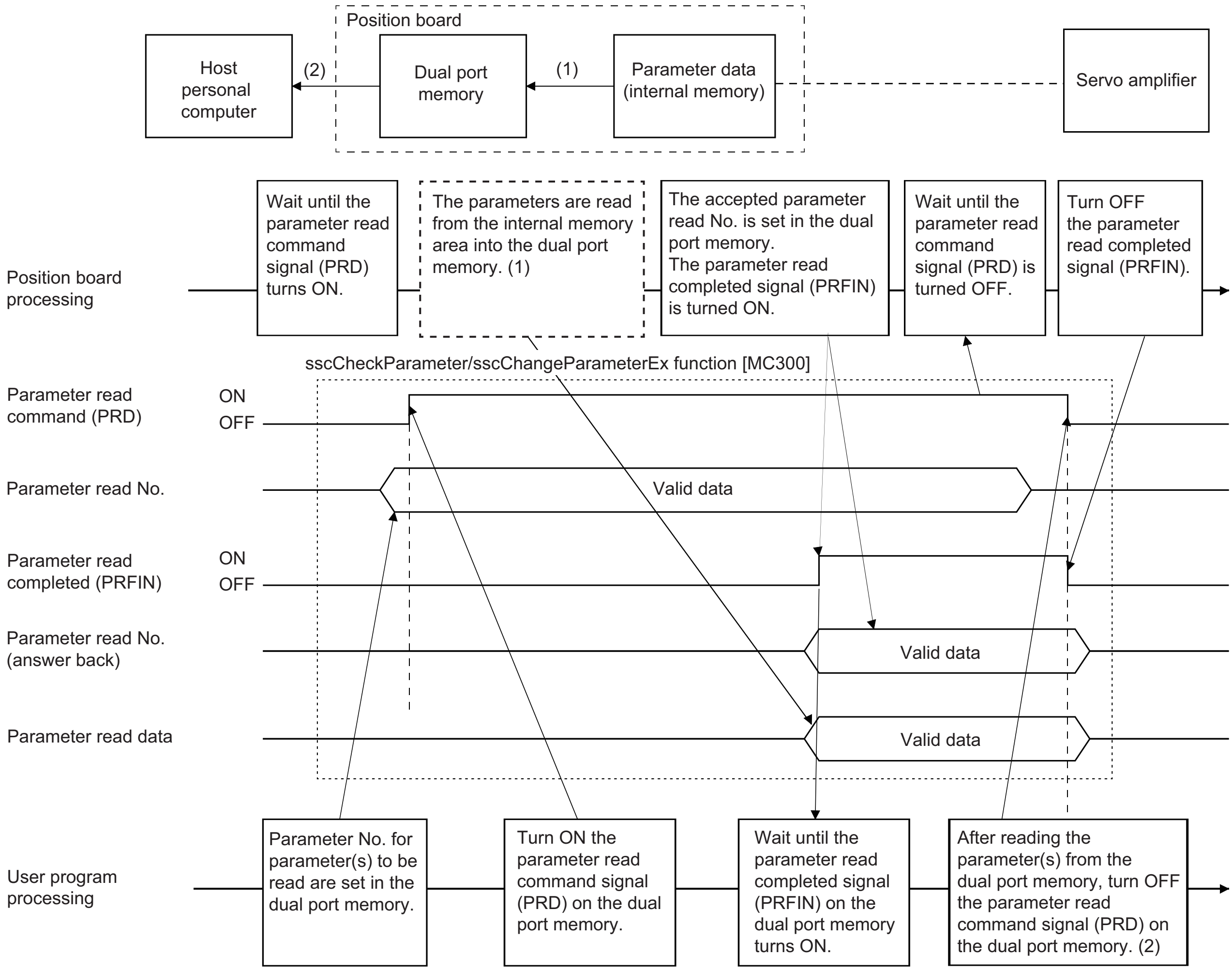
Point

- After writing parameters, some parameters do not become valid until rebooting the software. For the applicable parameters, refer to the following.
☞ Page 657 PARAMETERS
- For the 32bit length parameters*1, which are separated into upper and lower items, change them simultaneously. Changing of 32bit length parameters separately can lead to the erroneous operation.
- Two parameters can be written at a time. When writing one parameter, set "0" to the other parameter.
- If an erroneous parameter No. is set, the parameter No. error signal (PWEN□ (□ = 1 to 2)) is turned ON. However, if the parameter No. is "0", it is not considered an parameter No. error.
- If a parameter setting is outside the setting range, the parameter data out of bounds signal (PWED□ (□ = 1 to 2)) is turned ON.
- The parameter limit checks are not performed before during system running (system status code: 000Ah). If the parameter set is incorrect, "Parameter Error (system alarm 37H, servo alarm 37H, operation alarm 37H, detail 01H)" occurs at the system startup. Confirm the error parameter No. in "servo parameter error No. (MR-J4(W_)-_B: monitor No.0510H to 0537H, MR-J5(W_)-_B: monitor No.0900H to 0944H [MC300])", "control parameter error No. (monitor No.0330H to 033FH)" and "system parameter error No. (monitor No.0410H to 0417H)", and after rebooting the software, set the correct parameter and start the system again. "Parameter Error (system alarm 37H, operation alarm 37H, detail 01H)" cannot be reset by the alarm reset.
- In the system parameter write, the parameter write command signal (SPWRT), the parameter write completed signal (SPWFIN), the parameter No. error signal (SPWEN□ (□ = 1 to 2)) and the parameter data out of bounds signal (SPWED□ (□ = 1 to 2)) are used.
- For MR-J4(W_)-_B, the servo parameter No.2000 to 23FF of MR-J5(W_)-_B cannot be written while the system is running. The parameter No. error signal (PWEN□ (□ = 1 to 2)) is turned ON.

[MC300]
- For the servo parameter, the write destination of the parameter value varies depending on the servo parameter No. to be written. When writing the servo parameters No.1100 to 137F, write the parameter to be the parameter write data.
When writing the servo parameters No.2000 to 23FF, write the parameter value to the expanded parameter write data.
- For MR-J5(W_)-_B, compared to MR-J4(W_)-_B, the writing times of the servo parameters while the system is running are extended.
- For MR-J5(W_)-_B, the servo parameters No.1100 to 137F of MR-J4(W_)-_B cannot be written while the system is running. The parameter No. error signal (PWEN□ (□ = 1 to 2)) is turned ON.

*1 Except for the servo parameters of MR-J5(W_)-_B. [MC300]

Reading parameters



Point

- Two parameters can be read at a time. When reading one parameter, set "0" to the other parameter.
- If an erroneous parameter No. is set, the parameter No. error signal (PREN□ (□ = 1 to 2)) is turned ON. However, if the parameter No. is "0", it is not considered an parameter No. error.
- In the system parameter read, the parameter read command signal (SPRD), the parameter read completed signal (SPRFIN) and the parameter No. error signal (SPREN□ (□ = 1 to 2)) are used.
- For MR-J4(W_)-_B, the servo parameter No.2000 to 23FF of MR-J5(W_)-_B cannot be read while the system is running. The parameter No. error signal (PWEN□ (□ = 1 to 2)) is turned ON.

[MC300]

- For the servo parameter, the read destination of the parameter value varies depending on the servo parameter No. to be read. When reading the servo parameters No.1100 to 137F, read the specified parameter value to the parameter read data.
  When reading the servo parameters No.2000 to 23FF, read the specified parameter value to the expanded parameter read data.
- For MR-J5(W_)-_B, compared to MR-J4(W_)-_B, the reading times of the servo parameters while the system is running are extended.
- For MR-J5(W_)-_B, the servo parameters No.1100 to 137F of MR-J4(W_)-_B cannot be read while the system is running. The parameter No. error signal (PWEN□ (□ = 1 to 2)) is turned ON.

7.2 Changing Parameters at the Servo

The position board has a function of reflecting the results of changes made to parameters on the servo amplifier to the host personal computer. When parameters are changed on the servo amplifier, the position board changes the parameter data area (internal memory), and notifies the host personal computer using the changes to servo parameters exist signal (PSCHG). The changed servo parameter No. are notified in units of 16 to the servo parameter change No. table. To identify the changed parameter, confirm "Servo parameter change No. (MR-J4(W_)-_B: monitor No.0590H to 05B7H, MR-J5(W_)-_B: monitor No.0980H to 09BFH [MC300])" corresponding to the notification. Monitor this signal periodically and record parameters for which changes have been made.

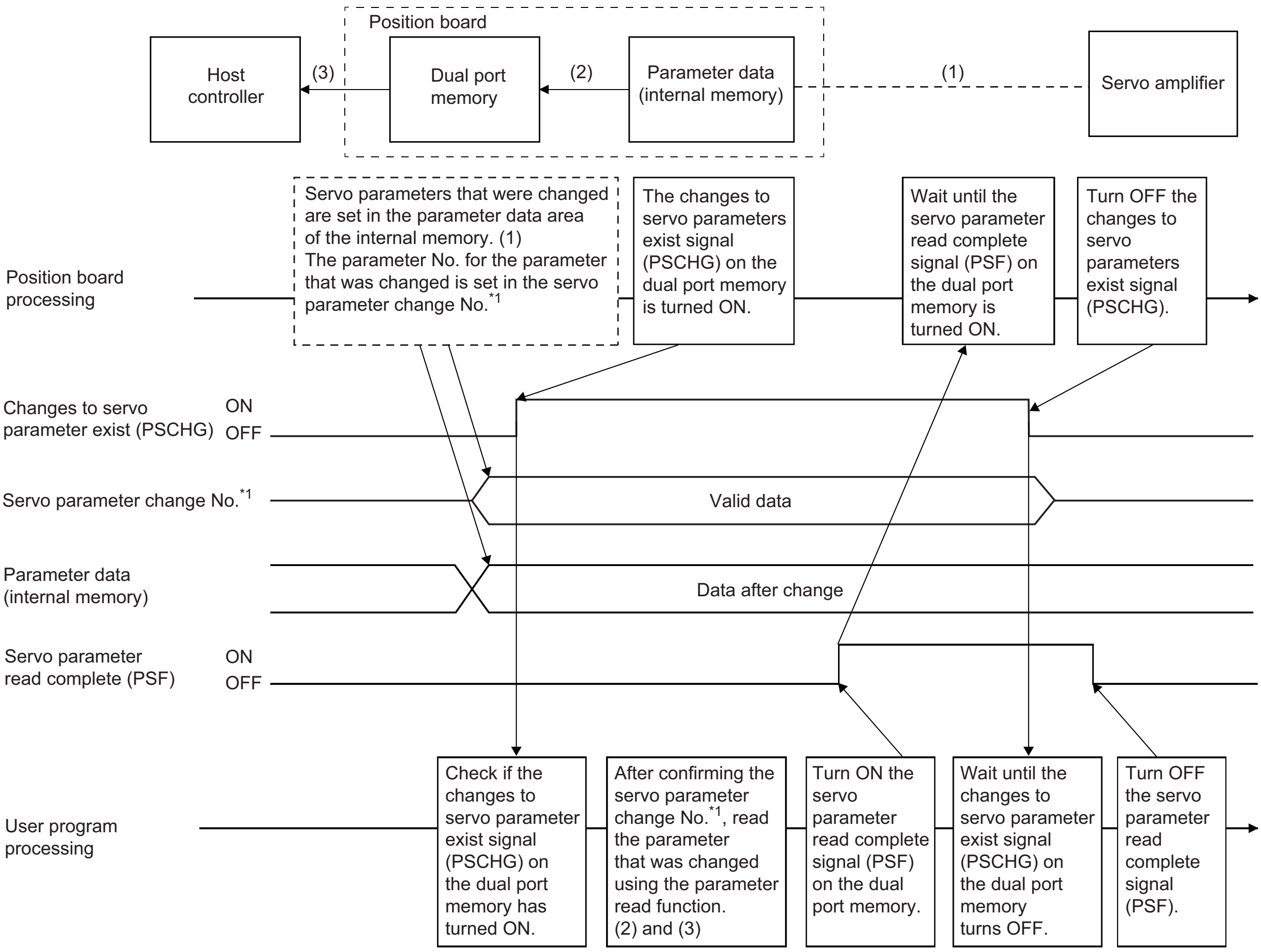
Point

- The reasons that parameters are re-written on the servo amplifier are as follows.
  · When parameters are changed using MR Configurator2.
  (This includes execution of the machine analyzer and the gain search function)
  · The parameter was automatically changed such as by the real time auto tuning function.
- For the servo parameters that are automatically changed, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

Point

[API library]
To get the servo parameter change No., use the sscCheckSvPrmChangeNumEx function.

The sequence for when servo parameters are changed is as follows.



*1 For MR-J4(W_)-_B, confirm "Servo parameter change No. (monitor No.0590H to 05B7H)" corresponding to the servo parameter change No.11☐☐ to 13☐☐ (PSN11 to PSN13).
For MR-J5(W_)-_B, confirm "Servo parameter change No. (monitor No.0980H to 09BFH)" corresponding to the servo parameter change No.20☐☐ to 23☐☐ (PSN20 to PSN21). [MC300]

7.3 Alarm and System Error

When the incorrect setting or incorrect operation is performed, the position board raises an alarm, so make user program monitor the alarm periodically.

The position board can raise the following six alarms: system alarm, servo alarm, operation alarm, RIO module alarm, RIO control alarm, and system error. For the cause of occurrence and treatment for each alarm, refer to the following.

☞ Page 731 ALARM No.

Point

[API library]

- To get/reset the alarm No., use the sscGetAlarm function/sscResetAlarm function. Specify the following in the argument for the alarm type.
  · System alarm: SSC_ALARM_SYSTEM
  · Servo alarm: SSC_ALARM_SERVO
  · Operation alarm: SSC_ALARM_OPERATION
  · RIO module alarm: SSC_ALARM_UNIT
  · RIO control alarm: SSC_ALARM_UNIT_CTRL
- To get the system error, use the sscGetSystemStatusCode function.

System alarm

7

The system alarm is an alarm that the position board raises by the incorrect setting of a system parameter or each function. When the system alarm occurs, the current system alarm signal (CALM) turns ON, and the alarm No. and the detail No. are stored in the system alarm No. and the specific system alarm No. To reset the system alarm, turn ON the system alarm reset signal (CRST).

Point

- "Parameter Error (system alarm 37H)" cannot be reset with the system alarm reset signal. Reexamine the parameter and start the system again.
- If another system alarm occurs while the system alarm is occurring, the first system alarm is notified to the system alarm No. By using log function, the history of the system alarm No. can be confirmed.

Servo alarm

The servo alarm is an alarm that the servo amplifier raises by the incorrect setting of the servo parameter or the incorrect operation of the servo amplifier. When a servo alarm occurs, during the servo alarm signal (SALM) or during the servo warning signal (SWRN) turns ON, and the alarm No. and the detail No. are stored in the servo alarm No. and the specific servo alarm No. To reset the servo alarm, turn ON the servo alarm reset signal (SRST).

Point

- The reset of the servo alarm depends on the specifications of the servo amplifier. For details, refer to the servo amplifier instruction manual or the manual for your servo amplifier.
- When a servo alarm occurs by multiple causes, which servo alarm No. is notified depends on the specifications of the servo amplifier.

Operation alarm

The operation alarm is an alarm a position board raises in each axis by the incorrect setting of a system parameter or each function. When an operation alarm occurs, during the operation alarm signal (OALM) turns ON, and the alarm No. and the detail No. are stored in the operation alarm No. and the specific operation alarm No. To reset the operation alarm, turn ON the operation alarm reset signal (ORST).

Point

- "Parameter Error (operation alarm 37H)" and "System Setting Error (operation alarm 38H)" cannot be reset with the operation alarm reset signal. Confirm the cause of the alarm and treatment, and start the system again.
- If another operation alarm occurs while the operation alarm is occurring, the first operation alarm is notified to the operation alarm No. By using log function, the history of the operation alarm No. can be confirmed.

RIO module alarm

The RIO module alarms occur from remote I/O modules as a result of incorrect RIO module parameter settings, and remote I/O module hardware errors.

When a RIO module alarm occurs, the RIO module alarm signal (RUALM), or the RIO module warning signal (RUWRN) turns ON, and the alarm No./detail No. is stored to the RIO module alarm No./detail RIO module alarm No. To reset the RIO module alarm, turn ON the RIO module alarm reset signal (RURST).

Point

- The reset of the RIO module alarm depends on the specifications of the remote I/O module. Refer to the User's Manual of the remote I/O module being used for details.
- When the RIO module alarm occurs by multiple causes, which RIO module alarm No. is notified depends on the specification of the remote I/O module.

RIO control alarm

The RIO control alarms occur at each station from the position board as a result of incorrect control parameter settings, and incorrect settings for each function. When a RIO control alarm occurs, the RIO control alarm signal (RCALM) turns ON, and the alarm No./detail No. is stored to the RIO control alarm No./detail RIO control alarm No. To reset the RIO control alarm, turn ON the RIO control alarm reset signal (RCRST).

Point

- The following RIO control alarms cannot be reset. Confirm the error causes and corrective actions, and start the system again.
  · Parameter Error (RIO control alarm 37H)
  · System Setting Error (RIO control alarm 38H)
  · I/O No. Assignment Setting Error (RIO control alarm 39H)
- When another RIO control alarm occurs at the same time a RIO control alarm has already occurred, the RIO control alarm No. of the RIO control alarm that occurred first is notified. The RIO control alarm No. history can be confirmed by using the log function.

System error

The system error occurs in the case when positioning control cannot be continued, such as when a hardware error of the position board occurs, when SSCNET communication error occurs. The error code of the system error is stored in the system status code.

Point

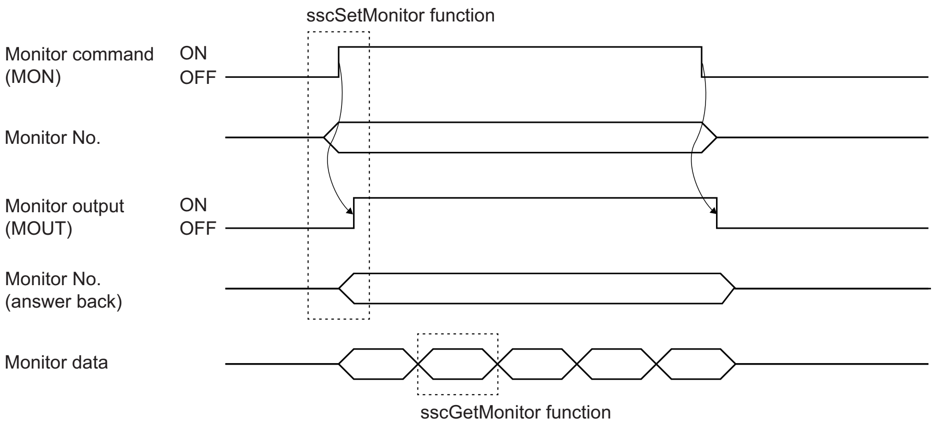
- System error cannot be reset. Reboot the software as necessary and start the system again.
- If another system error occurs while the system error is occurring, the error code of the system status code is overwritten. By using log function, the history of the system error occurred while system is running can be confirmed.

7.4 Monitor Function

The monitor function is for referencing the system information, the servo information such as the current command position and the speed feedback etc., and the operation information.
When monitoring the system information, the monitor area in the system command/status table is used. Also, when monitoring the servo information and the operational information, the monitor area of the command/status table for each axis is used.
2 items of system information and 4 items per axis of the servo information can be monitored.
While the monitor command signal (MON) is ON, the monitor data is continuously updated.

Point

The update cycle is the control cycle to several ms, and the updated cycle differs depending on the control status.



When changing the monitor No., turn OFF the monitor command signal (MON). Changing of the monitor No. is performed on the raising edge of the monitor command signal (MON) (if the monitor No. is changed while the monitor command is ON, it is ignored).
Monitor data is 16bits per item. For referencing 32bit data, designate 2 items, upper and lower or designate an operation information (double word) No. For designating operation information (double word) set the monitor No. to monitor No.1 or monitor No.3. If the operation information (double word) No. is set to monitor No.2 or monitor No.4 a monitor No. error occurs. Also, when designating operation information (double word) using monitor No.1 or monitor No.3, set monitor No.2 and monitor No.4 to 0. If a different monitor No. is set for monitor No.2 or monitor No.4, a monitor No. error occurs.

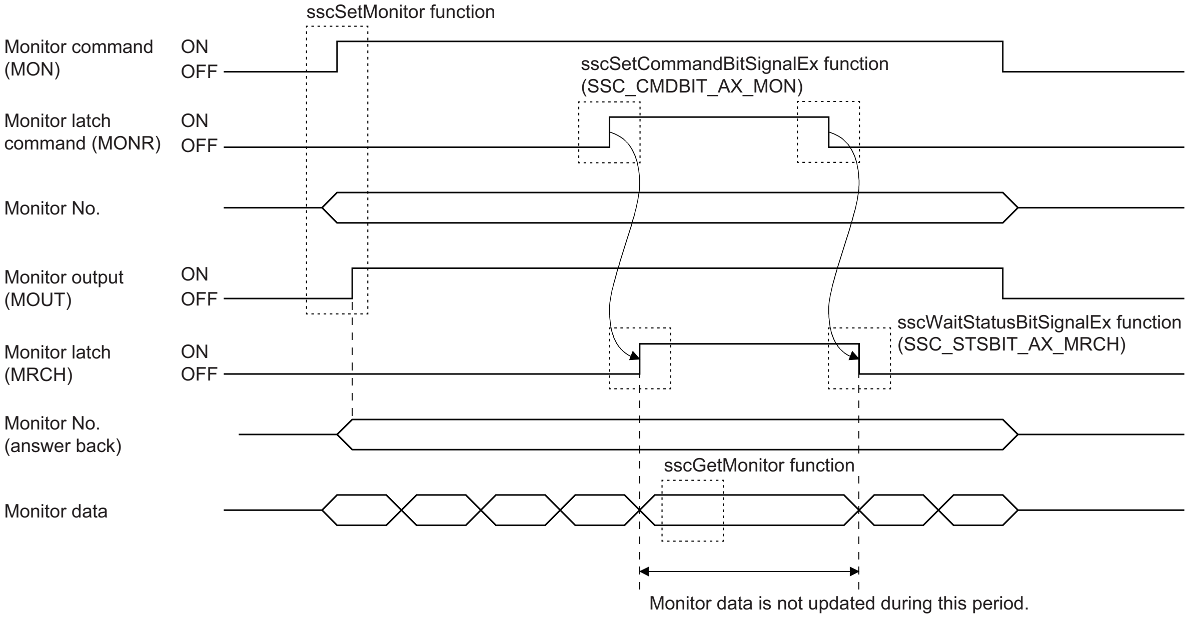
Point

- If an erroneous monitor No. is commanded, the monitor No. error signal (MER□ (□ = 1 to 4)) is turned ON. The data for a correct monitor No. can be monitored at this time (The monitor output is turned ON.). However, if the monitor No. is set to "0", the monitor No. error is not set and the monitor data is continually set to "0".
- The servo information cannot be referenced if the servo amplifier is not connected. If the servo amplifier is not connected, the servo amplifier is not connected signal (MESV) is turned ON.
- When using the monitor function (when monitoring the system information), the system monitor command signal (SMON), the monitor output signal (SMOUT), the monitor No. error signal (SMER□ (□ = 1 to 2)) are used.

7

Monitor latch function

The monitor data is not updated while the monitor latch command signal (MONR) is ON.



Point

When using the monitor function (when monitoring the system information), the system monitor latch command signal (SMONR) and the monitor latch signal (SMRCH) are used.

Point

[API library]

- To turn ON/OFF the monitor latch command signal (MONR), set "SSC_CMDBIT_AX_MON" to the command bit No. of the sscSetCommandBitSignalEx function.
  When using the monitor function (when monitoring the system information), set "SSC_CMDBIT_SYS_SMON".
- To confirm if the monitor latch signal (MRCH or SMRCH) is ON/OFF, set "SSC_STSBIT_AX_MRCH" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.
  When using the monitor function (when monitoring the system information), set "SSC_STSBIT_SYS_SMRCH".

High-speed update of monitor data [MC300]

By setting the monitor data high-speed update function, the data set to monitor No.1 to 4 can be confirmed at each control cycle. When using this function, set "High-speed update of monitor data" of "Control option 4 (parameter No.0206)" to "1: Enabled".

Point

- The monitor Nos. need to be set in the monitor function in advance. When the monitor No. error signal (MER□ (□ = 1 to 4)) is ON, the monitor data with the incorrect monitor No. is "0".
- Monitor data 1 to 4 (high-speed monitor) are only updated when the monitor command signal (MON) and the monitor output signal (MOUT) are ON. When the monitor output signal (MOUT) is OFF, monitor data 1 to 4 (high-speed monitor) are "0". Similarly, when monitor Nos. are being changed, monitor data 1 to 4 (high-speed monitor) are "0".
- When a double word (4bytes) monitor No. is set, in order to prevent the separation of the upper and lower data, access 4bytes of the monitor data (high-speed monitor) when getting monitor data. When using the API library, internally, 4bytes of data is got.
- When using the monitor latch function, it takes from 4 control cycles to several ms after the monitor latch command signal (MONR) is turned ON for monitor data to actually be latched.
- This function does not support remote I/O stations.

7.5 High Speed Monitor Function

The high speed monitor function is for monitoring the current command position and the current feedback position etc. It becomes valid after the system is started up, and the monitor data is updated every control cycle.
The data that can be referenced with the high speed monitor function are the following items.

Data item	Unit	Data size	Address (hexadecimal)*1		Remarks
			MR-MC2_ _	MR-MC3_ _	
Current command position	Command units	4bytes	A000h + 20h × (n - 1)	0E0000h + 20h × (n - 1)	Same as monitor No.0300H, 0301H
Current feedback position	Command units	4bytes	A004h + 20h × (n - 1)	0E0004h + 20h × (n - 1)	Same as monitor No.0302H, 0303H
Moving speed	Speed units	4bytes	A008h + 20h × (n - 1)	0E0008h + 20h × (n - 1)	Same as monitor No.0304H, 0305H
Feedback moving speed	Speed units	4bytes	A00Ch + 20h × (n - 1)	0E000Ch + 20h × (n - 1)	Same as monitor No.0316H, 0317H
Electrical current feedback	0.1%	2bytes	A010h + 20h × (n - 1)	0E0010h + 20h × (n - 1)	Same as monitor No.020BH
External signal status*2	—	2bytes	A012h + 20h × (n - 1)	0E0012h + 20h × (n - 1)	Same as monitor No.0320H
Position droop*3	pulse	4bytes	A014h + 20h × (n - 1)	0E0014h + 20h × (n - 1)	Same as monitor No.0204H, 0205H

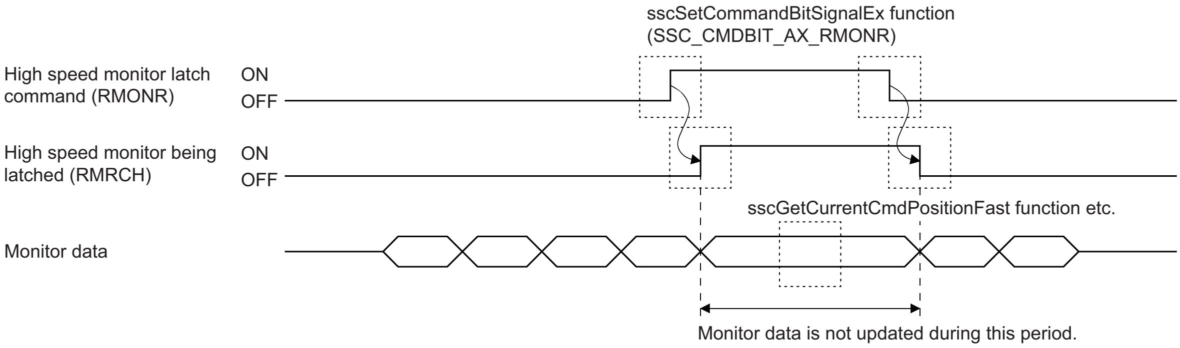
*1 n is the axis No.
*2 The sensor status specified at "Sensor input options (parameter No.0219)" is displayed for the external signal status.
*3 The position droop monitor is supported by the following software version or later and only in interface mode.
Using MR-MC2_ _: Software version A4 or later
Using MR-MC3_ _: No software restriction

Point

[API library]
To get the high speed monitor data, use the following functions.
- Current command position: sscGetCurrentCmdPositionFast function
- Current feedback position: sscGetCurrentFbPositionFast function
- Moving speed: sscGetCmdSpeedFast function
- Feedback moving speed: sscGetFbSpeedFast function
- Electrical current feedback: sscGetCurrentFbFast function
- External signal status: sscGetIoStatusFast function

Monitor latch function

The monitor data is not updated while the high speed monitor latch command signal (RMONR) is ON.



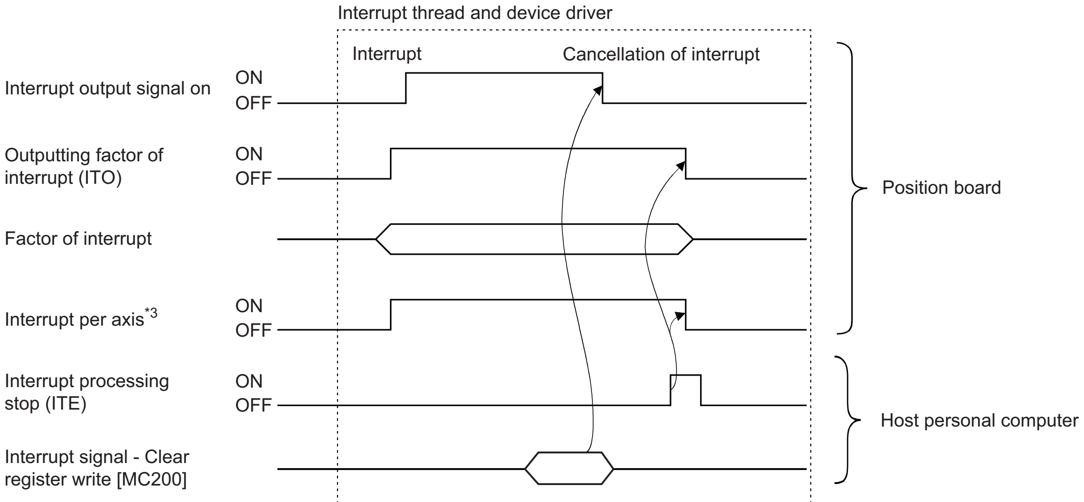
Point

[API library]
- To turn ON/OFF the high speed monitor latch command signal (RMONR), set "SSC_CMDBIT_AX_RMONR" to the command bit No. of the sscSetCommandBitSignalEx function. When using the monitor function (when monitoring the system information), set "SSC_CMDBIT_SYS_SMON".
- To confirm if the high speed monitor being latched signal (RMRCH) is ON/OFF, set "SSC_STSBIT_AX_RMRCH" to the status bit No. with the sscGetStatusBitSignalEx function/ sscWaitStatusBitSignalEx function.

7.6 Interrupt

Interrupt sequence

If the interrupt output start signal (ITS) is ON and the interrupt conditions are met*1, the position board outputs the interrupt trigger on the dual port memory and generates an interrupt.
For MR-MC2_ _, write 1 to an interrupt signal clear register*2 using a host personal computer for cancellation of the interrupt.
For MR-MC3_ _ cancellation of the interrupt is not required because the PCI Express message signal interrupt (MSI) is used.
After the cancellation of the interrupt, turn ON the interrupt processing stop signal (ITE). The position board turns OFF the outputting factor of interrupt signal (ITO) and clears the factor of the interrupt to 0 after confirming the interrupt processing stop signal (ITE) is ON. The next interrupt output is put on hold until this operation is performed.



*1 The interrupt conditions can be set in following parameters.
· System interrupt conditions (parameter No.0004)
· Interrupt condition 1 (parameter No.0204)
· Interrupt condition 2 (parameter No.0205)
*2 The interrupt signal clear register is changed to 0 automatically after the interrupt signal (IRQ□) is turned OFF.
*3 Only the axis signal with an interrupt generated turns ON.

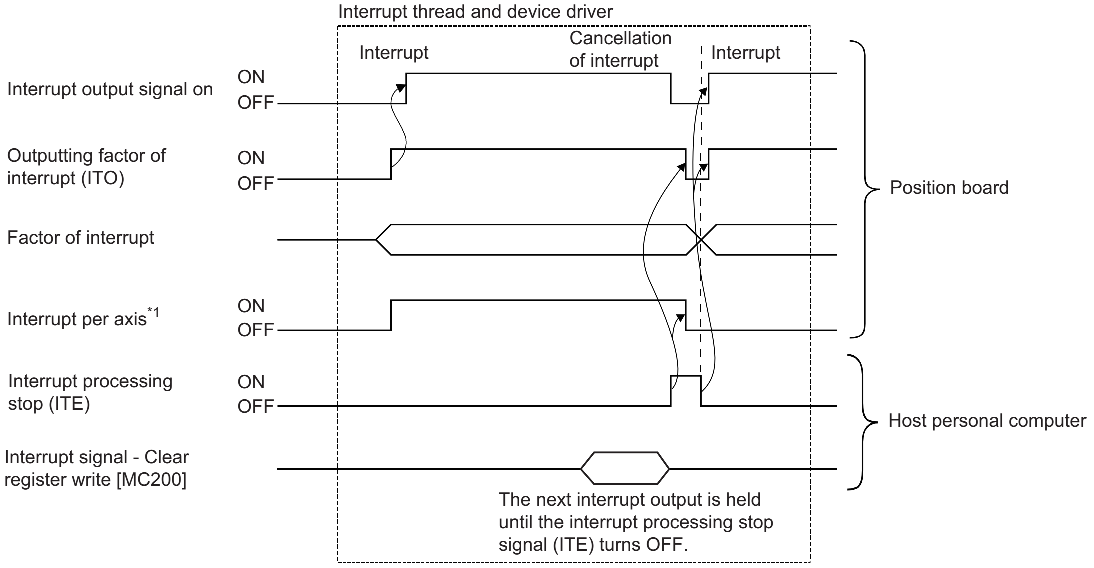
Point

If multiple interrupt conditions are met during one control cycle, all corresponding factors for interrupts are turned ON.

Point

[API library]
Confirmation of the factor of the interrupt and interrupt clear register are processed by the interrupt thread and the device driver that are created when calling the sscIntStart function. Thus processing by the user program is unnecessary.

If another interrupt condition is met while the outputting factor of interrupt signal (ITO) is ON, the factor of the interrupt is put on hold until the interrupt processing stop signal (ITE) turns OFF from ON.



*1 Only the signal for the axis where the interrupt occurs is turned ON.

Point

[MC200]

After occurrence of an interrupt, if cancel of interrupt processing cannot be performed by the host personal computer due to being backed up or some other reason, the interrupt output from the position board cannot be cancelled. In this case, turn OFF the power for the position board.

Interrupt conditions

Interrupt conditions (system parameters)

When interrupts the system are to be validated, set the values that designate ON for the bits that correspond to the conditions shown below to the parameter "Interrupt conditions (parameter No.0004)".

Point

[API library]

[MC200]

• To set the interrupt conditions, use the sscChangeParameter function.

[MC300]

• To set the interrupt conditions, use the sscChangeParameter function/sscChangeParameterEx function.

■System interrupt conditions (parameter No.0004)

Bit	Symbol	Signal name
0	SYSE	System error
1	CALM	System alarm
2	EMIO	During forced stop
3	—	For manufacturer setting
4		
5		
6		
7	OCME	Operation cycle alarm
8	OASF	Factor of other axes start interrupt is being sent
9	PPI	Factor of pass position interrupt is being sent
10	—	For manufacturer setting
11		
12		
13		
14		
15		

Interrupt conditions (control parameters)

When interrupts each axis are to be validated, set the values that designate ON for the bits that correspond to the conditions shown below to "Interrupt condition 1 (parameter No.0204)" and "Interrupt condition 2 (parameter No.0205)" of the parameter.
The interrupts occur on the leading edge of the signal corresponding to the interrupt condition.
The multiple interrupt conditions can be selected.

■Interrupt condition 1 (parameter No.0204)

Bit	Symbol	Signal name
0	RDY	Servo ready
1	INP	In-position
2	ZSP	Zero speed
3	ZPAS	Passed Z-phase
4	TLC	Torque limit effective
5	SALM	Servo alarm
6	SWRN	Servo warning
7	ABSE	Absolute position erased
8	OP	Operation processing
9	CPO	Rough match
10	PF	Positioning completed
11	ZP	Home position return completed
12	SMZ	Smoothing stop
13	OALM	Operation alarm
14	OPF	Operation completed
15	PSW	Position switch

■Interrupt condition 2 (parameter No.0205)

Bit	Symbol	Signal name
0	GAINO	During gain switching
1	FCLSO	Fully closed loop control changing
2	TLSO	Selecting torque limit
3	SPC	During PID control
4	—	For manufacturer setting
5	MAK1	Mark detection 1
6	MAK2	Mark detection 2
7	PRSMO	During continuous operation to torque control
8	IWT	Interference check standby
9	SINP	Servo amplifier in-position
10	—	For manufacturer setting
11		
12		
13		
14		
15		

Interrupt conditions (RIO control parameters)

When interrupts each axis are to be validated, set the values that designate ON for the bits that correspond to the conditions shown below to "Interrupt condition (parameter No.0203)" of the parameter.
The interrupts occur on the leading edge of the signal corresponding to the interrupt condition.
The multiple interrupt conditions can be selected.

■Interrupt condition (parameter No.0203)

Bit	Symbol	Signal name
0	—	For manufacturer setting
1		
2		
3		
4		
5	RUALM	RIO module alarm
6	RUWRN	RIO module warning
7	—	For manufacturer setting
8		
9		
10		
11		
12		
13	RCALM	RIO control alarm
14	—	For manufacturer setting
15		

Factor of interrupt

Point

[API library]

- Confirmation of the factor of the interrupt is processed by the interrupt thread that is created when calling the sscIntStart function. Thus processing by the user program is unnecessary.
- To wait the factor of the interrupt, use the following functions.
  Factor of system/axis interrupt: sscWaitIntEvent function/sscWaitIntEventMulti function
  Factor of other axes start interrupt: sscWaitIntOasEvent function
  Factor of pass position interrupt: sscWaitIntPassPosition function

Information of outputting with factor of interrupt

When an interrupt occurs, the bit corresponding to the axis No., the station No., or the system which is the factor of the interrupt turns ON.

Address (hexadecimal)		Content	Remarks
MR-MC2_ _	MR-MC3_ _		
04C0	002000	Outputting with factor of axis interrupt 1	Axis 1 (bit0) to axis 32 (bit31)
04C1	002001		
04C2	002002		
04C3	002003		
04C4	002004	Outputting with factor of axis interrupt 2*1	Axis 33 (bit0) to axis 64 (bit31)
04C5	002005		
04C6	002006		
04C7	002007		
—	002008	For manufacturer setting	—
	⋮		
	00200F		
04C8	002010	Outputting with factor of station interrupt*1	Station 1 (bit0) to station 4 (bit3) [MC200] Station 1 (bit0) to station 16 (bit15) [MC300]
04C9	002011		
—	002012		
	002013		
04CA	002014	Outputting with factor of system interrupt	System (bit0)
04CB	002015	For manufacturer setting	—
⋮	⋮		
04CF	002019		
—	00201A		
	⋮		
	00201F		

*1 When using MR-MC2_ _, 04C4 to 04C7, and 04C9 are "For manufacturer setting".

Factor of axis interrupt

Address (hexadecimal)		Content	Reference
MR-MC2_ _	MR-MC3_ _		
04D0 to 04D3	002020 to 002023	Factor of interrupt Axis 1	Page 581 Details on factor of interrupt on axis n
04D4 to 04D7	002024 to 002027	Factor of interrupt Axis 2	
04D8 to 04DB	002028 to 00202B	Factor of interrupt Axis 3	
04DC to 04DF	00202C to 00202F	Factor of interrupt Axis 4	
04E0 to 04E3	002030 to 002033	Factor of interrupt Axis 5	
⋮	⋮	⋮	
054C to 054F	00209C to 00209F	Factor of interrupt Axis 32	
0550 to 0553	0020A0 to 0020A3	Factor of interrupt Axis 33*1	
⋮	⋮	⋮	
058C to 058F	0020DC to 0020DF	Factor of interrupt Axis 48*1	
—	0020E0 to 0020E3	Factor of interrupt Axis 49	
	⋮	⋮	
	00211C to 00211F	Factor of interrupt Axis 64	
	002120 to 00221F	For manufacturer setting	

*1 When using MR-MC2_ _, 0550 to 058F are "For manufacturer setting".

System interrupt factors

Address (hexadecimal)		Content	Reference
MR-MC2_ _	MR-MC3_ _		
0590	002220	Factor of system interrupt	Page 583 Details on factor of system interrupt
0591	002221		
0592	002222	For manufacturer setting	—
0593	002223		
—	002224		
	⋮		
	002227		
0594	002228	Factor of other axes start interrupt [MC200] Factor of other axes start interrupt 1 [MC300]	Page 584 Factor of other axes start interrupt
0595	002229		
0596	00222A		
0597	00222B		
—	00222C	Factor of other axes start interrupt 2	
	00222D		
	00222E		
	00222F		
	002230	For manufacturer setting	—
	⋮		
	002237		

7

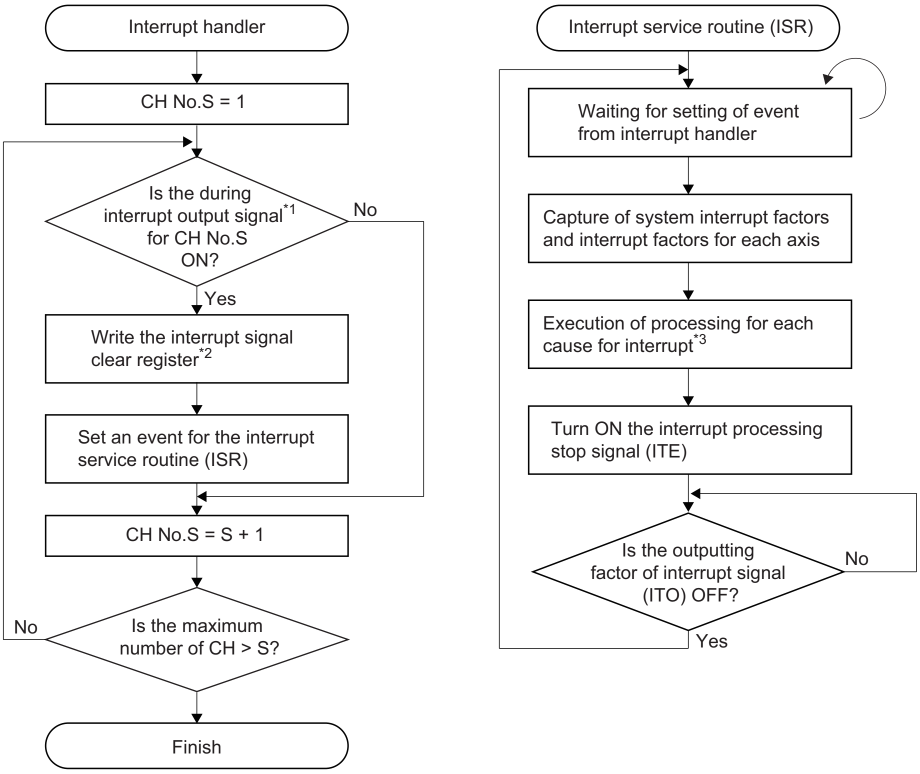
Address (hexadecimal)		Content	Reference
MR-MC2_ _	MR-MC3_ _		
0598	002238	Factor of pass position interrupt 1	Page 588 Factor of pass position interrupt
0599	002239		
059A	00223A		
059B	00223B		
059C	00223C	Factor of pass position interrupt 2	
059D	00223D		
059E	00223E		
059F	00223F		
—	002240	Factor of pass position interrupt 3	
	002241		
	002242		
	002243		
	002244	Factor of pass position interrupt 4	
	002245		
	002246		
	002247		
05A0	002248	For manufacturer setting	—
⋮	⋮		
05AF	00229F		

Station interrupt factors

Address (hexadecimal)		Content	Reference
MR-MC2_ _	MR-MC3_ _		
05B0	0022A0	Station interrupt factor station 1	Page 593 Interrupt factor for each station
05B1	0022A1		
05B2	0022A2	Station interrupt factor station 2	
05B3	0022A3		
05B4	0022A4	Station interrupt factor station 3	
05B5	0022A5		
05B6	0022A6	Station interrupt factor station 4	
05B7	0022A7		
05B8	0022A8	Station interrupt factor station 5*1	
05B9	0022A9		
05BA	0022AA	Station interrupt factor station 6*1	
05BB	0022AB		
05BC	0022AC	Station interrupt factor station 7*1	
05BD	0022AD		
05BE	0022AE	Station interrupt factor station 8*1	
05BF	0022AF		
—	0022B0	Station interrupt factor station 9	
	0022B1		
	⋮	⋮	
	0022BE	Station interrupt factor station 16	
	0022BF		
	0022C0	For manufacturer setting	—
	⋮		
	0022DF		

*1 When using MR-MC2_ _, 05B8 to 05BF are "For manufacturer setting".

Interrupt processing example



*1 Confirm the bit(s) for the during interrupt output signal. (If the bit(s) are ON: a current interrupt is being output, while if the bit(s) are OFF: there is not a current interrupt)

*2 When 1 is written in the interrupt signal clear register, the output of the interrupt is cancelled.

*3 Perform the necessary processing for the different factor of interrupts, such as for the completion of the operation and the generation of an operation alarm.
<Example> When an operation alarm occurs, send a stop request to other axes that are in the operation.

Point

[API library]

This interrupt processing example is processed by the device driver thus processing by the user program is unnecessary.

7.7 User Watchdog Function

The user watchdog function is to check the user program error.
Reset the value of watchdog check counter on the dual port memory using a host personal computer on a periodic basis. If the watchdog check counter value is not reset at the designated time (watchdog timer counts down to 0), it is determined that the host personal computer error and a forced stop status is entered.
The position board decrements the watchdog timer on each control cycle until the watchdog check counter value is reset. When the watchdog check counter value is reset, it is reset to the value set for the watchdog timer start counter.

Point

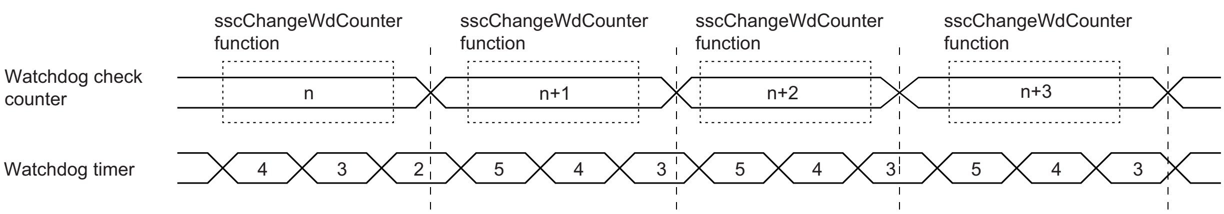
When the watchdog timer start counter is set to 0, user watchdog is not executed.

Point

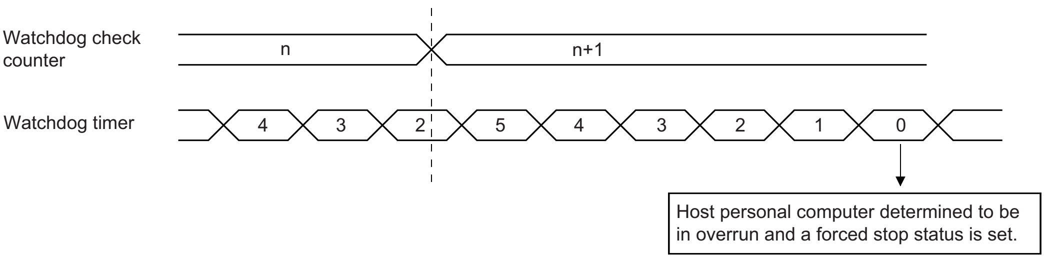
[API library]

- To enable/disable user watchdog function, use the sscWdEnable function/sscWdDisable function.
- To update the watchdog check counter, use the sscChangeWdCounter function.
- For a detailed procedure for watchdog, refer to the sample program (WatchDog) contained on the utility software.

Normal conditions

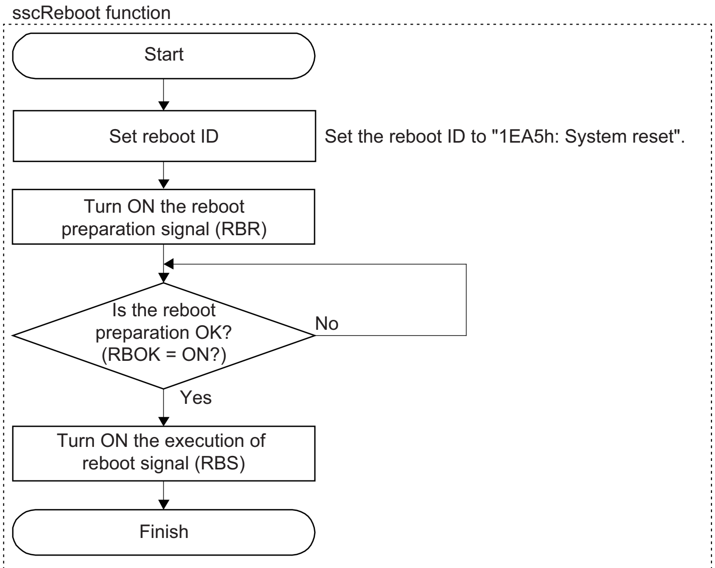


When the host personal computer overruns



7.8 Software Reboot Function

Through using the software reboot function, the host personal computer can restart the position board using the software.
Perform the software reboot according to the following procedure. (Refer to the system data table for the command/status signal.)



Point

- When turning ON the reboot preparation, it becomes a forced stop status.
- If an erroneous reboot ID is set and reboot preparation turned ON or execution of reboot turned ON without performing reboot preparation, a reboot preparation error occurs. If a reboot preparation error occurs, turn OFF reboot preparation and execution of reboot and restart the process from the beginning.
- Accessing the position board via the bus during a software reboot may cause the host personal computer connected to the bus to freeze. [MC300]

Point

[API library]
To perform the software reboot, use the sscReboot function.

7.9 Parameter Backup

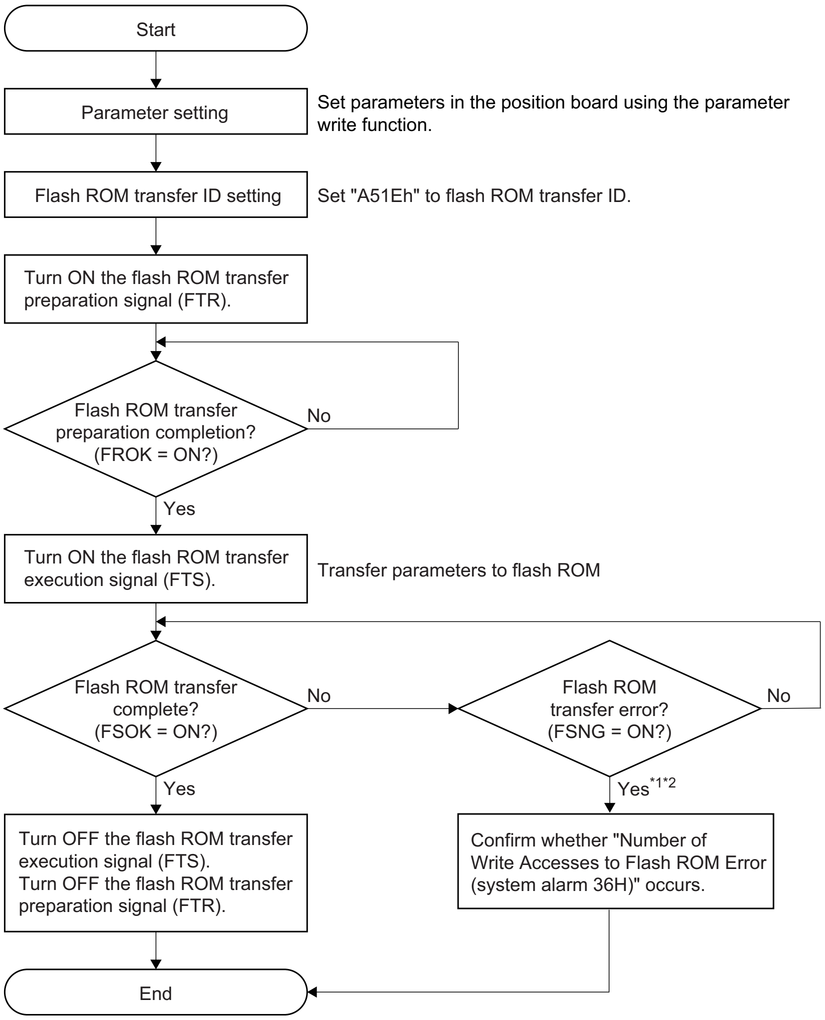
Point

When there are a lot of changing parameters of the position board and servo amplifier and the parameter changing time effects the system startup, saving parameters in the flash ROM of the position board by this function can shorten the time of system startup.

Flash ROM parameter backup

The contents of the parameter data area in the position board can be backed up to the flash ROM. When executing flash ROM parameter read (system command code: 0004h) at system preparation completion (system status code: 0001h), backup the parameter in the flash ROM with this function. Execute parameter backup in the flash ROM in the following procedure. (At factory shipment, the initial value is set to each parameter.)

sscSaveAllParameterToFlashROM function



*1 The flash ROM can be rewritten up to 100,000 times. If it exceeds 100,000 times, "Number of Write Accesses to Flash ROM Error (system alarm 36H, detail 01H)" occurs and parameter backup is not performed.

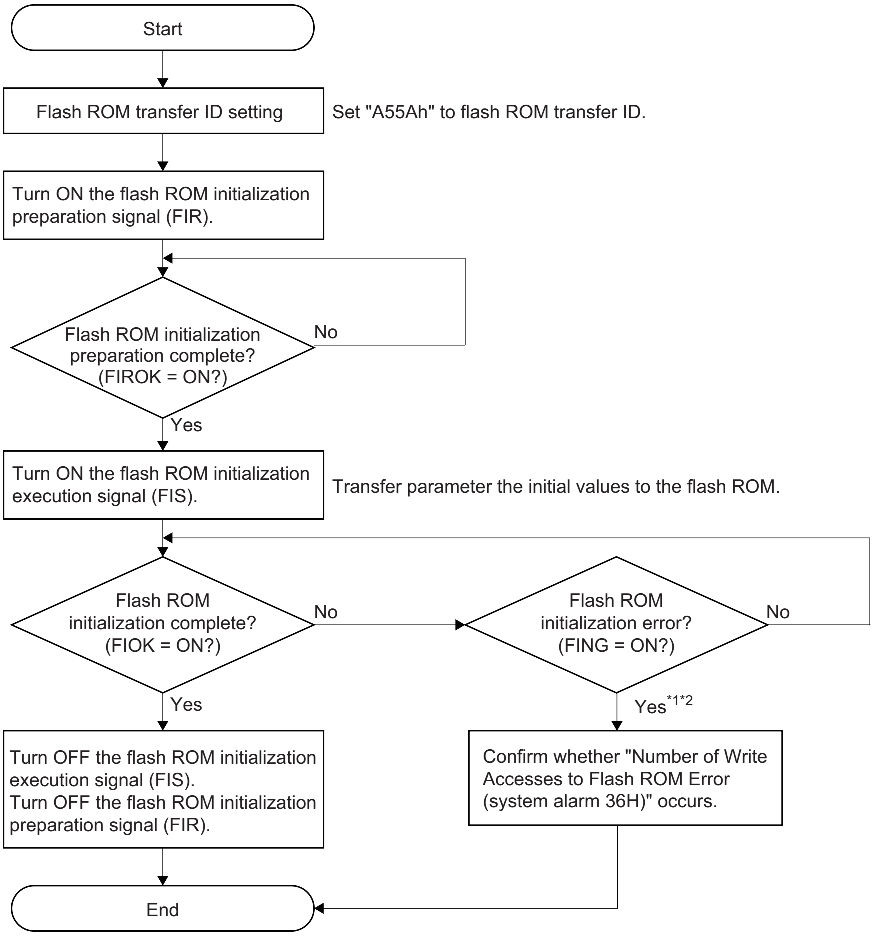
*2 The flash ROM can be rewritten up to 25 times after every system preparation completion. If it exceeds 25 times, "Number of Write Accesses to Flash ROM Error (system alarm 36H, detail 03H)" occurs and parameter backup is not performed. Rewriting times to the flash ROM is cleared to 0 by resetting the system alarm or the software reboot. The parameter backup times executed after system preparation completion can be confirmed in "Parameter backup times (monitor No.040AH)".

Point

- The flash ROM parameter backup function becomes available after the system preparation completion (system status code: 0001h).
- When the flash ROM transfer preparation error signal (FRNG) or the flash ROM transfer error signal (FSNG) turns ON, confirm the procedure and restart the process from the beginning.
- Do not turn OFF the power supply of the position board, or execute the software reboot function during the parameter backup in the flash ROM. If flash ROM parameter read is executed before normal backup completion, flash ROM parameter read error (system status code: 0005h) occurs. In this case, execute parameter initialization (system command code: 0003h), set parameters as required and backup data to flash ROM again.
- When flash ROM parameter read is executed, the value of gain of the servo amplifier is the backed up value in the flash ROM, so vibration or abnormal sound may occur even when auto tuning is valid. Execute flash ROM backup after adjusting the gain of the servo amplifier.
- Execute flash ROM backup after home position return is performed when the absolute position detection system is used.··· (1)
- Execute (1) above when changing a servo motor.
- Execute flash ROM backup after changing a position board.
- Perform the parameter backup while the operation of all axes is stopped.
- Writing and reading parameters are impossible during the flash ROM transfer.
- The time required for flash ROM transfer execution until flash ROM transfer is completed varies depending on the software version. The following is the time until flash ROM transfer is completed for each software version. [MC300]
  · Software version A4 or earlier: 5 minutes
  · Software version A5: 1 minute
  · Software version A6: 2 minutes

Flash ROM parameter initialization

The contents of the parameters which is backed up in the flash ROM is changed to the initial value.



*1 The flash ROM can be rewritten up to 100,000 times. If it exceeds 100,000 times, "Number of Write Accesses to Flash ROM Error (system alarm 36H, detail 01H)" occurs and parameter initialization is not performed.

*2 The flash ROM can be rewritten up to 25 times after every system preparation completion. If it exceeds 25 times, "Number of Write Accesses to Flash ROM Error (system alarm 36H, detail 03H)" occurs and parameter backup is not performed. Rewriting times to the flash ROM is cleared to 0 by resetting the system alarm or the software reboot. The parameter backup times executed after system preparation completion can be confirmed in "Parameter backup times (monitor No.040AH)".

Point

- The flash ROM initialization function becomes available after the parameter initialization completion (system status code: 0003h) or the flash ROM parameter read (system status code: 0004h) is executed.
- When the flash ROM initialization preparation error signal (FIRNG) or the flash ROM initialization error signal (FING) occurs, confirm the procedure and restart the process from the beginning.
- Do not turn OFF the power supply of the position board while transferring parameter initial values to the flash ROM. If flash ROM parameter read is executed before normal initialization completion, flash ROM parameter read error (system status code: 0005h) occurs.
- Perform the flash ROM parameter initialization while the operation of all axes is stopped.
- Writing and reading parameters are impossible during the flash ROM initialization.
- The time required for flash ROM transfer execution until flash ROM transfer is completed varies depending on the software version. The following is the time until flash ROM transfer is completed for each software version. [MC300]
  · Software version A4 or earlier: 5 minutes
  · Software version A5: 1 minute
  · Software version A6: 2 minutes

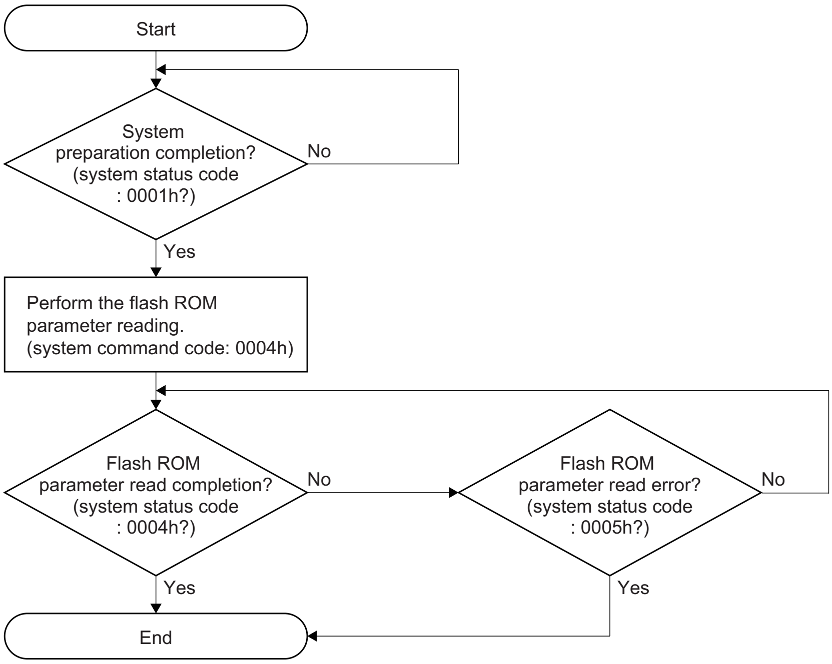
Point

[API library]
For flash ROM parameter initialization, save the flash ROM parameters with the sscSaveAllParameterToFlashROM function after initializing the parameters with the sscResetAllParameter function.

Flash ROM parameter reading

The parameters backed up in the flash ROM is read when the system preparation is completed (system status code: 0001h).

sscLoadAllParameterFromFlashROM function



7

7.10 Test Mode

Servo amplifier can be adjusted using test operation function (JOG, test positioning, machine analyzer etc.) of the MR Configurator2 attached to the position board using a USB connection. At this time, the in test mode signal (TSTO) is turned ON on the position board side, and the operation (such as automatic operation) cannot be performed from the position board. In order to perform operations using the position board, the system must be restarted. For the MR Configurator2 test operation, refer to the servo amplifier instruction manual or the manual for your servo amplifier and/or MR Configurator2 help.

Point

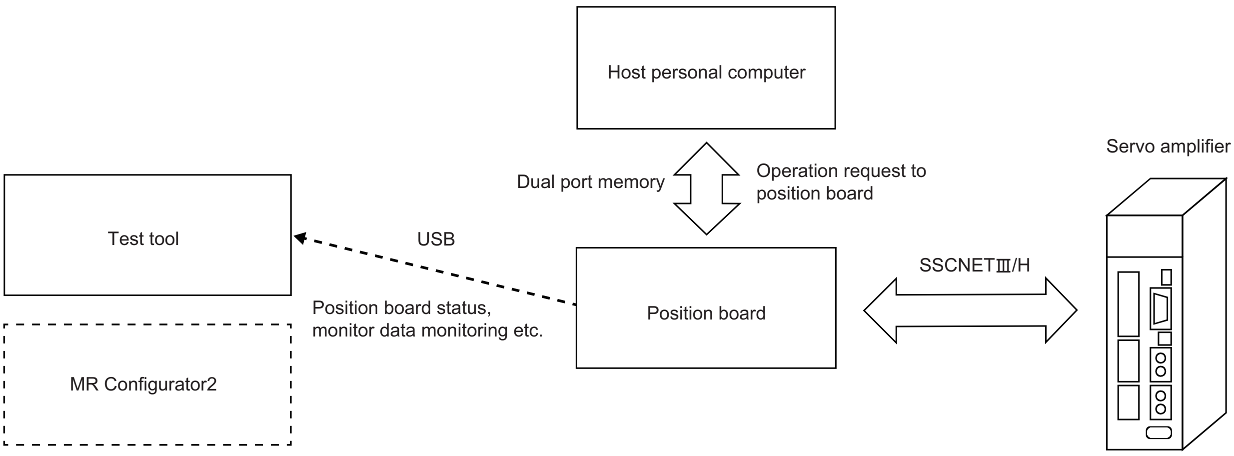
The MR Configurator2 version 1.155M or later is supported.

Point

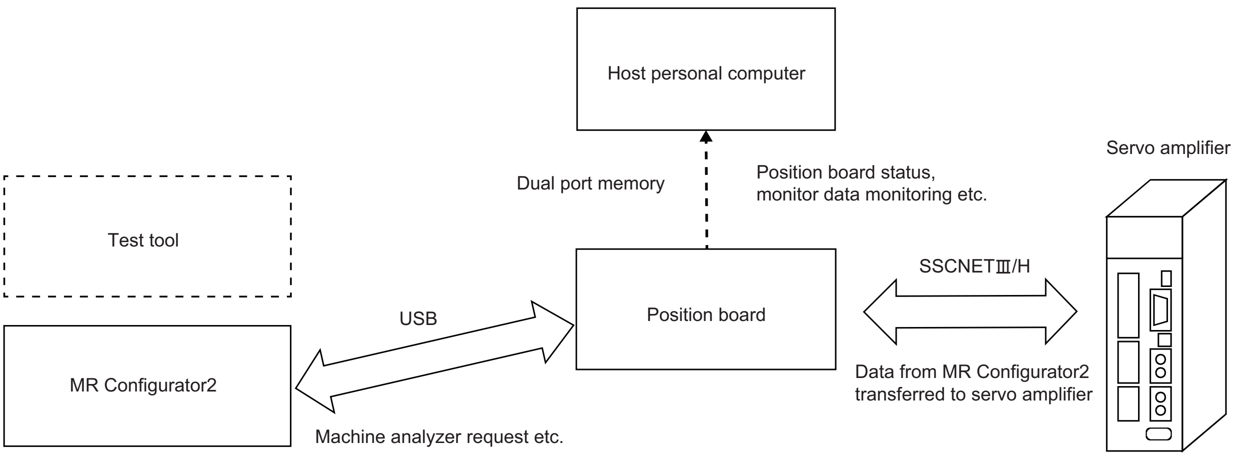
[API library]
To confirm the in test mode signal (TSTO) is ON/OFF, confirm if "SSC_STSBIT_AX_TSTO" is ON/OFF with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.

Structural diagram

Under normal operation



While in test mode



Test operation mode

Limitations

- If operation is started using the position board, "In Test Mode (operation alarm 1AH, detail 01H)" occurs and operation cannot be performed.
- The commands to servo amplifier (servo on/off, servo alarm reset, torque limit command etc.) are invalid. Monitoring and reading and writing of parameters can be performed as normal.

Transition to test mode

In the following cases, it is not possible to transit to test mode. Confirm error messages on the MR Configurator2.

- While not in system running (system status code: 000Ah)
- While an axis is in operation
- While an axis has servo alarm

When a servo parameter has been changed using the MR Configurator2

If a servo parameter is changed at the MR Configurator2 using the machine analyzer etc., it is necessary to reflect the parameters that are managed by the host personal computer for all the parameters that were changed. As the parameters that were changed can be confirmed using "servo parameter change No.", read the parameter and reflect it to the parameters being managed by the host personal computer.

7.11 Reconnect/disconnect Function

Disconnection function

By turning ON the disconnection command signal (CCC), SSCNET communication with selected axis and later can be disconnected.

To use this function, set "Consistency check selection at system startup" of "System option 2 (parameter No.0002)" to "1: Invalid". This function becomes available after the system is started.

The axes whose communication is disconnected become non-communicating axes, so their power supplies can be turned OFF and SSCNETⅢ cables can be detached. At this time, communicating axes are not affected.*1

*1 If the power supplies of communicating axes are turned off or their SSCNETⅢ cables are detached, a system error of the position board occurs and the axes enter forced stop status.

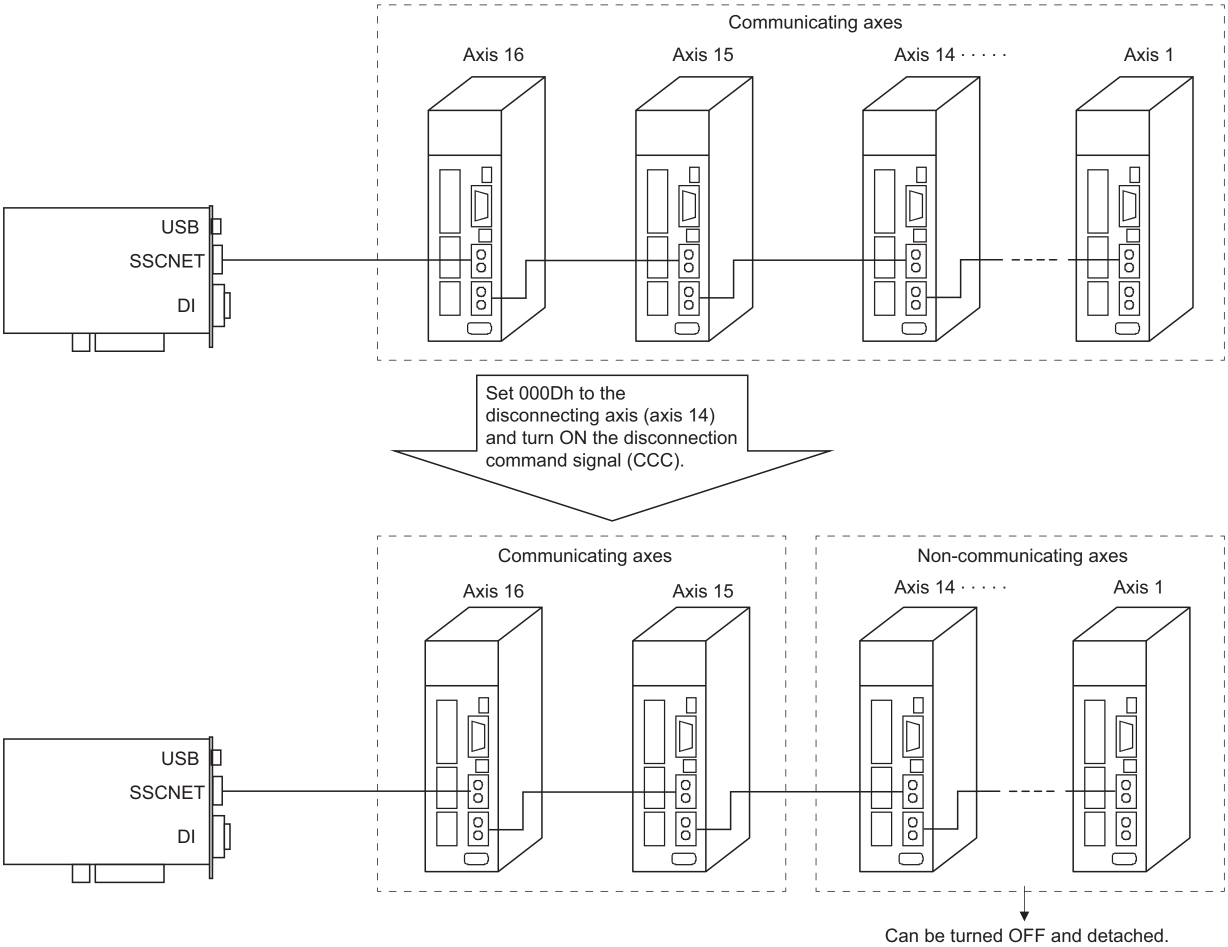
Point

Refer to the controlling axis information after the disconnection is completed to confirm the bit corresponding to the non-communicating axis is OFF.

Point

[API library]

To disconnect SSCNET communication, use the sscDisconnectSSCNET function.



Reconnect function

This function is a function that searches for controlled and non-communicating axes from all connected axes and starts SSCNET communication with them by turning ON the reconnection command signal (RCC).
To use this function, set "Consistency check selection at system startup" of "System option 2 (parameter No.0002)" to "1: Invalid". This function becomes available after the system is started.

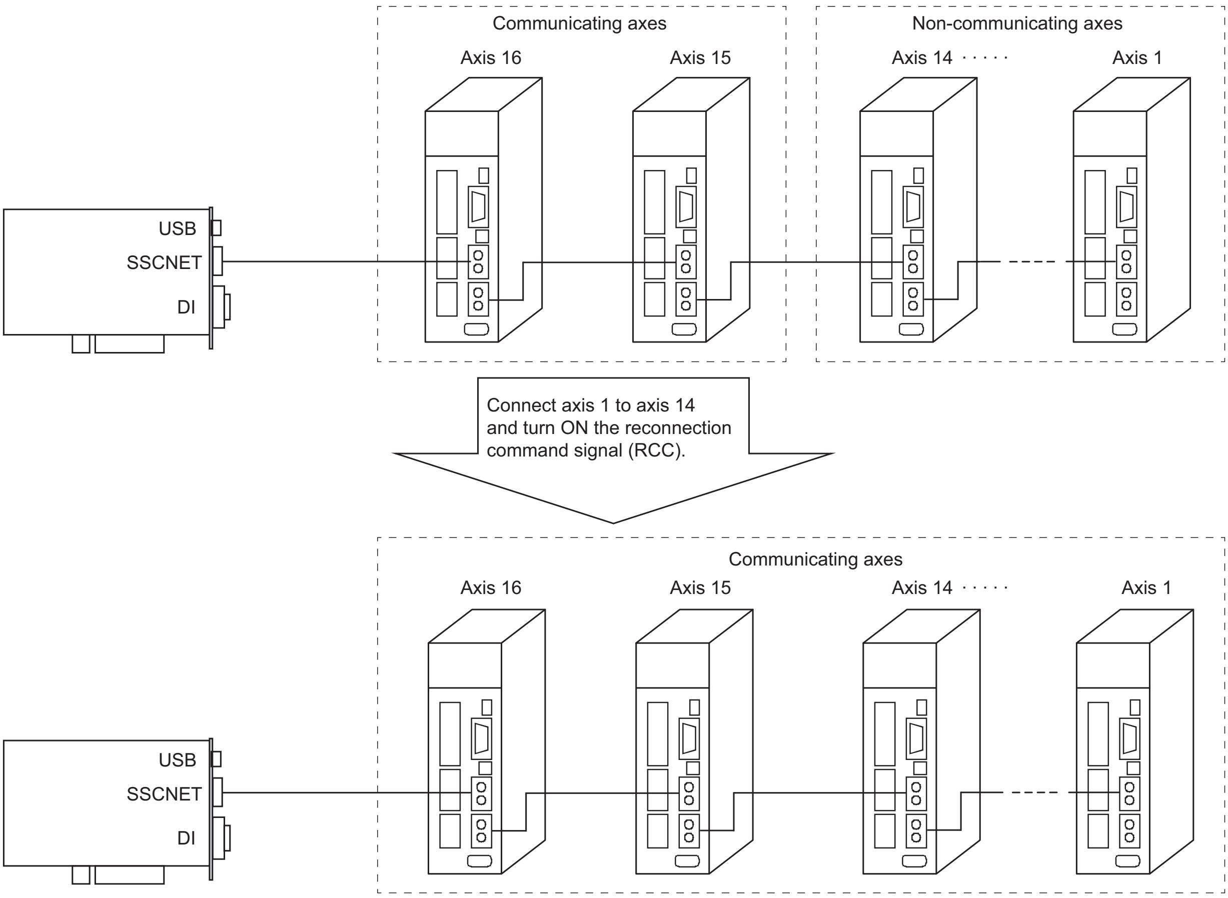
Point

- Set all parameters related to reconnecting axes before system startup, including the setting of "Control axis" of "Control option 1 (parameter No.0200)".
- Update time synchronization information before turning ON the reconnection command signal (RCC).
- Refer to the controlling axis information after the reconnection is completed to confirm the bit corresponding to the communicating axis is ON.
- When an axis which has completed home position return is reconnected after being disconnected, it is in a home position return incomplete status (the home position return request signal (ZREQ) is ON) at the time of reconnection. (Except for when absolute position detection system is valid and absolute position was correctly restored, and when "No home position" of "Control option 1 (parameter No.0200)" is "1: Valid")

Point

[API library]

- To reconnect SSCNET communication, use the sscReconnectSSCNET function.
- Update the time synchronization information with the sscReconnectSSCNET function.



Interface

System command/status table

■System command

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0434	000B64	Disconnection axis No.*1
0435	000B65	

*1 Set the axis No., and station No. to the following values.
Using MR-MC2_ _: Set axis No. to 0000h (axis 1) to 001Fh (axis 32), and station No. to 8000h (station 1) to 8003h (station 4).
Using MR-MC3_ _: Set axis No. to 0000h (axis 1) to 003Fh (axis 64), and station No. to 8000h (station 1) to 800Fh (station 16).

■System status

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
04A4	000C44	Error code of reconnection/disconnection*1
04A5	000C45	

*1 Set the axis No., and station No. to the following values.
Using MR-MC2_ _: Set axis No. to 0000h (axis 1) to 001Fh (axis 32), and station No. to 8000h (station 1) to 8003h (station 4).
Using MR-MC3_ _: Set axis No. to 0000h (axis 1) to 003Fh (axis 64), and station No. to 8000h (station 1) to 800Fh (station 16).

• Error code of reconnection/disconnection

No.	Content	Detail
0001h	Disconnected axis specification error	The axis (station) specified as the disconnecting axis (station) is not in communication.
0002h	Reconnected axis No. duplication error	The axis No. (station No.) of the reconnected axis (station) is already used.
0003h	Reconnected axis type code error	The vendor ID and type code of the reconnected axis (station) differ from the setting of the parameter (parameter No.021D, 021E).
0004h	Reconnection error during communication error	Execute reconnection during communication error.
0006h	Communication cycle error	An axis (station) that is not compatible with the set control cycle (communication cycle) is connected.

System command/status bit

■System command bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03EB	000B0B	0	RCC	Reconnection command
		1	—	For manufacturer setting
		2		
		3	CCC	Disconnection command
		4	—	For manufacturer setting
		5		
		6		
		7		

■System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
045B	000BEB	0	RCO	During reconnection processing
		1	RCF	Reconnection complete
		2	RCE	Reconnection error
		3	CCO	During disconnection processing
		4	CCF	Disconnection complete
		5	CCE	Disconnection error
		6	—	For manufacturer setting
		7		

System parameter

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Function
0002	*SYSOP2	System option 2	0000h	—	0000h to 1101h	■□■■ (Consistency check selection at system startup) Set whether to perform consistency check selection for controlled axes setting at system startup. • 0: Valid • 1: Invalid

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

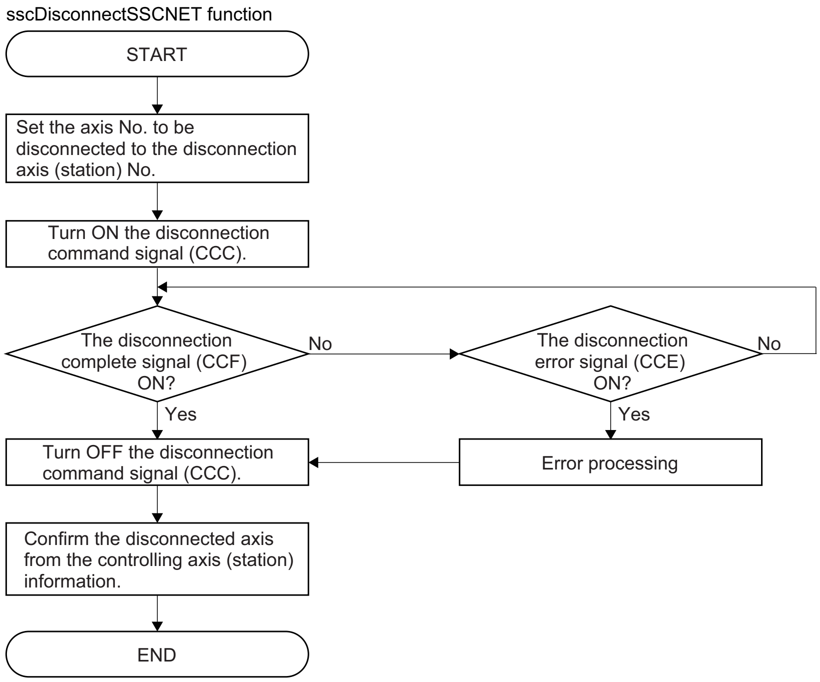
System configuration information table

Address (hexadecimal)		Content	Remarks
MR-MC2_ _	MR-MC3_ _		
06E0	000CD0	Controlling axis information (lower) [MC200] Controlling axis information 1 [MC300] (4bytes)	The bit corresponding to the axis which can currently be controlled (SSCNET communicating axis or the amplifier-less axis) turns ON. The bit is the axis 1 (bit0) to the axis 32 (bit31).
06E1	000CD1		
06E2	000CD2		
06E3	000CD3		
06E4	000CD4	Controlling axis information (upper) [MC200] Controlling axis information 2 [MC300] (4bytes)	■Using MR-MC2_ _ Fixed at 0. ■Using MR-MC3_ _ The bit corresponding to the axis which can currently be controlled (SSCNET communicating axis or the amplifier-less axis) turns ON. The bit is the axis 33 (bit0) to the axis 64 (bit31).
06E5	000CD5		
06E6	000CD6		
06E7	000CD7		
06E8	000CE0	Controlling station information (2bytes) [MC200] (4bytes) [MC300]	The bit corresponding to the station which can currently be controlled (SSCNET communicating station or the remote I/O disconnect station) turns ON. The bit is the station 1 (bit0) to the station 4 (bit3). [MC200] The bit is the station 1 (bit0) to the station 16 (bit15). [MC300]
06E9	000CE1		
—	000CE2		
	000CE3		

Disconnection method

SSCNET communication disconnection is executed by turning ON the disconnection command signal (CCC) after the axis No. of the axis to be disconnected is specified.

The flowchart of the disconnection is shown below.



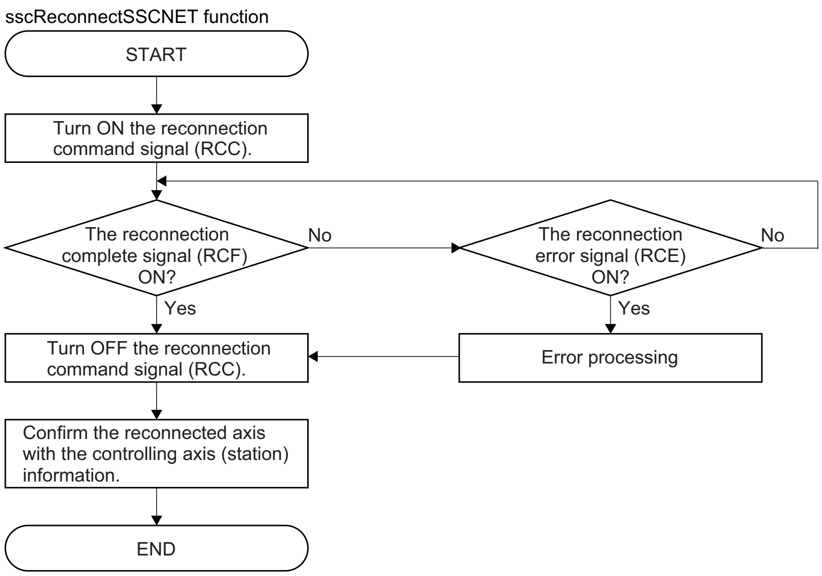
Point

When "Consistency check selection at system startup" of "System option 2 (parameter No.0002)" is "0: Valid", the disconnection error signal (CCE) turns ON.

Reconnection method

SSCNET communication reconnection is executed by turning ON the reconnection command signal (RCC). The axis No. to be connected axis is not needed to be specified.

The flowchart of the reconnection is shown below.



Restrictions

The restrictions for SSCNET reconnect/disconnect function are shown below.

Linear interpolation startup [MC200]/interpolation operation startup [MC300]

When the axis allocated to the same linear interpolation group [MC200]/interpolation group [MC300] is not connected, "Linear Interpolation Startup Error [MC200]/Interpolation Startup Error [MC300] (operation alarm 40H, detail 01H)" occurs.

Tandem drive

When the axis allocated to the same tandem drive group is not connected, servo cannot be turned on during in the synchronous mode.
During operation in non-synchronous micro-adjustment mode, the servo operates normally.

Disconnect during operation

When SSCNET disconnection is executed to the axis which is in operation, "Servo Is Not Controllable (operation alarm B0H, detail 02H)" occurs and the servo stops by the dynamic brake or decelerates to stop depending on the setting of the servo amplifier.

Multi-axis amplifier

When using SSCNET disconnect function in multi-axis amplifier such as MR-J4W_-_B, make sure that all axes in the unit are simultaneously disconnected.
When the disconnection command is sent to the second axis or later in the same unit, the disconnection error signal (CCE) turns ON.

Turning OFF the power supply after disconnection

Turn off the power supply of the servo amplifier after confirming the LED indicates "AA" and SSCNET disconnection completed.
For the SSCNETⅢ/H head module, confirm that the REM.LED is OFF before turning OFF power supply of the SSCNETⅢ/H head module.
For the sensing module, confirm that the sensing SSCNETⅢ/H head module RUN.LED is flickering before turning OFF power supply of sensing module.

Operation at the system startup

When "Consistency check selection at system startup" of "System option 2 (parameter No.0002)" is set to "1: Invalid" and all control axes are not connected when system is started, "An Axis That Has Not Been Mounted Exists (system error E400H)" does not occur and the system is started with the only connected axis.

Input device signal

When a limit switch is allocated to a remote I/O input device and that input device allocated to the module is disconnected, the limit is continuously detected. However, when "1: Maintain status" is set for "RI control at communication error" for "Control option 2 (parameter No.0201)", the status before disconnection is maintained.

7.12 Sampling

The sampling function is a function that monitors the servo amplifier status and samples this data. After sending the sampling start signal (SMPS), the following data is sampled every sampling cycle. The data is sampled in the sampling data buffer area in the position board up to 8192 [MC200]/65536 [MC300] points.

For MR-MC2_ _, in sampling with the sampling points exceeding 8192, the user program always needs to read sampling data during sampling. Data can be sampled up to 65536 points. For details, refer to the following.

☞ Page 429 Timing chart for sampling function

Point

- The sampling function can be used in the test tool.
- When using the graph function of the test tool using a USB connection, the data can be sampled up to 8192 points since enough data transfer speed cannot be ensured. [MC200]

Point

[API library]

For a detailed procedure for sampling, refer to the sample program (Sampling) contained on the utility software.

The sampled data can be read to the sampling data read area by specifying the sampling read page No. The sampled data is stored in the position board internal memory and initialized by power off of the position board or the software reboot.

Sampling specification list

Item		Specification	
		MR-MC2_ _	MR-MC3_ _
Number of sampling points		Up to 65536 points (with a bus connection) (Ring buffer of 8192 points) Up to 8192 points (when there is a test tool USB connection) • 0.88ms: approx. 7.3s • 0.44ms: approx. 3.6s • 0.22ms: approx. 1.8s (When using 8192 points and a 1 × sampling cycle.)	Up to 65536 points (with a bus or USB connection) (Ring buffer of 65536 points) • 0.88ms: approx. 58.2s • 0.44ms: approx. 29.1s • 0.22ms: approx. 14.6s (When using 65536 points and a 1 × sampling cycle.)
Sampling cycle		Control cycle × (1 to 256) • 0.88ms: up to approx. 1863s	
Number of sampling items	Bits	Up to 16 items	Up to 32 items
	Data	Up to 32 items (32 items set to either 2 or 4bytes each)*1	
Sampling item content	Bits	Set through the operation information monitor • Command bits (address: 1000H to 100FH) • Status bits (address 1060H to 106FH)	
	Data	• Servo information (monitor) • Operation information (monitor) • System information (monitor)	
Sampling trigger	Number of trigger conditions	8 conditions	
	Trigger conditions*2	• Leading edge of bit • Trailing edge of bit • Bit ON • Bit OFF • When data is "passing through trigger value in increase direction" • When data is "passing through trigger value in decrease direction" • When data is "same as trigger value or higher" • When data is "same as trigger value or lower" • No trigger	
	Trigger mode	• Trigger condition "or" • Trigger condition "and" • No trigger	
	Pre-trigger	0 to 90% (in units of 10%)	
Sampling data	Number of points per page	32 points	128 points
	Maximum page No.	256 (= 8192/32)	512 (= 65536/128)

*1 There can be a combination of up to 3bit or data points of the servo information per axis. The electrical current feedback monitor and the effective load ratio monitor have no restriction on the number of points allowed.
*2 For details about bits/data, refer to "Sampling item content".

7

Command/status bit

System command/status bits related to sampling function are shown below.

System command bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E1	000B01	0	SMPS	Sampling start
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F2	000B12	0	SMPSW	Sampling setting write command
		1	—	For manufacturer setting
		2		
		3		
		4	SMPSR	Sampling setting read command
		5	—	For manufacturer setting
		6		
		7		

- Details concerning system command bits

Symbol	Signal name	Function details	
		Function	Operation
SMPS	Sampling start	Start sampling.	When turning ON the sampling start signal (SMPS), starts the storage of sampling data.
SMPSW	Sampling setting write command	Write sampling setting.	Write the sampling setting which is set to the sampling setting write No. When the sampling setting write No. is incorrect and the sampling setting to be written is outside the setting range, the sampling setting write is not performed. (The sampling setting write command is valid only while the system is running.)
SMPSR	Sampling setting read command	Read sampling setting.	Read the sampling setting which is set to the sampling setting read No. When the sampling setting read No. is incorrect, the sampling setting read is not performed. (The sampling setting read command is valid only while the system is running.)

■System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0451	000BE1	0	SMPW	Waiting for sampling trigger
		1	SMPO	Sampling is being performed
		2	SMPF	Sampling completed
		3	SMPE	Sampling error
		4	—	For manufacturer setting
		5	AHINF	Alarm history information
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0462	000BF2	0	SWFIN	Sampling setting write completed
		1	SWEN	Sampling setting No. error
		2	SWED	Sampling setting data out of bounds
		3	—	For manufacturer setting
		4	SRFIN	Sampling setting read completed
		5	SREN	Sampling setting No. error
		6	—	For manufacturer setting
		7		

- Details concerning system status bits

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
SMPW	Waiting for sampling trigger	Notify that the sampling trigger is being waited.	When the sampling start signal (SMPS) is ON, and being wait for the sampling trigger.	• The sampling start signal (SMPS) is turned OFF. • The trigger for the start sampling trigger axis is met.
SMPO	Sampling is being performed	Notify that sampling is now being performed.	When the sampling start signal (SMPS) is ON, and being performed sampling.	• The sampling start signal (SMPS) is turned OFF. • Sampling is completed.
SMPF	Sampling completed	Notify that sampling was completed normally.	Sampling is completed normally.	The sampling start signal (SMPS) is turned OFF.
SMPE	Sampling error	Notify that sampling was not completed normally.	• The sampling setting error occurs. • The sampling item error occurs. • The next page No. of the completed read sampled page No. is same as the sampling read page No. (The data was not sampled in time.) • The sampling start signal (SMPS) is turned ON when the read sampled data completion page No. is "-1". • The page No.0 is designated from the page No. other than 0 when the sampling is being performed.	The sampling start signal (SMPS) is turned OFF.
SWFIN	Sampling setting write completed	Notify that writing of the sampling setting was completed.	The sampling setting write No. and the setting value in the range are set correctly and the sampling setting write command signal (SMPSW) is turned ON.	The sampling setting write command signal (SMPSW) is turned OFF.
SWEN	Sampling setting No. error	Notify that the sampling setting No. is incorrect.	The sampling setting No. is set incorrectly and the sampling setting write command signal (SMPSW) is turned ON.	The sampling setting write command signal (SMPSW) is turned OFF.

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
SWED	Sampling setting data out of bounds	Notify that the sampling setting value is outside the setting range.	The sampling setting value which is outside the setting range is set and the sampling setting write command signal (SMPSW) is turned ON.	The sampling setting write command signal (SMPSW) is turned OFF.
SRFIN	Sampling setting read completed	Notify that reading of the sampling setting was completed.	The sampling setting read No. is set correctly and the sampling setting read command signal (SMPSR) is turned ON.	The sampling setting read command signal (SMPSR) is turned OFF.
SREN	Sampling setting No. error	Notify that the sampling setting No. is incorrect.	The sampling setting read No. is set incorrectly and the sampling setting read command signal (SMPSR) is turned ON.	The sampling setting read command signal (SMPSR) is turned OFF.

Command/status data

The system command/status data related to the sampling function are shown below.

Sampling setting write (command)

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
BDA0	0E4060	Sampling setting write No.	0000h to 00AFh	Set the sampling setting No. to be written. (For 0000h, the sampling setting No. error does not occur.)
BDA1	0E4061			
BDA2	0E4062	For manufacturer setting	—	—
BDA3	0E4063			
BDA4	0E4064	Sampling setting write data	00000000h to FFFFFFFFh	Set the data of the sampling setting No. to be written.
BDA5	0E4065			
BDA6	0E4066			
BDA7	0E4067			

Sampling setting write (status)

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
BDA8	0E4068	Sampling setting write No.	0000h to FFFFh	Display the sampling setting No. which was written.
BDA9	0E4069			
BDAA	0E406A	For manufacturer setting	—	—
BDAB	0E406B			
BDAC	0E406C	Sampling setting write data	00000000h to FFFFFFFFh	Display the data of the sampling setting No. which was written.
BDAD	0E406D			
BDAE	0E406E			
BDAF	0E406F			

Sampling setting read (command)

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
BDB0	0E4070	Sampling setting read No.	0000h to 00AFh	Set the sampling setting No. to be read. (For 0000h, the sampling setting No. error does not occur.)
BDB1	0E4071			
BDB2	0E4072	For manufacturer setting	—	—
BDB3	0E4073			
BDB4	0E4074			
BDB5	0E4075			
BDB6	0E4076			
BDB7	0E4077			

Sampling setting read (status)

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
BDB8	0E4078	Sampling setting read No.	0000h to FFFFh	Display the sampling setting No. which was read.
BDB9	0E4079			
BDBA	0E407A	For manufacturer setting	—	—
BDBB	0E407B			
BDBC	0E407C	Sampling setting read data	00000000h to FFFFFFFFh	Display the data of the sampling setting No. which was read.
BDBD	0E407D			
BDBE	0E407E			
BDBF	0E407F			

Sampling error information

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
BDC0	0E4080	Sampling axis error information 1	00000000h to FFFFFFFFh	Turn ON the bit of the axis which cannot be controlled. • Axis No.1 (bit0) to 32 (bit31)
BDC1	0E4081			
BDC2	0E4082			
BDC3	0E4083			
BDC4	0E4084	Sampling axis error information 2*1	00000000h to FFFFFFFFh	Turn ON the bit of the axis which cannot be controlled. • Axis No.33 (bit0) to 64 (bit31)
BDC5	0E4085			
BDC6	0E4086			
BDC7	0E4087			
—	0E4088	For manufacturer setting	—	—
	⋮			
	0E408F			
BDC8	0E4090			
⋮	⋮			
BDCF	0E4097			
BDD0	0E4098	Sampling data error information	00000000h to FFFFFFFFh	Turn ON the bit of the sampling data which became sampling error. • Sampling data information 1 (bit0) to 64 (bit31)
BDD1	0E4099			
BDD2	0E409A			
BDD3	0E409B			
BDD4	0E409C	For manufacturer setting	—	—
⋮	⋮			
BDD7	0E409F			
BDD8	0E40A0	Sampling bit error information	00000000h to FFFFFFFFh	Turn ON the bit of the sampling bit information which became sampling error. • Sampling data information 1 (bit0) to 16 (bit15) [MC200] • Sampling data information 1 (bit0) to 32 (bit31) [MC300]
BDD9	0E40A1			
BDDA	0E40A2			
BDDB	0E40A3			
BDDC	0E40A4	For manufacturer setting	—	—
⋮	⋮			
BDDF	0E40A7			
—	0E40A8			
	⋮			
	0E40AF			

*1 When using MR-MC2_ _, BDC4 to BDC7 are "For manufacturer setting".

Sampled data read command

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
BDE0	0E40B0	Sampling read page No.	[MC200] 0 to 256 [MC300] 0 to 512	Set the page No. which is read in the sampling data read area. 12 points of sampled data are read per page. (When start sampling, set "0".)
BDE1	0E40B1			
BDE2	0E40B2	For manufacturer setting	—	—
⋮	⋮			
BDE7	0E40B7			

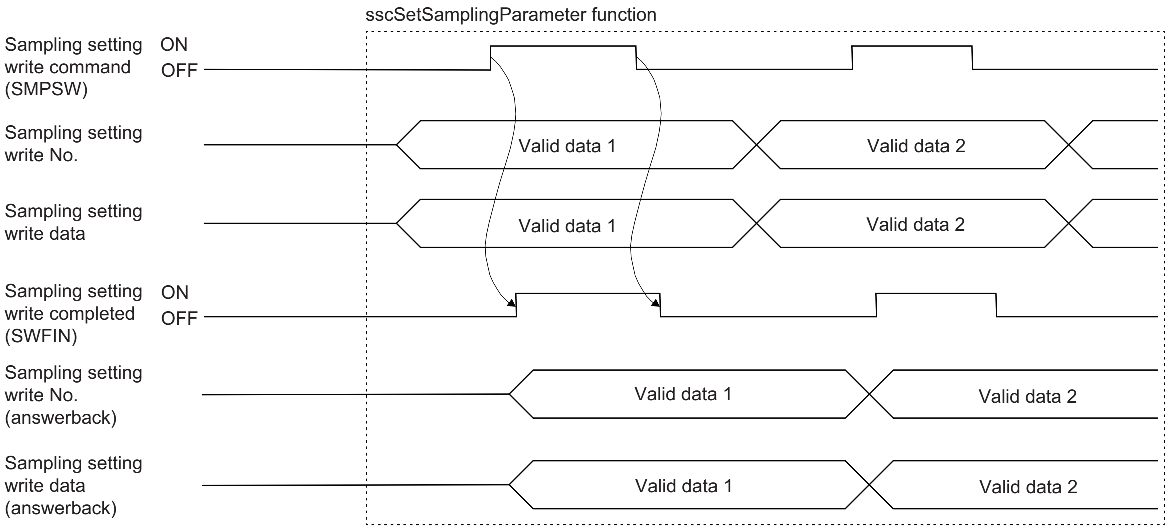
Sampled data read status

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
BDE8	0E40B8	Read sampled data completion page No.	[MC200] -2 to 256 [MC300] -2 to 512	Store the page No. which is transferred to the sampling data read area. • -2: Sampling read error • -1: Sampling reading • 0: When sampling read No. is 0 • 1 to 256: Page No. whose sampled data is read [MC200] • 1 to 512: Page No. whose sampled data is read [MC300]
BDE9	0E40B9			
BDEA	0E40BA	Valid read sampled points	[MC200] 0 to 32 [MC300] 0 to 128	Store the number of sampled data in the page where sampling read is completed. The user program needs to read the sampling data read area and to refer to the data of this valid read sampled points. All sampled data after the valid sampled points is "0". • 0 to 32 points: Data points sampled in a page [MC200] • 0 to 128 points: Data points sampled in a page [MC300]
BDEB	0E40BB			
BDEC	0E40BC	Completed read sampled page No.	[MC200] 0 to 256 [MC300] 0 to 512	Store the page No. where sampling is completed by the position board. • 0: Sampling trigger waiting or the page No.1 (only the first time) is being sampled • 1 to 256: Completed read sampled page No. [MC200] • 1 to 512: Completed read sampled page No. [MC300]
BDED	0E40BD			
BDEE	0E40BE	For manufacturer setting	—	—
BDEF	0E40BF			

Sampling setting write/read

The conditions for sampling and the contents of sampling can be set by the sampling setting write. Also, the current sampling setting can be read by the sampling setting read. The sampling setting write/read is valid after executing parameter initialization (system command code: 0003h).

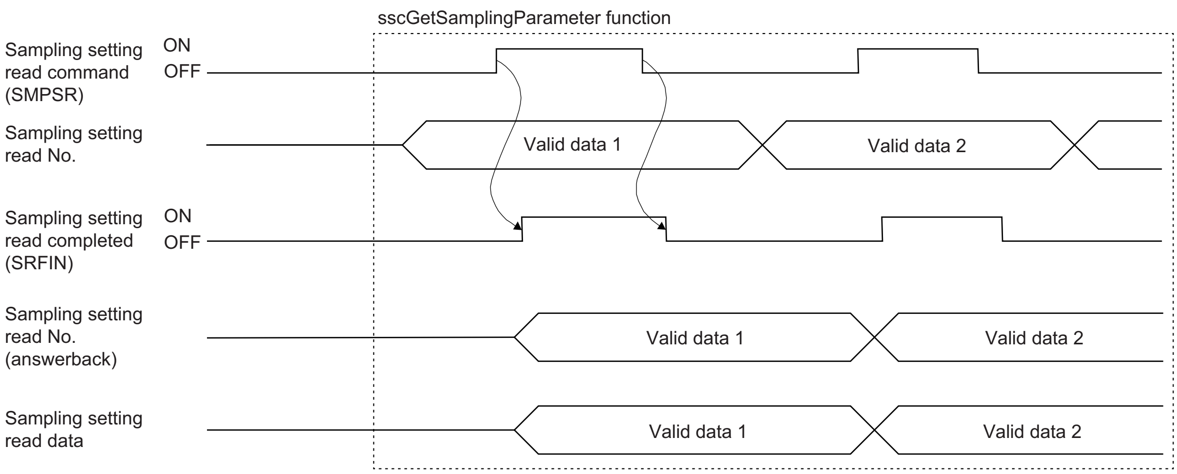
When writing the sampling setting



Point

The sampling setting write data is written in 4bytes.

When reading the sampling setting



Point

The sampling setting read data is read in 4bytes.

Details for sampling function settings

The settings related to the sampling function are shown below. Each setting is imported when the sampling start signal (SMPS) turns ON. The sampling setting cannot be changed while the waiting for sampling trigger signal (SMPW) turns ON and the sampling is being performed signal (SMPO) turns ON.

Sampling setting

Sampling setting No.	Name	Initial value	Setting range	Description
0001	Sampling option	00000000h	00000000h to 000029FFh	■■■■■■□□ (Sampling cycle) Set the sampling cycle. • 00h to FFh: Control cycle × (setting + 1) <Example> If the sampling cycle is set to 3 with the control cycle set to 0.44ms • Perform sampling every 1.777ms. ■■■■■□■■ (Pre-trigger) Set the timing that the trigger condition is met. • 0 to 9: Setting × 10% ■■■■□■■■ (Trigger mode) Set the trigger mode. • 0: Trigger turns ON when the sampling is started. • 1: Trigger turns ON when one of each trigger condition is met. • 2: Trigger turns ON when all of the trigger conditions are met.
0002	Sampling points	[MC200] 8192 [MC300] 65536	0 to 65536	Set the points to be sampled.
0003	For manufacturer setting	00000000h	—	—
⋮		⋮		
000F		00000000h		
0010	Sampling trigger 1 setting	00000000h	00000000h to 10041F01h	■■■■■■■□ (Trigger 1 sampling items) Select the sampling items referred by trigger 1. • 0: Sampling data • 1: Sampling bit information The following settings differ up to the trigger 1 sampling items. [When "0: Sampling data" is selected] ■■■■□□■■ (Trigger 1 sampling data No.) Set the sampling data No. referred by the trigger 1 in hexadecimal. <Example> 00h to 1Fh • Sampling data 1 to 32 ■■■□■■■■ (Trigger 1 condition) Set the trigger 1 condition. • 0: Trigger 1 setting invalid • 1: Fulfilled when passing through trigger value 1 in increase direction • 2: Fulfilled when passing through trigger value 1 in decrease direction • 3: Fulfilled with trigger value 1 or later • 4: Fulfilled with trigger value 1 or lower □■■■■■■■ (Trigger 1 code) Set the code of sampling data referred by trigger 1. • 0: Without code • 1: With code [When "1: Sampling bit information" is selected] ■■■■□□■■ (Trigger 1 sampling bit information No.) Set the sampling bit information No. referred by trigger 1 in hexadecimal. <Example> 00h to 0Fh • Sampling bit information 1 to 16 ■■■□■■■■ (Trigger 1 condition) Set the trigger 1 condition. • 0: Trigger 1 setting invalid • 1: Fulfilled by leading edge of bit • 2: Fulfilled by trailing edge of bit • 3: Fulfilled while bit is ON • 4: Fulfilled while bit is OFF
0011	Sampling trigger 2 setting	00000000h	00000000h to 10041F01h	Same as the sampling trigger 1 setting.

Sampling setting No.	Name	Initial value	Setting range	Description
0012	Sampling trigger 3 setting	00000000h	00000000h to 10041F01h	Same as the sampling trigger 1 setting.
0013	Sampling trigger 4 setting	00000000h	00000000h to 10041F01h	Same as the sampling trigger 1 setting.
0014	Sampling trigger 5 setting	00000000h	00000000h to 10041F01h	Same as the sampling trigger 1 setting.
0015	Sampling trigger 6 setting	00000000h	00000000h to 10041F01h	Same as the sampling trigger 1 setting.
0016	Sampling trigger 7 setting	00000000h	00000000h to 10041F01h	Same as the sampling trigger 1 setting.
0017	Sampling trigger 8 setting	00000000h	00000000h to 10041F01h	Same as the sampling trigger 1 setting.
0018 ⋮ 001F	For manufacturer setting	00000000h	—	—
0020	Sampling trigger value 1	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 1. • Set the threshold in double word regardless of the size of the data set in the sampling trigger 1 setting. • When the contents of trigger 1 are sampling bit information, this setting is not used.
0021	Sampling trigger value 2	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 2. The setting contents are same as the sampling trigger value 1.
0022	Sampling trigger value 3	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 3. The setting contents are same as the sampling trigger value 1.
0023	Sampling trigger value 4	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 4. The setting contents are same as the sampling trigger value 1.
0024	Sampling trigger value 5	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 5. The setting contents are same as the sampling trigger value 1.
0025	Sampling trigger value 6	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 6. The setting contents are same as the sampling trigger value 1.
0026	Sampling trigger value 7	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 7. The setting contents are same as the sampling trigger value 1.
0027	Sampling trigger value 8	00000000h	00000000h to FFFFFFFFh	Set the threshold for the trigger 8. The setting contents are same as the sampling trigger value 1.
0028 ⋮ 002F	For manufacturer setting	00000000h	—	—
0030	Sampling data 1 setting	00000000h	00000000h to 003F04FFh	■■■■□□□□ (Monitor No.) Set the monitor No. to be sampled. (Axis No. is not necessary to be set in the system information.) • 0000h: Not selected • 0100h to 01FFh: servo information (1) • 1100h to 11FFh: servo information (2) • 0300h to 03FFh: operation information • 1300h to 13FFh: operation information (double word) • 0400h to 04FFh: system information • 1400h to 14FFh: system information (double word) ■■□□■■■■ (Axis No.) Set the axis No. of sampling data 1. • 00h to 1Fh: Axis No.-1 [MC200] • 00h to 3Fh: Axis No.-1 [MC300] <Example> 00h • Axis No.1
0031	Sampling data 2 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0032	Sampling data 3 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0033	Sampling data 4 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0034	Sampling data 5 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.

Sampling setting No.	Name	Initial value	Setting range	Description
0035	Sampling data 6 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0036	Sampling data 7 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0037	Sampling data 8 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0038	Sampling data 9 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0039	Sampling data 10 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
003A	Sampling data 11 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
003B	Sampling data 12 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
003C	Sampling data 13 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
003D	Sampling data 14 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
003E	Sampling data 15 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
003F	Sampling data 16 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0040	Sampling data 17 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0041	Sampling data 18 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0042	Sampling data 19 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0043	Sampling data 20 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0044	Sampling data 21 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0045	Sampling data 22 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0046	Sampling data 23 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0047	Sampling data 24 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0048	Sampling data 25 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0049	Sampling data 26 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
004A	Sampling data 27 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
004B	Sampling data 28 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
004C	Sampling data 29 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
004D	Sampling data 30 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
004E	Sampling data 31 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
004F	Sampling data 32 setting	00000000h	00000000h to 003F04FFh	Same as the sampling data 1 setting.
0050 ⋮ 006F	For manufacturer setting	00000000h	—	—

Sampling setting No.	Name	Initial value	Setting range	Description
0070	Sampling bit information 1 setting*1	00000000h	00000000h to 0F3F03FFh	■■■■□□□□(Monitor No.) Set the monitor No. including the bit information to be sampled. • 0000h: Not selected • 0300h to 03FFh: Operation information ■■□□■■■■(Axis No.) Set the axis No. of sampling data 1. • 00h to 1Fh: Axis No.-1 [MC200] • 00h to 3Fh: Axis No.-1 [MC300] <Example> 00h • Axis No.1 ■□■■■■■■(Bit No.) Set the bit No. of the sampling bit information 1. • 0h to Fh: Bit No.0 to F
0071	Sampling bit information 2 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0072	Sampling bit information 3 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0073	Sampling bit information 4 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0074	Sampling bit information 5 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0075	Sampling bit information 6 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0076	Sampling bit information 7 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0077	Sampling bit information 8 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0078	Sampling bit information 9 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0079	Sampling bit information 10 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
007A	Sampling bit information 11 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
007B	Sampling bit information 12 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
007C	Sampling bit information 13 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
007D	Sampling bit information 14 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
007E	Sampling bit information 15 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
007F	Sampling bit information 16 setting	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0080	Sampling bit information 17 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0081	Sampling bit information 18 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0082	Sampling bit information 19 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0083	Sampling bit information 20 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0084	Sampling bit information 21 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0085	Sampling bit information 22 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0086	Sampling bit information 23 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0087	Sampling bit information 24 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0088	Sampling bit information 25 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.

Sampling setting No.	Name	Initial value	Setting range	Description
0089	Sampling bit information 26 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
008A	Sampling bit information 27 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
008B	Sampling bit information 28 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
008C	Sampling bit information 29 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
008D	Sampling bit information 30 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
008E	Sampling bit information 31 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
008F	Sampling bit information 32 setting*2	00000000h	00000000h to 0F3F03FFh	Same as the sampling bit information 1 setting.
0090 ⋮ 012F	For manufacturer setting	00000000h	—	—

*1 For the bits which are able to be sampled and their settings (monitor No. and bit No.), refer to the following.
☞ Page 414 Sampling items

*2 When using MR-MC2_ _, it is "For manufacturer setting".

Number of sampled points

By setting "Sampling points (sampling setting No.0002)", points to be sampled can be changed. Number of data which is sampled before the trigger conditions are met (set with "Pre-trigger" of "Sampling option (sampling setting No.0001)") is specified by the percentage to the number of sampled points. However, for MR-MC2_ _, when the number of sampled points exceeds 8192, the percentage is to 8192.

For when the number of sampled points is 8192 or less, and 8193 or more, the characteristics are shown below.

For MR-MC2_ _when the number of sampled points is 8192 or less/for MR-MC3_ _

When sampling of the points set in "Sampling points (sampling setting No.0002)" is completed, sampling itself is completed automatically. Since the host personal computer is required to read the sampling data buffer area after the sampling is completed, the load on the host personal computer is light, however, on the other hand, sampling for a long time cannot be executed.

For MR-MC2_ _ when the number of sampled points is 8193 or more

Points which are set to "Sampling points (sampling setting No.0002)" are sampled by the position board. However, the host personal computer is required to read sampled data during the sampling, the load on the host personal computer is high.

The sampling data buffer area of the position board internal memory is regarded as the ring buffer of 256 pages (8192 points), and the host personal computer and the position board read the sampling data read area with executing exclusive control based on the page No.

Point

The larger the pre-trigger setting is, the higher the load on the host personal computer is since it is required to read the sampling data in a short time after the trigger conditions are met.

As an example, when pre-trigger is set to 90%, after the trigger conditions are met, the host personal computer is required to complete reading the data sampled by pre-trigger (at least 1 page) before the position board completes the sampling of 10% left.

Sampling items

The sampling items are the sampling data and the sampling bit information. By setting the axis No./station No. and the monitor No. to be sampled in the sampling data, the arbitrary monitor data can be sampled. Up to 32 items of monitor data can be specified. Axis data command/status bit (address 1000h to 100Fh, 1060h to 106Fh) can be sampled as sampling bit information. Up to 16 items [MC200]/32 items [MC300] of bit information can be specified.
Examples of the sampling items are shown below.

For operation information

"Current command position (monitor No.0300H, 0301H)", "Current feedback position (monitor No.0302H, 0303H)", "Moving speed (monitor No.0304H, 0305H)" etc. can be set as the sampling items. For details, refer to the following.
☞ Page 716 Operation Information

For servo information

"Position feedback (monitor No.0200H, 0201H)", "Position droop (monitor No.0204H, 0205H)" etc. can be set as the sampling items. For details, refer to the following.
☞ Page 711 Servo Information (2)

For axis bit information

The operation processing signal (OP), the operation processing signal (OPF), the servo alarm signal (SALM) etc. can be set as the sampling items. For details, refer to the following tables.

■Axis data command bit

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0380	Axis data command bit 1	0	SON	Servo on
		1	—	For manufacturer setting
		2		
		3		
		4	TL	Torque limit
		5	SRST	Servo alarm reset
		6	—	For manufacturer setting
		7		
		8	ST	Start operation
		9	DIR	Movement direction
		10	STP	Stop operation
		11	RSTP	Rapid stop
		12	—	For manufacturer setting
		13	ORST	Operation alarm reset
		14	—	For manufacturer setting
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0381	Axis data command bit 2	0	AUT	Automatic operation mode
		1	ZRN	Home position return mode
		2	JOG	JOG operation mode
		3	S	Incremental feed mode
		4	—	For manufacturer setting
		5	LIP	Linear interpolation mode [MC200]/interpolation operation mode [MC300]
		6	DST	Home position reset mode
		7	—	For manufacturer setting
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0382	Axis data command bit 3	0	ITL	Interlock
		1	RMONR	High speed monitor latch command
		2	—	For manufacturer setting
		3		
		4	LSPC	+ side limit switch input
		5	LSNC	- side limit switch input
		6	DOGC	Proximity dog input
		7	—	For manufacturer setting
		8	SCHG	Change speed
		9	TACHG	Change acceleration time constant
		10	TDCHG	Change deceleration time constant
		11	PCHG	Change position
		12	—	For manufacturer setting
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0383	Axis data command bit 4	0	FST	Fast start operation
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		
		8	PPISTP	Pass position interrupt cancel
		9	—	For manufacturer setting
		10		
		11		
		12		
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0384	Axis data command bit 5	0	GAIN	Gain switching command
		1	FCLS	Fully closed loop control change command
		2	—	For manufacturer setting
		3	CPC	PID control command
		4	—	For manufacturer setting
		5		
		6		
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0385	Axis data command bit 6	0	—	For manufacturer setting
		1		
		2		
		3		
		4	ZSC	Home position set command
		5	—	For manufacturer setting
		6		
		7		
		8		
		9	MKC1	Mark detection clear command 1
		10	MKD1	Mark detection disable command 1
		11	MKSEN1	Mark detection setting enable command 1
		12	—	For manufacturer setting
		13	MKC2	Mark detection clear command 2
		14	MKD2	Mark detection disable command 2
		15	MKSEN2	Mark detection setting enable command 2

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0386	Axis data command bit 7	0	—	For manufacturer setting
		1		
		2		
		3		
		4	CTLMC	Control mode switch command
		5	—	For manufacturer setting
		6		
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
0387	Axis data command bit 8	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

■Axis data status bit

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
03A0	Axis data status bit 1	0	RDY	Servo ready
		1	INP	In-position
		2	ZSP	Zero speed
		3	ZPAS	Passed Z-phase
		4	TLC	Torque limit effective
		5	SALM	Servo alarm
		6	SWRN	Servo warning
		7	ABSE	Absolute position erased
		8	OP	Operation processing
		9	CPO	Rough match
		10	PF	Positioning completed
		11	ZP	Home position return completed
		12	SMZ	Smoothing stop
		13	OALM	Operation alarm
		14	OPF	Operation completed
		15	PSW	Position switch

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
03A1	Axis data status bit 2	0	AUTO	In automatic operation mode
		1	ZRNO	In home position return mode
		2	JO	In JOG operation mode
		3	SO	In incremental feed mode
		4	—	For manufacturer setting
		5	LIPO	In linear interpolation mode [MC200]/In interpolation operation mode [MC300]
		6	DSTO	In home position reset mode
		7	—	For manufacturer setting
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
03A2	Axis data status bit 3	0	ISTP	Interlock stop
		1	RMRCH	High speed monitor being latched
		2	POV	Exceeded stop position
		3	STO	Start up acceptance completed
		4	—	For manufacturer setting
		5		
		6	ZREQ	Home position return request
		7	—	For manufacturer setting
		8	SCF	Preparation for changing speed completed
		9	TACF	Preparation for changing acceleration time constant completed
		10	TDCF	Preparation for changing deceleration time constant completed
		11	PCF	Preparation for changing position completed
		12	SCE	Speed change error
		13	TACE	Acceleration time constant change error
		14	TDCE	Deceleration time constant change error
		15	PCE	Position change error

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
03A3	Axis data status bit 4	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8	PPIOP	Operating pass position interrupt
		9	PPIFIN	Pass position interrupt completed
		10	PPIERR	Pass position interrupt incompleted
		11	—	For manufacturer setting
		12		
		13		
		14		
		15	AUTLO	In point table loop

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
03A4	Axis data status bit 5	0	GAINO	During gain switching
		1	FCLSO	Fully closed loop control changing
		2	TLSO	Selecting torque limit
		3	SPC	During PID control
		4	—	For manufacturer setting
		5		
		6		
		7	PRSMO	During continuous operation to torque control
		8	IWT	Interference check standby
		9	SINP	Servo amplifier in-position
		10	—	For manufacturer setting
		11		
		12		
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
03A5	Axis data status bit 6	0	—	For manufacturer setting
		1		
		2		
		3		
		4	ZSF	Home position set complete
		5	ZSE	Home position set error
		6	—	For manufacturer setting
		7		
		8	MKIF1	Mark detection compatible information 1
		9	MKCF1	Mark detection clear complete 1
		10	MKDO1	Mark detection disabled 1
		11	MKSEF1	Mark detection setting enable complete 1
		12	MKIF2	Mark detection compatible information 2
		13	MKCF2	Mark detection clear complete 2
		14	MKDO2	Mark detection disabled 2
		15	MKSEF2	Mark detection setting enable complete 2

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
03A6	Axis data status bit 7	0	—	For manufacturer setting
		1		
		2		
		3		
		4	CTLMCF	Control mode switch complete
		5	CTLMCE	Control mode switch error
		6	—	For manufacturer setting
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

Monitor No. (hexadecimal)	Content	Bit	Symbol	Signal name
000003A7	Axis data status bit 8	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		

Point

Up to 3 items (total of sampling data and sampling bit information) can be specified for the servo information. If more than 4 items are set, the sampling error signal (SMPE) turns ON when sampling is started and the bit of the sampling error information corresponding to the fourth item turns ON. However, there is no restriction for the number of the items in the following servo information.

· Position feedback (lower) (monitor No.0200H)
· Position feedback (upper) (monitor No.0201H)
· Position droop (lower) (monitor No.0204H)
· Position droop (upper) (monitor No.0205H)
· Current feedback (monitor No.020BH)
· Servo parameter error No. (MR-J4(W_)-_B: monitor No.0510H to 0537H, MR-J5(W_)-_B: monitor No.0900H to 0944H [MC300])
· Servo parameter change No. (MR-J4(W_)-_B: monitor No.0590H to 05B7H, MR-J5(W_)-_B: monitor No.0980H to 09BFH [MC300])

Sampling trigger

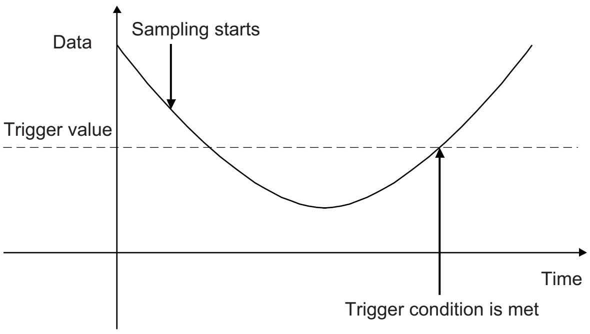
As a trigger for start of the sampling, up to 8 conditions can be set. The case when one of the trigger conditions is met or when all of the trigger conditions are met can be set as a trigger. The data or the bit information trigger refers to are selected from set sampling items. There are 4 types of trigger conditions for each of the contents the trigger refers to.

When the trigger content is data

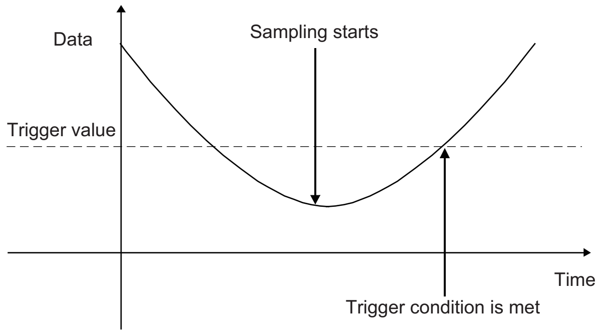
■Fulfilled when passing through trigger value in increase direction

When the data increases from lower than the trigger value to the trigger value or higher, the trigger condition is met.

<Example 1>



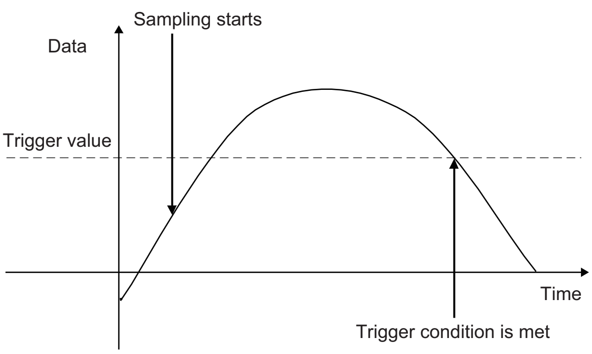
<Example 2>



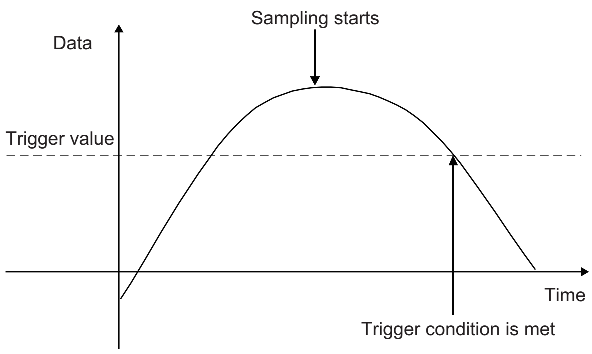
■Fulfilled when passing through trigger value in decrease direction

When the data decreases from higher than the trigger value to the trigger value or lower, the trigger condition is met.

<Example 1>



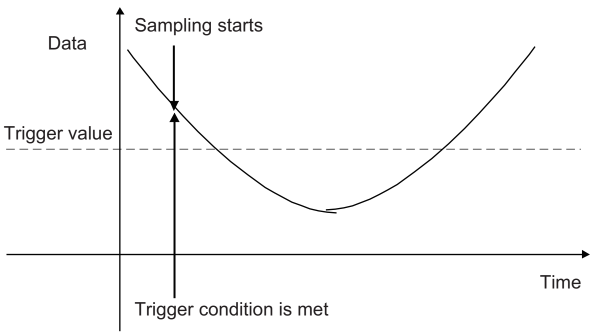
<Example 2>



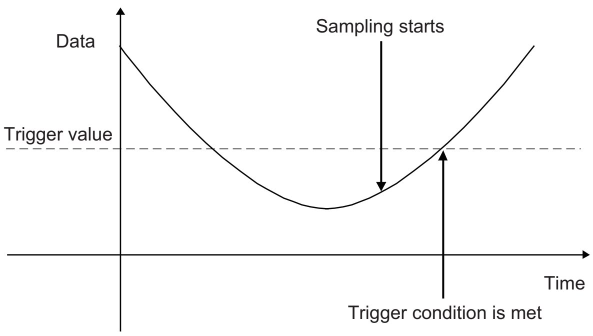
■Fulfilled when the data is same as trigger value or higher

When the data is same as the trigger value or higher, the trigger condition is met.

<Example 1>



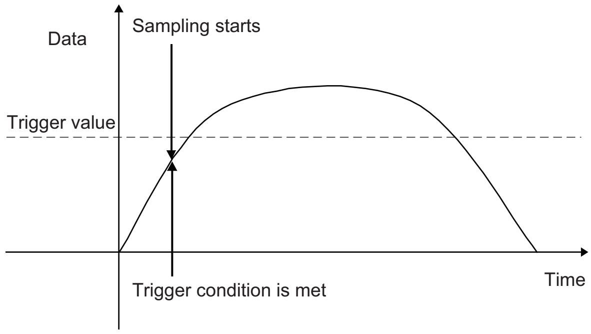
<Example 2>



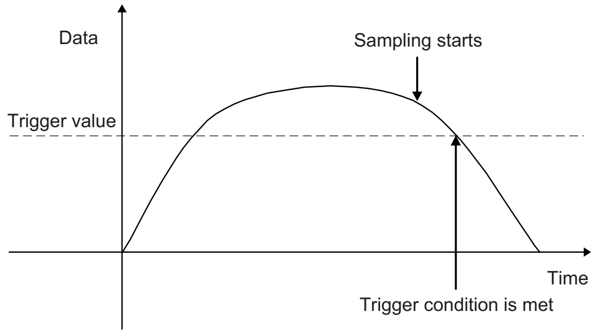
■Fulfilled when the data is same as trigger value or lower

When the data is same as the trigger value or lower, the trigger condition is met.

<Example 1>



<Example 2>

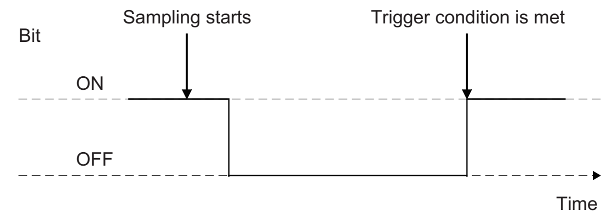


When the trigger content is bit information

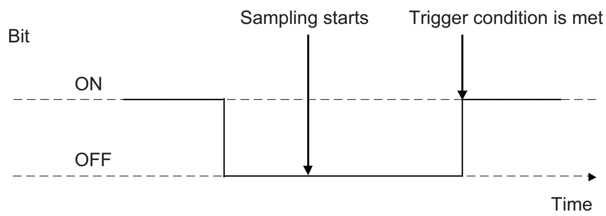
■Fulfilled by leading edge of bit

When the bit turns ON from OFF, the trigger condition is met.

<Example 1>



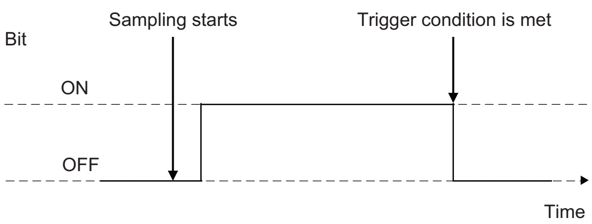
<Example 2>



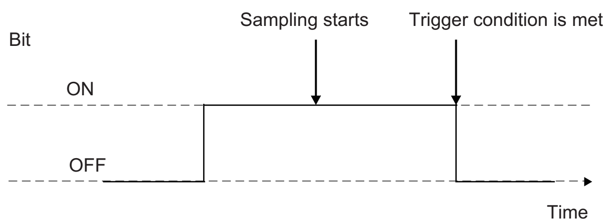
■Fulfilled by trailing edge of bit

When the bit turns OFF from ON, the trigger condition is met.

<Example 1>



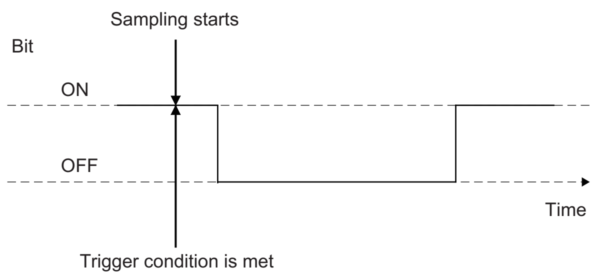
<Example 2>



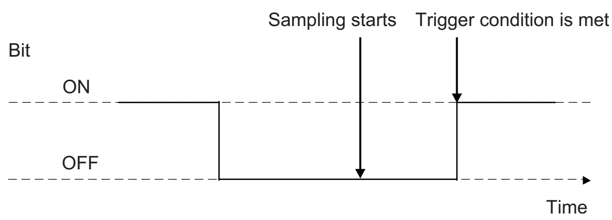
■Fulfilled while bit is on

While the bit is ON, the trigger condition is met.

<Example 1>



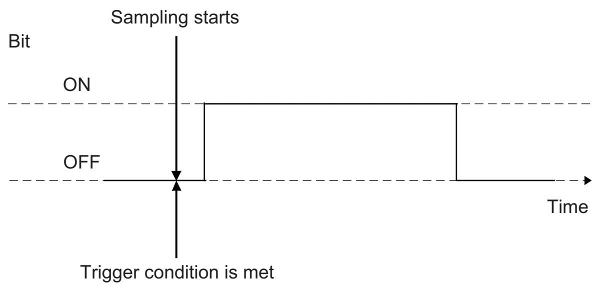
<Example 2>



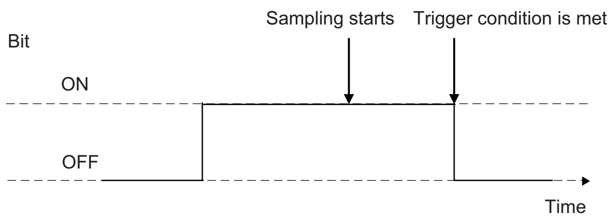
■Fulfilled while bit is OFF

While the bit is OFF, the trigger condition is met.

<Example 1>



<Example 2>



Sampling data read

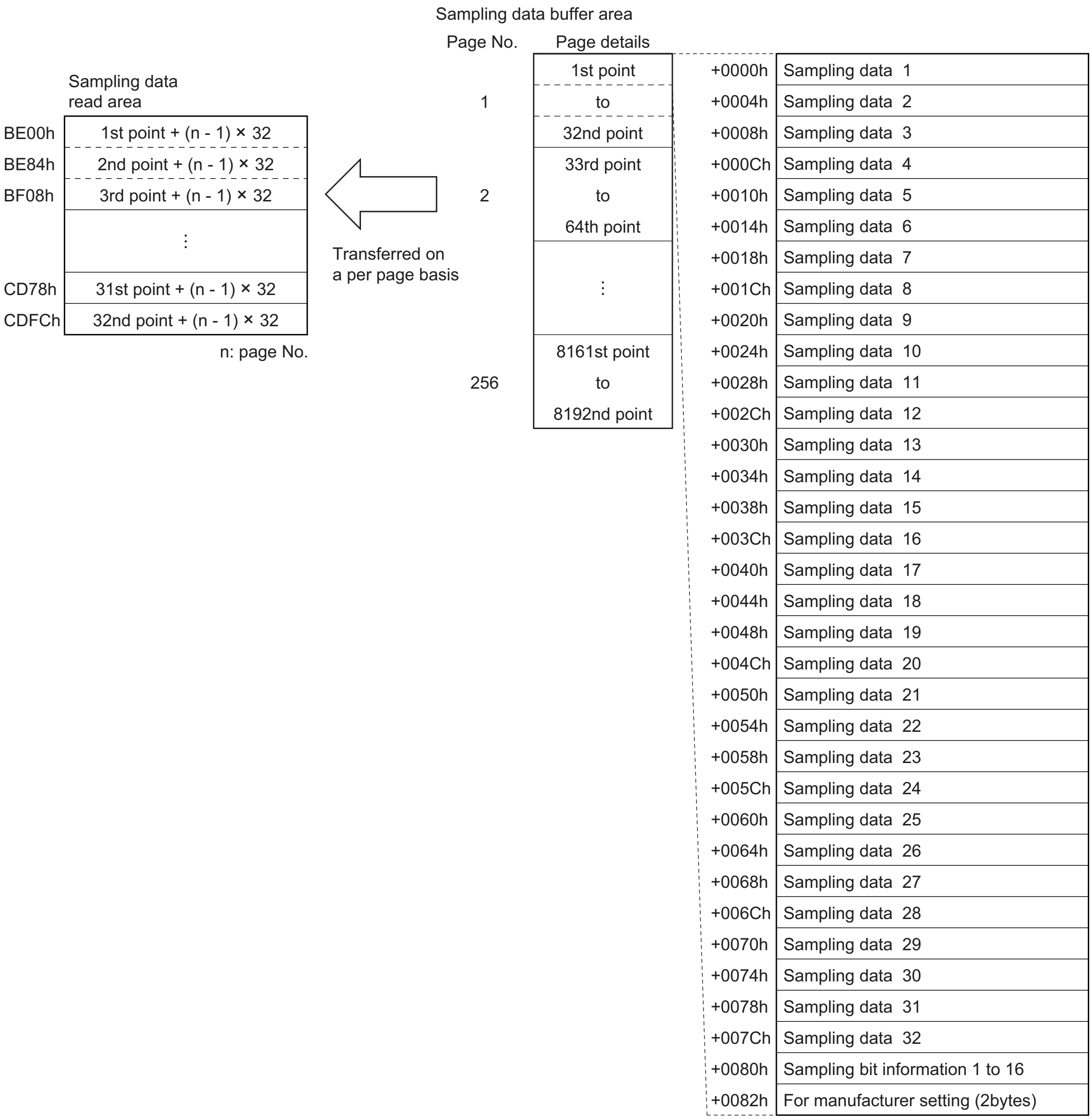
The sampled data of 8192 points [MC200]/65536 points [MC300] is stored in the sampling data buffer area of the position board internal memory. The sampled data is transferred to the sampling data read area divided in units of a page (32 points/page [MC200], 128 points/page [MC300]).

For the sampling data read during the sampling, refer to the following.

☞ Page 429 Timing chart for sampling function

Sampling data read area

■Using MR-MC2_ _



■Using MR-MC2_ _

Sampling data read area

0E4100h	1st point + (n - 1) × 128
0E4184h	2nd point + (n - 1) × 128
0E4208h	3rd point + (n - 1) × 128
	⋮
0E81F8h	127th point + (n - 1) × 128
0E827Ch	128th point + (n - 1) × 128

n: page No.

Transferred on a per page basis

Sampling data buffer area

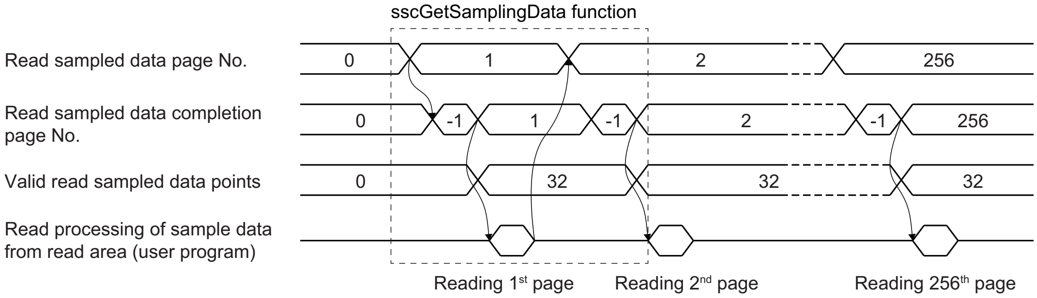
Page No.	Page details
1	1st point to 128th point
2	129th point to 256th point
	⋮
512	65409th point to 65536th point

+0000h	Sampling data 1
+0004h	Sampling data 2
+0008h	Sampling data 3
+000Ch	Sampling data 4
+0010h	Sampling data 5
+0014h	Sampling data 6
+0018h	Sampling data 7
+001Ch	Sampling data 8
+0020h	Sampling data 9
+0024h	Sampling data 10
+0028h	Sampling data 11
+002Ch	Sampling data 12
+0030h	Sampling data 13
+0034h	Sampling data 14
+0038h	Sampling data 15
+003Ch	Sampling data 16
+0040h	Sampling data 17
+0044h	Sampling data 18
+0048h	Sampling data 19
+004Ch	Sampling data 20
+0050h	Sampling data 21
+0054h	Sampling data 22
+0058h	Sampling data 23
+005Ch	Sampling data 24
+0060h	Sampling data 25
+0064h	Sampling data 26
+0068h	Sampling data 27
+006Ch	Sampling data 28
+0070h	Sampling data 29
+0074h	Sampling data 30
+0078h	Sampling data 31
+007Ch	Sampling data 32
+0080h	Sampling bit information 1 to 16
+0082h	Sampling bit information 17 to 32

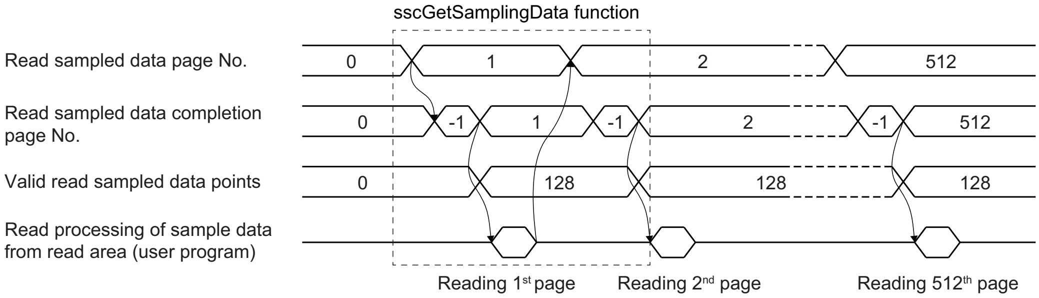
A timing chart of reading of sampled data

To read the sampled data, set the page No. to be transferred to the sample read page No. When detecting the change of the sampling read page No., the position board transfers the sampled data corresponding to the page No. to the sampling data read area and stores the points of data which are sampled in the page in the valid read sampled points.

■Using MR-MC2_ _



■Using MR-MC3_ _



Point

- The read sampled data completion page No. is -1 (during sampling data transferring) while the data is being transferred to the sampling data read area.
- When the sample read is executed in the following cases, read sampled data completion page No. is -2 (sampling read error) and sampled data is not read.
  - · When the sample read page No. is incorrect
  - · When the next page No. of the completed read sampled page No. is specified during sampling
- When the page No. is changed from other than 0 to 0 during sampling, sampling is finished (the sampling error signal (SMPE) turns ON). The read sampled data completion page No. becomes 0 and the sampling data read area is cleared to 0.
- The change of sample read No. is invalid while the data is being transferred to the sampling data read area (transferring the page No. before changed is continued). After completion of the sample read, the sampled data of changed page No. is started to be transferred.
- When 0 is set to the sampling read page No., the sampling data read area is cleared to 0.
- The position board does not start transferring sampled data until the sampling read page No. is changed. When the same page No. is needed to be set, such as to update the contents of the sampling data read area, set the sampling read page No. to 0. After confirming the page No. is 0, specify the page No. to be transferred.

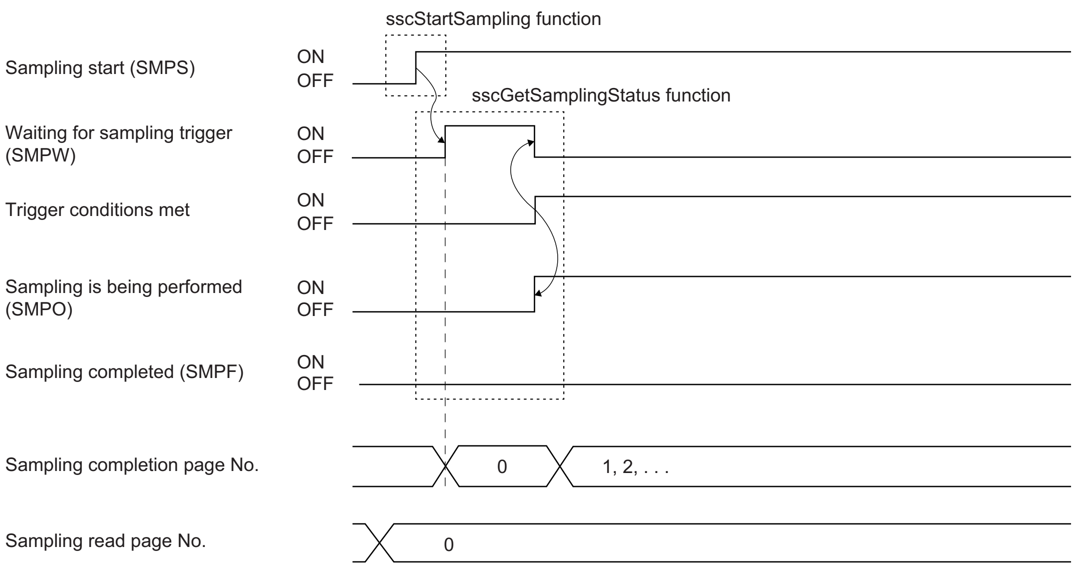
Timing chart for sampling function

A timing chart for the sampling function is shown below.

For MR-MC2_ _ when the number of sampled points is 8192 or less/for MR-MC3_ _

■Starting sampling

To start the sampling, write the sampling setting previously and turn ON the sampling start signal (SMPS). When the sampling start signal (SMPS) is accepted, the waiting for sampling trigger signal (SMPW) turns ON. Then, after trigger conditions are met, the sampling is being performed signal (SMPO) turns ON.



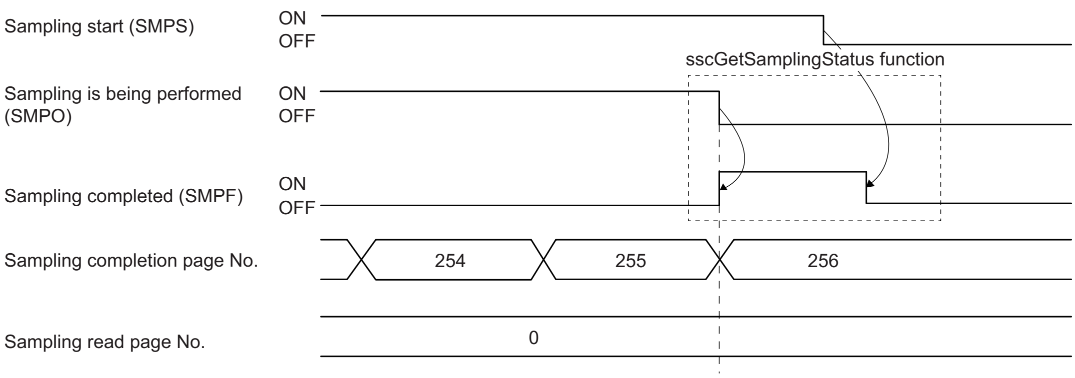
Point

- Turn ON the sampling start signal (SMPS) after setting 0 to the sampling read page No.
- In the following cases, the sampling error signal (SMPE) turns ON.
  - · When the setting for the sampling option is outside of the setting range
  - · When the setting for the sampling data is outside of the setting range
  - · When the setting value for the sampling bit information is outside of the setting range
  - · When four or more monitor Nos. for the servo information are designated for the same axis
  - · When 0 is not set to the sampling read page No.
- When a monitor No. related to the servo information is designated for an axis for which communication with the servo amplifier has not been performed, such as it is not the control axis or an amplifier-less axis, the data to be sampled is always 0 (for bit, OFF). (The sampling error signal (SMPE) and the sampling error information do not turn ON.)

■Sampling completion

When the sampling of specified sampling points is completed, the sampling completed signal (SMPF) turns ON.

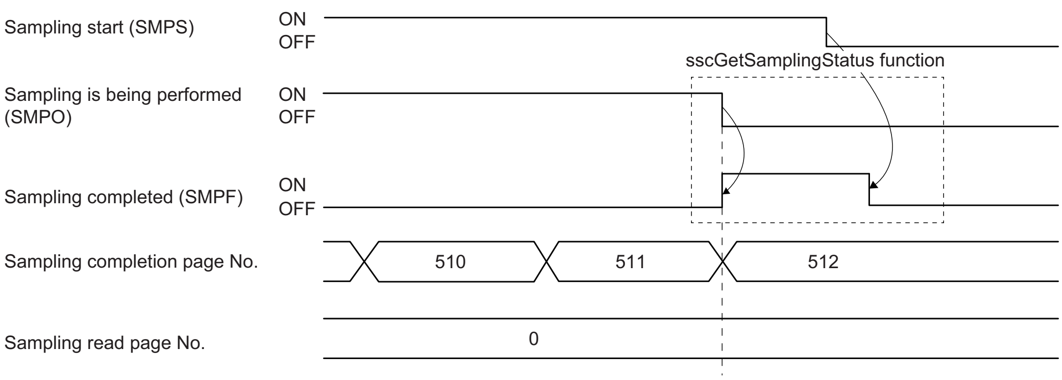
- Using MR-MC2_ _



Point

In the timing chart above, since 8192 is the multiplication of 32, the valid sampled data (valid sampled read points) in the last page (page 256) are 1 to 32 points.

- Using MR-MC3_ _

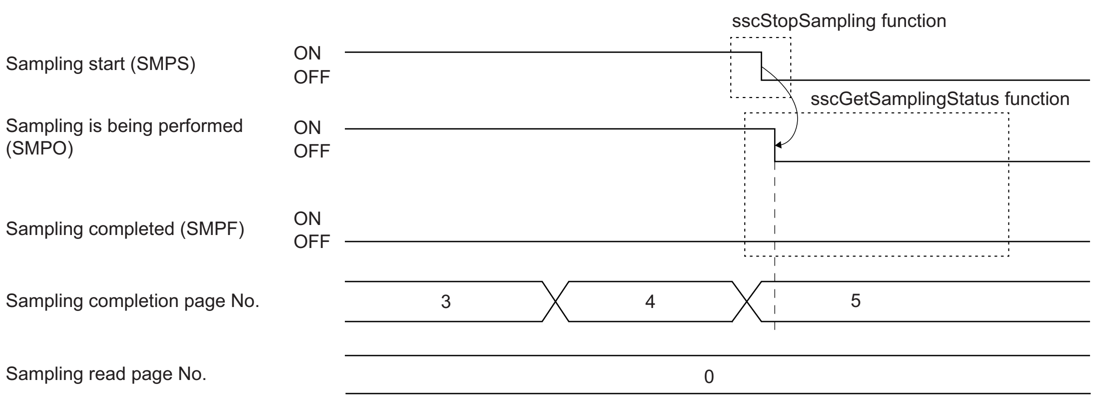


Point

In the timing chart above, since 65536 is the multiplication of 128, the valid sampled data (valid sampled read points) in the last page (page 512) are 1 to 128 points.

■Sampling stopped prior to full completion

When the sampling start signal (SMPS) is turned OFF while the sampling is being performed signal (SMPO) is ON, the sampling is being performed signal (SMPO) turns OFF and the sampling finishes.



Point

- The sampling completed signal (SMPF) is not turned ON.
- In the timing chart above, the sampling stopped in the 5 page. For the valid sampled data in the page, confirm the valid sampled read points at the sampling read.
- The sampling data other than the valid read sampled points is read as "0" value.

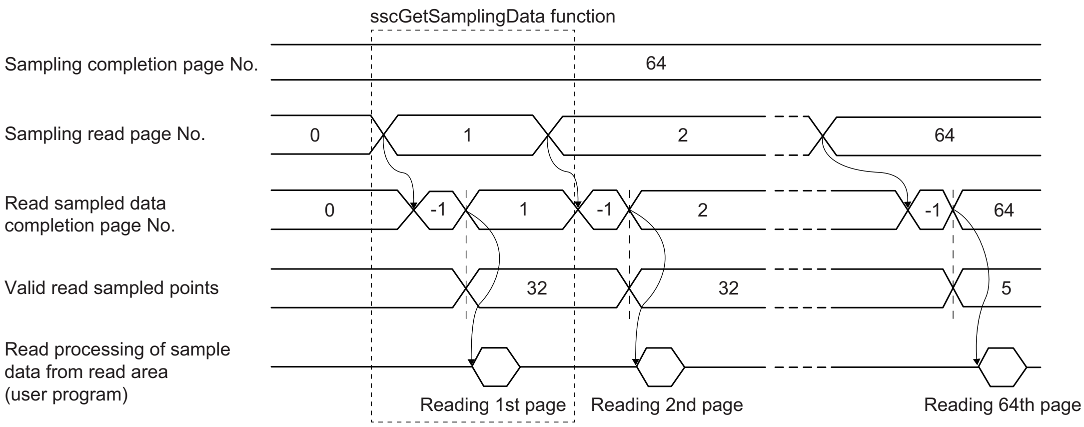
■When reading sampled data

After confirming the sampling is being performed signal (SMPO) is turned OFF, read the sampled data and the valid read sampled points from the page 1 to the page of the completed read sampled page No. The sampled data points in the page where the sampling read is completed is stored in the valid read sampled points.

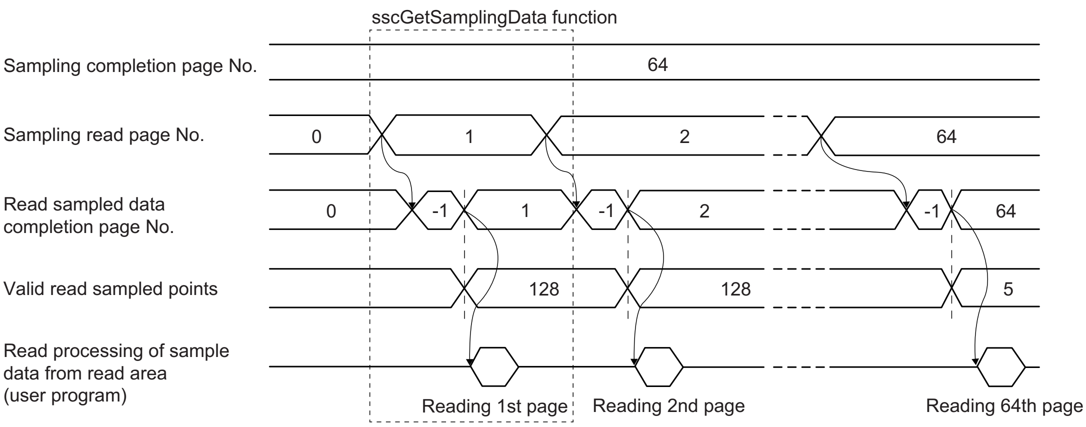
Point

- In the following timing chart, the data is stored in the page 1 to 64, and the sampled data in the page 64 is valid from 1 to 5 points.
- The sampling data other than the valid read sampled points is read as "0" value.
- In the following cases, the sampling read error (The read sampled data completion page No. is -2) occurs.
  - · When the setting for the sampling read page No. is outside of the setting range
  - · When the next page No. of the completed read sampled page No. is specified during the sampling

- Using MR-MC2_ _



- Using MR-MC3_ _

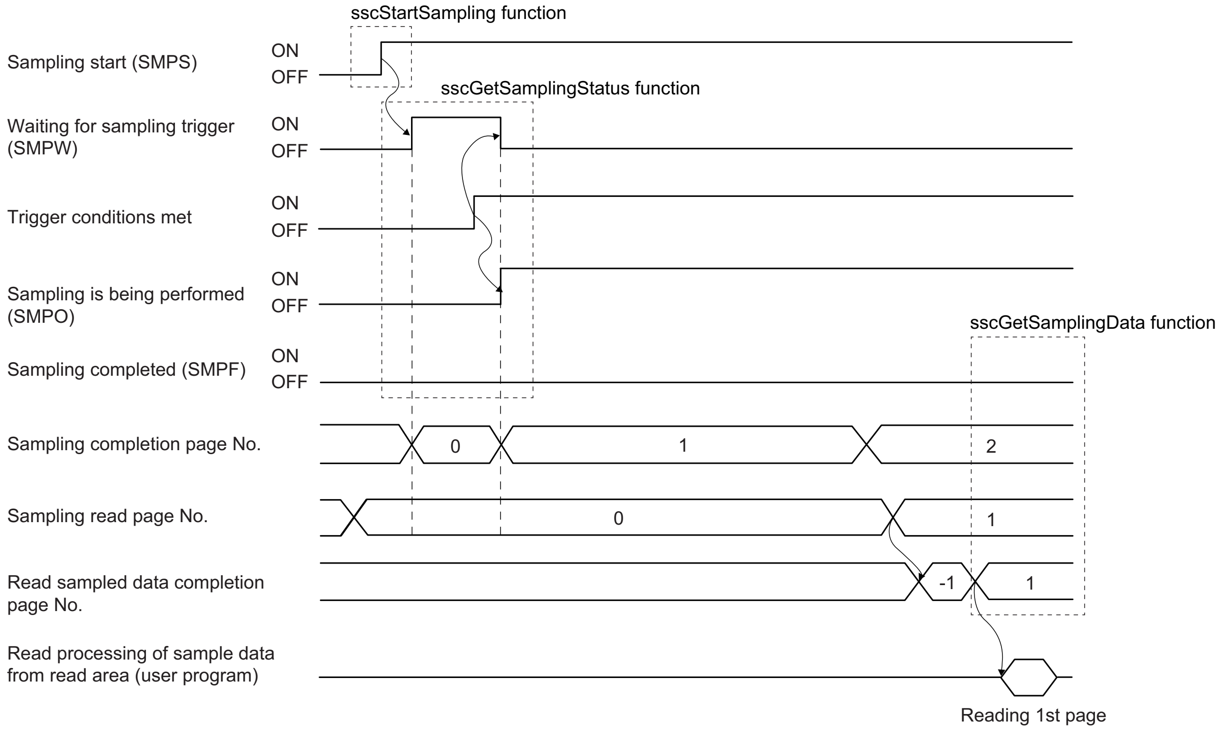


7

For MR-MC2_ _ when the number of sampled points is 8193 or more

■Starting sampling

To start the sampling, write the sampling setting previously and turn ON the sampling start signal (SMPS). When the sampling start signal (SMPS) is accepted, the waiting for sampling trigger signal (SMPW) turns ON. Then, after trigger conditions are met, the sampling is being performed signal (SMPO) turns ON.



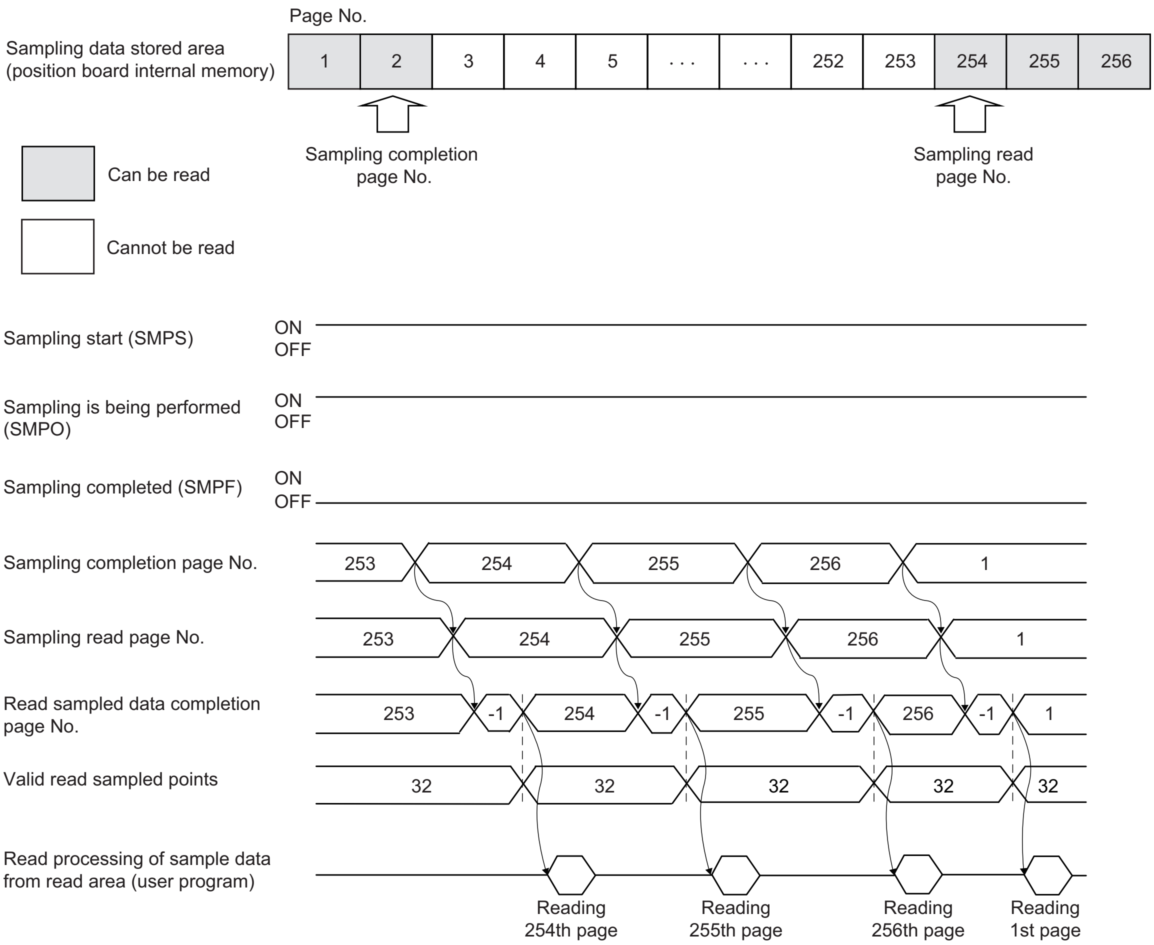
Point

- Turn ON the sampling start signal (SMPS) after setting 0 to the sampling read page No.
- In the following cases, the sampling error signal (SMPE) turns ON.
  - · When the setting for the sampling option is outside of the setting range
  - · When the setting for the sampling data is outside of the setting range
  - · When the setting value for the sampling bit information is outside of the setting range
  - · When four or more monitor Nos. for the servo information are designated for the same axis
  - · When the sampling start signal (SMPS) is turned ON when the read sampled data completion page No. is -1
- When a monitor No. related to the servo information is designated for an axis for which an amplifier-less axis, the data to be sampled is always 0 (for bit, OFF). (The sampling error signal (SMPE) and the sampling error information do not turn ON.)
- When a monitor No. related to the servo information is designated for an axis for which communication with the servo amplifier has not been implemented, such as it is not the control axis, the corresponding sampling error information turns ON (excluding the amplifier-less axis). (The sampling error signal (SMPE) is not turned ON.)

■Sampling is being performed

The user program reads the sampled data sequentially according to the sampling completion page No.

The user program can read the page from the page of the sampling read page No. to the page of the sampling completion page No. in numerical order. The sampling data buffer area is a ring buffer of 256 pages. For example, when the sampling read page No. is the page 254 and the sampling completion page No. is the page 2, the pages 254, 255, 256, 1 and 2 can be read. When the sampling read page No. differs from the sampling completion page No., the user program writes the next page No. of the sampling read page No. and executes the process of reading page.

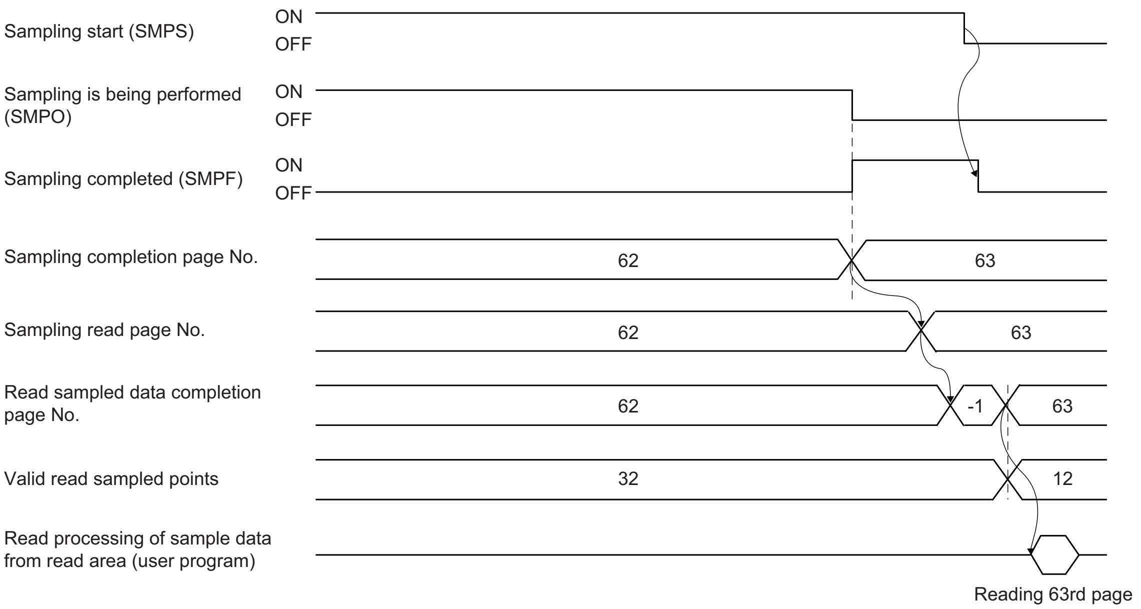


Point

- In the timing chart above, the sampling read page No. differs from the sampling completion page No. by 1 page, unless the next page No. of the sampling completion page No. becomes the sampling read page No., reading sampled data can be delayed.
- In the following cases, the sampling read error (The read sampled data completion page No. is -2) occurs.
  · When the setting for the sampling read page No. is outside of the setting range.
  · When the next page No. of the sampling completion page No. is specified during sampling.
- In the following cases during the sampling, the sampling error signal (SMPE) turns ON.
  · When the next page No. of the sampling completion page No. is the same as the sampling read page No.
  · When the sampling completion page No. switches to the page 256, with the sampling read page No. remaining 0.
  · When the sampling read error (Read sampled data completion page No. is -2) occurs.
  · When the page No. is changed from other than 0 to 0 during the sampling. (The read sampled data completion page No. becomes 0 and sampling data read area is cleared to 0.)

■Sampling completion

When the sampling of specified sampling points is completed, the sampling completed signal (SMPF) turns ON. After confirming the sampling completed signal (SMPF) turns ON, read until the sampling completion page No.

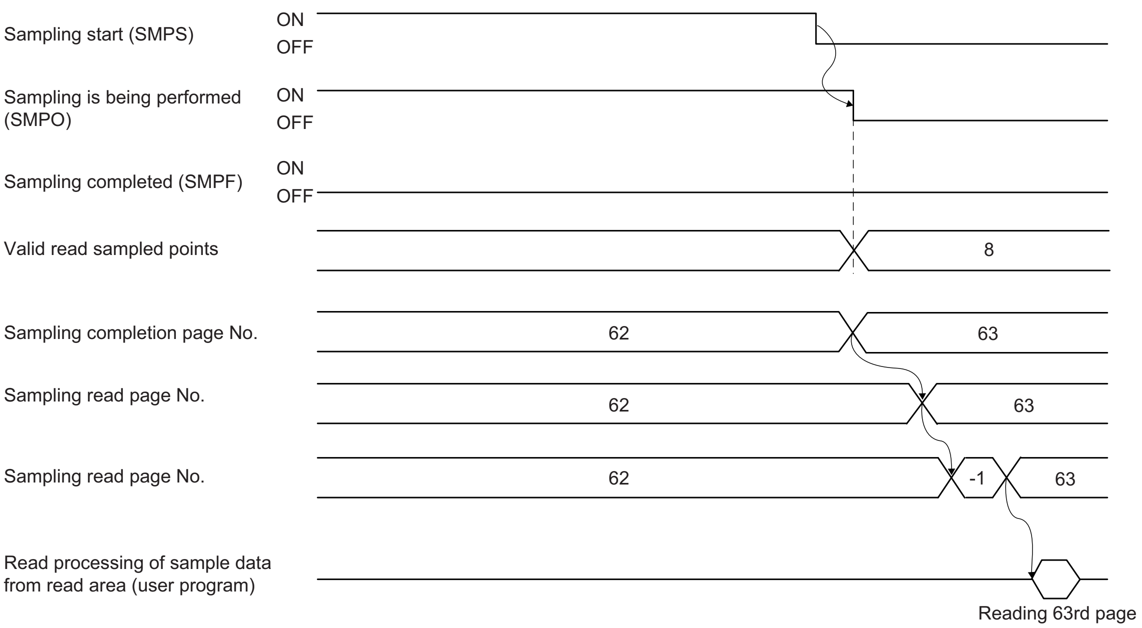


Point

- In the timing chart above, since the valid read sampled points of the last page of the sampling (63rd page) are 12, the valid sampled data of the last page is 1 to 12 points.
- The sampling data other than the valid read sampled points is read as "0" value.

■Sampling stopped prior to full completion

When the sampling start signal (SMPS) is turned OFF while the sampling is being performed signal (SMPO) is ON, the sampling is being performed signal (SMPO) turns OFF and the sampling finishes. After confirming the sampling is being performed signal (SMPO) turns OFF, read until the sampling completion page No.

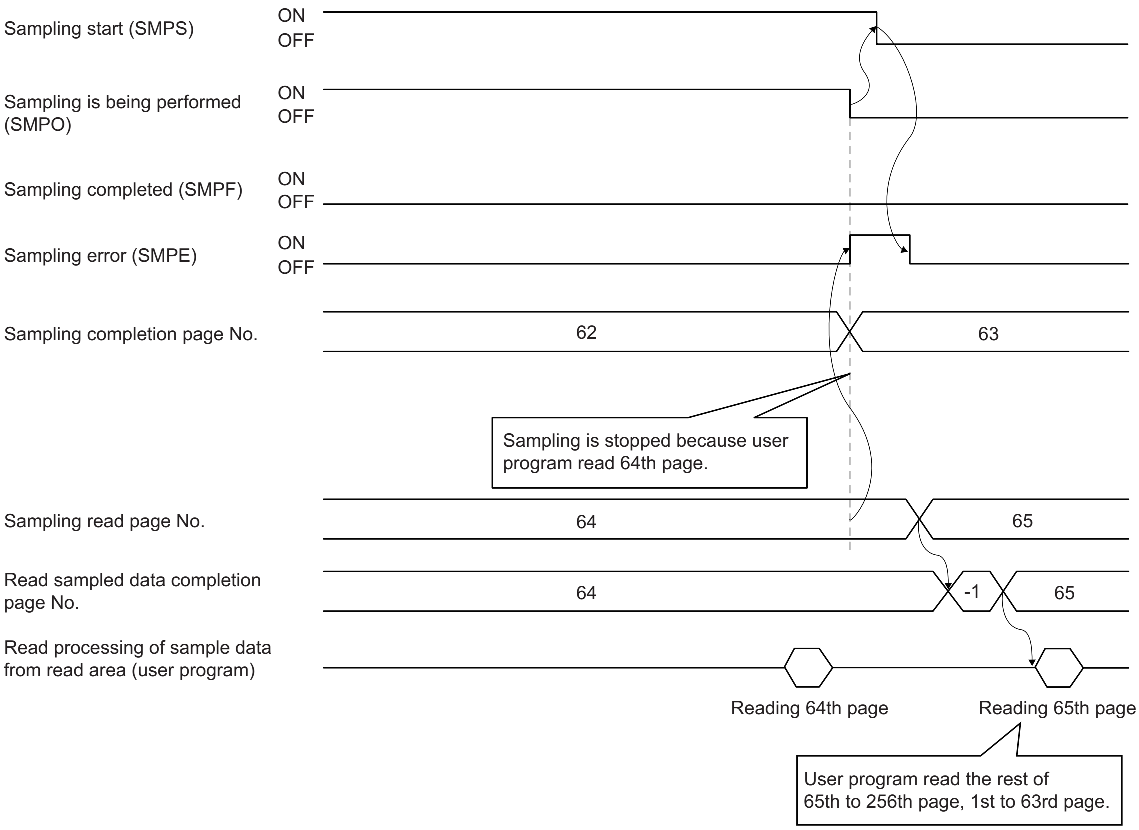


Point

- In the timing chart above, since the valid read sampled points of the last page of the sampling (63rd page) are 8, the valid sampled data of the last page is 1 to 8 points.
- The sampling data other than the valid read sampled points is read as "0" value.
- The sampling completed signal (SMPF) is not turned ON.

■When the reading of sampled data is not finished in time

When the next page No. of the sampling completion page No. matches the sampling read page No. while the sampling is being performed signal (SMPO) is ON, the position board judges that the reading of sampled data is not finished in time and the sampling is finished (the sampling error signal (SMPE) turns ON). After confirming the sampling is being performed signal (SMPO) turns OFF, read the unread pages to the page of the read sampled data completion page No. and valid read sampled points. The valid data points sampled in the page of the sampling completion page No. are stored in the valid sampled read points.



Point

- In the timing chart above, since the sampling is stopped when the sampling of the 63rd page is completed, the valid sampled data of the 63rd page (valid read sampled points) is 32 points.
- The sampling data other than the valid read sampled points is read as "0" value.

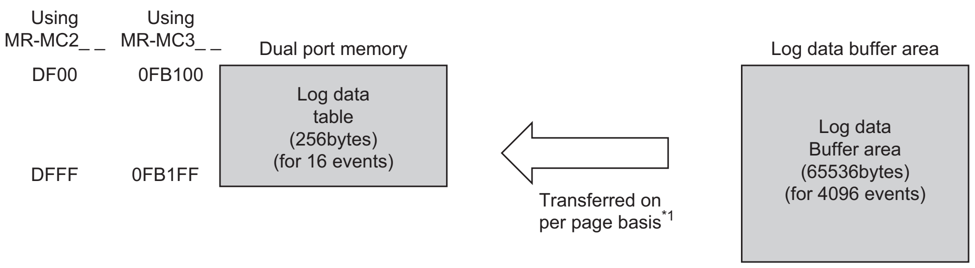
7

7.13 Log

The log function is a function that stores the status when an event occurs (start operation, completion, alarm occurs etc.) on the position board. The log data is stored in the log data buffer area (internal memory of the position board). When a reading of log data command is generated at a host personal computer, the log data stored in the log data buffer area is transferred to the dual port memory.

The log data is a ring buffer where the oldest data is deleted sequentially.

The log data is stored in the internal memory of the position board, and the log data is initialized when the power for the position board is turned off, or by a software reboot.



*1 Log data read to dual port memory from internal memory of position board on per page (for 16 events) basis.

Point

- Reading of log data can be performed in the test tool.
- When using MR-MC2_ _, log needs to be started by user program etc. in order to use the log function.
- When using MR-MC3_ _, log is started automatically at system startup.

Point

[API library]
- To start log, use the sscStartLog function.
- To stop log, use the sscStopLog function.
- To get log operation status, use the sscCheckLogStatus function.
- To get the number of valid log data events, use the sscCheckLogEventNum function.
- To get the log data, use the sscReadLogData function.

Log data details

The log data for 1 event is 16bytes. The details of the data are shown in the following.

Offset	Content	Details
0000h	Axis No.	Axis (station) No. [MC200] • 0: For events that are common to axes • 1 to 32: For events for separate axes • 1 to 4: For events for separate stations [MC300] • 0: For events that are common to axes • 1 to 64: For events for separate axes • 1 to 16: For events for separate stations
0002h	Event code	Refer to the following. ☞ Page 437 Event code list
0004h	Time stamp	Set the value of the 32bit free run counter added to each control cycle. This free run counter value is reset at system start up. It is 0 cleared when a software reboot is performed or when the position board power is turned OFF and ON.
0006h		
0008h	Information for each event	Refer to the following. ☞ Page 439 Information for each event
000Ah		
000Ch		
000Eh		

Event code list

Event code	Factor	Each axis (station)/ common
0001h	Start of automatic operation	Each axis
0002h	Start of return to home position	Each axis
0003h	Start of JOG operation	Each axis
0004h	Start of incremental movement	Each axis
0005h	Start of linear interpolation operation [MC200]/Start of interpolation operation [MC300]	Each axis
0006h	Home position reset startup	Each axis
0011h	Completion of automatic operation	Each axis
0012h	Home position return complete	Each axis
0013h	Completion of JOG operation	Each axis
0014h	Completion of incremental movement	Each axis
0015h	Completion of linear interpolation operation [MC200]/Completion of interpolation operation [MC300]	Each axis
0016h	Home position reset completion	Each axis
0020h	Change speed	Each axis
0021h	Change acceleration time constant	Each axis
0022h	Change deceleration time constant	Each axis
0023h	Position change	Each axis
0100h	Operation alarm occurs	Each axis
0101h	A servo alarm occurs	Each axis
0102h	Start of operation while alarm is set	Each axis
0103h	System alarm occurs	Common
0201h	Parameter initialization	Common
0202h	Writing to parameters	Each axis, common
0203h	Reading parameters	Each axis, common
0204h	Writing to parameters (MR-J5(W_)-_B) [MC300]	Each axis
0205h	Reading parameters (MR-J5(W_)-_B) [MC300]	Each axis
0210h	Backup parameters reading	Common
0211h	Flash ROM parameter backup	Common
0212h	Flash ROM parameter initialization	Common
0300h	Start of system startup	Common
0310h	Completion of system startup	Common

Event code	Factor	Each axis (station)/ common
0311h	System error occurs	Common
0402h	Interlock occurs	Each axis
0403h	Interlock cancelled	Each axis
0404h	Stop command (STP)	Each axis
0408h	Rapid stop command (RSTP)	Each axis
0500h	Operation alarm reset	Each axis
0501h	Servo alarm reset	Each axis
0503h	System alarm reset	Common
0601h	Waiting required for interference	Each axis
0602h	Cancellation of waiting for interference	Each axis
0603h	Rough match output	Each axis
0604h	Pass position interrupt start	Each axis
0605h	Pass position interrupt complete	Each axis
0606h	Pass position interrupt incomplete	Each axis
0607h	Pass position interrupt cancel	Each axis
0608h	Pass position interrupt condition satisfied	Each axis
0609h	Point table loop start	Each axis
0800h	Other axes start complete	Common
0801h	Other axes start incomplete	Common
0900h	SSCNET disconnection command	Common
0901h	SSCNET disconnection complete [MC200]	Common
0902h	SSCNET disconnection error	Common
0903h	SSCNET reconnection command	Common
0904h	SSCNET reconnection complete [MC200]	Common
0905h	SSCNET reconnection error	Common
0906h	SSCNET disconnection complete (axis) [MC300]	Common
0908h	SSCNET disconnection complete (station) [MC300]	Common
0909h	SSCNET reconnection complete (axis) [MC300]	Common
090Bh	SSCNET reconnection complete (station) [MC300]	Common
0A00h	Control mode switch complete	Each axis
0A01h	Control mode switch error	Each axis
0B00h	Mark detection signal detection	Each axis
0B01h	Mark detection clear	Each axis
0B02h	Mark detection disable start	Each axis
0B03h	Mark detection disable cancel	Each axis
0B04h	Mark detection setting enable	Each axis
0C00h	Transient transmit start	Each axis
0C01h	Transient transmit error occurrence	Each axis
2100h	RIO control alarm occurrence	Each station
2101h	RIO module alarm occurrence	Each station
2202h	Writing to parameters (remote I/O)	Each station
2500h	RIO control alarm reset	Each station
2501h	RIO module alarm reset	Each station
2C00h	Transient transmit start (remote I/O)	Each station
2C01h	Transient transmit error occurrence (remote I/O)	Each station

Information for each event

Log data set per event is as follows.

Also, details concerning the operation mode noted in the information per event is as follows.

- 0: Automatic operation
- 1: Home position return
- 2: JOG operation
- 3: Incremental feed
- 4: Mode not selected
- 5: Mode error
- 6: Home position reset
- 8: Linear interpolation operation [MC200]/interpolation operation [MC300]

Start of automatic operation

Offset	Content
0000h	Axis No.
0002h	Event code (0001h)
0004h	Time stamp
0006h	
0008h	Start point No.
000Ah	End point No.
000Ch	Operation startup coordinate
000Eh	

Start of home position return

Offset	Content
0000h	Axis No.
0002h	Event code (0002h)
0004h	Time stamp
0006h	
0008h	Home position return speed
000Ah	
000Ch	Creep speed
000Eh	Return to home position mode*1

*1 Follow "Home position return method" designated in "Home position return option 1 (parameter No.0240)".

Start of JOG operation

Offset	Content
0000h	Axis No.
0002h	Event code (0003h)
0004h	Time stamp
0006h	
0008h	Manual feed speed*1
000Ah	
000Ch	0 (fixed value)
000Eh	

*1 Taken as a negative number when the movement direction is -.

Start of incremental feed

Offset	Content
0000h	Axis No.
0002h	Event code (0004h)
0004h	Time stamp
0006h	
0008h	Manual feed speed[*1]
000Ah	
000Ch	Incremental feed movement amount
000Eh	

*1 Taken as a negative number when the movement direction is -.

Start of linear interpolation operation [MC200]/Start of interpolation operation [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (0005h)
0004h	Time stamp
0006h	
0008h	Start point No.
000Ah	End point No.
000Ch	Operation startup coordinate
000Eh	

Home position reset startup

Offset	Content
0000h	Axis No.
0002h	Event code (0006h)
0004h	Time stamp
0006h	
0008h	0 (fixed value)
000Ah	
000Ch	
000Eh	

Completion of automatic operation

Offset	Content
0000h	Axis No.
0002h	Event code (0011h)
0004h	Time stamp
0006h	
0008h	Coordinate operation completed
000Ah	
000Ch	0 (fixed value)
000Eh	

Home position return complete

Offset	Content
0000h	Axis No.
0002h	Event code (0012h)
0004h	Time stamp
0006h	
0008h	Completion status • 0: Normal • -1: Error
000Ah	0 (fixed value)
000Ch	
000Eh	

Completion of JOG operation

Offset	Content
0000h	Axis No.
0002h	Event code (0013h)
0004h	Time stamp
0006h	
0008h	Coordinate operation completed
000Ah	
000Ch	0 (fixed value)
000Eh	

Completion of incremental feed

Offset	Content
0000h	Axis No.
0002h	Event code (0014h)
0004h	Time stamp
0006h	
0008h	Coordinate operation completed
000Ah	
000Ch	0 (fixed value)
000Eh	

Completion of linear interpolation operation [MC200]/Completion of interpolation operation [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (0015h)
0004h	Time stamp
0006h	
0008h	Coordinate operation completed
000Ah	
000Ch	0 (fixed value)
000Eh	

Home position reset complete

Offset	Content
0000h	Axis No.
0002h	Event code (0016h)
0004h	Time stamp
0006h	
0008h	Completion status • 0: Normal • -1: Error
000Ah	0 (fixed value)
000Ch	
000Eh	

Change speed

Offset	Content
0000h	Axis No.
0002h	Event code (0020h)
0004h	Time stamp
0006h	
0008h	Speed after change
000Ah	
000Ch	Status • 0: Completion of preparation for change • 1: Change error
000Eh	0 (fixed value)

Change acceleration time constant

Offset	Content
0000h	Axis No.
0002h	Event code (0021h)
0004h	Time stamp
0006h	
0008h	Acceleration time constant after change
000Ah	
000Ch	Status • 0: Completion of preparation for change • 1: Change error
000Eh	0 (fixed value)

Change deceleration time constant

Offset	Content
0000h	Axis No.
0002h	Event code (0022h)
0004h	Time stamp
0006h	
0008h	Deceleration time constant after change
000Ah	
000Ch	Status • 0: Completion of preparation for change • 1: Change error
000Eh	0 (fixed value)

Position change

Offset	Content
0000h	Axis No.
0002h	Event code (0023h)
0004h	Time stamp
0006h	
0008h	Position after change
000Ah	
000Ch	Status • 0: Completion of preparation for change • 1: Change error
000Eh	0 (fixed value)

Operation alarm occurs

Offset	Content
0000h	Axis No.
0002h	Event code (0100h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

A servo alarm occurs

Offset	Content
0000h	Axis No.
0002h	Event code (0101h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

Start of operation while alarm is set

Offset	Content
0000h	Axis No.
0002h	Event code (0102h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

System alarm occurs

Offset	Content
0000h	Axis No.
0002h	Event code (0103h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

Parameter initialization

Offset	Content
0000h	Axis No.
0002h	Event code (0201h)
0004h	Time stamp
0006h	
0008h	System command code
000Ah	0 (fixed value)
000Ch	
000Eh	

Writing to parameters

Offset	Content
0000h	Axis No.
0002h	Event code (0202h)
0004h	Time stamp
0006h	
0008h	Parameter No.
000Ah	Parameter setting prior to change
000Ch	Parameter setting after change
000Eh	0 (fixed value)

Reading parameters

Offset	Content
0000h	Axis No.
0002h	Event code (0203h)
0004h	Time stamp
0006h	
0008h	Parameter No.
000Ah	Parameter data
000Ch	0 (fixed value)
000Eh	

Writing to parameters (MR-J5(W_)-_B) [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (0204h)
0004h	Time stamp
0006h	
0008h	Parameter No.
000Ah	0 (fixed value)
000Ch	Parameter setting after change
000Eh	

Reading parameters (MR-J5(W_)-_B) [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (0205h)
0004h	Time stamp
0006h	
0008h	Parameter No.
000Ah	0 (fixed value)
000Ch	Parameter data
000Eh	

Backup parameters reading

Offset	Content
0000h	Axis No.
0002h	Event code (0210h)
0004h	Time stamp
0006h	
0008h	0 (fixed value)
000Ah	
000Ch	
000Eh	

Flash ROM parameter backup

Offset	Content
0000h	Axis No.
0002h	Event code (0211h)
0004h	Time stamp
0006h	
0008h	0 (fixed value)
000Ah	
000Ch	
000Eh	

Flash ROM parameter initialization

Offset	Content
0000h	Axis No.
0002h	Event code (0212h)
0004h	Time stamp
0006h	
0008h	0 (fixed value)
000Ah	
000Ch	
000Eh	

Start of system startup

Offset	Content
0000h	Axis No.
0002h	Event code (0300h)
0004h	Time stamp
0006h	
0008h	System command code
000Ah	0 (fixed value)
000Ch	
000Eh	

Completion of system startup

Offset	Content
0000h	Axis No.
0002h	Event code (0310h)
0004h	Time stamp
0006h	
0008h	System status code
000Ah	0 (fixed value)
000Ch	
000Eh	

System error occurs

Offset	Content
0000h	Axis No.
0002h	Event code (0311h)
0004h	Time stamp
0006h	
0008h	System status code
000Ah	0 (fixed value)
000Ch	
000Eh	

Interlock occurs

Offset	Content
0000h	Axis No.
0002h	Event code (0402h)
0004h	Time stamp
0006h	
0008h	Operation mode
000Ah	0 (fixed value)
000Ch	
000Eh	

Interlock cancelled

Offset	Content
0000h	Axis No.
0002h	Event code (0403h)
0004h	Time stamp
0006h	
0008h	Operation mode
000Ah	0 (fixed value)
000Ch	
000Eh	

Stop command (STP)

Offset	Content
0000h	Axis No.
0002h	Event code (0404h)
0004h	Time stamp
0006h	
0008h	Operation mode
000Ah	0 (fixed value)
000Ch	
000Eh	

Rapid stop command (RSTP)

Offset	Content
0000h	Axis No.
0002h	Event code (0408h)
0004h	Time stamp
0006h	
0008h	Operation mode
000Ah	0 (fixed value)
000Ch	
000Eh	

Operation alarm reset

Offset	Content
0000h	Axis No.
0002h	Event code (0500h)
0004h	Time stamp
0006h	
0008h	Alarm No. when reset is performed
000Ah	Details No. when reset is performed
000Ch	0 (fixed value)
000Eh	

Servo alarm reset

Offset	Content
0000h	Axis No.
0002h	Event code (0501h)
0004h	Time stamp
0006h	
0008h	Alarm No. when reset is performed
000Ah	Details No. when reset is performed
000Ch	0 (fixed value)
000Eh	

System alarm reset

Offset	Content
0000h	Axis No.
0002h	Event code (0503h)
0004h	Time stamp
0006h	
0008h	Alarm No. when reset is performed
000Ah	Details No. when reset is performed
000Ch	0 (fixed value)
000Eh	

Waiting required for interference

Offset	Content
0000h	Axis No.
0002h	Event code (0601h)
0004h	Time stamp
0006h	
0008h	Operation mode
000Ah	0 (fixed value)
000Ch	
000Eh	

Cancellation of waiting for interference

Offset	Content
0000h	Axis No.
0002h	Event code (0602h)
0004h	Time stamp
0006h	
0008h	Operation mode
000Ah	0 (fixed value)
000Ch	
000Eh	

Rough match output

Offset	Content
0000h	Axis No.
0002h	Event code (0603h)
0004h	Time stamp
0006h	
0008h	Operation mode
000Ah	0 (fixed value)
000Ch	
000Eh	

Pass position interrupt start

Offset	Content
0000h	Axis No.
0002h	Event code (0604h)
0004h	Time stamp
0006h	
0008h	Pass position condition No.
000Ah	Pass position option
000Ch	Start coordinate
000Eh	

Pass position interrupt complete

Offset	Content
0000h	Axis No.
0002h	Event code (0605h)
0004h	Time stamp
0006h	
0008h	Pass position condition No.
000Ah	Pass position option
000Ch	Completion coordinate
000Eh	

Pass position interrupt incomplete

Offset	Content
0000h	Axis No.
0002h	Event code (0606h)
0004h	Time stamp
0006h	
0008h	Pass position condition No.
000Ah	Pass position option
000Ch	Completion coordinate
000Eh	

Pass position interrupt cancel

Offset	Content
0000h	Axis No.
0002h	Event code (0607h)
0004h	Time stamp
0006h	
0008h	Pass position condition No.
000Ah	Pass position option
000Ch	Cancel coordinate
000Eh	

Pass position interrupt condition satisfied

Offset	Content
0000h	Axis No.
0002h	Event code (0608h)
0004h	Time stamp
0006h	
0008h	Pass position condition No.
000Ah	Pass position option
000Ch	Condition satisfied coordinate
000Eh	

Point table loop start

Offset	Content
0000h	Axis No.
0002h	Event code (0609h)
0004h	Time stamp
0006h	
0008h	0 (fixed value)
000Ah	
000Ch	
000Eh	

Other axes start complete

Offset	Content
0000h	Axis No.
0002h	Event code (0800h)
0004h	Time stamp
0006h	
0008h	Other axes start data No.
000Ah	0 (fixed value)
000Ch	
000Eh	

Other axes start incomplete.

Offset	Content
0000h	Axis No.
0002h	Event code (0801h)
0004h	Time stamp
0006h	
0008h	Other axes start data No.
000Ah	0 (fixed value)
000Ch	
000Eh	

SSCNET disconnection command

Offset	Content
0000h	Axis No.
0002h	Event code (0900h)
0004h	Time stamp
0006h	
0008h	Disconnection Axis No.
000Ah	0 (fixed value)
000Ch	
000Eh	

SSCNET disconnection complete [MC200]

Offset	Content
0000h	Axis No.
0002h	Event code (0901h)
0004h	Time stamp
0006h	
0008h	Controlling axis information (lower)
000Ah	
000Ch	Controlling axis information (upper) (0 (fixed value))
000Eh	Controlling station information

SSCNET disconnection error

Offset	Content
0000h	Axis No.
0002h	Event code (0902h)
0004h	Time stamp
0006h	
0008h	Error code of reconnection/disconnection
000Ah	0 (fixed value)
000Ch	
000Eh	

SSCNET reconnection command

Offset	Content
0000h	Axis No.
0002h	Event code (0903h)
0004h	Time stamp
0006h	
0008h	0 (fixed value)
000Ah	
000Ch	
000Eh	

SSCNET reconnection complete [MC200]

Offset	Content
0000h	Axis No.
0002h	Event code (0904h)
0004h	Time stamp
0006h	
0008h	Controlling axis information (lower)
000Ah	
000Ch	Controlling axis information (upper) (0 (fixed value))
000Eh	Controlling station information

SSCNET reconnection error

Offset	Content
0000h	Axis No.
0002h	Event code (0905h)
0004h	Time stamp
0006h	
0008h	Error code of reconnection/disconnection
000Ah	0 (fixed value)
000Ch	
000Eh	

SSCNET disconnection complete (axis) [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (0906h)
0004h	Time stamp
0006h	
0008h	Controlling axis information 1
000Ah	
000Ch	Controlling axis information 2
000Eh	

SSCNET disconnection complete (station) [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (0908h)
0004h	Time stamp
0006h	
0008h	Controlling station information
000Ah	
000Ch	0 (fixed value)
000Eh	

SSCNET reconnection complete (axis) [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (0909h)
0004h	Time stamp
0006h	
0008h	Controlling axis information 1
000Ah	
000Ch	Controlling axis information 2
000Eh	

SSCNET reconnection error (station) [MC300]

Offset	Content
0000h	Axis No.
0002h	Event code (090Bh)
0004h	Time stamp
0006h	
0008h	Controlling station information
000Ah	
000Ch	0 (fixed value)
000Eh	

Control mode switch complete

Offset	Content
0000h	Axis No.
0002h	Event code (0A00h)
0004h	Time stamp
0006h	
0008h	Control mode before switch • 0: Position control mode • 1: Speed control mode • 2: Torque control mode
000Ah	Control mode after switch • 0: Position control mode • 1: Speed control mode • 2: Torque control mode
000Ch	0 (fixed value)
000Eh	

Control mode switch error

Offset	Content
0000h	Axis No.
0002h	Event code (0A01h)
0004h	Time stamp
0006h	
0008h	Control mode before switch • 0: Position control mode • 1: Speed control mode • 2: Torque control mode
000Ah	Control mode after switch • 0: Position control mode • 1: Speed control mode • 2: Torque control mode
000Ch	Switch error cause • 0: Zero speed signal (ZSP) OFF • 1: Control mode error • 2: Incompatible axis • 3: Switch not possible
000Eh	0 (fixed value)

Mark detection signal detection

Offset	Content
0000h	Axis No.
0002h	Event code (0B00h)
0004h	Time stamp
0006h	
0008h	Mark detection No. • 0: Mark detection setting 1 • 1: Mark detection setting 2
000Ah	Mark detection edge data • 0: OFF edge • 1: ON edge
000Ch	Data latch • 0: No latch • 1: Latch
000Eh	0 (fixed value)

Mark detection clear

Offset	Content
0000h	Axis No.
0002h	Event code (0B01h)
0004h	Time stamp
0006h	
0008h	Mark detection setting No.
000Ah	0 (fixed value)
000Ch	
000Eh	

Mark detection disable start

Offset	Content
0000h	Axis No.
0002h	Event code (0B02h)
0004h	Time stamp
0006h	
0008h	Mark detection setting No.
000Ah	0 (fixed value)
000Ch	
000Eh	

Mark detection disable cancel

Offset	Content
0000h	Axis No.
0002h	Event code (0B03h)
0004h	Time stamp
0006h	
0008h	Mark detection setting No.
000Ah	0 (fixed value)
000Ch	
000Eh	

Mark detection setting enable

Offset	Content
0000h	Axis No.
0002h	Event code (0B04h)
0004h	Time stamp
0006h	
0008h	Mark detection setting No.
000Ah	0 (fixed value)
000Ch	
000Eh	

Transient transmit start

Offset	Content
0000h	Axis No.
0002h	Event code (0C00h)
0004h	Time stamp
0006h	
0008h	Transient command
000Ah	0 (fixed value)
000Ch	
000Eh	

Transient transmit error occurrence

Offset	Content
0000h	Axis No.
0002h	Event code (0C01h)
0004h	Time stamp
0006h	
0008h	Transient command
000Ah	0 (fixed value)
000Ch	
000Eh	

RIO control alarm occurrence

Offset	Content
0000h	Station No.
0002h	Event code (2100h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

RIO module alarm occurrence

Offset	Content
0000h	Station No.
0002h	Event code (2101h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

Writing to parameters (remote I/O)

Offset	Content
0000h	Station No.
0002h	Event code (2202h)
0004h	Time stamp
0006h	
0008h	Parameter No.
000Ah	Parameter setting prior to change
000Ch	Parameter setting after change
000Eh	0 (fixed value)

RIO control alarm reset

Offset	Content
0000h	Station No.
0002h	Event code (2500h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

RIO module alarm reset

Offset	Content
0000h	Station No.
0002h	Event code (2501h)
0004h	Time stamp
0006h	
0008h	Alarm No.
000Ah	Details No.
000Ch	0 (fixed value)
000Eh	

Transient transmit start (remote I/O)

Offset	Content
0000h	Station No.
0002h	Event code (2C00h)
0004h	Time stamp
0006h	
0008h	Transient command
000Ah	0 (fixed value)
000Ch	
000Eh	

Transient transmit error occurrence (remote I/O)

Offset	Content
0000h	Station No.
0002h	Event code (2C01h)
0004h	Time stamp
0006h	
0008h	Transient command
000Ah	0 (fixed value)
000Ch	
000Eh	

Point

- For change of parameters (event code 0202h), the parameter value prior to change and parameter value after change are compared and only if the setting is different is the parameter change recorded in the log data.
- For occurrence of system errors (event code 0311h), occurrence of system errors related to communication (E400H to) are recorded in the log data. However system errors that show issues with the position board (E001H to E302H) are not recorded in the log data, as the position board is in an error state.

Interface

Command/status bit

System command/status bits related to log function are shown below.

■System command bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03EA	000B0A	0	LOGC	Log command
		1	LOGR	Reading of log data command
		2	—	For manufacturer setting
		3	LOGI	Log data initialization command
		4	—	For manufacturer setting
		5	OCMC	Operation cycle monitor clear
		6	—	For manufacturer setting
		7		

- Details concerning system command bits

Symbol	Signal name	Function details	
		Function	Operation
LOGC	Log command	Start/stops recording of log data.	When the log command signal (LOGC) is turned ON, recording of log data is started, and the log operation being performed signal (LOGO) is turned ON. The log operation being performed signal (LOGO) is turned OFF when the log command signal (LOGC) is turned OFF.
LOGR	Reading of log data command	Read the log data stored in the log data buffer area to the log data table on the dual port memory.	When the reading of log data command signal (LOGR) is turned ON, the log data for the page No. set as the read log data page No. is read into the log data table. When reading of log data is complete, the reading of log data complete signal (LOGRF) is turned ON or the reading of log data error signal (LOGRE) is turned ON.
LOGI	Log data initialization command	Initialization of the log data stored in the log data buffer area.	When the log data initialization command signal (LOGI) is turned ON, the log data is initialized and the number of valid log data events and time stamp are 0 cleared.

■System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
045A	000BEA	0	LOGO	Log operation being performed
		1	LOGRF	Reading of log data complete
		2	LOGRE	Reading of log data error
		3	LOGIF	Log data initialization is complete
		4	LOGIE	Log data initialization error
		5	OCMCO	During operation cycle monitor clear
		6	OCME	Operation cycle alarm
		7	OCMW	Operation cycle warning

- Details concerning system status bits

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
LOGO	Log operation being performed	Notify that log is now being taken.	The log command signal (LOGC) was turned ON.	The log command signal (LOGC) was turned OFF.
LOGRF	Reading of log data complete	Notify that reading of log data was completed normally.	Reading of log data is completed normally.	• Entered reading of data because the log command signal (LOGC) was turned ON. • The reading of log data command signal (LOGR) was turned OFF.

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
LOGRE	Reading of log data error	Notify that reading of log data was not completed normally.	• The reading of log data command signal (LOGR) was turned ON while the log operation being performed signal (LOGO) was turned ON. • The reading of log data command signal (LOGR) was turned ON with a reading of log data page No. set outside page No. limits.	The reading of log data command signal (LOGR) was turned OFF.
LOGIF	Log data initialization is complete	Notify that log data initialization was completed normally.	Log data initialization is completed normally.	• Entered initialization of data because the log data initialization command signal (LOGI) was turned ON. • The log data initialization command signal (LOGI) was turned OFF.
LOGIE	Log data initialization error	Notify that log data initialization was not completed normally.	The log data initialization command signal (LOGI) was turned ON while the log operation being performed signal (LOGO) was turned ON.	The log data initialization command signal (LOGI) was turned OFF.

System command/status table

■System Commands

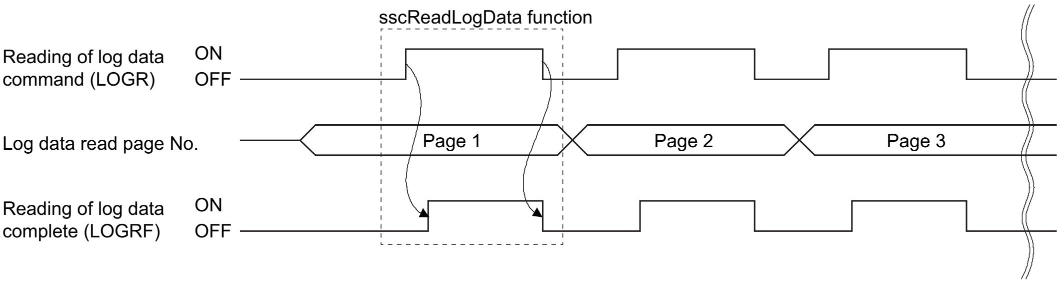
Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
0428	000B58	Reading of log data page No.	1 to 256	Set the page No. for the log data area for logged data to be read to. Data for 16 events of log data are read for each page. <Example> When the number of valid events is 345 events 345/16 = 21···9 In other words, pages 1 to 22 are read.
0429	000B59			

■System status

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
0498	000C38	Reading of log data page No.	1 to 256	Store the page No. that was read. The details for the settings for the page number of the log data that was read using a system command are stored.
0499	000C39			
049A	000C3A	Number of valid log data events	0 to 4096	Store the number of valid events stored in current log data. When the number of valid events reaches 4096 events the number of valid events becomes 4096.
049B	000C3B			

Timing chart for reading of log data

A method for reading log data stored in the log data buffer area is shown below.



Point

- For reading of log data, turn OFF the log command signal (LOGC). If log data is read while the log operation being performed signal (LOGO) is turned ON, the reading of log data error signal (LOGRE) is turned ON.
- Log data is stored using a ring buffer format in the log data buffer area of the position board; however, when transferred to the dual port memory, the data is transferred from the oldest (oldest is transferred first) in order.

Log acquiring selection

By setting Log acquiring selection (parameter No.0040 to 0042, 0044/No.0043, 004B [MC300]), the axis No. and system for which the log to be acquired can be set. When the number of log events to be memorized is not enough, set the events (axis and system) for which log is to be acquired, using this function.

System parameter

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0040	LGS1	Log acquiring selection 1[*1]	0000h	—	0000h to 0001h	Set whether to acquire the log of the system when the log function is used. System (bit0) • 0: Not acquire • 1: Acquire
0041	LGS2	Log acquiring selection 2[*1]	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 1 (bit0) to axis 16 (bit15) • 0: Not acquire • 1: Acquire
0042	LGS3	Log acquiring selection 3[*1]	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 17 (bit0) to axis 32 (bit15) • 0: Not acquire • 1: Acquire
0043	LGS4	Log acquiring selection 4 [MC300][*1]	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 33 (bit0) to axis 48 (bit15) • 0: Not acquire • 1: Acquire
0044	LGS5	Log acquiring selection 5[*1]	0000h	—	[MC200] 0000h to 00FFh [MC300] 0000h to FFFFh	Set the station No. for which the log is to be acquired. Station 1 (bit0) to station 4 (bit3) [MC200] Station 1 (bit0) to station 16 (bit15) [MC300] • 0: Not acquire • 1: Acquire
004B	LGS6	Log acquiring selection 6 [MC300][*1]	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 49 (bit0) to axis 64 (bit15) • 0: Not acquire • 1: Acquire

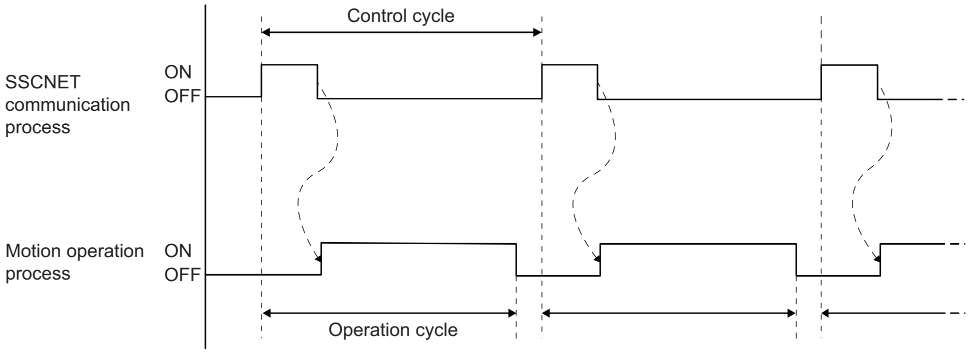
*1 When all the system parameters of the log acquiring selection (parameter No.0040 to 0042, 0044/No.0043, 004B [MC300]) are set to "0000h" (initial value), log for all axes, stations, and systems are acquired.

Point

Since the parameter for the log acquiring selection is not determined before the system startup, log for all axes, stations, and systems are acquired.

7.14 Operation Cycle Monitor Function

The operation cycle monitor function is a function that monitors the operation cycle current time, the operation cycle maximum time, and the operation cycle over time. The operation cycle monitor function becomes valid after the system starts.
The operation cycle is the position board processing (SSCNET communication process + motion operation process) time.



When the operation cycle exceeds the warning level (95% of the control cycle, 0.84ms when control cycle 0.88ms is selected), the operation cycle warning signal (OCMW) turns ON. Also, when the operation cycle exceeds the alarm level (100% or more of the control cycle, 0.88ms or more when control cycle 0.88ms is selected), the count of the operation cycle over time increases and the operation cycle alarm signal (OCME) turns ON.

Interface

The interfaces related to the operation cycle monitor function are shown below.

System command bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03EA	000B0A	0	LOGC	Log command
		1	LOGR	Reading of log data command
		2	—	For manufacturer setting
		3	LOGI	Log data initialization command
		4	—	For manufacturer setting
		5	OCMC	Operation cycle monitor clear
		6	—	For manufacturer setting
		7		

System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
045A	000BEA	0	LOGO	Log operation being performed
		1	LOGRF	Reading of log data complete
		2	LOGRE	Reading of log data error
		3	LOGIF	Log data initialization is complete
		4	LOGIE	Log data initialization error
		5	OCMCO	During operation cycle monitor clear
		6	OCME	Operation cycle alarm
		7	OCMW	Operation cycle warning

System information table (operation cycle monitor data)

Address (hexadecimal)		Size	Name	Unit	Description
MR-MC2_ _	MR-MC3_ _				
0014	000014	2byte	Operation cycle current time	μs	Current processing time is stored.
0016	000016	2byte	Operation cycle maximum time	μs	Maximum processing time is stored.
0018	000018	2byte	Operation cycle over time	Number of times	The cumulative value of the number of times which exceeds the control cycle is stored.

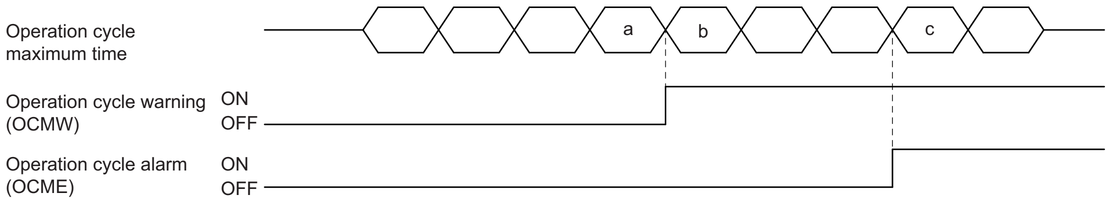
Operation timing

Operation cycle alarm, operation cycle warning occurrence timing

A timing chart for when the operation cycle exceeds the warning level (95% of the control cycle) and alarm level (100% of the control cycle) is shown below.

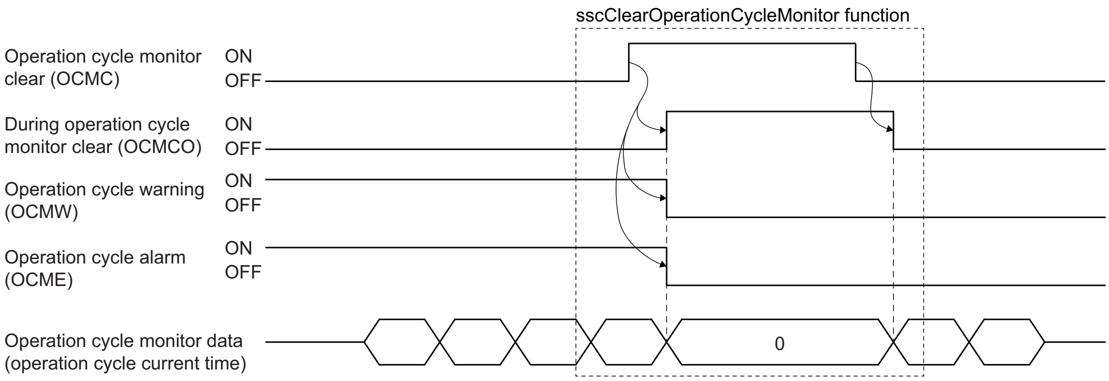
Ex.

The following figure shows: a < Operation cycle 95% < b < Operation cycle 100% < c



Operation cycle monitor clear timing

When the operation cycle monitor clear signal (OCMC) is turned ON, the during operation cycle monitor clear signal (OCMCO) is turned ON. Then, the operation cycle alarm signal (OCME) and the operation cycle warning signal (OCMW) are turned OFF, and each data item in the operation cycle monitor data is cleared to 0.



Point

- When the operation cycle alarm signal (OCME) and the operation cycle warning signal (OCMW) are turned ON, the load of the motion operation is high. Review the following contents.
  · Extend the control cycle in the setting. (Example: When the control cycle is 0.44ms, change it to 0.88ms.)
  · Set less control axes.
  · Reexamine the operation pattern so that each axis does not start operation simultaneously.
- For software version A4 or later, when the operation cycle alarm signal (OCME) turns ON, "Operation Cycle Alarm (system alarm 35H, detail 01H)" occurs. Operation continues even when "Operation Cycle Alarm (system alarm 35H, detail 01H)" has occurred. When clearing "Operation Cycle Alarm (system alarm 35H, detail 01H)", turn ON the system alarm reset signal (CRST).

Point

[API library]

To get the operation cycle current time/operation cycle maximum time/operation cycle over time, use the sscGetOperationCycleMonitor function

7.15 External Forced Stop Disabled

The external forced stop disabled function disables the external forced stop by the input signal (EMI) from the I/O connector.

Point

The software forced stop signal (SEMI) by the system command bit and forced stops due to the system status error such as SSCNET communication errors (system status code E□□□h) are not disabled.

Interface

System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0452	000BE2	0	EMIO	Being executed forced stop
		1	—	For manufacturer setting
		2	TSTO	In test mode
		3	—	For manufacturer setting
		4		
		5		
		6	EMID	External forced stop disabled
		7	—	For manufacturer setting

System parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Function
000E	*EMID	External forced stop disabled	0000h	—	0000h to FFFFh	Disable the forced stop by EMI signal. • 5AE1h: Forced stop disabled • Other than 5AE1h: Forced stop enabled

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Setting method

To disable the external forced stop, set "5AE1h: Forced stop disabled" to "External forced stop disabled (parameter No.000E)", and start the system. When the external forced stop is disabled, the external forced stop disabled signal (EMID) turns ON.

Point

- "External forced stop disabled (parameter No.000E)" settings are imported at the system startup. Changes while the system is running are invalid.
- The external forced stop disabled signal (EMID) turns ON at system startup.

7.16 Amplifier-less Axis Function

The amplifier-less axis function is a function that enables to operate the position board without connecting a servo amplifier. This function enables to debug the user program at the start-up of the device and to simulate the positioning operation.

Interface

To use the amplifier-less axis function, set "Amplifier-less axis function" of "Control option 1 (parameter No.0200)" to "1: Valid".

Control parameters

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Function
0200	*OPC1	Control option 1	0000h	—	0000h to 2111h	■■□■ (Amplifier-less axis function) Set "1: Valid" when not communicating with servo amplifier. When setting "1" with "Control axis", the operation without the servo amplifier (simulation) is available. • 0: Invalid • 1: Valid

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

7

Control details

The operation details related to the amplifier-less axis function are shown below.

Item	Operation
Servo amplifier	For the specification of a supposedly connected servo amplifier, refer to the notes.[*1*2*3]
Home position return	Home position return using an incremental encoder or incremental linear scale including the home position return using a scale home position signal detection method and the home position return using a scale home position signal detection method 2 (home position return which searches a home position signal again) cannot be used.
In-position signal (INP)	This signal turns ON when the current command position and the current feedback position are the same.
Servo alarm	No servo alarm occurs.
Servo information	Servo information (monitor No.0100H to 02FFH) cannot be referred unless the servo amplifier is connected. The servo amplifier is not connected signal (MESV) turns ON.
High speed monitor	In the current feedback position, the current command position of 1 previous control cycle is displayed. In the electrical current feedback, always 0 is displayed.
Torque limit	By turning ON/OFF the torque limit signal (TL), ON/OFF of the selecting torque limit signal (TLSO) can be confirmed. However, the torque limit effective signal (TLC) does not turn ON and the operation of the amplifier-less axis is not affected.
Gain switching	By turning ON/OFF the gain switching command signal (GAIN), ON/OFF of the during gain switching signal (GAINO) can be confirmed. However, the operation of the amplifier-less axis is not affected.
Fully closed loop control change	By turning ON/OFF the fully closed loop control change command signal (FCLS), ON/OFF of the fully closed loop control changing signal (FCLSO) can be confirmed. However, the operation of the amplifier-less axis is not affected.
PI-PID switching	By turning ON/OFF the PID control command signal (CPC), ON/OFF of the during PID control signal (SPC) can be confirmed. However, the operation of the amplifier-less axis is not affected.
Forced stop	When forced stop occurs, amplifier-less axis continues the positioning operation without the servo warning [AL. E7_Controller forced stop warning][*4].
External signal	To simulate an operation using a limit switch signal or dog signal (such as the home position return), set "4: Dual port memory input" to "Sensor input system" of "Sensor input options (parameter No.0219)" and control the sensor signal command (LSPC, LSNC, DOGC) with the user program.
Absolute position detection system	The absolute position detection system cannot be used. It operates as the incremental system.
Reconnect/disconnect function	The amplifier-less axis cannot be disconnected or reconnected.
Continuous operation to torque control	After reaching the continuous operation to torque control speed limit value, it is regarded that the torque settle width has been reached, and operation is completed after the continuous operation to torque control time has passed. For electrical current feedback, torque 0% occurs before reaching the speed limit value, and target torque occurs after reaching the speed limit value.
Operation with MR Configurator2	Servo amplifier cannot be operated or monitored.

*1 The specification of a supposedly connected servo amplifier is shown below.
Switch MR-J4(W_)-_B and MR-J5(W_)-_B by the setting of "Type code (parameter No.021E)". [MC300]

SSCNET communication method	Vendor ID (parameter No.021D)	Type code (parameter No.021E)	Number of encoder pulses per revolution [pulse]	Motor maximum revolution speed [r/min]
SSCNETⅢ	—	—	262144	6000
SSCNETⅢ/H	0000h: Mitsubishi Electric	1000h: MR-J4(W_)-_B	4194304	6000
		1400h: MR-J5(W_)-_B [MC300]	67108864	6700

*2 The servo amplifier operates as a servo amplifier compatible with a rotary servo motor. (It does not operate as a servo amplifier compatible with the fully closed, linear, and direct drive.)

*3 If the type code other than "1000h: MR-J4(W_)-_B" and "1400h: MR-J5(W_)-_B [MC300]" are set to "Type code (parameter No.021E)", the servo amplifier operates as MR-J4(W_)-_B.

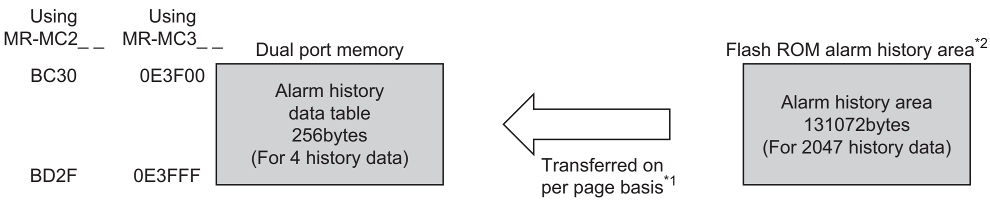
*4 For MR-J5(W_)-_B, the servo warning [AL. 0E7_Controller forced stop warning] [MC300]

Point

The operation of the current feedback position and the timing of the in-position signal (INP) are different from the case where the servo amplifier is connected. Confirm the final operation with a real machine.

7.17 Alarm History Function

The alarm history function is a function that records the history of system errors and alarms (system, operation, and servo alarms) when they occur. The alarm history data is stored in the alarm history area of the flash ROM. Alarm history can also be confirmed after the power is turned off.



*1 Log data is read to the dual port memory from internal memory of the position board in units of pages (4 data).

*2 There is a storage area for 2047 history data. However, when power supply is turned ON, or a software reboot is performed after storing 1536 data or more, the oldest 1024 items of history data are deleted.

Point

- History data is also stored at system startup command (when 000Ah is input to the system command code) and at completion of system startup (when system status code has become 000Ah).
- Alarm history data is stored to the flash ROM once every 10s. (max. 100 alarms each storing)
- When more than 100 alarms occur over 10s, the data passed 100 alarms is discarded.
- If power is turned off or a reboot is performed before alarm history write, the history data is not saved.
- Reading of alarm history data can be performed in the test tool.

Point

[API library]

For a detailed procedure for getting alarm history data, refer to the sample program (AlarmHistory) contained on the utility software.

Alarm history data details

There are three types of history data, system startup command data and completion of system startup data, and alarm history data. One history data is 64bytes. The details of the data are shown in the following.

System startup command data

Offset	Content	Detail
0000h	System startup time	When the API library is used, the number of seconds passed since 0000hrs, January 1, 1970 at the input time for system startup command is stored. When the API library is not used, "0" is stored.
0001h		
0002h		
0003h		
0004h		
0005h		
0006h		
0007h		
0008h	Free run counter	Store the value of the free-run counter at the system startup command.
0009h		
000Ah		
000Bh		
000Ch	Control cycle	Store the control cycle. • 00h: 0.88ms • 01h: 0.44ms • 02h: 0.22ms
000Dh	Event code	Store the type of history content. • 00h: System startup command • 02h: Completion of system startup • 10h: System error • 11h: System alarm • 12h: Servo alarm • 13h: Operation alarm • 92h: RIO module alarm • 93h: RIO control alarm • A2h: Servo alarm (MR-J5(W_)-_B) [MC300]
000Eh	For manufacturer setting	—
000Fh		
0010h	Communication mode	Store the communication mode. • 00h: SSCNETⅢ/H mode
0011h	Control mode	Store the control mode. • 00h: Standard mode • 01h: Interface mode
0012h	For manufacturer setting	—
⋮		
003Eh		
003Fh	Checksum	Store the inverted sum of the 1byte data from the whole area for history data as the checksum data.

Point

If control mode, communication mode, and control cycle for history data are set outside the range in system parameters, the following history is stored.

- Control cycle: 00h (0.88ms)
- Communication mode: 00h (SSCNETⅢ/H mode)
- Control mode: 00h (Standard mode)

Completion of system startup data

Offset	Content	Detail
0000h	System startup time	Same as the system startup command data. Refer to the following. ☞ Page 470 System startup command data
0001h		
0002h		
0003h		
0004h		
0005h		
0006h		
0007h		
0008h	Free run counter	Store the value of the free-run counter at the completion of system startup.
0009h		
000Ah		
000Bh		
000Ch	Control cycle	Same as the system startup command data. Refer to the following. ☞ Page 470 System startup command data
000Dh	Event code	
000Eh	For manufacturer setting	—
⋮		
003Eh		
003Fh	Checksum	Same as the system startup command data. Refer to the following. ☞ Page 470 System startup command data

Alarm history data

Offset	Content	Detail
0000h	System startup time	Same as the system startup command data. Refer to the following. ☞ Page 470 System startup command data
0001h		
0002h		
0003h		
0004h		
0005h		
0006h		
0007h		
0008h	Free run counter	Store the value of the free-run counter at the alarm occurrence.
0009h		
000Ah		
000Bh		
000Ch	Control cycle	Same as the system startup command data. Refer to the following. ☞ Page 470 System startup command data
000Dh	Event code	
000Eh	For manufacturer setting	—
⋮		
0013h		
0014h	Error axis (station) No.	Store the error axis (station) No. when the event code is an alarm/error. • 0000h: System • 0001h to 0020h: Axis No. [MC200] • 0001h to 003Fh: Axis No. [MC300] • 0001h to 0004h: Station No. [MC200] • 0001h to 000Fh: Station No. [MC300]
0015h		
0016h	Alarm No.	Store the alarm No. (lower), and details No. (upper) when the event code is an alarm/error. Store the alarm No.0 when the event code is "A2h: servo alarm (MR-J5(W_)-_B)". [MC300]
0017h		
0018h	Operation mode	Store the operation mode. • 00h: Automatic operation • 01h: Home position return • 02h: JOG operation • 03h: Incremental feed • 04h: Mode not selected • 05h: Mode error • 06h: Home position reset • 08h: Linear interpolation operation [MC200]/interpolation operation [MC300] Store "04h: Mode not selected" when the event code is not a servo alarm or operation alarm.
0019h	For manufacturer setting	—
001Ah		
001Bh		
001Ch	Current command position	Store the signed current command position [command units] when the event code is a servo alarm or operation alarm. Store 0 when the event code is not a servo alarm or operation alarm.
001Dh		
001Eh		
001Fh		
0020h	Current feedback position	Store the signed current feedback position [command units] when the event code is a servo alarm or operation alarm. Store 0 when the event code is not a servo alarm or operation alarm.
0021h		
0022h		
0023h		
0024h	Alarm No. (MR-J5(W_)-_B) [MC300]	Store the servo alarm No. and details No. to alarm No. (MR-J5(W_)-_B) and details No. (MR-J5(W_)-_B) when the event code is "A2h: servo alarm (MR-J5(W_)-_B)".
0025h		
0026h	Details No. (MR-J5(W_)-_B) [MC300]	
0027h		
0028h	For manufacturer setting	—
⋮		
003Eh		
003Fh	Checksum	Same as the system startup command data. Refer to the following. ☞ Page 470 System startup command data

Interface

System command/status bit

System command/status bits related to alarm history function are shown below.

■System command bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E1	000B01	0	SMPS	Sampling start
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F7	000B17	0	ALHR	Alarm history read command
		1	—	For manufacturer setting
		2	ALHI	Alarm history initialization command
		3	—	For manufacturer setting
		4		
		5		
		6		
		7		

• Details concerning system command bits

Symbol	Signal name	Function details	
		Function	Operation
ALHR	Alarm history read command	Read the alarm history stored in the alarm history buffer area (flash ROM) to the alarm history table on the dual port memory.	When the alarm history read command signal (ALHR) is turned ON, the alarm history for the page No. set as the alarm history read page No. is read to the alarm history table. When reading of alarm history is complete, the alarm history read complete signal (ALHRF) is turned ON or the alarm history read error signal (ALHRE) is turned ON.
ALHI	Alarm history initialization command	Initialization of the alarm history stored in the alarm history buffer area (flash ROM).	When the alarm history initialization command signal (ALHI) is turned ON, the alarm history is initialized and the number of valid alarm history events are 0 cleared.

■System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0451	000BE1	0	SMPW	Waiting for sampling trigger
		1	SMPO	Sampling is being performed
		2	SMPF	Sampling completed
		3	SMPE	Sampling error
		4	—	For manufacturer setting
		5	AHINF	Alarm history information
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0467	000BF7	0	ALHRF	Alarm history read complete
		1	ALHRE	Alarm history read error
		2	ALHIF	Alarm history initialization complete
		3	ALHIE	Alarm history initialization error
		4	—	For manufacturer setting
		5		
		6		
		7		

- Details concerning system status bits

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
AHINF	Alarm history information	Show that position board is alarm history compatible.	An alarm history compatible position board is connected.	A position board that is not alarm history compatible is connected.
ALHRF	Alarm history read complete	Notify that reading of alarm history was completed normally.	Reading of alarm history is completed normally.	The alarm history read command signal (ALHR) was turned OFF.
ALHRE	Alarm history read error	Notify that reading of alarm history was not completed normally.	The alarm history read command signal (ALHR) was turned ON with an alarm history read page No. set outside page No. limits.	The alarm history read command signal (ALHR) was turned OFF.
ALHIF	Alarm history initialization complete	Notify that alarm history initialization was completed normally.	Initialization of alarm history is completed normally.	• Initialization of data entered through turning the alarm history initialization command signal (ALHI) ON. • The alarm history initialization command signal (ALHI) was turned OFF.
ALHIE	Alarm history initialization error	Notify that alarm history initialization was not completed normally.	The alarm history initialization command signal (ALHI) was turned ON with a value other than "E15Ah" set to the alarm history initialization ID.	The alarm history initialization command signal (ALHI) was turned OFF.

System command/status table

■System Commands

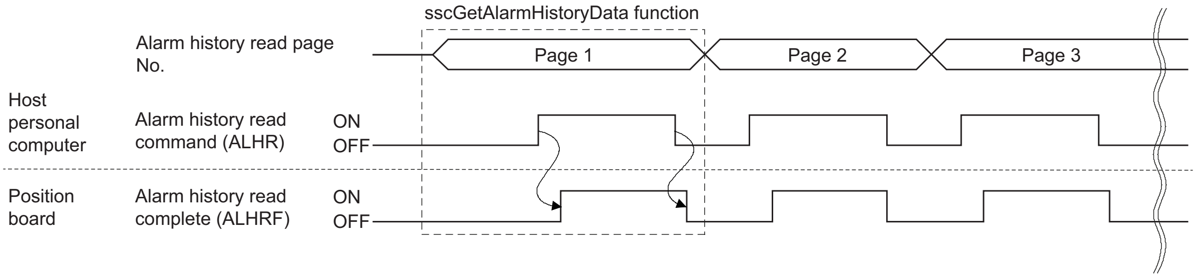
Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
0444	000B74	Alarm history read page No.	1 to 512	Set the page No. for the alarm history area for alarm history to be read to. Data for 4 events of alarm history are read for each page. <Example> When the number of valid events is 1250 events 1250/4 = 312 ··· 2 In other words, pages 1 to 313 are read.
0445	000B75			
0446	000B76	Alarm history initialization ID	E15Ah	When initializing the alarm history, set "E15Ah". Refer to the following. ☞ Page 476 Alarm history initialization procedure
0447	000B77			
0448	000B78	System startup time	0000000000000000h to FFFFFFFFFFFFFFFFh	When the API library sscSystemStart function is used, the host personal computer stores the time of system startup. When the API library is not used, perform system startup after storing the number of seconds since 0000hrs, January 1, 1970. Refer to the following. ☞ Page 82 System Startup Processing
0449	000B79			
044A	000B7A			
044B	000B7B			
044C	000B7C			
044D	000B7D			
044E	000B7E			
044F	000B7F			

■System status

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
04B4	000C54	Alarm history read page No.	1 to 512	Store the page No. that was read. The details of the settings for the alarm history read page No. of the system command are stored.
04B5	000C55			
04B6	000C56	Number of valid alarm history events	0 to 2047	Store the number of valid events stored in current alarm history. When the number of valid events reaches 2047 events the number of valid events becomes 2047.
04B7	000C57			

Timing chart for alarm history read

A method for reading alarm history stored in the alarm history area is shown below.



Point

The alarm history is stored in the alarm history area of the position board flash ROM in ring buffer format. The data is read from the oldest data first when transmitting to the dual port memory.

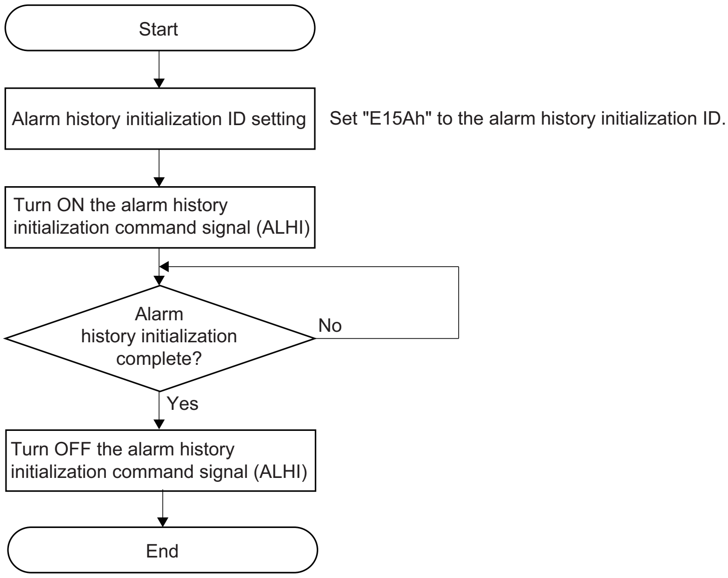
Point

[API library]
To read the alarm history, use the sscGetAlarmHistoryData function. Calculate the largest page No. (divide the number of valid events by 4 and round up to nearest whole number) to be read by using the number of valid events got with the sscCheckAlarmHistoryEventNum function.
Use this function to get alarm history data from page 1 to the largest page No. to be read.

Alarm history initialization procedure

The procedure for initialization of parameters are as follows.

sscClearAlarmHistoryData function



Point

- Do not turn OFF the power supply to the position board during initialization of alarm history.
- Alarm history data cannot be read during initialization of alarm history.

Point

[API library]

To initialize alarm history, use the sscClearAlarmHistoryData function.

List of system errors that do not apply to alarm history storage

System errors that do not apply to alarm history storage are shown below.

Error code	Content
E001H	ROM error 1
E002H	RAM error 1
E003H	Dual port memory error
E004H	RAM error 2
E006H	SSCNET communication IC error 1
E007H	SSCNET communication IC error 2
E008H	Board error
E009H	ROM error 2
E00AH	ROM error 3
E1□□H	CPU error
EF01H	System command code error

7.18 Transient Transmit

Using the transient transmit function allows the buffer memory of a servo amplifier or intelligent function module connected to a remote I/O module to be accessed directly from the position board.
Compared to the monitor function, the transient transmit data receives data at a slower speed, however it is used to get data that isn't required to be read at a fixed cycle. Additionally, commands can be sent depending on the data type.

Point

[API library]
To send and receive data by transient transmit, use the sscSendReceiveTransientData function.

Interface

The command/status data related to the transient transmit function are shown below.

Transient transmit command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)*1		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
D400	0F8B00	Command transmission request (2bytes)	0000h to 0001h	Request transmission of transient command. • 1: Transient request • Other than the above: No request If the value is changed while processing, the process is not interrupted. For "1: Transient request", all data is cleared to 0 upon the completion of all processes.
D401	0F8B01			
D402	0F8B02	Transient command (2bytes)	0000h to FFFFh	Set the transient command to be sent. Without checking the value, the set value is sent to the servo amplifier as a command. Do not set values other than those that are set for transient commands as the servo amplifier operation for other values is not guaranteed.
D403	0F8B03			
D404	0F8B04	Request data 1 (2bytes)	0000h to FFFFh	Set the request data. Without checking the value, the set value is sent to the servo amplifier as a command. Set "0" when request data is not defined by command.
D405	0F8B05			
D406	0F8B06	Request data 2 (2bytes)	0000h to FFFFh	
D407	0F8B07			
D408	0F8B08	Request data 3 (2bytes)	0000h to FFFFh	
D409	0F8B09			
D40A	0F8B0A	Request data 4 (2bytes)	0000h to FFFFh	
D40B	0F8B0B			
D40C	0F8B0C	For manufacturer setting	—	—
D40D	0F8B0D			
D40E	0F8B0E			
D40F	0F8B0F			

*1 The start address for the first station is as follows. For the second station and after, add "+20h" for each station.
Using MR-MC2_ _: DA00h
Using MR-MC3_ _: 0F9B00h

Transient transmit status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)*1		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
D410	0F8B10	Transient status (2bytes)	0000h to 800Fh	The process after sending transient request is stored. • Bit0: Transient command processing completion wait • Bit1: Transient request start • Bit2: Transient receiving • Bit3: Transient reception completed normally • BitF: Data valid bit 1: ON (transient normal) 0: OFF (abnormal occurrence) An abnormal occurrence is when there is a failure in communication, or a transient request is conducted to an axis/station other than the send target axis/station.
D411	0F8B11			
D412	0F8B12	For manufacturer setting	—	—
D413	0F8B13			
D414	0F8B14	Response data 1 (2bytes)	0000h to FFFFh	The response data is stored. The response data includes valid data and invalid data (0), and is always stored as 4 words.
D415	0F8B15			
D416	0F8B16	Response data 2 (2bytes)	0000h to FFFFh	
D417	0F8B17			
D418	0F8B18	Response data 3 (2bytes)	0000h to FFFFh	
D419	0F8B19			
D41A	0F8B1A	Response data 4 (2bytes)	0000h to FFFFh	
D41B	0F8B1B			
D41C	0F8B1C	For manufacturer setting	—	—
D41D	0F8B1D			
D41E	0F8B1E			
D41F	0F8B1F			

*1 The start address for the first station is as follows. For the second station and after, add "+20h" for each station.
Using MR-MC2_ _: DA10h
Using MR-MC3_ _: 0F9B10h

Transient commands for servo amplifier

Data type	Transient command	Unit	Number of valid words *1	Remark
Servo motor ID (SSCNETⅢ)/Encoder ID	0304	—	3	
Servo motor ID (SSCNETⅢ/H)	0309	—	2	
Encoder resolution	0305	[pulse]	2	
Servo amplifier serial No. (First 8 characters)	0306	[characters]	4	
Servo amplifier serial No. (Last 8 characters)	0307	[characters]	4	
Servo amplifier recognition information (First 8 characters)	0310	[characters]	4	
Servo amplifier recognition information (Last 8 characters)	0311	[characters]	4	
Servo amplifier software No. (First 8 characters)	0312	[characters]	4	
Servo amplifier software No. (Last 8 characters)	0313	[characters]	4	
Power ON cumulative time	0319	[h]	3	
Inrush relay ON/OFF number	031A	[times]	2	Return the contactor ON count.
Read alarm history number	0323	[times]	1	
Alarm history/Detail #1, #2	0324	—	4	
Alarm history/Detail #3, #4	0325	—	4	
Alarm history/Detail #5, #6	0326	—	4	
Alarm history/Detail/Occurrence time	0328	—/[h]	4	
Alarm occurrence time #1, #2	0329	[h]	4	
Alarm occurrence time #3, #4	032A	[h]	4	
Alarm occurrence time #5, #6	032B	[h]	4	
Alarm history clear command	0382	—	0	
Home position [command unit]	0408	[pulse]/[rev]	3	
Main circuit bus voltage	040A	[V]	1	
Regenerative load ratio	040B	[%]	1	
Effective load ratio	040C	[%]	1	
Peak load ratio	040D	[%]	1	
Estimate inertia moment ratio	040E	[× 0.1]	1	
Model loop gain	040F	[rad/s]	1	
LED display	0410	[characters]	2	
Load-side encoder information 1	0416	[pulse]	2	Fully closed control or synchronous encoder via servo amplifier use
Load-side encoder information 2	0417	[pulse]	2	
Speed feedback	0418	[0.01mm/s]	2	Linear servo use
Servo motor thermistor temperature	0419	[℃]	1	
Z-phase counter	041A	[pulse]	2	
Module power consumption	0424	[W]	2	
Module integral power consumption	0425	[Wh]	2	
Disturbance torque	0427	[0.1%]	1	
Instantaneous torque	0428	[0.1%]	1	
Overload alarm margin	0429	[0.1%]	1	
Error excessive alarm margin	042A	[pulse]	2	
Settling time	042B	[ms]	1	
Overshoot amount	042C	[pulse]	1	
Servo motor side/load-side position deviation	042D	—	2	Fully closed control use
Servo motor side/load-side speed deviation	042E	—	2	
Machine diagnostic status	042F	—	1	
Friction estimation data	0430	[0.1%]	4	
Vibration estimation data	0431	[Hz/0.1%]	4	
Internal temperature of encoder	0434	[℃]	1	For encoders that are not supported, 0 is returned.
Motor serial number (First 8 characters)	0350	[characters]	4	
Motor serial number (Last 8 characters)	0351	[characters]	4	

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Data type	Transient command	Unit	Number of valid words *1	Remark
Failure prediction status [MC300]	0437	—	2	MR-J5(W_)-_B use
Friction failure prediction - Threshold [MC300]	0438	[0.1%]	1	
Vibration failure prediction - Threshold [MC300]	0439	[0.1%]	1	
Failure prediction - Preparation progress [MC300]	043A	[%]	1	
Machine total travel distance [MC300]	043B	[10rev]	4	
Estimated tension value [MC300]	043C	[0.1N]	2	
One-touch tuning - Start command [MC300]	04B2	—	1	
One-touch tuning - Stop command [MC300]	04B3	—	1	
One-touch tuning - Parameter changing command [MC300]	04B4	—	1	
One-touch tuning - Progress confirmation [MC300]	0432	[%]	1	
One-touch tuning - Error code confirmation [MC300]	0433	—	1	
Optional transient command	—	—	4	Used when using an optional transient command.

*1 Number of valid words for response data 1 to 4.

Servo motor ID (SSCNETIII)/Encoder ID [0304h]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Servo motor ID (lower)
Response data 2	Servo motor ID (upper)
Response data 3	Encoder ID
Response data 4	For manufacturer setting

Servo motor ID (SSCNETIII/H) [0309h]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Servo motor ID (lower)
Response data 2	Servo motor ID (upper)
Response data 3	For manufacturer setting
Response data 4	

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Alarm history/Detail #1, #2 [0324h]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Alarm history #1
Response data 2	Alarm detail #1
Response data 3	Alarm history #2
Response data 4	Alarm detail #2

Alarm history/Detail/Occurrence time [0328h]

Request data/response data	Content
Request data 1	Alarm history number (from N = 0)
Request data 2	For manufacturer setting
Request data 3	
Request data 4	
Response data 1	Alarm history number #(N + 1)
Response data 2	Alarm history number #(N + 1) detail
Response data 3	Alarm history number #(N + 1) occurrence time (lower)
Response data 4	Alarm history number #(N + 1) occurrence time (upper)

Alarm history clear command [0382h]

Request data/response data	Content
Request data 1	Alarm reset command (1EA5h)
Request data 2	For manufacturer setting
Request data 3	
Request data 4	
Response data 1	
Response data 2	
Response data 3	
Response data 4	

Home position [command unit] [0408h]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Home position within 1 revolution (lower)
Response data 2	Home position within 1 revolution (upper)
Response data 3	Home position multiple revolution counter
Response data 4	For manufacturer setting

LED display [0410h]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Driver display status (7segLED) lower 2 digits
Response data 2	Character [JIS8 code] upper 2 digits
Response data 3	For manufacturer setting
Response data 4	

Machine diagnostic status [042Fh]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	■■■□ (Forward rotation friction) • 0: Estimating friction • 1: Estimating complete • 2: One side operation (motor rotation stays in one direction) • 3: Parameter threshold exceeded • 4: Low variation highspeed operation • 5: Time constant underestimate • 7: 60 minutes elapsed ■■□■ (Reverse rotation friction) • 0: Estimating friction • 1: Estimating complete • 2: One side operation (motor rotation stays in one direction) • 3: Parameter threshold exceeded • 4: Low variation highspeed operation • 5: Time constant underestimate • 7: 60 minutes elapsed ■□■■ (Vibration estimation) • 0: Estimating vibration • 1: Estimating complete
Response data 2	For manufacturer setting
Response data 3	
Response data 4	

Friction estimation data [0430h]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Forward rotation torque static friction [0.1%]
Response data 2	Forward rotation torque kinetic friction (at rated speed) [0.1%]
Response data 3	Reverse rotation torque static friction [0.1%]
Response data 4	Reverse rotation torque kinetic friction (at rated speed) [0.1%]

Vibration estimation data [0431h]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Motor stopped/servo amplifier locked Oscillation frequency [Hz]
Response data 2	Motor stopped/servo amplifier locked Vibration level [0.1%]
Response data 3	Motor operating Oscillation frequency [Hz]
Response data 4	Motor operating Vibration level [0.1%]

Failure prediction status [0437h] [MC300]

Request data/response data	Content
Request data 1	For manufacturer setting
Request data 2	
Request data 3	
Request data 4	
Response data 1	Failure prediction status ■■■□ (Friction failure prediction status) • 0: Friction failure prediction disabled • 1: During preparation for friction failure prediction • 2: During execution of friction failure prediction • 3: During friction failure prediction warning ■■□■ (Vibration failure prediction status) • 0: Vibration failure prediction disabled • 1: During preparation for vibration failure prediction • 2: During execution of vibration failure prediction • 3: During vibration failure prediction warning ■□■■ (Total travel distance failure prediction status) • 0: Motor total travel distance failure prediction disabled • 1: Motor total travel distance failure prediction being executed • 2: Motor total travel distance failure prediction at warning □■■■ (Motor total travel distance calculation status) • 0: During stop of motor total travel distance calculation • 1: During calculation of motor total travel distance
Response data 2	■■■□ (Total travel distance 2 failure prediction status) • 0: Motor total travel distance 2 failure prediction disabled • 1: Motor total travel distance 2 failure prediction being executed • 2: Motor total travel distance 2 failure prediction at warning ■■□■ (Static friction failure prediction status) • 0: Static friction failure prediction disabled • 1: During preparation for static friction failure prediction • 2: During execution of static friction failure prediction • 3: During static friction failure prediction warning ■□■■ (Belt tension deterioration prediction status) • 0: Belt tension deterioration prediction disabled • 1: Belt tension deterioration prediction in progress • 2: During belt tension deterioration warning □■■■ (Belt tension estimation status) • 0: Belt tension estimation in progress • 1: Belt tension estimation has finished • 7: Belt tension estimation is not set
Response data 3	For manufacturer setting
Response data 4	

Point

- Input 0 for request data that is for manufacturer setting.
- Get "friction estimation data" and "vibration estimation data" with transient command after conducting machine diagnosis estimation.

Example of using transient commands

Friction estimation data/vibration estimation data

Setting "friction estimation data" and "vibration estimation data" to the transient command does not enable the correct values to be stored. With the procedure below, perform machine diagnosis and refer to the values.

1. Operate the servo motor approximately 20 minutes in the operation pattern of "Machine diagnosis function - Friction judgment speed (parameter No.125E)"*1 until the diagnosis function is complete.
2. Confirm that "forward rotation friction", "reverse rotation friction", and "vibration estimation" values of machine diagnostic status are "1: Estimating complete". When the values are not that of estimating complete and machine diagnosis fails, repeat the operating procedure starting from the procedures 1.
3. Set "friction estimation data" and "vibration estimation data" to the transient command, and turn ON the transient request.

*1 For MR-J5(W_)-_B, "Machine diagnosis function - Friction estimate area judgment speed at low speed" (parameter No.21DA) [MC300]

Point

For the operation pattern of machine diagnosis function, refer to the servo amplifier instruction manual or the manual.

Transient commands for SSCNETIII/H head module

Data type	Transient command	Unit	Number of valid words*1	Remark
Buffer memory read	0211	—	4	
Buffer memory write (2byte)	0291	—	1	
Buffer memory write (4byte)	0292	—	1	

*1 Number of valid words for response data 1 to 4.

Buffer memory read [0211h]

Request data/response data	Content
Request data 1	Start I/O No. (first 2 digits of 3-digit display)
Request data 2	Buffer memory address
Request data 3	Number of read data (1 to 4)
Request data 4	0 (fixed value)
Response data 1	2-byte data of buffer memory address + 0
Response data 2	2-byte data of buffer memory address + 2
Response data 3	2-byte data of buffer memory address + 4
Response data 4	2-byte data of buffer memory address + 6

Buffer memory write (2bytes) [0291h]

Request data/response data	Content
Request data 1	Start I/O No. (first 2 digits of 3-digit display)
Request data 2	Buffer memory address
Request data 3	Write data
Request data 4	0 (fixed value)
Response data 1	
Response data 2	
Response data 3	
Response data 4	

Buffer memory write (4bytes) [0292h]

Request data/response data	Content
Request data 1	Start I/O No. (first 2 digits of 3-digit display)
Request data 2	Buffer memory address
Request data 3	Write data (lower)
Request data 4	Write data (upper)
Response data 1	0 (fixed value)
Response data 2	
Response data 3	
Response data 4	

Point

Set the first 2 digits for the start I/O No. when the start I/O No. of the intelligent function module is a 3-digit display. (Example: When start I/O No. is 1F0h, set 1Fh)

Transient commands for sensing module (axis mode)

Data type	Transient command	Unit	Number of valid words*1	Remark
Encoder resolution	0305	[pulse]	2	
Servo amplifier recognition information (First 8 characters)	0310	[characters]	4	Refer to the following. ☞ Page 479 Transient commands for servo amplifier
Servo amplifier recognition information (Last 8 characters)	0311	[characters]	4	
Servo amplifier software No. (First 8 characters)	0312	[characters]	4	
Servo amplifier software No. (Last 8 characters)	0313	[characters]	4	
Read alarm history number	0323	[items]	1	
Alarm history/Detail #1, #2	0324	—	4	
Alarm history/Detail #3, #4	0325	—	4	
Alarm history/Detail #5, #6	0326	—	4	
Alarm history/Detail/Occurrence time	0328	—/[h]	4	
Alarm occurrence time #1, #2	0329	[h]	4	
Alarm occurrence time #3, #4	032A	[h]	4	
Alarm occurrence time #5, #6	032B	[h]	4	
Alarm history clear command	0382	—	0	
LED display	0410	[characters]	2	
Optional transient command	—	—	4	Used when using an optional transient command.

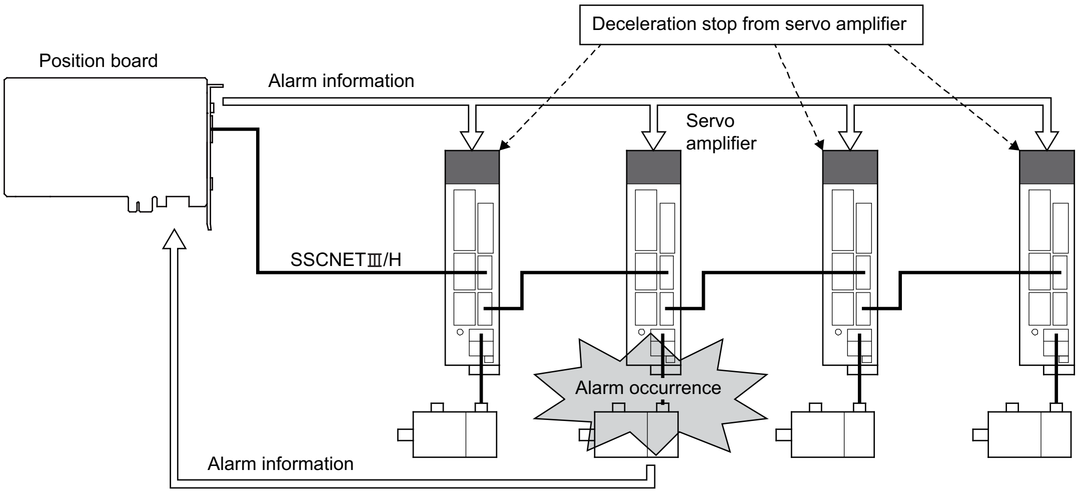
*1 Number of valid words for response data 1 to 4.

Encoder resolution [0305h]

Request data/response data	Content
Request data 1	0 (fixed value)
Request data 2	
Request data 3	
Request data 4	
Response data 1	Encoder resolution (lower)
Response data 2	Encoder resolution (upper)
Response data 3	0 (fixed value)
Response data 4	

7.19 Hot Line Forced Stop Function

When an alarm occurs in a MR-JE-_B servo amplifier, the hot line forced stop function stops the other axes on the same line with a deceleration stop, allowing the axes to stop safely. When the main circuit power is shut-off at a servo alarm occurrence, use this function.



Point

- For the MR-JE-_B, the control power supply and main circuit power are integrated. Therefore, when L1/2/3, the equivalent of the main circuit power of MR-J4(W_)-_B is shut-off, the control power supply of the servo amplifier is turned OFF. Consequently, SSCNET communication of the axes after the axis where the alarm occurred is disconnected when the wiring is designed to shut-off the main circuit power at an alarm occurrence. When this occurs, the position board can no longer control the disconnected axes and they are stopped by dynamic brake. Thus, if the hot line forced stop function is not used, machinery may cause a collision due to the coasting distance. When SSCNET communication is disconnected, a system error (E40□h) occurs.
- System errors cannot be reset. Reboot the software, restart the system as required.

Control details

The hot line forced stop function is set by a servo parameter. By using this function, other axes are stopped with a deceleration stop by a notification from the axis where the servo alarm occurred, without going through the control from the position board. The hot line forced stop function is enabled by factory default in the MR-JE-_B. To disable the function, set "1: Disabled" in hot line forced stop function selection of "Hot line forced stop function (servo parameter No.111A)".
Also, when using MR-JE-_B and MR-J4(W_)-_B together, the hot line forced stop function can stop MR-J4(W_)-_B axes with a deceleration stop when an alarm occurs in a MR-JE-_B.
In order to stop MR-J4(W_)-_B with a deceleration stop as well, set "2: Enabled" in Hot line forced stop deceleration stop selection of "Hot line forced stop function (servo parameter No.111A)" of MR-J4(W_)-_B. (The factory default is "0: Disabled".)
For details, refer to the servo amplifier instruction manual for your servo amplifier.

Point

For axes that deceleration stop by the hot line forced stop function, "Controller forced stop warning (servo warning E7)" occurs.

7

The setting values for "Hot line forced stop function selection (servo parameter No.111A)", and the operation in the servo amplifier is shown below.

- Using MR-JE-_B

Setting value	Hot line output	Deceleration stop at the receiving of hot line signal
0: Enabled (initial value)	Enabled	Enabled
1: Disabled	Disabled	Disabled

- Using MR-J4(W_)-_B

Setting value	Hot line output	Deceleration stop at the receiving of hot line signal
0: Disabled (initial value)	Disabled	Disabled
2: Enabled	Disabled	Enabled

Use a software version that supports hot line forced stop function for the servo amplifier. Servo amplifier software versions that support hot line forced stop function are shown in the table below.

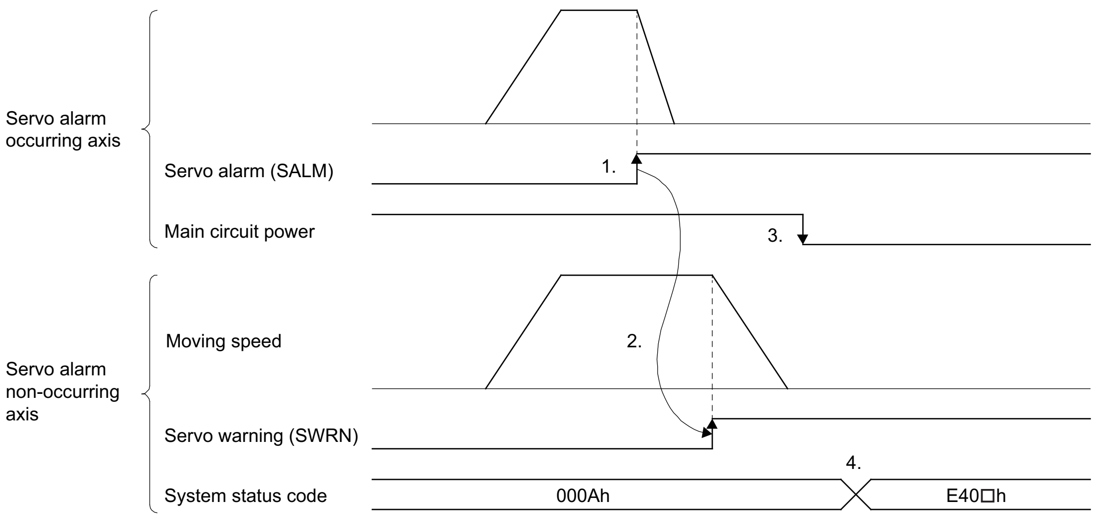
Servo amplifier model	Software version
MR-J4(W_)-_B	B7 or later
MR-JE-_B	B6 or later

Point

Servo amplifiers other than the above do not support the hot line forced stop function and therefore do not perform a hot line output or deceleration stop at the receiving of hot line signal.

Timing for alarm occurrences

A timing chart using for servo alarm occurrence is shown below.



1. A servo alarm occurs, and a stop is performed by dynamic brake.
2. The servo alarm non-occurring axis receives notification from the servo alarm occurring axis, and the servo warning signal (SWRN) turns ON.
3. Checks that servo alarm non-occurring axes are stopped, and main circuit power is shut-off by host personal computer command. (If the main circuit power is shut-off before the servo warning signal (SWRN) turns ON in the servo alarm non-occurring axis, a deceleration stop by this function may not perform correctly.)
4. System error (E40□h) occurs.

8 TANDEM DRIVE

The tandem drive is the function that 1 physically connected axis is driven by 2 motors. The position board provides the same position command to the 2 axes set up for the tandem drive.
The tandem drive can be set up for a maximum of 8 sets (16 axes).

Point

[MC300]
Use the same type servo amplifier for the tandem drive group. When performing the tandem drive by using different types of servo amplifier such as a combination of MR-J4(W_)-_B and MR-J5(W_)-_B, the operation alarms such as "Tandem drive excessive deviation (operation alarm 53H, detail 01H)" may occur easily.

8.1 Drive Modes

For the tandem drive, there are 2 drive modes; synchronous mode and non-synchronous micro-adjustment mode. The types of the operation that can be performed for each mode are as follows.
○: Operation available, ×: Operation not available

Operation mode	Drive Modes	
	Synchronous mode	Non-synchronous micro-adjustment mode
JOG operation	○	○
Incremental feed	○	○
Automatic operation	○	×
Interpolation operation	○	×
Home position return	○*1	×
Home position reset	○	×

*1 Home position return operation can be performed only using the following home position return method. If a different method is used to perform home position return, "Tandem Drive Axis Setting Error (operation alarm 52H, detail 01H)" occurs.
· Dog cradle method
· Dog method
· Data set method
· Dog front end method
· Z-phase detection method
· Scale home position signal detection method
· Scale home position signal detection method 2

Point

When performing the start operation with the non-compatible mode during the non-synchronous micro-adjustment mode, "While in Tandem Drive Nonsynchronous Mode (operation alarm 51H, detail 01H)" occurs.

Synchronous mode

Through providing the same position command to the master and slave axes, they move together. The position loop, the speed loop, and the current loop use a feedback signal of each axis for control.

Non-synchronous micro-adjustment mode

The non-synchronous micro-adjustment mode temporarily cancels synchronizing in order to adjust the position balance between the master axis and the slave axis. This enables submitting different position commands to each of the axes. This can only be done when using the incremental feed or the JOG operation.

When the home position return has been completed, even if the tandem drive mode is switched to the non-synchronous micro-adjustment mode, the system is not switched to the non-home position return complete (the home position return request signal (ZREQ) is not ON). After the mode is switched to the synchronous mode, the automatic operation and the linear interpolation operation can be performed without the re-performing home position return.

Point

- If "Synchronization setting" of "Tandem drive options (parameter No.0265)" is set to "0: Valid", the synchronization is not completed when the mode is switched to the non-synchronous micro-adjustment mode. When the mode is switched to the synchronous mode again, turn the servo off and then on, then perform the synchronization. When the automatic operation or the interpolation operation is performed with the synchronization incomplete, "Tandem Drive Synchronous Alignment Error (operation alarm 58H, detail 02H)" occurs.
- When "Synchronization setting" of "Tandem drive options (parameter No.0265)" is set to "1: Invalid", the operation in the synchronization mode is performed based on the master axis holding deviation between the master axis and the slave axis at switching the mode to the synchronization mode.

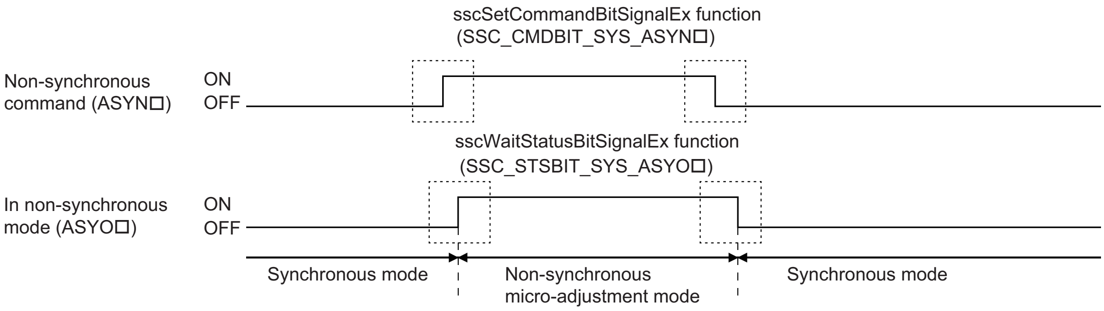
Changing of drive mode

The changing of modes is performed using ON/OFF of the non-synchronous command signal (ASYN□: □ is the group No.).
The changing of mode can be performed on a group basis.
The changing of drive mode can only be performed when all of the following conditions are met.

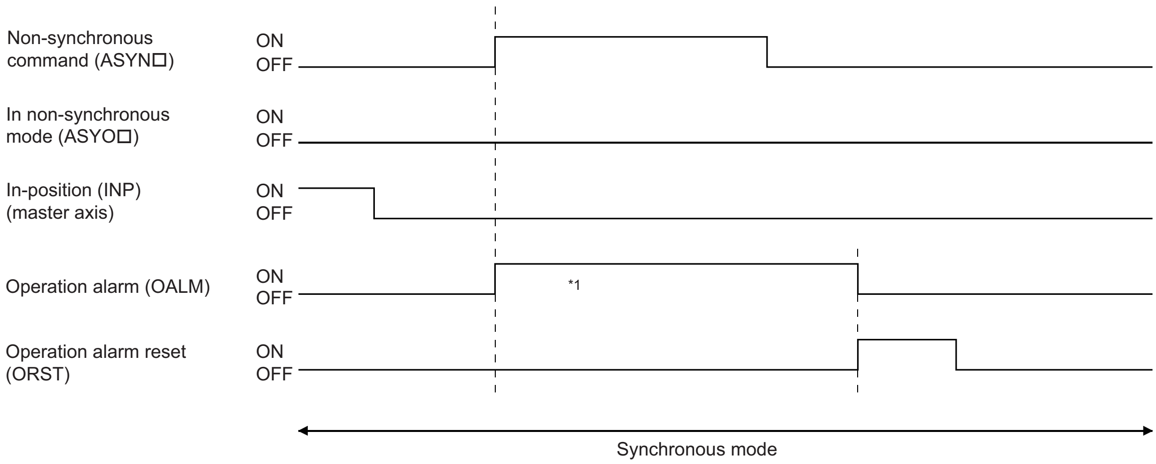
- The smoothing stop signal (SMZ) is ON for both the master axis and the slave axis.
- The in-position signal (INP) is ON for both the master axis and the slave axis.
- No operation alarm has occurred for both the master axis and the slave axis.
- Neither the master axis nor the slave axis is operating.
- They are not being synchronized.

If even one of the conditions is not met, "Tandem Drive Mode Change Error (operation alarm 50H, detail 01H)" occurs.

Example when drive mode can be changed



Example when drive mode cannot be changed (master axis is not during in-position)



*1 When "Tandem Drive Mode Change Error (operation alarm 50H, detail 01H)" has been set, after returning the non-synchronous command signal (ASYN□) to its normal status, turn ON the operation alarm reset signal (ORST) to cancel the operation alarm.

When changing from the non-synchronous micro-adjustment mode to the synchronous mode, of the axis data for the slave axis, only the data that is valid for the master axis (☞ Page 493 Axis Data Classifications) is saved from the non-synchronous micro-adjustment mode. The zero-initialization and the like is not performed.

8.2 Parameter Settings

Designation of tandem drive axes

Setting the group No. in "Tandem drive group (parameter No.0264)" defines the tandem drive axis.
The 2 axes that are set to the same group No. can be driven in parallel. The maximum number of groups that can be driven in parallel is 8 (groups 1 to 8). Of the 2 axes that are designated with the same tandem drive group No., the axis with the smaller axis No. is the master axis and the axis with the larger axis No. is the slave axis.

Control cycle	Valid group No.	
	MR-MC2_ _	MR-MC3_ _
0.88ms	1 to 8	1 to 8
0.44ms		
0.22ms	1 to 4	

Point

For the following conditions, upon system startup, "Tandem Drive Axis Setting Error (operation alarm 52H, detail 02H)" occurs, and the tandem drive control cannot be performed.
- If the complement axis is not set up.
- If 3 or more axes are set up with the same group No.
- If the group No. exceeds the valid group No.

Servo parameters

Set the servo parameters to the same values for the axes for which the tandem drive is performed. However, "Rotation direction selection/travel direction selection (parameter No.110D)"*1 can be different values depending on the mechanical specifications.

*1 For MR-J5(W_)-_B, "Travel direction selection (parameter No.200D)" [MC300]

Control parameters

The settings of the control parameters for when using tandem drive can be selected from among the following 3 selections: "only values of master axis are valid", "set master/slave axes to same values", and "master and slave can be set separately". Only master axis values are valid means that the parameter settings of the master axis are used for both the master and the slave. In this case, the parameters of the slave axis are ignored. For setting classifications of each control parameter, refer to the following.

☞ Page 657 PARAMETERS

8.3 Axis Data Classifications

The axis data for the tandem drive axes have 2 data type settings: "only master axis data is valid" and "master axis/slave axis data are separate".

Point

- For the axis data classifications for the tandem drive axes, refer to the following.
  ☞ Page 599 Axis Data
  In the above table, the data only valid for the master axis is designated as "master", the individual data for the master axis/slave axis is designated as "each axis".
- It is possible to review the monitor data for each axis individually.

Data only valid for the master axis

■Command table data

When the drive mode is the synchronous mode, only the command table data from the master axis is valid. For this case, the command table data for the slave axis is ignored. If the drive mode is the non-synchronous micro-adjustment mode, each axis becomes valid.

■Status table data

When the drive mode is the synchronous mode, only the status table data from the master axis is valid. For this case, the status table data for the slave axis is optional. If the drive mode is the non-synchronous micro-adjustment mode, each axis becomes valid.

Individual data for master axis/slave axis

The data that is valid for each axis independent of the drive mode.

8.4 Tandem Drive Axis Operation

Point

For the start operation functions of each axis in the synchronous mode, call the master axis only.

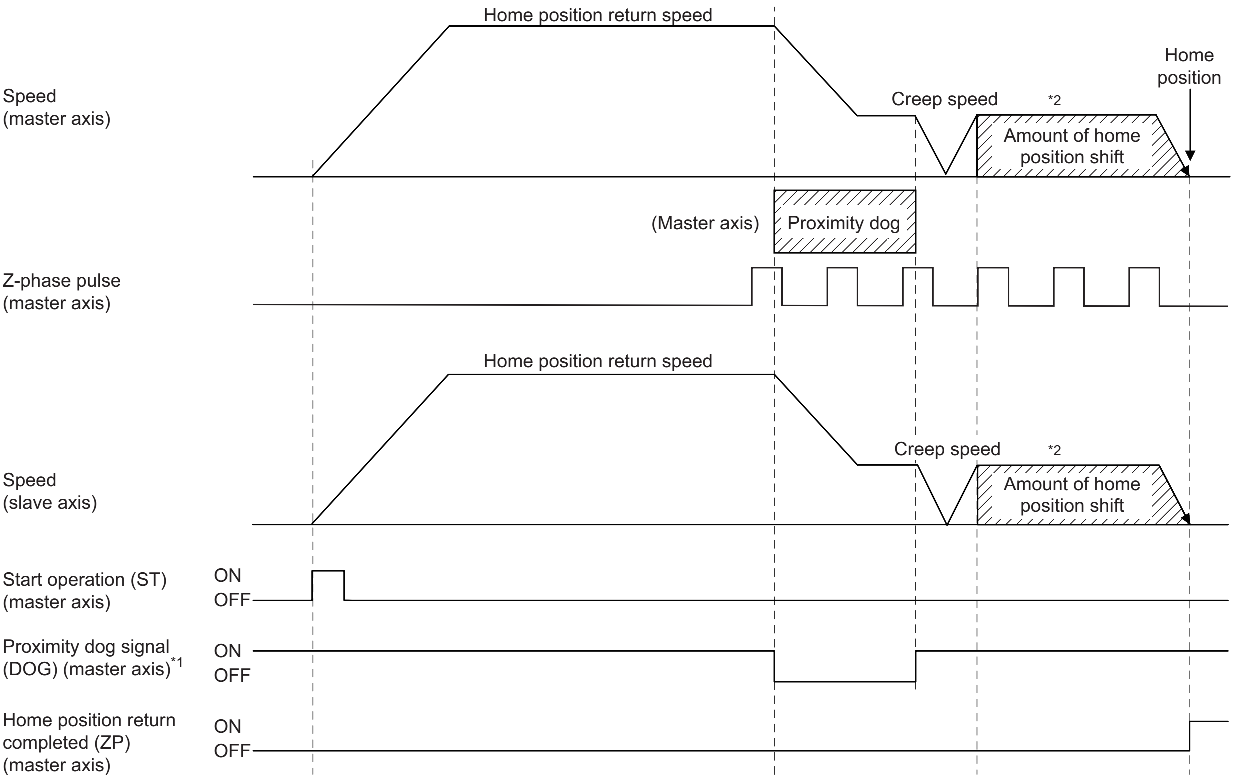
Home position return during the tandem drive

The method for returning to home position while using the tandem drive axes includes : dog method, dog cradle method, data set method, dog front end method, Z-phase detection method, scale home position signal detection method, and scale home position signal detection method 2. These home position return methods are performed while in the synchronous mode.

Point

- If a non-compatible method is used to perform the home position return, "Tandem Drive Axis Setting Error (operation alarm 52H, detail 01H)" occurs when the home position return is started.
- When in the non-synchronous micro-adjustment mode, "While in Tandem Drive Nonsynchronous Mode (operation alarm 51H, detail 01H)" occurs when the home position return is started.
- The amount of home position shift is set using "Amount of home position shift (parameter No.0248, 0249)". The home position can be shifted by setting the amount of home position shift.
- If the balance between the tandem drive axes is not good just after turning ON the power, it can cause stress to the equipment, therefore use the non-synchronous micro-adjustment mode to adjust the balance and perform the home position return.
- When the home position return is completed, "Home position coordinates (parameter No.0246, 0247)" of the master axis are set to the current command position for both the master axis and the slave axis.

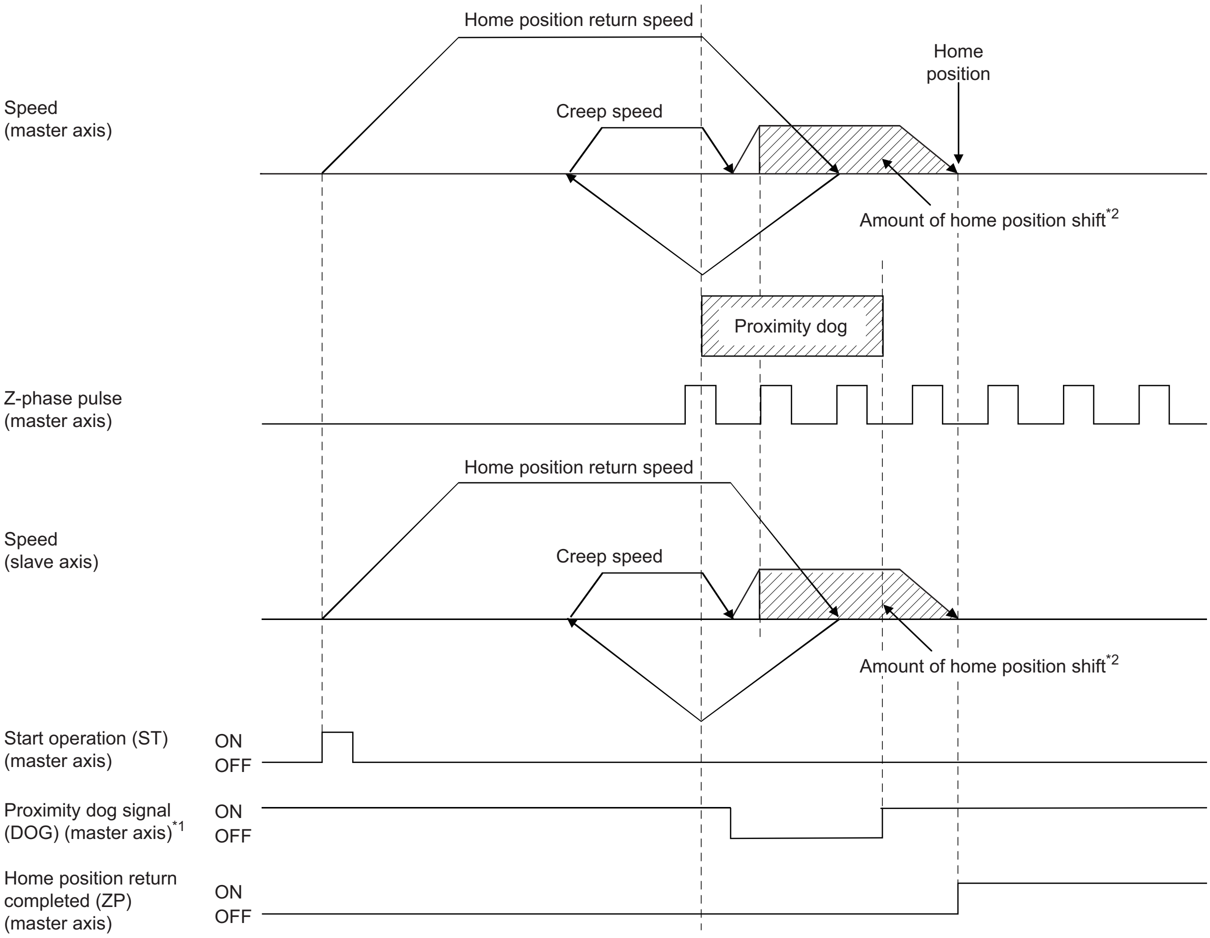
Home position return using a dog method



*1 The proximity dog signal for the master is the only valid signal. The slave axis also returns to home position based on the proximity dog signal for the master.

*2 The final stop position for both the master axis and the slave axis is based on the final master axis motor Z-phase.
Also, only the master axis parameter for the value for the home position shift amount is valid.

Home position return using a dog cradle method

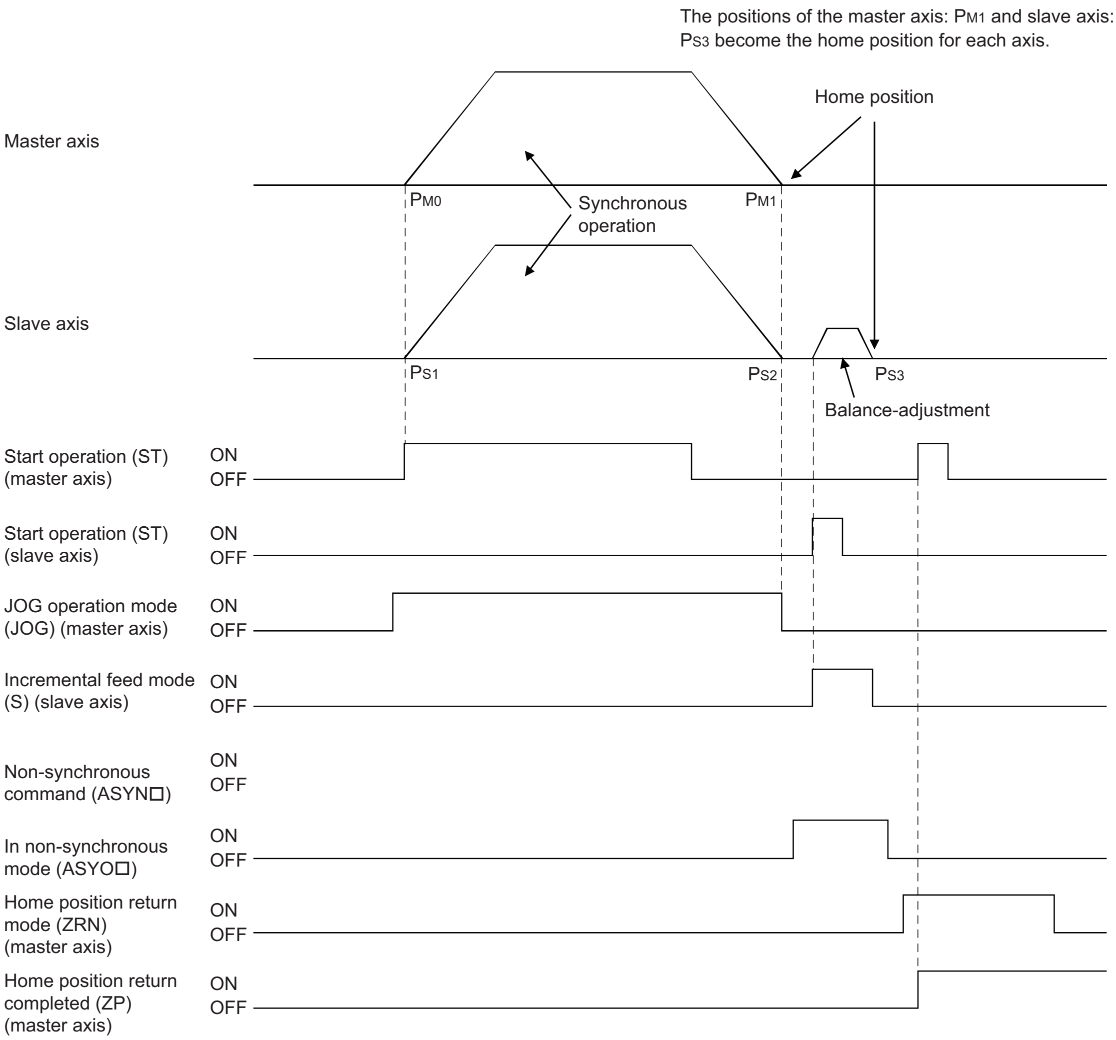


*1 The proximity dog signal for the master is the only valid signal. The slave axis also returns to home position based on the proximity dog signal for the master.

*2 The final stop position for both the master axis and the slave axis is based on the final master axis motor Z-phase. Also, only the master axis parameter for the value for the home position shift amount is valid.

Home position return using a data set method

This explanation is an example for using JOG operation for moving to home position.



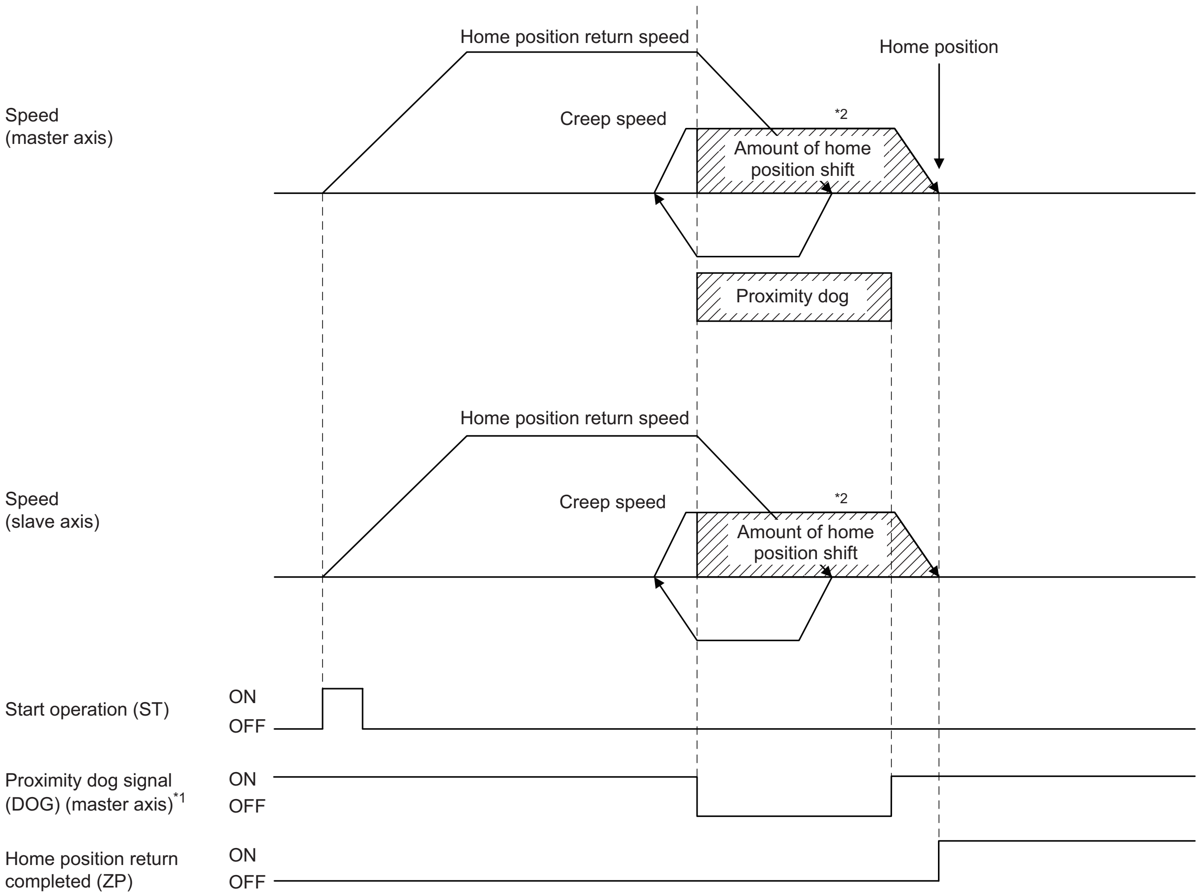
Home position return using a dog front end method

Home position return using a dog front end method uses the proximity dog front end as the home position. The following two methods are available for the home position return using a dog front end method with the tandem drive axes: using the proximity dog front end on the master axis as the home position and detecting each proximity dog front end for the master axis and slave axis to perform tweaking (compensation of deviation between master axis and slave axis). Set either of the methods with "Compensation of home position return deviation" in "Tandem drive options (parameter No.0265)".

Tandem drive options (parameter No.0265)		Application
Compensation of home position return deviation	**Home position return method**	
0: Deviation compensation invalid	—	Use the proximity dog front end as the home position. Use this method when there is no need to consider the mechanical deviation such as the case where no deviations occur between master axis and slave axis.
1: Deviation compensation valid	1: Adjustment mode	Use this mode to calculate the proximity dog front end offset (amount of deviation in the position of the proximity dog front end for the master axis and slave axis) during mechanical adjustment.
	0: Normal mode	Use this mode to detect the amount of proximity dog front end deviation between master axis and slave axis and perform tweaking (compensation of deviation between master axis and slave axis) in normal operation so that the axis is mechanically at a right angle.

■Deviation compensation invalid

The motion detected by the proximity dog front end slows down to stop, and return to the proximity dog front end at creep speed, setting there to the home position. When deviation compensation is invalid, only the proximity dog signal for the master axis is used.



*1 The proximity dog signal for the master is the only valid signal. The slave axis also returns to home position based on the proximity dog signal for the master.

*2 The final stop position for both the master axis and the slave axis is based on the master axis proximity dog front end. Also, only the master axis parameter for the value for the home position shift amount is valid.

■Deviation compensation valid

The motion detected by the proximity dog front end slows down to stop, and return to the proximity dog front end at creep speed, setting there to the home position. When deviation compensation is valid, the proximity dog signals for the master axis and for the slave axis are used to calculate the amount of deviation between each dog front end position or to compensate the deviation between the master axis and the slave axis. To perform the calculation or the compensation of deviation amount, designate "1: Adjustment mode" or "0: Normal mode" using "Method of to home position return" of "Tandem drive options (parameter No.0265)".

- Adjustment mode

  Adjustment mode is used during mechanical adjustment, and is used to calculate the dog front end position offset (amount of deviation in the position of the proximity dog front end for the master axis and slave axis).

  When executing home position return while in adjustment mode, after detecting the master axis dog front end position and the slave axis dog front end position while returning to home position, the axes are moved to the dog front end position of the master axis. At this time the amount of offset from the position of the dog front end for the master axis to the position of the dog front end for the slave axis is calculated and output using "Tandem drive home position signal offset (parameter No.026C, 026D)". This amount of offset is used when compensating the amount of deviation between the master axis and slave axis when returning to home position; therefore, after completing home position return save this offset on the user program.

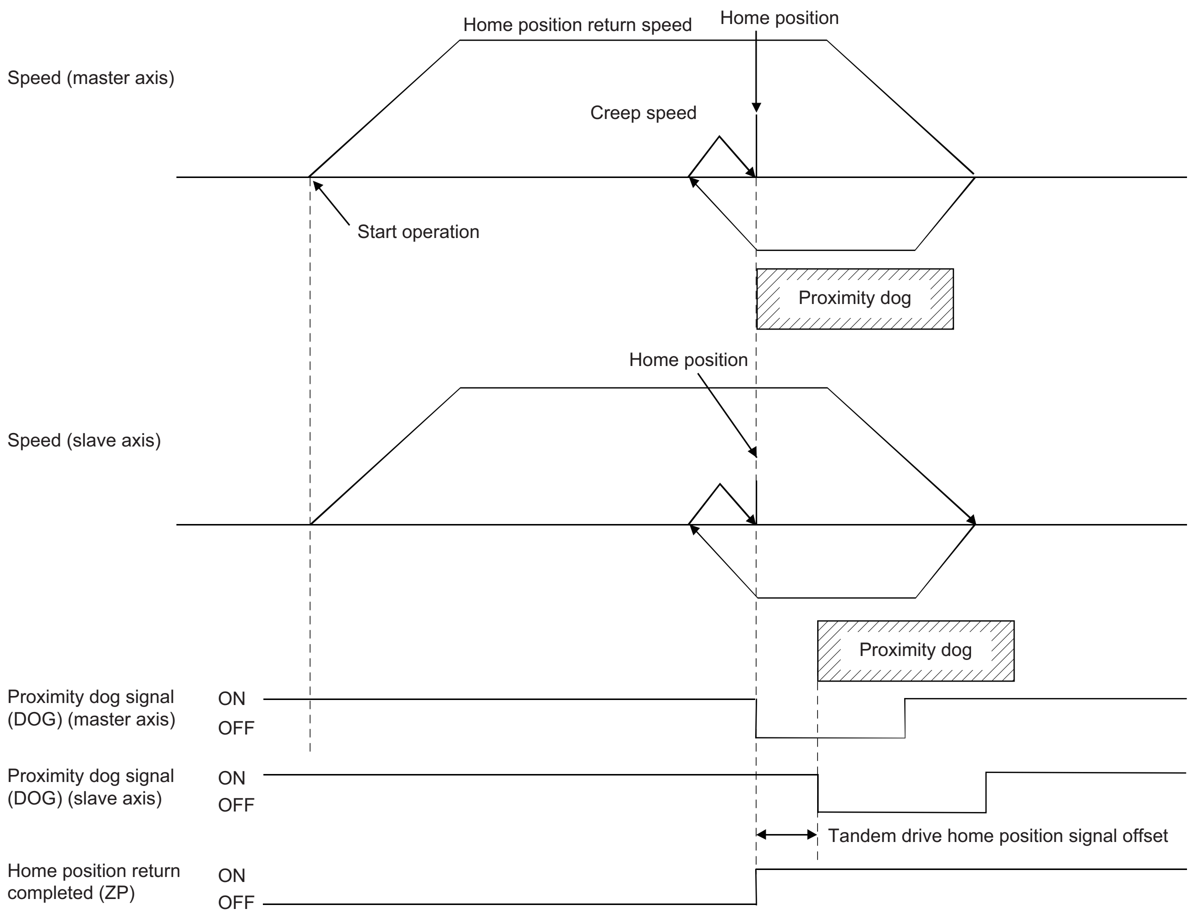
Point

Prior to returning to home position, set the axis linking the master axis and slave axis mechanically at a right angle to the movement direction. If it is not at a right angle, the dog front end position offset amount cannot be correctly calculated.

■Start operation method

1. Adjust the axis linking the master axis and slave axis mechanically at a right angle to the movement direction.
2. Set "Home position return method" of "Home position return option 1 (parameter No.0240)" to "8: Dog front end method" and "Method of to home position return" of "Tandem drive option (parameter No.0265)" to "1: Adjustment mode".
3. Start home position return operation.
4. After home position return is complete, read "Tandem drive home position signal offset (parameter No.026C, 026D)" and save it to the user program.

■Operation example



• Normal mode

In normal mode, the amount of deviation between the master axis and slave axis is detected and tweaking (compensation of deviation between master axis and slave axis) is performed. This movement sets the axis linking the master axis and slave axis mechanically at a right angle to the movement direction.

When home position return is performed using normal mode, after detecting the master axis dog front end position and slave axis dog front end position while returning to home position, calculate the deviation of the master axis and slave axis based on "Tandem drive home position signal offset (parameter No.026C, 026D)". The master axis moves to the dog front end position and the slave axis moves to the slave axis home position calculated based on the tandem driver home position signal offset and the previously noted deviation.

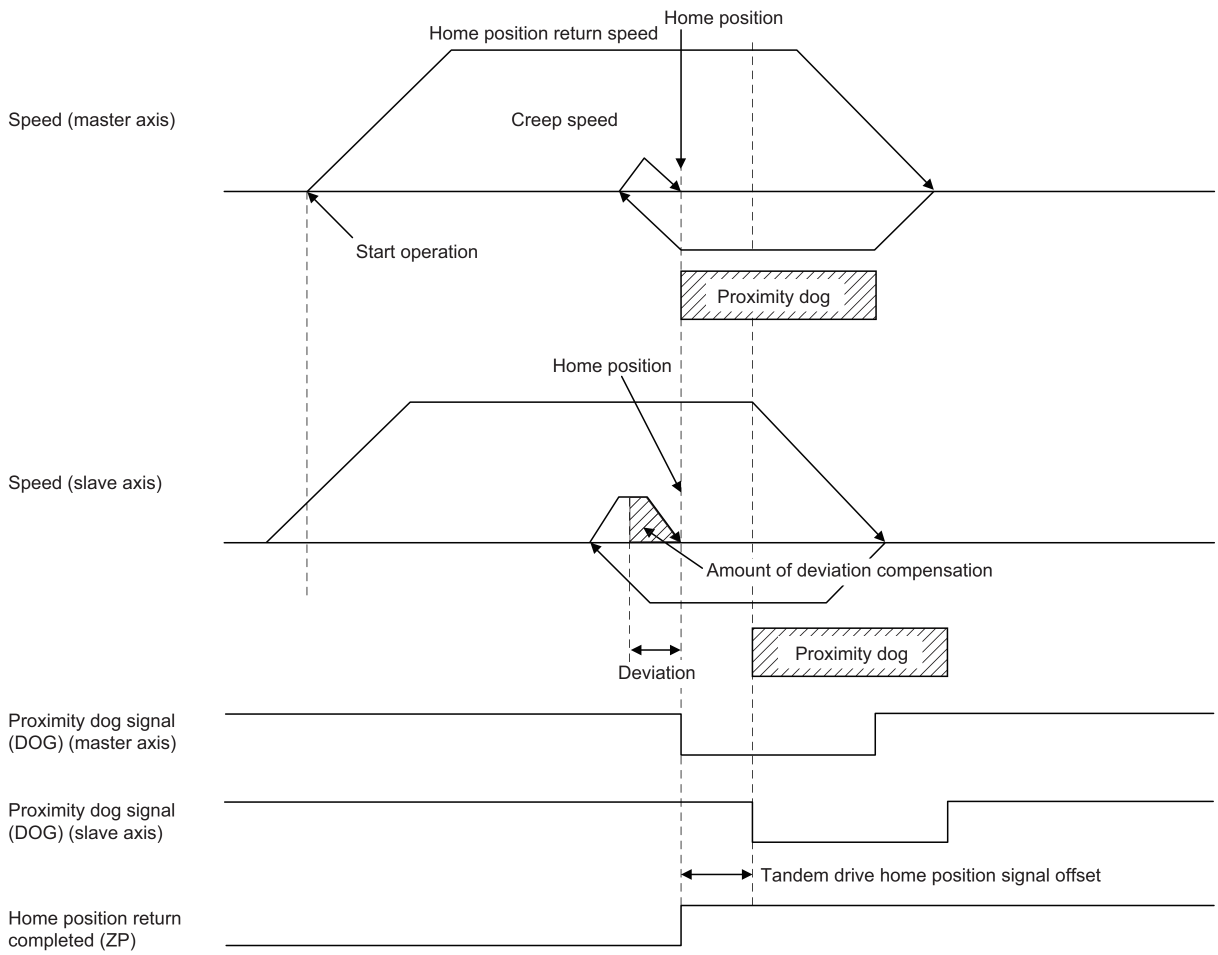
Point

- When performing home position return in normal mode, set "Tandem drive home position signal offset (parameter No.026C, 026D)" to the correct value. If the tandem drive home position signal offset value is erroneous, the axis that links the master axis and slave axis is not at a right angle.
- If the amount of deviation between the master axis and the slave axis exceeds the value calculated from the "Valid width of tandem drive deviation compensation (parameter No.026B) × Tandem drive deviation compensation units multiplication (parameter No.026E)", "Exceeding of Valid Width of Tandem Drive Deviation Compensation Error (operation alarm 57H, detail 01H)" occurs and home position return operation is terminated. (Tweak movement is not performed.)

■Start operation method

1. Set "Home position return method" of "Home position return option 1 (parameter No.0240)" to "8: Dog front end method" and "Method of to home position return" of "Tandem drive options (parameter No.0265)" to "0: Normal mode".
2. Set "Tandem drive home position signal offset (parameter No.026C, 026D)".
3. Start home position return operation.
(Through setting "Amount of home position shift (parameter No.0248, 0249)", the position shifted from dog front end position can be defined as the home position.)

■Operation example



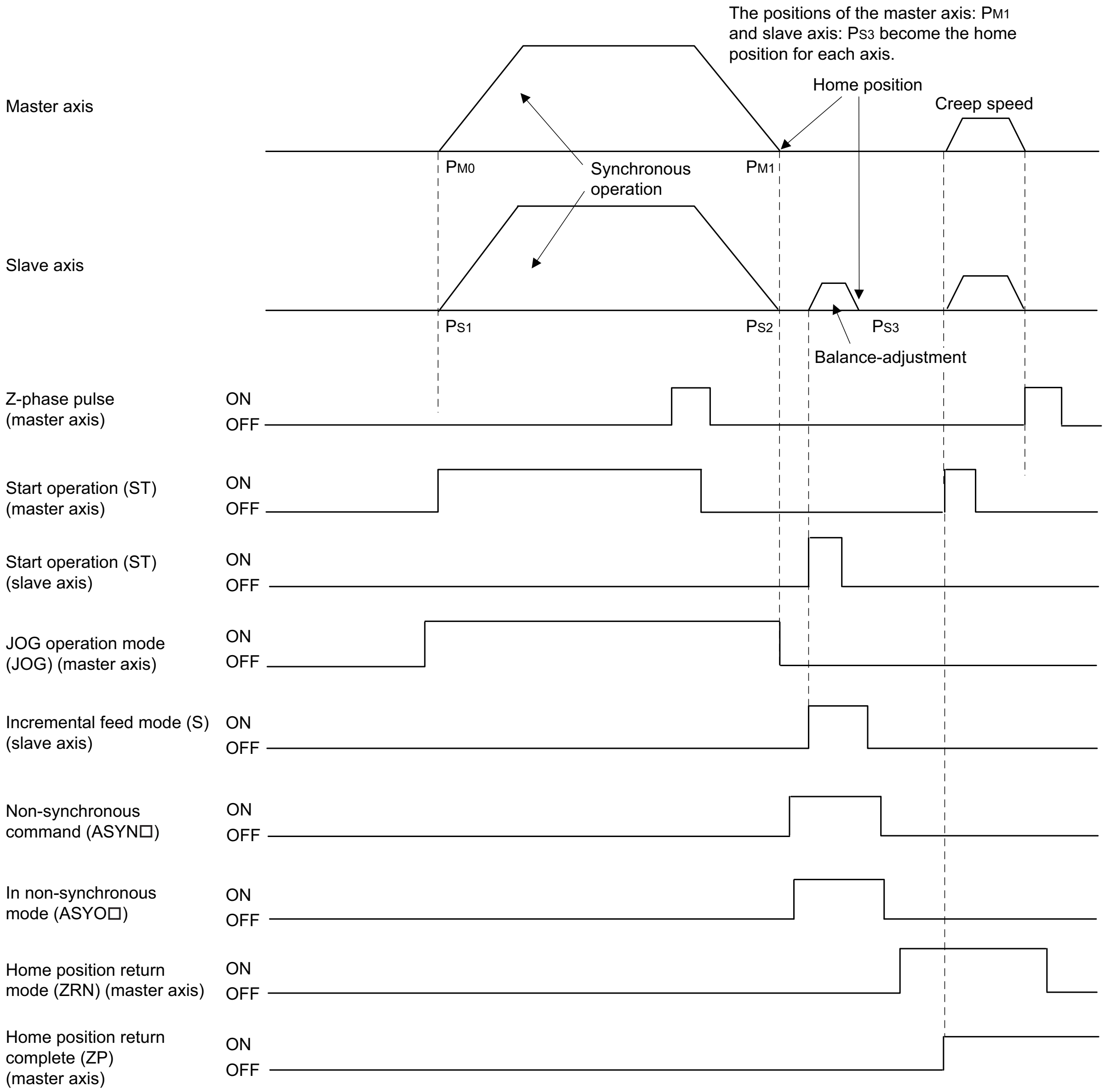
8

Home position return using a Z-phase detection method

This explanation is an example for using JOG operation for moving to home position.

The final stop position for both the master axis and the slave axis is based on the first master axis motor Z-phase in the home position return direction from the start operation position.

Also, only the master axis parameter for the value for the home position shift amount is valid.



Home position return using a scale home position signal detection method

Home position return is performed using a home position signal (Z-phase) on a linear scale. After detecting the proximity dog, move in the opposite direction of the home position and the position where a home position signal is detected is defined to be the home position. When using the home position return using a scale home position signal detection method for tandem drive axes, designate "1: Adjustment mode" or "0: Normal mode" using "Method of to home position return" of "Tandem drive options (parameter No.0265)".

- Adjustment mode

  Adjustment mode is used during mechanical adjustment, and is used to calculate the home position signal offset (amount of deviation in the position of the home position signal for the master axis and slave axis) on a linear scale.

  When executing home position return while in adjustment mode, after detecting the master axis home position signal and the slave axis home position signal while returning to home position, the axes are moved to the home position signal of the master axis. At this time the amount of offset from the position where the master home position signal was detected to the position where the slave home position was detected is calculated and output using "Tandem drive home position signal offset (parameter No.026C, 026D)". This amount of offset is used when compensating the amount of deviation between the master axis and slave axis when returning to home position; therefore, after completing home position return save this offset on the user program.

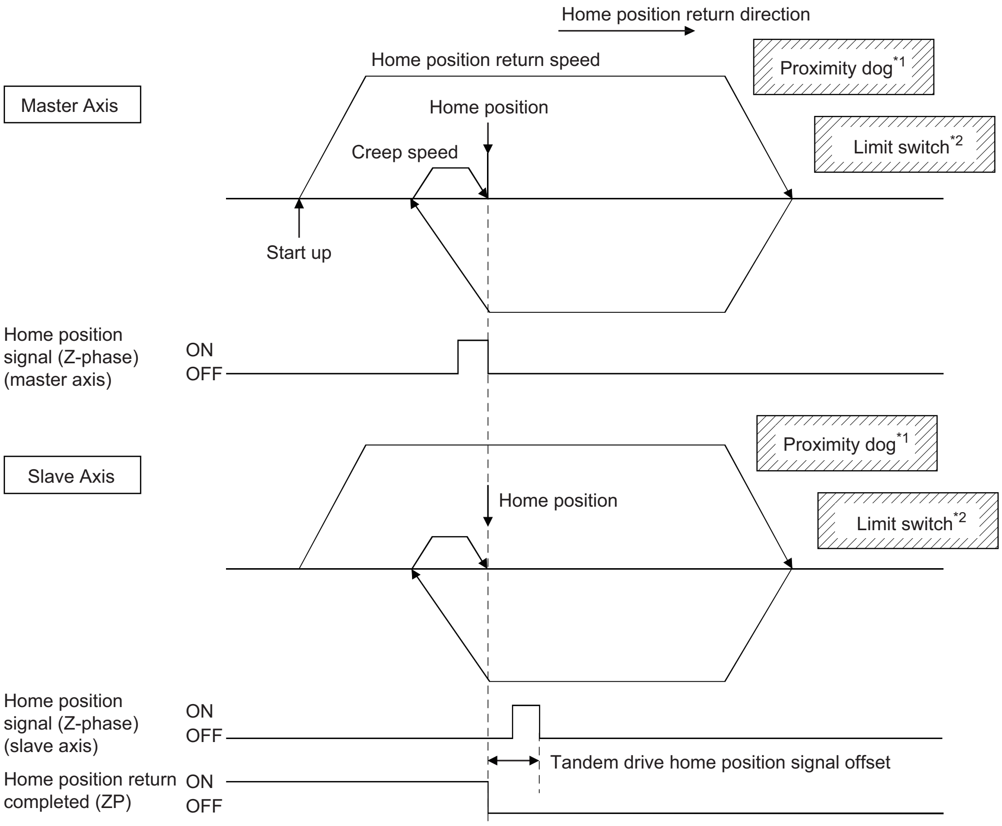
Point

Prior to returning to home position, set the axis linking the master axis and slave axis mechanically at a right angle to the movement direction. If it is not at a right angle, the home position signal position offset amount cannot be correctly calculated.

■Start operation method

1. Adjust the axis linking the master axis and slave axis mechanically at a right angle to the movement direction.
2. Set "Home position return method" of "Home position return option 1 (parameter No.0240)" to "6: Scale home position signal detection method" and "Method of to home position return" of "Tandem drive options (parameter No.0265)" to "1: Adjustment mode".
3. Start home position return operation.
4. After home position return is complete, read "Tandem drive home position signal offset (parameter No.026C, 026D)" and save it to the user program.

■Operation example



*1 Set the distance between the master axis/slave axis home position signals and the proximity dog so that it is greater than the deviation at maximum tolerance of the master axis and slave axis.

*2 When a limit switch signal is detected, an alarm occurs and execution of home position return is terminated.
Position the proximity dog in front of the limit switch signal. (As shown in the diagram, position the proximity dog signal so that it overlaps the limit switch signal.)

• Normal mode

In normal mode, the amount of deviation between the master axis and slave axis is detected and tweaking (compensation of deviation between master axis and slave axis) is performed. This movement sets the axis linking the master axis and slave axis mechanically at a right angle to the movement direction.

When home position return is performed using normal mode, after detecting the master axis home position signal and slave position home position signal while returning to home position, calculate the deviation of the master axis and slave axis based on "Tandem drive home position signal offset (parameter No.026C, 026D)". The master axis moves to the position of the home position signal and the slave axis moves to the slave axis home position calculated based on the tandem driver home position signal offset and the previously noted deviation.

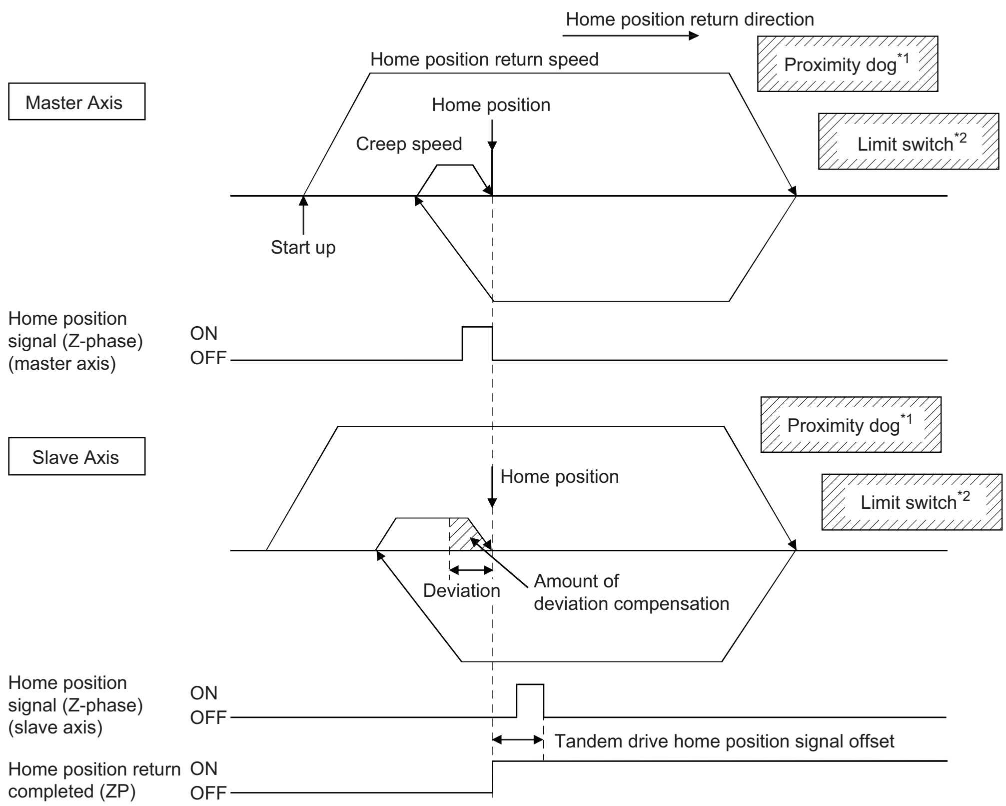
Point

- When performing home position return in normal mode, set "Tandem drive home position signal offset (parameter No.026C, 026D)" to the correct value. If the tandem drive home position signal offset value is erroneous, the axis that links the master axis and slave axis is not be at a right angle.
- If the amount of deviation between the master axis and the slave axis exceeds the value calculated from "Valid width of tandem drive deviation compensation (parameter No.026B) × Tandem drive deviation compensation units multiplication (parameter No.026E)", "Exceeding of Valid Width of Tandem Drive Deviation Compensation Error (operation alarm 57H, detail 01H)" occurs and home position return operation is terminated. (Tweak movement is not performed.)

■Start operation method

1. Set "Home position return method" of "Home position return option 1 (parameter No.0240)" to "6: Scale home position signal detection method" and "Method of to home position return" of "Tandem drive option (parameter No.0265)" to "0: Normal mode".
2. Set "Tandem drive home position signal offset (parameter No.026C, 026D)".
3. Start home position return operation.

■Operation example



*1 Set the distance between the master axis/slave axis home position signals and the proximity dog so that it is greater than the deviation at maximum tolerance of the master axis and slave axis.

*2 When a limit switch signal is detected, an alarm occurs and execution of home position return is terminated.
Position the proximity dog in front of the limit switch signal. (As shown in the diagram, position the proximity dog signal so that it overlaps the limit switch signal.)

8

Home position return using a scale home position signal detection method 2

Home position return is performed using a home position signal (Z-phase) on a linear scale. After the start operation is performed, move in the opposite direction of the home position and the position where a home position signal is detected is defined to be the home position. When using the home position return using a scale home position signal detection method for tandem drive axes, designate "1: Adjustment mode" or "0: Normal mode" using "Method of to home position return" of "Tandem drive options (parameter No.0265)".

- Adjustment mode

  Adjustment mode is used during mechanical adjustment, and is used to calculate the home position signal offset (amount of deviation in the position of the home position signal for the master axis and slave axis) on a linear scale.

  When executing home position return while in adjustment mode, after detecting the master axis home position signal and the slave axis home position signal while returning to home position, the axes are moved to the home position signal of the master axis. At this time the amount of offset from the position where the master home position signal was detected to the position where the slave home position was detected is calculated and output using "Tandem drive home position signal offset (parameter No.026C, 026D)". This amount of offset is used when compensating the amount of deviation between the master axis and slave axis when returning to home position; therefore, after completing home position return save this offset on the user program.

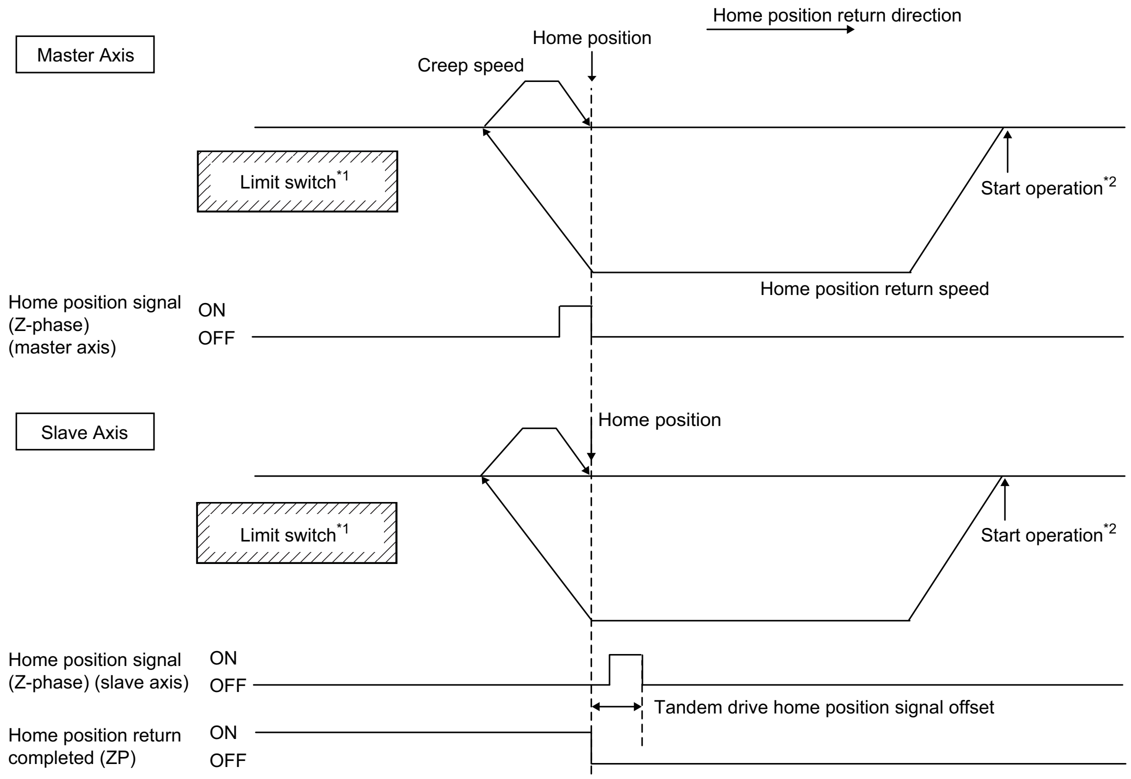
Point

Prior to returning to home position, set the axis linking the master axis and slave axis mechanically at a right angle to the movement direction. If it is not at a right angle, the home position signal position offset amount cannot be correctly calculated.

■Start operation method

1. Adjust the axis linking the master axis and slave axis mechanically at a right angle to the movement direction.
2. Set "Home position return method" of "Home position return option 1 (parameter No.0240)" to "D: Scale home position signal detection method 2" and "Method of to home position return" of "Tandem drive option (parameter No.0265)" to "1: Adjustment mode".
3. Start home position return operation.
4. After home position return is complete, read "Tandem drive home position signal offset (parameter No.026C, 026D)" and save it to the user program.

■Operation example



*1 When a limit switch signal is detected, an alarm occurs and execution of home position return is terminated.

*2 Set the distance between the master axis/slave axis home position signals and the start operation position so that it is greater than the deviation at maximum tolerance of the master axis and slave axis.

• Normal mode

In normal mode, the amount of deviation between the master axis and slave axis is detected and tweaking (compensation of deviation between master axis and slave axis) is performed. This movement sets the axis linking the master axis and slave axis mechanically at a right angle to the movement direction.

When home position return is performed using normal mode, after detecting the master axis home position signal and slave position home position signal while returning to home position, calculate the deviation of the master axis and slave axis based on "Tandem drive home position signal offset (parameter No.026C, 026D)". The master axis moves to the position of the home position signal and the slave axis moves to the slave axis home position calculated based on the tandem driver home position signal offset and the previously noted deviation.

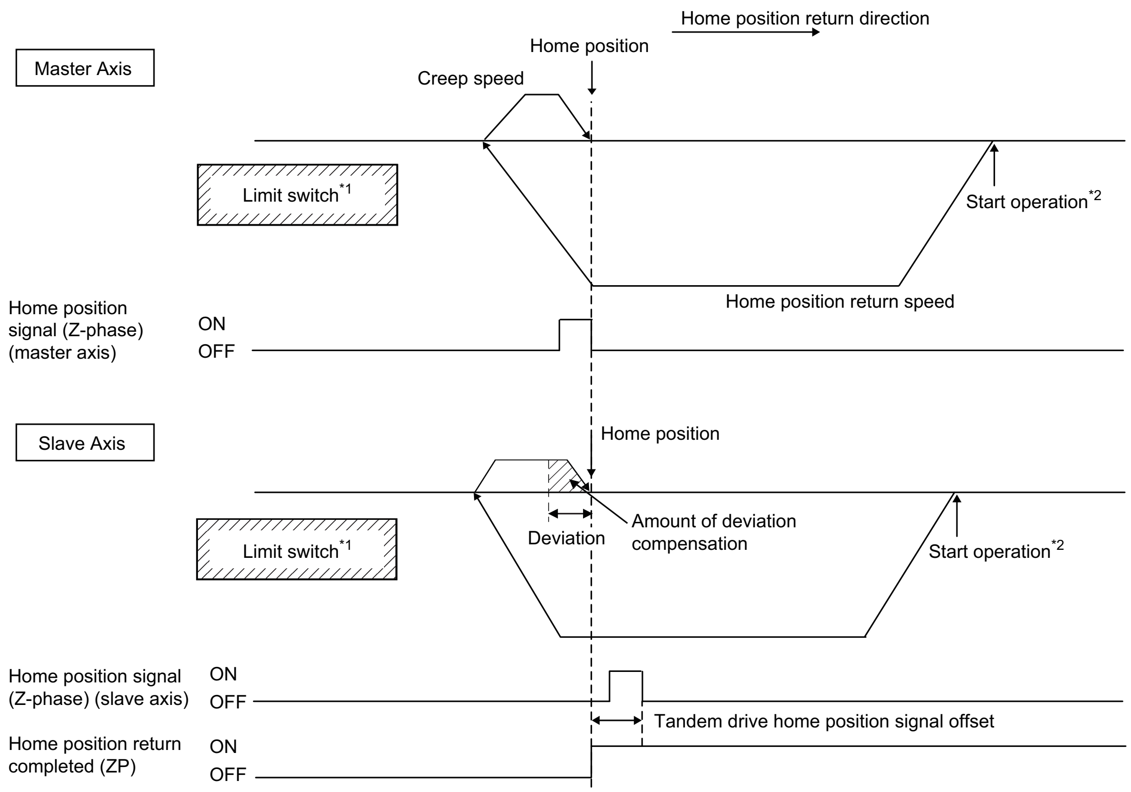
Point

- When performing home position return in normal mode, set "Tandem drive home position signal offset (parameter No.026C, 026D)" to the correct value. If the tandem drive home position signal offset value is erroneous, the axis that links the master axis and slave axis is not be at a right angle.
- If the amount of deviation between the master axis and the slave axis exceeds the value calculated from "Valid width of tandem drive deviation compensation (parameter No.026B) × Tandem drive deviation compensation units multiplication (parameter No.026E)", "Exceeding of Valid Width of Tandem Drive Deviation Compensation Error (operation alarm 57H, detail 01H)" occurs and home position return operation is terminated. (Tweak movement is not performed.)

■Start operation method

1. Set "Home position return method" of "Home position return option 1 (parameter No.0240)" to "D: Scale home position signal detection method 2" and "Method of to home position return" of "Tandem drive option (parameter No.0265)" to "0: Normal mode".
2. Set "Tandem drive home position signal offset (parameter No.026C, 026D)".
3. Start home position return operation.

■Operation example



*1 When a limit switch signal is detected, an alarm occurs and execution of home position return is terminated.

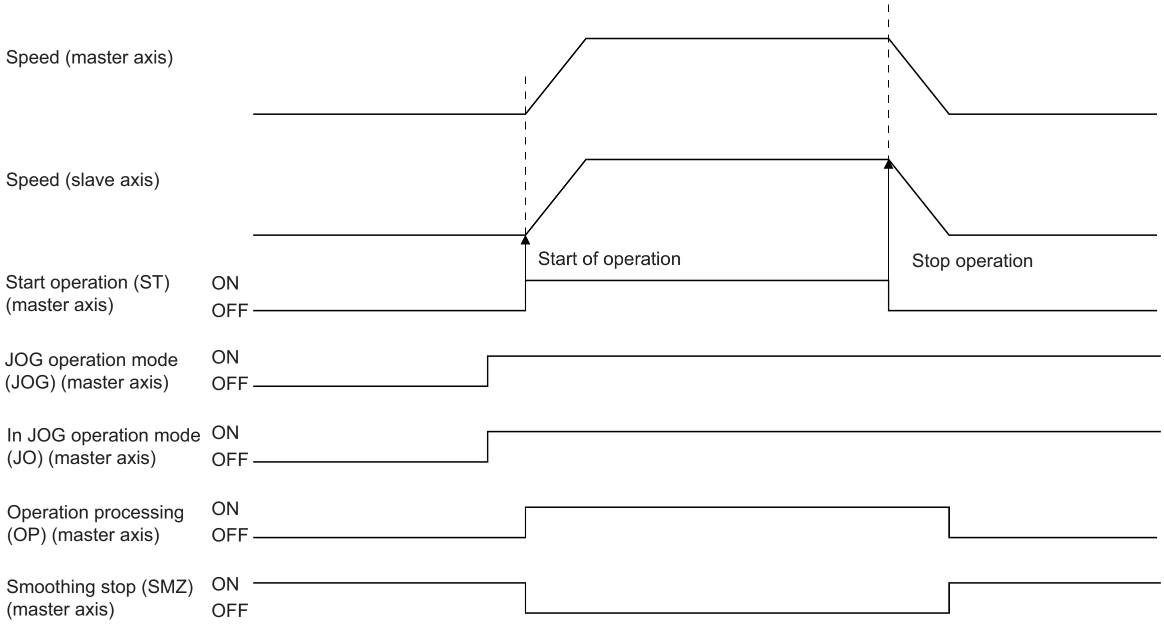
*2 Set the distance between the master axis/slave axis home position signals and the start operation position so that it is greater than the deviation at maximum tolerance of the master axis and slave axis.

JOG operation during the tandem drive

Synchronous mode

When the JOG operation is performed while in the synchronous mode, the master axis data and the signals are used.

Ex.



The important data classifications related to the JOG operation during the synchronous mode are shown in the following table.
For other related data, refer to the following.

☞ Page 599 Axis Data

Type	Data only valid for the master axis	Individual data for master axis/slave axis
Command signal/data	JOG operation mode signal (JOG) Movement direction signal (DIR) Start operation signal (ST) Manual feed speed Acceleration time constant Deceleration time constant	None
Status signal	In JOG operation mode signal (JO) Operation processing signal (OP) Smoothing stop signal (SMZ)	In-position signal (INP) Position switch signal (PSW)

The in-position signal (INP) is output for each axis separately; therefore, when the axes have come to a stop and the in-position signals (INP) are being used, confirm the in-position signal (INP) for both the master axis and the slave axis.
For other types of operation, the normal axis operation is followed. (☞ Page 90 JOG Operation)

Non-synchronous micro-adjustment mode

The operation is the same as for the normal axis operation. For details, refer to the following.

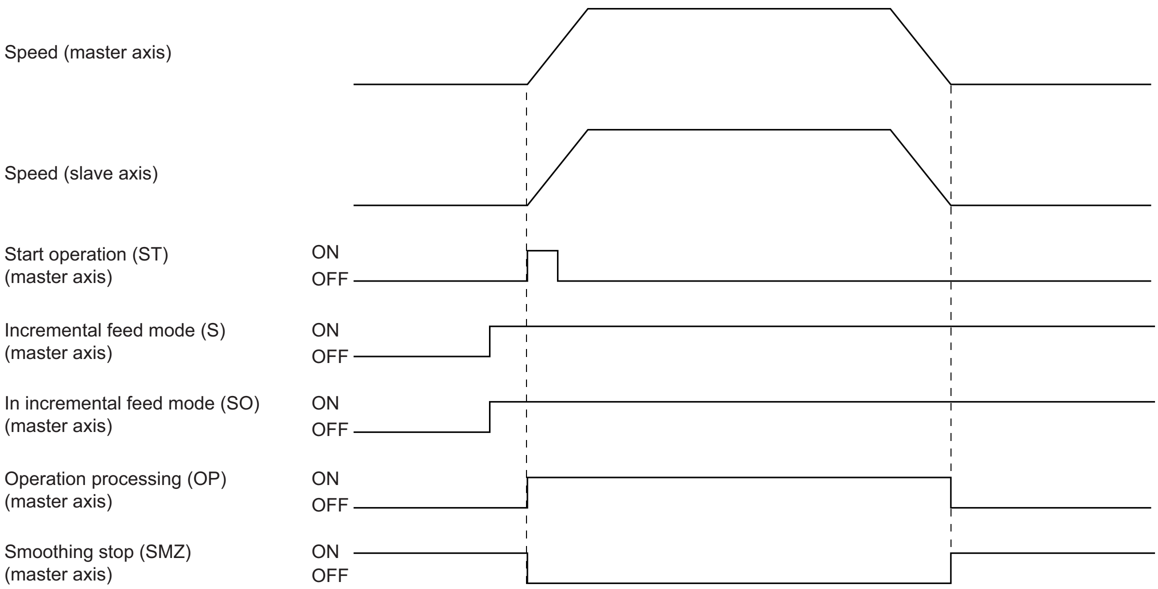
☞ Page 90 JOG Operation

Incremental feed while using the tandem drive

Synchronous mode

When the incremental feed operation is performed while in the synchronous mode, the master axis data and the signals are used.

Ex.



The important data classifications related to the incremental feed operation during the synchronous mode are shown in the following table. For other related data, refer to the following.

☞ Page 599 Axis Data

Type	Data only valid for the master axis	Individual data for master axis/slave axis
Command signal/data	Incremental feed mode signal (S) Movement direction signal (DIR) Start operation signal (ST) Fast start operation signal (FST) Manual feed speed Acceleration time constant Deceleration time constant Incremental feed movement amount	None
Status signal	In incremental feed mode signal (SO) Operation processing signal (OP) Smoothing stop signal (SMZ)	In-position signal (INP) Position switch signal (PSW)

The in-position signal (INP) is output for each axis separately; therefore, when the axes have come to a stop and the in-position signals (INP) are being used, confirm the in-position signal (INP) for both the master axis and the slave axis.

For other types of operation, the normal axis operation is followed. (☞ Page 92 Incremental Feed)

Non-synchronous micro-adjustment mode

The operation is the same as for the normal axis operation. For details, refer to the following.

☞ Page 92 Incremental Feed

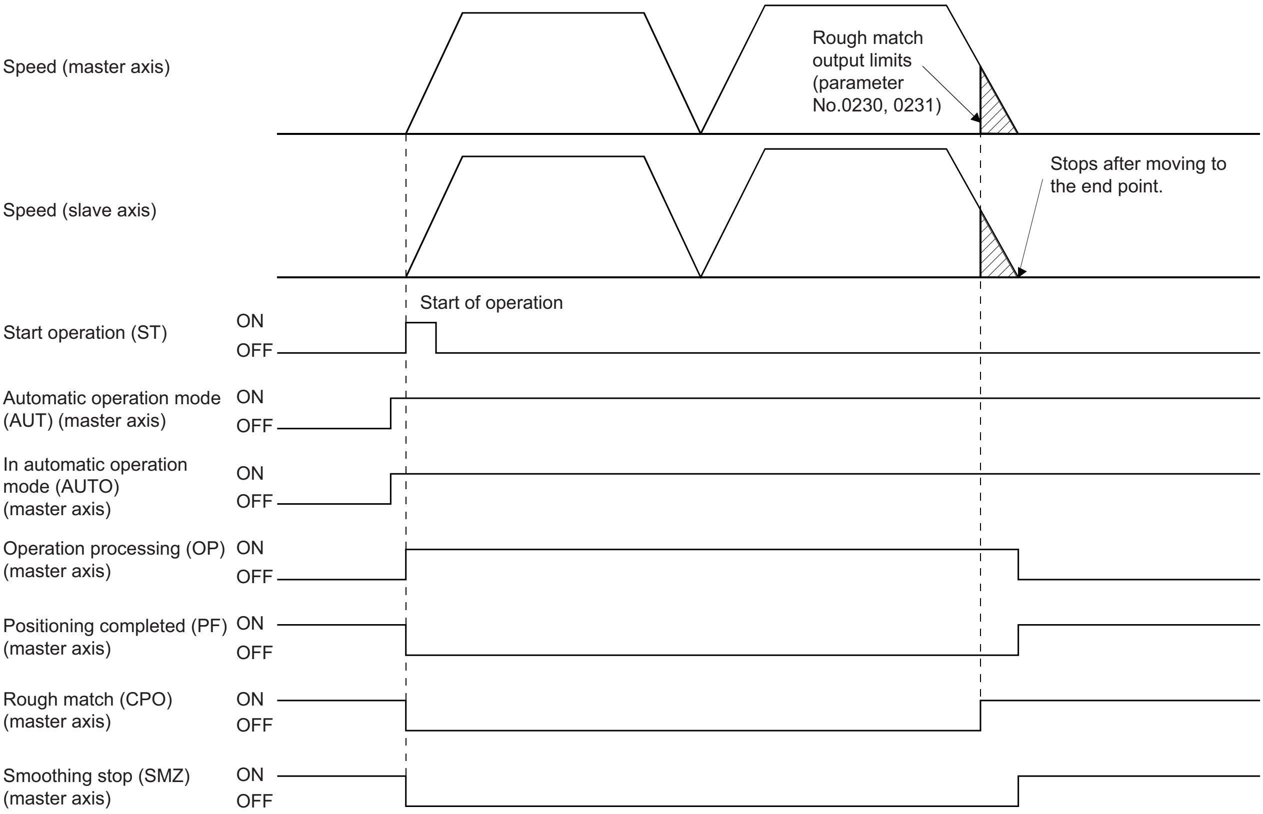
8

Automatic operation during tandem drive

Synchronous mode

When the automatic operation is performed while in the synchronous mode, the master axis data and the signals are used. Also, the master axis table is used for the point table.

Ex.



The important data classifications related to the automatic operation during the synchronous mode are shown in the following table. For other related data, refer to the following.

☞ Page 599 Axis Data

Type	Data only valid for the master axis	Individual data for master axis/slave axis
Command signal/data	Automatic operation mode signal (AUT) Start operation signal (ST) Start point No. End point No. (Point table)	None
Status signal	In automatic operation mode signal (AUTO) Operation processing signal (OP) Smoothing stop signal (SMZ) Positioning completed signal (PF) Rough match signal (CPO)	In-position signal (INP) Position switch signal (PSW)

The in-position signal (INP) is output for each axis separately; therefore, when the axes have come to a stop and the in-position signals (INP) are being used, confirm the in-position signal (INP) for both the master axis and the slave axis.
For other types of operation, the normal axis operation is followed. (☞ Page 93 Automatic Operation)

Non-synchronous micro-adjustment mode

The automatic operation cannot be performed while in the non-synchronous micro-adjustment mode. "While in Tandem Drive Nonsynchronous Mode (operation alarm 51H, detail 01H)" occurs upon the start of the operation.

Interpolation operation during the tandem drive

When performing the linear interpolation operation [MC200]/interpolation operation [MC300], it is necessary to group the axes for which the interpolation is to be set up. The groups are set up using "Linear interpolation group [MC200]/interpolation group [MC300] (parameter No.0260)" and the master axis is the only one set up when in the tandem drive axis operation. For other types of operation, the normal axis operation is followed. For details, refer to the following.

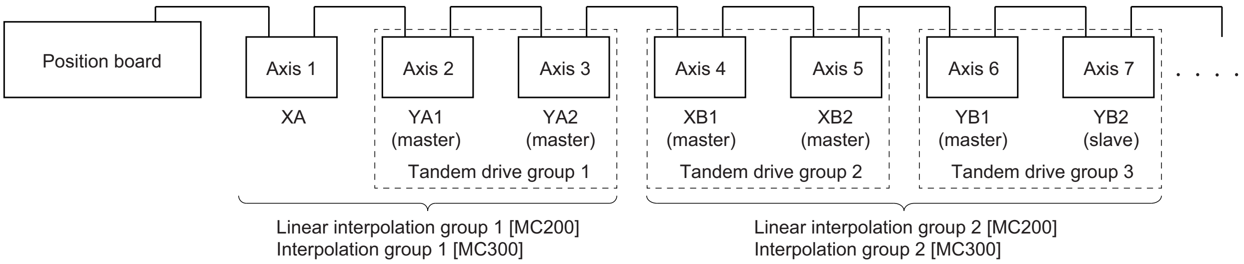
☞ Page 109 Linear Interpolation

Point

When performing the linear interpolation operation [MC200]/interpolation operation [MC300], limit the total number of axes for 1 tandem drive group to be within 4 axes, including the slave axes. If the total number of axes exceeds 4, "Interpolation Start Up Error (operation alarm 40H, detail 02H)" occurs upon the start of the operation.

The following is a system configuration set up example.

Ex.



Axis No.	Axis name	Linear interpolation group [MC200]/interpolation group [MC300] (parameter No.0260)	Tandem drive group (parameter No.0264)
1	XA	1	0
2	YA1	1	1
3	YA2	0*1	1
4	XB1	2	2
5	XB2	0*1	2
6	YB1	2	3
7	YB2	0*1	3

*1 The slave axis group No. operates with the content set to the master axis regardless of the setting value.

Synchronous mode

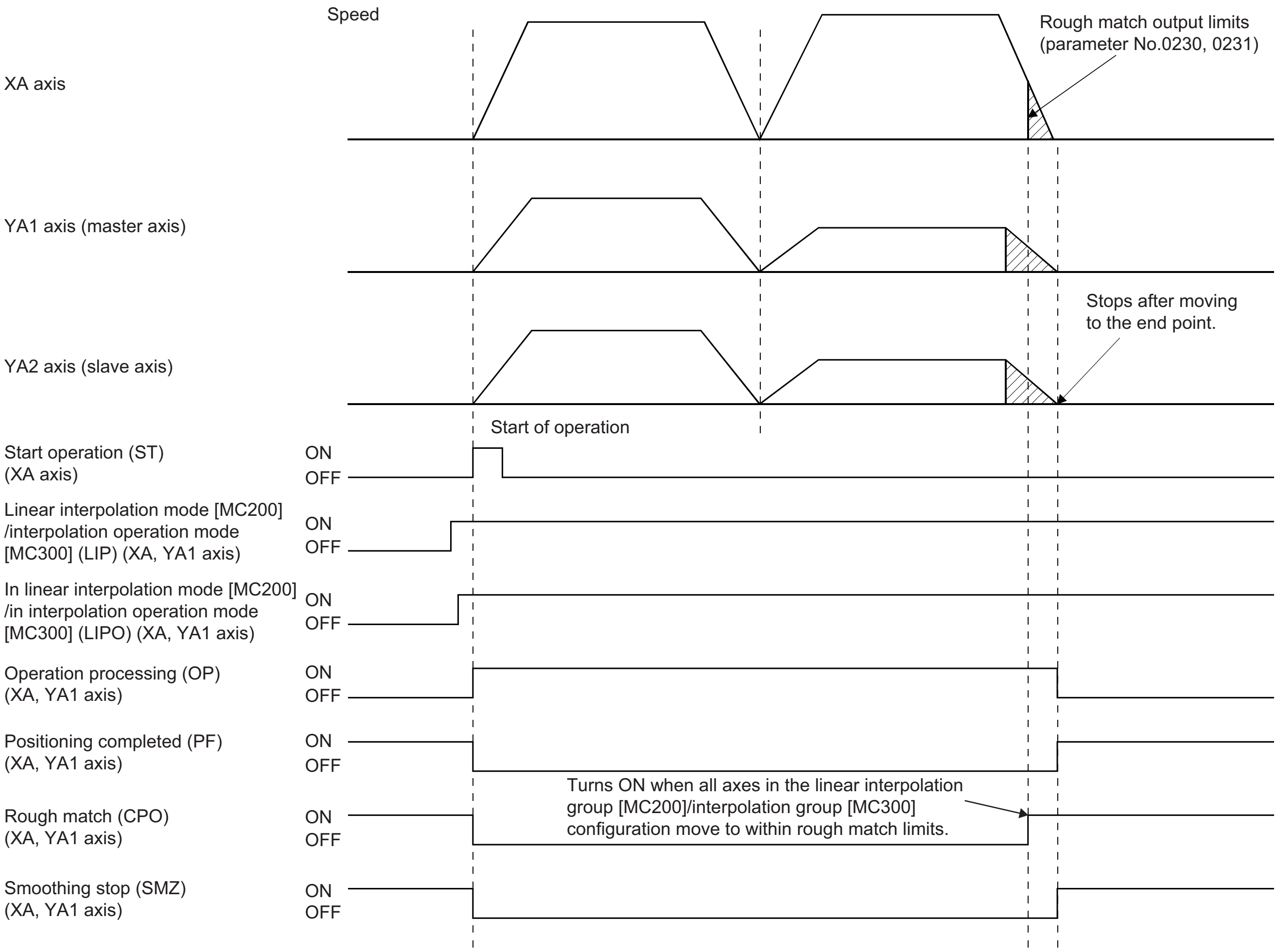
When performing the linear interpolation operation [MC200]/interpolation operation [MC300] in the synchronous mode, the master axis data and the signals are used. Also, the master axis table is used for the point table.

The important data classifications related to the linear interpolation operation [MC200]/interpolation operation [MC300] during the synchronous mode are shown in the following table. For other related data, refer to the following.

☞ Page 599 Axis Data

Type	Data only valid for the master axis	Individual data for master axis/slave axis
Command signal/data	Linear interpolation mode signal [MC200]/interpolation operation mode signal [MC300] (LIP) Start operation signal (ST) Start point No. End point No. (Point table)	None
Status signal	In linear interpolation mode signal [MC200]/in interpolation operation mode signal [MC300] (LIPO) Operation processing signal (OP) Smoothing stop signal (SMZ) Positioning completed signal (PF) Rough match signal (CPO)	In-position signal (INP) Position switch signal (PSW)

The in-position signal (INP) is output for each axis separately; therefore, when the axes have come to a stop and the in-position signals (INP) are being used, confirm the in-position signal (INP) for both the master axis and the slave axis.
For other types of operation, the normal axis operation is followed. (☞ Page 109 Linear Interpolation)
The following shows an example where the start operation is performed for the linear interpolation group 1 [MC200]/ interpolation group 1 [MC300] from the configuration example on the previous.



Point

For the linear interpolation operation [MC200]/interpolation operation [MC300], the XA axis and YA1 axis (master axis) are used for the interpolation operation. The YA2 axis (slave axis) moves synchronously with the master axis.

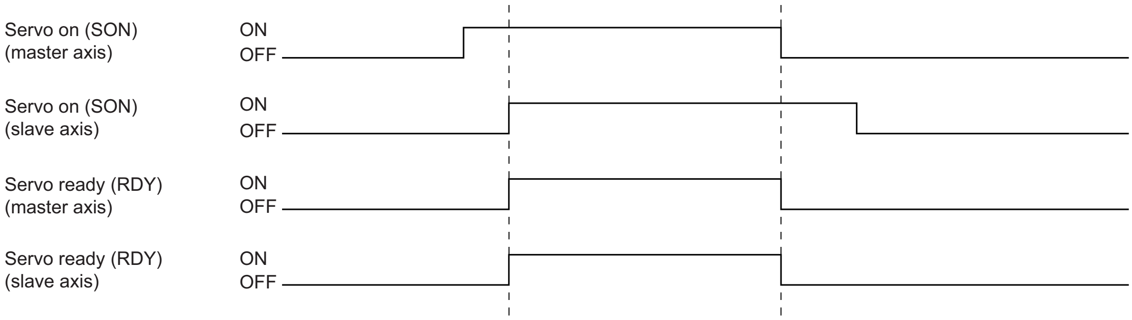
Non-synchronous micro-adjustment mode

The linear interpolation operation [MC200]/interpolation operation [MC300] cannot be performed while in the non-synchronous micro-adjustment mode. "While in Tandem Drive Nonsynchronous Mode (operation alarm 51H, detail 01H)" occurs upon the start of the operation.

8.5 Servo On and Servo Off During Tandem Drive Axis Operation

Synchronous mode

When the master axis servo on signal (SON) and the slave axis servo on signal (SON) are turned ON, the both axes are turned on. Also, when the servo on signal (SON) for either the master axis or the slave axis is turned OFF, both axes are turned servo off.



If an axis has moved during servo off, the current command position is updated in accordance with the movement amount (current feedback position) both for the master axis and for the slave axis. When there is a misalignment between the master axis and the slave axis at the servo on, the synchronous alignment is performed by aligning the command for the slave axis with the one for the master axis. During the synchronous alignment, the synchronizing signal (SYEO□: □ = group No.) turns ON. After confirming the synchronizing signal is OFF, perform the start operation.

However under the following conditions, "Tandem Drive Synchronous Alignment Error (operation alarm 58H, detail 01H)" occurs and the synchronization is canceled. After the cause for the alarm is removed, turn the servo off and then on to perform synchronization again. When the automatic operation or the interpolation operation is performed with the synchronization incomplete, "Tandem Drive Synchronous Alignment Error (operation alarm 58H, detail 02H)" occurs.

- If the misalignment between the master axis command position and the slave axis command position exceeds "Tandem drive synchronous alignment valid width (parameter No.0266)", "Tandem Drive Synchronous Alignment Valid Width Error (operation alarm 54H, detail 01H)" occurs.
- If a stop command (STP, RSTP) is input while synchronizing, "Tandem Drive Synchronous Alignment Error (operation alarm 58H, detail 01H)" occurs.

Point

- The Synchronization is validated after the home position return complete (after the home position is established). When the home position return request signal (ZREQ) is ON, the synchronization is not performed.
- Set the speed at the synchronization using "Tandem drive synchronous alignment speed (parameter No.0267)" and "Speed units multiplication factor (parameter No.020E, 020F)".
- When the start operation is performed during the synchronization, "Tandem Drive While Performing Synchronization (operation alarm 55H, detail 01H)" occurs.
- When the drive mode is toggled during the synchronization, "Tandem Drive Mode Change Error (operation alarm 50H, detail 01H)" occurs.
- If "Tandem Drive Synchronous Alignment Valid Width Error (operation alarm 54H, detail 01H)" or "Tandem Drive Synchronous Alignment Error (operation alarm 58H, detail 01H)" occurs within the absolute position detection system, the absolute value is lost. ("Absolute position data" of "Home position return option 2 (parameter No.0241)" becomes "0: Invalid" and the absolute position erased signal (ABSE) turns ON.)
- Implement a stop command on the master axis. Because the system is in the synchronous mode, inputting a stop command to the slave axis is invalid.
- If "Synchronization setting" of "Tandem drive options (parameter No.0265)" is set to "1: Invalid", the synchronization for turning servo on is not performed. The position board operates with the deviation between the master axis and the slave axis held. The setting of this parameter becomes valid at the leading edge of the servo ready signal (RDY).

  While the synchronization is invalid, the following operations may make a deviation between the master axis and the slave axis. As necessary, perform synchronization (micro-adjustment) with the user program. In addition, confirm the deviation between the master axis and the slave axis is within an allowance.

  · At turning on the servo after turning off the servo
  · At canceling the servo alarm after the servo alarm occurs
  · At resetting the forced stop after the forced stop occurs

Non-synchronous micro-adjustment mode

The servos can be turned on and off separately. The operation is the same as for the normal axis operation. For details, refer to the following.

☞ Page 166 Servo Off

8.6 Tandem Drive Axis Limit Switch

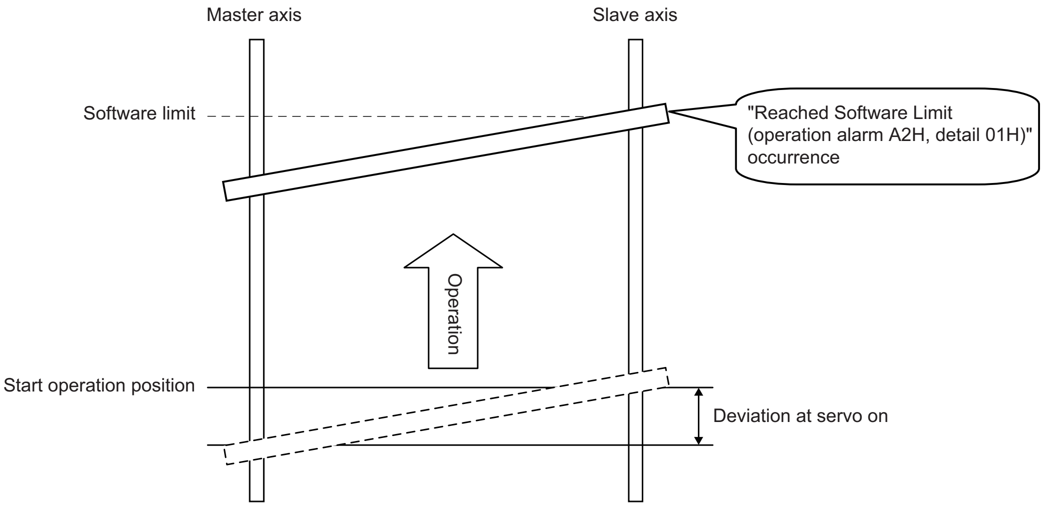
If the limit switches on either the master axis or the slave axis is detected, an alarm occurs and both axes are stopped using the rapid stop time constant. For other types of operation, the normal axis operation is followed. Refer to the following.

☞ Page 170 Limit Switch (Stroke End)

8.7 Tandem Drive Axis Software Limit

The software limits become valid after completing the home position return (the home position return request signal (ZREQ) is OFF). The software limits are confirmed for both the master axis and the slave axis. In this case, the software limit boundaries for the master axis become valid.

The following shows an example where the software limit is reached during the JOG operation when "Synchronization setting" of "Tandem drive options (parameter No.0265)" is set to "1: Invalid", and there is a misalignment between the master axis and the slave axis at servo on.

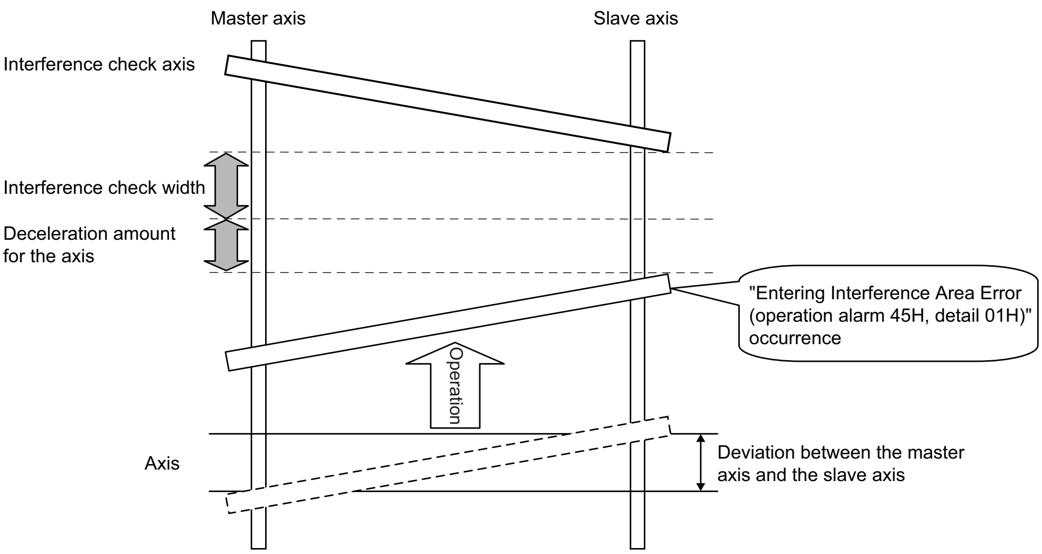


For the operation at software limit occurrence, the normal axis operation is followed. For details, refer to the following.

☞ Page 171 Software Limit

8.8 Tandem Drive Interference Check

Interference check is performed both for the master axis and slave axis. The parameter value of interference check width for the master axis becomes valid.



8.9 Tandem Drive Axis Servo Alarms

If a servo alarm occurs on either the master axis or the slave axis, the axis for which the servo alarm did not occur is stopped using a dynamic brake as well. When the cause for the alarm on an axis is removed such as through a servo alarm reset, the dynamic brake is canceled.
This is the same when either the master axis or the slave axis becomes status on the servo warning [AL. E6_Servo forced stop warning] or [AL. E9_Main circuit off warning]*1.
This operation does not depend on drive modes (synchronous mode/non-synchronous micro-adjustment mode).

*1 For MR-J5(W_)-_B, the servo warning [AL. 0E6_Servo forced stop warning] or [AL. 0E9_Main circuit off warning] [MC300]

Point

The relationship between servo ON/OFF and dynamic brake ON/OFF is shown below.

- Dynamic brake OFF
  While the servo on command is ON: The servo control is operating (Positioning can be controlled.)
  While the servo on command is OFF: The servo is coasting (Is easily turned using an external force.)
- Dynamic brake ON
  While the servo on command is ON/OFF: Dynamic brake status (If an external force is placed to try and rotate axis, the dynamic brake resists the force.)

8.10 Deviation Monitoring Function

A function where if the deviation between the master axis and the slave axis exceeds "Tandem drive excessive deviation width (parameter No.0268)" during the synchronous mode while in the tandem drive axis, "Tandem Drive Excessive Deviation (operation alarm 53H, detail 01H)" occurs and both axes are stopped using a dynamic brake. When the setting for the excessive deviation width is set to "0", it becomes invalid.

9 INTERFACE MODE

Interface mode is a function for sending the commands for every control cycle (position commands, speed commands and torque commands) straight to the servo amplifier. By using this function, any given acceleration/deceleration pattern, speed pattern, or torque pattern is possible.
To use interface mode, designate "1: Interface mode" with "Control mode selection" of "System option 2 (parameter No.0002)", and perform system startup after setting "Interface mode option (parameter No.000F)".
When system startup is performed in interface mode, operation modes from standard mode such as JOG operation, automatic operation, etc. cannot be used.
The host personal computer controls the servo amplifier by updating the contents of the command buffer at a timing of either when the host personal computer receives the interrupt output for each control cycle given by the position board (when interrupt output is valid), or at any given timing (when interrupt output is invalid).
When interrupt output is valid, position control mode, speed control mode, and torque control mode can be used. When interrupt output is invalid, only position control mode can be used.

- Using MR-MC2_ _
  Software version A3 or earlier: Only position control mode can be used.
  Software version A4 or later: Position control mode, speed control mode, and torque control mode can be used.
- Using MR-MC3_ _
  Position control mode, speed control mode, and torque control mode can be used. (No restrictions by software version)

Point

- When using interface mode, all axes operate in interface mode. Some axes cannot be used in standard mode.
- Control modes (standard mode and interface mode) cannot be switched after system startup.
- When using the test operation function of MR Configurator2 connected to the position board with a USB connection, the position board stops importing commands. If the test operation function is executed while motors are rotating, they come to a stop. Be sure to perform test operation after stopping operation.
  The system must be restarted to control with commands from the position board again.
  For the test operation, refer to the servo amplifier instruction manual, the manual, and/or MR Configurator2 help.
- The test tool is not compatible with interface mode.
  It can get monitors and graphs of servo information.
- When the buffer No. used in "Interface mode maximum buffer No. (parameter No.023F)" is set to "1", the number of axes that can be controlled is restricted. While it is possible to control more axes than the recommended number of control axes below, the during system program memory access signal (BMA) stays ON for a longer time, making the available time for command buffer writing from the user program shorter.
  When controlling more axes than the recommended number of control axes below, and making the available time for command buffer writing from the user program longer, set the number of buffers used to "2" or more, or make the command data update cycle longer. [MC300]
  · Control cycle 0.88ms: 64 axes
  · Control cycle 0.44ms: 52 axes
  · Control cycle 0.22ms: 27 axes
- When connecting remote I/O modules, the number of axes that can be controlled, and the available time for command buffer writing from the user program varies with the number of modules to be connected, and the number of I/O device points to be used.
- The available time for command buffer writing from the user program can be calculated with control cycle [ms] × 1000 - Operation cycle current time [μs]. The calculation is an estimate, thus it is shorter than the actual writing time.

Point

[API library]

- For a detailed procedure for interface mode, refer to the sample program (InterruptIfmDrive/PollingIfmDrive) contained on the utility software.
- When the response of the host personal computer operating system is not on time due to the load of the user program etc., increase the number of position command buffers to be used (position control only), or set the command data update cycle longer.

9.1 Combinations with Functions

The following shows the combinations of interface mode with each function.

○: Usable, ×: Unusable, △: Restriction

Classification	Function		Control mode			Remarks
			Position control	Speed control	Torque control	
Operational function	JOG operation		×	×	×	
	Incremental feed		×	×	×	
	Automatic operation		×	×	×	
	Linear interpolation [MC200] Interpolation operation (linear interpolation, circular interpolation) [MC300]		×	×	×	
	Home position return		×	×	×	The normal home position return function is invalid. After moving to the home position, use the home position set command signal (ZSC). Confirm the DOG signal status with the high-speed monitor.
	Home position reset function		×	×	×	
Application function	Command unit	Electronic gear	×	×	×	Command units are always pulse units.
	Speed unit	Speed unit	△	△	△	Related only to speed units during monitor output.
		Speed units multiplication factor	△	△	△	Related only to speed units during monitor output.
		Speed limit	×	×	×	
	Acceleration/ deceleration	Linear acceleration/ deceleration	×	×	×	
		Smoothing filter	×	×	×	
		Start up speed enable	×	×	×	
		S-curve acceleration/ deceleration (Sine acceleration/deceleration)	×	×	×	
		Jerk ratio acceleration/ deceleration [MC300]	×	×	×	
		Vibration suppression command filter 1 [MC300]	×	×	×	
	Servo off		×	×	×	The system becomes servo free. Follow up processes are not performed after servo off. Perform them with the user program. Operation stop by servo off is invalid. Perform servo off after a deceleration stop.
	Forced stop		○	○	○	
	Stop operation		×	×	×	
	Rapid stop operation		×	×	×	
	Limit switch (stroke end)		×	×	×	Confirm the LSP/LSN signal status with the high-speed monitor.
	Software limit		×	×	×	
	Interlock		×	×	×	
	Rough match output		×	×	×	
	Torque limit		○	○	×	
	Command change	Speed change	×	×	×	
		Change of time constants	×	×	×	
		Position change	×	×	×	
	Backlash		×	×	×	
	Position switch		×	×	×	
	Completion of operation signal		×	×	×	
	Interference check		×	×	×	
	Home position search limit		×	×	×	

Classification	Function		Control mode			Remarks
			Position control	Speed control	Torque control	
Application function	Gain switching		○	○	○	
	PI-PID switching		○	×	×	
	Absolute position detection system		○	○	○	
	Home position return request		×	×	×	
	Other axes start		×	×	×	
	High response I/F		×	×	×	
	In-position function		○	×	×	
	Digital I/O		○	○	○	
	I/O device		○	○	○	
	Servo amplifier general I/O		○	○	○	
	Dual port memory exclusive control		○	○	○	
	Pass position interrupt		×	×	×	
	Mark detection		○	○	○	
	Continuous operation to torque control		×	×	×	
	SSCNETⅢ/H head module		○	○	○	
	Sensing module connection	Station mode	○	○	○	
		Axis mode	○	×	×	
Auxiliary function	Reading/writing parameters		○	○	○	
	Changing parameters at the servo		○	○	○	
	Alarm/system error		○	○	○	
	Monitor function		○	○	○	
	High speed monitor function		○	○	○	
	Interrupt		△	△	△	Interrupt output is not performed by factor of interrupt. Interrupt is output according to the interrupt output cycle settings only during interrupt valid.
	Interrupt output cycle		○	○	○	Can only be used in interface mode.
	Command data update cycle		○	○	○	Can only be used in interface mode.
	User watchdog function		○	○	○	
	Software reboot function		○	○	○	
	Parameter backup		○	○	○	
	Test mode		○	○	○	
	Reconnect/disconnect function		○	△	△	When reconnecting, startup is in position control mode.
	Sampling		○	○	○	
	Log		○	○	○	
	Operation cycle monitor function		○	○	○	
	External forced stop disable		○	○	○	
	Amplifier-less axis function		○	○	○	For torque control mode, operation stops when torque command is 0.0%, or when torque control speed limit value is 0, and the zero speed signal (ZSP) turns ON.
	Alarm history function		○	○	○	
	Transient transmit		○	○	○	
	Hot line forced stop function		○	○	○	
Tandem drive	Tandem drive		×	×	×	
Interface mode	Home position set		○	×	×	If the home position set command signal (ZSC) is turned ON at speed control/torque control, the home position set error signal (ZSE) turns ON.

9.2 Parameters

For interface mode, the parameters used and some of the parameter functions change. The following are parameters used in interface mode.

System parameters

System parameters used

Parameter No.	Symbol[*1]	Name	Remarks
0001	*SYSOP1	System option 1	
0002	*SYSOP2	System option 2	Set interface mode in control mode.
000E	*EMID	External forced stop disabled	
000F	*IFMO	Interface mode option	Set the interrupt output cycle and command data update cycle.
0040	LGS1	Log acquiring selection 1	
0041	LGS2	Log acquiring selection 2	
0042	LGS3	Log acquiring selection 3	
0043	LGS4	Log acquiring selection 4 [MC300]	
0044	LGS5	Log acquiring selection 5	
004A	*IOTBL	I/O table	
004B	LGS6	Log acquiring selection 6 [MC300]	

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Parameter details

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
0002	*SYSOP2	System option 2	0000h	—	0000h to 1101h	□■■■ (Control mode selection) Set the control mode. • 0: Standard mode • 1: Interface mode
000F	*IFMO	Interface mode option	0000h	—	0000h to 0F0Fh	■■■□ (Interrupt output cycle) When interrupt by interface mode is valid, set the cycle for which the interrupt is output. • Interrupt output cycle: Control cycle × (setting value + 1) <Example> When interrupt output cycle is set to 1 and control cycle is 0.88ms Interrupt is output approximately every 1.77ms. ■□■■ (Command data update cycle) Set the cycle for which position command is updated in interface mode. Command data update cycle: Control cycle × (setting value + 1) <Example> When command data update cycle is set to 2 and control cycle is 0.88ms. Position command is updated approximately every 2.66ms.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Servo parameters

There are no differences to standard mode.

Control parameters

Control parameters used

Parameter No.	Symbol*1	Name	Remarks
0200	*OPC1	Control option 1	Speed units relates to the units during monitor output.
0203	*AXALC	Axis No. assignment	
020E	SUML	Speed units multiplication factor (lower)	Speed units multiplication factor relates to the units during monitor output.
020F	SUMH	Speed units multiplication factor (upper)	
0210	TLP	Forward rotation torque limit value	
0211	TLN	Reverse rotation torque limit value	
0213	*GIOO	General I/O option	
0214	*GDNA	General I/O No. assignment	
0215	*GDINA	General input No. assignment [MC300]	
0216	*GDONA	General output No. assignment [MC300]	
0218	*SSIA	Sensor signal input assignment [MC300]	
0219	*SOP	Sensor input options	Set the source of input for LSP/LSN/DOG signals. Each signal is used in monitor output only.
021A	*SLSP	Sensor signal (LSP) connection specification	
021B	*SLSN	Sensor signal (LSN) connection specification	
021C	*SDOG	Sensor signal (DOG) connection specification	
021D	*VEND	Vender ID	
021E	*CODE	Type code	
023F	*IFBN	Interface mode maximum buffer No.	Set the maximum buffer No. of the command buffer. (When controlling interface mode with interrupt output invalid, 1 or more must be set.)
0241	*OPZ2	Home position return Option 2	Can set valid/invalid of the absolute position system only.
0246	ZPSL	Home position coordinates (lower)	Set only for absolute position system.
0247	ZPSH	Home position coordinates (upper)	
024D	*LS0	Home position multiple revolution data	
024E	*CY0L	Home position within 1 revolution position (lower)	
024F	*CY0H	Home position within 1 revolution position (upper)	

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Parameter details

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
023F	*IFBN	Interface mode maximum buffer No.	0	—	0 to 63	Sets the maximum value of the ring buffer No. being used in interface mode. The set value+1 is the number of buffers. When controlling interface mode with interrupt output invalid, 1 or more must be set.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

9.3 Interface

System information table

Address (hexadecimal)		Name	Description
MR-MC2_ _	MR-MC3_ _		
0010	000010	Interrupt output cycle	The interrupt output cycle (control cycle × N) outputs the value of N.
0011	000011		
0012	000012	Command data update cycle	The command data update cycle (control cycle × N) outputs the value of N.
0013	000013		

System status table

Address (hexadecimal)		Name
MR-MC2_ _	MR-MC3_ _	
0478	000C18	Command buffer read error counter
0479	000C19	

System command/status bit

■System command bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E0	000B00	0	ITE	Interrupt processing stop
		1	ITS	Interrupt output start
		2	—	For manufacturer setting
		3		
		4	HMA	During user program memory access
		5	—	For manufacturer setting
		6		
		7		

- Details concerning system command bits

Symbol	Signal name	Function details	
		Function	Operation
ITS	Interrupt output start	Command the interrupt output valid.	Output the interrupt each interrupt output cycle when the interrupt output start signal (ITS) is turned ON.
HMA	During user program memory access	Command that the user program is accessing the command buffer.	When the during user program memory access signal (HMA) is turned ON, the system program recognizes that the user program is accessing the command buffer, and does not access the command buffer. When this happens, the system program counts up the command buffer read error counter.

■System status bit

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0450	000BE0	0	ITO	Outputting factor of interrupt
		1	IITO	During interface mode interrupt valid
		2	EVDO	Event detection enabled
		3	HRIF	Highly response I/F enabled
		4	BMA	During system program memory access
		5	PRINF	Continuous operation to torque control compatible information
		6	—	For manufacturer setting
		7	IFMO	In interface mode

- Details concerning system status bit

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
IITO	During interface mode interrupt valid	Notify that the interrupt during interface mode is valid.	The interrupt output start signal (ITS) is turned ON.	The interrupt output start signal (ITS) is turned OFF.
EVDO	Event detection enabled	Notify that the event detection function is valid.	Interface mode is selected in control mode, and system startup is performed.	—
BMA	During system program memory access	Notify that the system program is accessing the command buffer.	The system program is accessing the command buffer.	The system program is not accessing the command buffer.
IFMO	In interface mode	Notify that the control mode is in interface mode.	Interface mode is selected in control mode, and system startup is performed.	Standard mode is selected in control mode, and system startup is performed.

Axis command/status data

■Axis command data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range	Description
MR-MC2_ _	MR-MC3_ _			
1030	005040	Latest position command buffer No.	0 to 63	Set the latest position command buffer No. after updating.
1031	005041			
1032	005042	Control mode command	→	Set the mode to switch to. • 0000h: Position control mode • 0001h: Speed control mode • 0002h: Torque control mode
1033	005043			
1048	005058	Torque control speed limit value (0.01r/min)	0 to 1000000000	Set the speed limit value when in torque control mode. When a value outside the setting range is set, the previous value that was set within the valid range is the speed limit value. Also, "Torque Control Setting Error (operation alarm 2FH, detail 01H)" occurs.
1049	005059			
104A	00505A			
104B	00505B			

■Axis status data

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Output range	Description
MR-MC2_ _	MR-MC3_ _			
108E	0050DE	Maximum position command buffer No.	1 to 64	Notify the maximum position command buffer No. that can be used.
108F	0050DF			
1090	0050E0	Transmit position command buffer No.	0 to 63	Notify the position command buffer No. that is being transmitted.
1091	0050E1			
1092	0050E2	Control mode status	→	The current control mode is shown below. ■□□□ • 000h: Position control mode • 001h: Speed control mode • 002h: Torque control mode □■■■ • 0: Control mode switch normal • 8: Control mode switch error*1
1093	0050E3			

*1 A control mode switch error occurs when conducting the following operations.
· Switching from position control mode to another control mode while the zero speed signal (ZSP) is OFF.
· Specifying a control mode outside of range to control mode command.

Command buffer

The numbers and the addresses of the command buffers that are used differ for each control mode. The buffers for each control mode are shown below.

■Position control mode

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+100h" for each axis.

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
5000	101000	Position command buffer 0 [pulse]
5001	101001	
5002	101002	
5003	101003	
5004	101004	Position command buffer 1 [pulse]
5005	101005	
5006	101006	
5007	101007	
5008	101008	Position command buffer 2 [pulse]
5009	101009	
500A	10100A	
500B	10100B	
500C	10100C	Position command buffer 3 [pulse]
500D	10100D	
500E	10100E	
500F	10100F	
5010	101010	Position command buffer 4 [pulse]
5011	101011	
5012	101012	
5013	101013	
5014	101014	Position command buffer 5 [pulse]
5015	101015	
5016	101016	
5017	101017	
5018	101018	Position command buffer 6 [pulse]
5019	101019	
501A	10101A	
501B	10101B	
501C	10101C	Position command buffer 7 [pulse]
501D	10101D	
501E	10101E	
501F	10101F	
5020	101020	Position command buffer 8 [pulse]
5021	101021	
5022	101022	
5023	101023	
5024	101024	Position command buffer 9 [pulse]
5025	101025	
5026	101026	
5027	101027	
5028	101028	Position command buffer 10 [pulse]
5029	101029	
502A	10102A	
502B	10102B	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
502C	10102C	Position command buffer 11 [pulse]
502D	10102D	
502E	10102E	
502F	10102F	
5030	101030	Position command buffer 12 [pulse]
5031	101031	
5032	101032	
5033	101033	
5034	101034	Position command buffer 13 [pulse]
5035	101035	
5036	101036	
5037	101037	
5038	101038	Position command buffer 14 [pulse]
5039	101039	
503A	10103A	
503B	10103B	
503C	10103C	Position command buffer 15 [pulse]
503D	10103D	
503E	10103E	
503F	10103F	
5040	101040	Position command buffer 16 [pulse]
5041	101041	
5042	101042	
5043	101043	
5044	101044	⋮
⋮	⋮	
50EF	1010EF	
50F0	1010F0	Position command buffer 60 [pulse]
50F1	1010F1	
50F2	1010F2	
50F3	1010F3	
50F4	1010F4	Position command buffer 61 [pulse]
50F5	1010F5	
50F6	1010F6	
50F7	1010F7	
50F8	1010F8	Position command buffer 62 [pulse]
50F9	1010F9	
50FA	1010FA	
50FB	1010FB	
50FC	1010FC	Position command buffer 63 [pulse]
50FD	1010FD	
50FE	1010FE	
50FF	1010FF	

■Speed control mode

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +100h

Setting range: -1000000000 (-10000000r/min) to 1000000000 (10000000r/min)

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
7800	109000	Speed command buffer 0 (0.01r/min)
7801	109001	
7802	109002	
7803	109003	
7804	109044	For manufacturer setting
⋮	⋮	
787F	10907F	
—	109080	
	⋮	
	1090FF	

■Torque control mode

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +100h

Setting range: -32768 (-3276.8%) to 32767 (3276.7%)

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
8C00	111000	Torque command buffer 0 (0.01r/min) (MR-J4(W_)-_B: When "Rotation direction selection/travel direction selection (parameter No.110D)" is 0, positive: CCW negative: CW) (MR-J5(W_)-_B: When "Travel direction selection (parameter No.200D)" is 0, positive: CCW negative: CW [MC300])
8C01	111001	
8C02	111002	
8C03	111003	
8C04	111004	For manufacturer setting
⋮	⋮	
8C7F	11107F	
—	111080	
	⋮	
	1110FF	

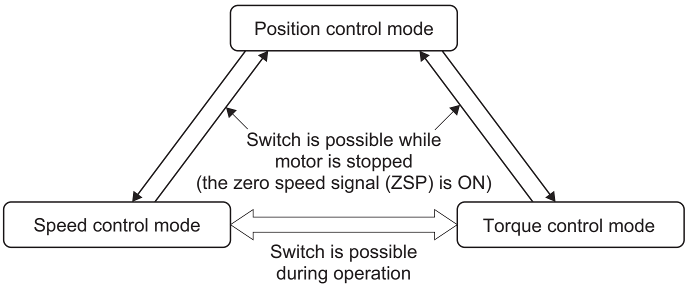
9.4 Control Method

Control mode

The control mode is switched by specifying the control mode in "control mode command". Switching to/from position control mode to/from speed control mode/torque control mode is performed while the motor is stopped, and switching between speed control mode and torque control mode is possible at any given time.

For details on switching control mode, refer to the following.

☞ Page 538 Procedure for switching control mode
☞ Page 540 Examples of switching control mode



Point

- After turning power supply ON, or after SSCNET reconnection, the control mode is position control mode.
- When a control mode other than position control mode was specified at power supply ON or SSCNET reconnection, start up in position control mode before switching to the specified control mode.
- When a control mode switch error has occurred, return the control mode command to the current control mode before performing the control mode switch again.
- When switching from speed control mode/torque control mode to position control mode, update the command position with the current feedback position after confirming that the zero speed signal (ZSP) is ON.
- The data for control mode command is applied at the timing of the command data update cycle.

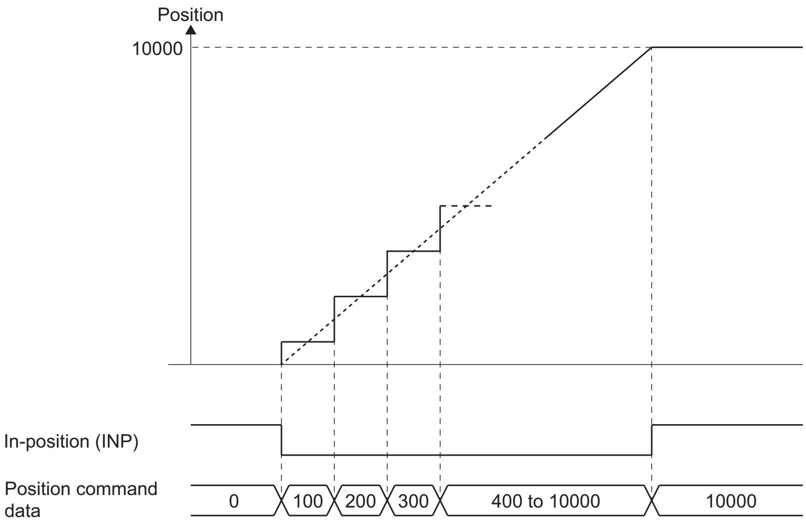
Position control mode

Position control mode is the mode that position commands (absolute position in pulse units) generated by the user program can be sent to the servo amplifier. The position command buffer is made up of position data × a maximum of 64 ring buffers, and is controlled with the latest position command buffer No. and the transmit position command buffer No.
For the update method of the buffer, refer to the following.

☞ Page 533 Control method for interrupt output invalid
☞ Page 535 Control method for interrupt output valid

Point

- For the setting value of the position command buffer, ensure that the difference between the previous command value and the current command value is no more than 20000000. When the difference between the previous command value and the current command value exceeds 20000000, "Command Data Error (operation alarm A7H, detail 03H)" occurs, followed by an immediate stop.
- When an alarm other than "Command Data Error (operation alarm A7H, detail 03H)" occurs, conduct a deceleration stop by the user program.



Parameter

■System parameter

Parameter No.	Symbol*1	Name	Remarks
000F	*IFMO	Interface mode option	Set the interrupt output cycle and command data update cycle.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

■Control parameter

Parameter No.	Symbol*1	Name	Remarks
0210	TLP	Forward rotation torque limit value	Become valid when using torque limit.
0211	TLN	Reverse rotation torque limit value	
023F	*IFBN	Interface mode maximum buffer No.	Set the maximum buffer No. of the position command buffer. When controlling interface mode with interrupt output invalid, 1 or more must be set.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Axis data command/status table

■Axis data command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range
MR-MC2_ _	MR-MC3_ _		
1030	005040	Latest position command buffer No.	0 to 63
1031	005041		

■Axis data status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range
MR-MC2_ _	MR-MC3_ _		
108E	0050DE	Maximum position command buffer No.	1 to 64
108F	0050DF		
1090	0050E0	Transmit position command buffer No.	0 to 63
1091	0050E1		

Position command buffer

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+100h" for each axis.

Address (hexadecimal)		Name	Initial value	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
5000	101000	Position command buffer 0	0	pulse	-2147483648 to 2147483647	Input the target position in absolute position for every command data update cycle.
5001	101001					
5002	101002					
5003	101003					
5004	101004	Position command buffer 1	0	pulse	-2147483648 to 2147483647	Input the target position in absolute position for every command data update cycle.
5005	101005					
5006	101006					
5007	101007					
5008	101008	⋮	⋮	⋮	⋮	⋮
⋮	⋮					
50FB	1010FB					
50FC	1010FC	Position command buffer 63	0	pulse	-2147483648 to 2147483647	Input the target position in absolute position for every command data update cycle.
50FD	1010FD					
50FE	1010FE					
50FF	1010FF					

Speed control mode

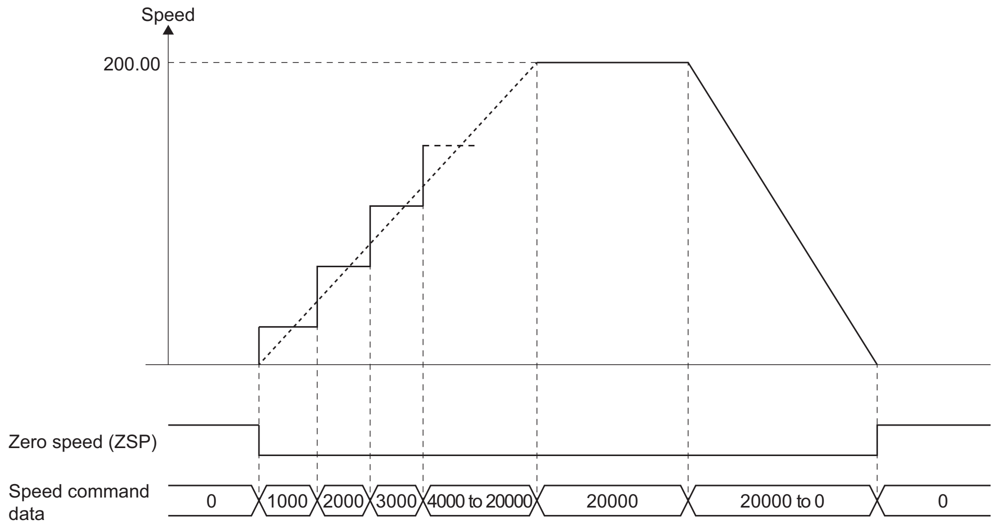
Speed control mode is the mode that speed commands (speed in units of 0.01r/min) generated by the user program can be sent to the servo amplifier. The speed command buffer is made up of speed command data × a maximum of 1 buffer.

For the update method of the buffer, refer to the following.

☞ Page 535 Control method for interrupt output valid

Point

- If a value outside of the range is input to the speed command buffer, "Command Data Error (operation alarm A7H, detail 01H)" occurs. The speed command value becomes 0 [0.01r/min], followed by an immediate stop.
- When an alarm other than "Command Data Error (operation alarm A7H, detail 01H)" occurs, conduct a deceleration stop by the user program.



Parameter

■System parameter

Parameter No.	Symbol*1	Name	Remarks
000F	*IFMO	Interface mode option	Set the interrupt output cycle and command data update cycle.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

■Control parameter

Parameter No.	Symbol	Name	Remarks
0210	TLP	Forward rotation torque limit value	Become valid when using torque limit.
0211	TLN	Reverse rotation torque limit value	

Speed command buffer

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +100h

Address (hexadecimal)		Name	Initial value	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
7800	109000	Speed command buffer 0	0	0.01r/min	-1000000000 to 1000000000	Input the target speed for every command data update cycle.
7801	109001					
7802	109002					
7803	109003					

Monitor

When using speed control mode in interface mode, use the following monitor No. to monitor/sample the speed commands being sent to the servo amplifier.

■Operation information

Monitor No. (hexadecimal)	Content	Unit	Remarks
0324	Speed command (lower)	0.01r/min	Notify the speed command during speed control.
0325	Speed command (upper)		

■Operation information (double word)

Monitor No. (hexadecimal)	Content	Unit	Remarks
1324	Speed command	0.01r/min	Notify the speed command during speed control.

Torque control mode

Torque control mode is the mode that torque commands (torque in units of 0.1%) generated by the user program of the host personal computer can be sent to the servo amplifier. The torque command buffer is made up of torque command data × a maximum of 1 buffer.

For the update method of the buffer, refer to the following.

☞ Page 535 Control method for interrupt output valid

The relationship between the torque command and the direction of the output torque of the servo motor differs depending on the settings of "Rotation direction selection/travel direction selection (parameter No.110D)" and "POL reflection selection at torque control" of "Function selection C-B (parameter No.119C)".*1 The torque command during torque control mode is restricted by the torque control speed limit value.

*1 For MR-J5(W_)-_B, "Torque POL reflection selection" of "Travel direction selection (parameter No.200D)" and "Function selection C-B (parameter No.20AF)" [MC300]

The meanings of the signs for the following data that can be referred to by the monitor during torque control mode differ from other control modes.

- Servo information (2)

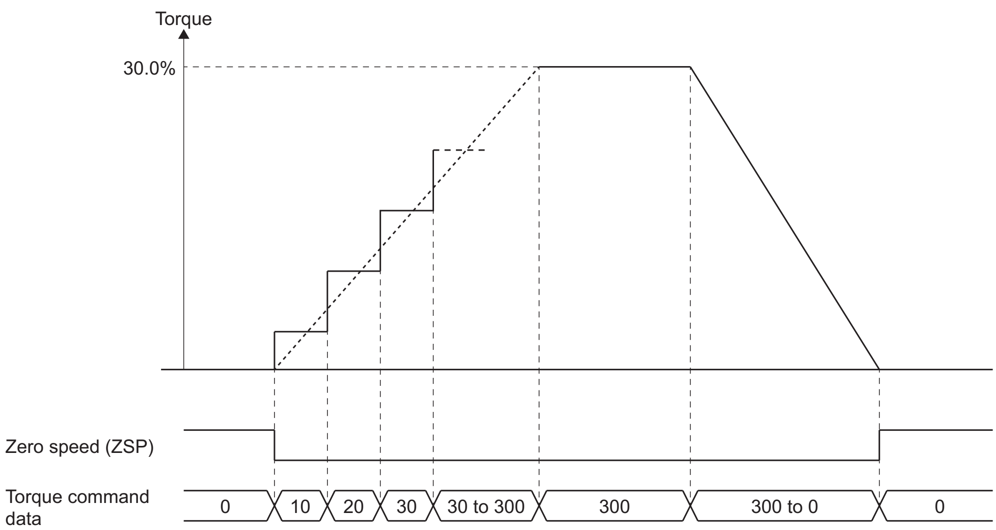
Monitor No. (hexadecimal)	Content	Unit
020A	Electrical current command	0.1%
020B	Electrical current feedback	0.1%

The meanings of the signs for "Electrical current command (monitor No.020AH)" and "Electrical current feedback (monitor No.020BH)" during torque control mode are as follows.

Parameter No.	Command direction	Motor revolution direction	Electrical current command/electrical current feedback sign		
			Position control	Speed control	Torque control
0	Positive	CCW (positive)	Positive	Positive	Positive
	Negative	CW (negative)	Negative	Negative	Negative
1	Positive	CW (negative)	Negative	Negative	Positive
	Negative	CCW (positive)	Positive	Positive	Negative

Point

- If a value outside of the range is input to the torque command buffer, "Command Data Error (operation alarm A7H, detail 02H)" occurs. The torque command value becomes the value before the change.
- When an alarm occurs, conduct a deceleration stop by the user program.



Parameter

■System parameter

Parameter No.	Symbol*1	Name	Remarks
000F	*IFMO	Interface mode option	Set the interrupt output cycle and command data update cycle.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Axis data command/status table

■Axis data command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Name	Setting range
MR-MC2_ _	MR-MC3_ _		
1048	005058	Torque control speed limit value (0.01r/min)	0 to 1000000000
1049	005059		
104A	00505A		
104B	00505B		

Torque command buffer

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +100h

Address (hexadecimal)		Name	Initial value	Unit	Setting range	Description
MR-MC2_ _	MR-MC3_ _					
8C00	111000	Torque command buffer 0	0	0.1%	-32768 to 32767	Input the target torque for every command data update cycle.
8C01	111001					
8C02	111002					
8C03	111003					

Control method for interrupt output invalid

Interrupt output invalid is compatible with position control mode only.

Point

- When the update of the latest position command buffer No. is delayed etc. due to the load, etc. on the user program, and the latest position command buffer No. and the transmit position command buffer No. continue to be the same, the same position command details are transmitted to the servo amplifier. During this time, if an axis is in operation, the command of speed 0 is output.
- When controlling with interrupt output invalid, set "Interface mode maximum buffer No. (parameter No.023F)" to 1 or more. When set to 0, the position command buffer cannot be updated and thus cannot control. (The same position command is transmitted to the servo amplifier)

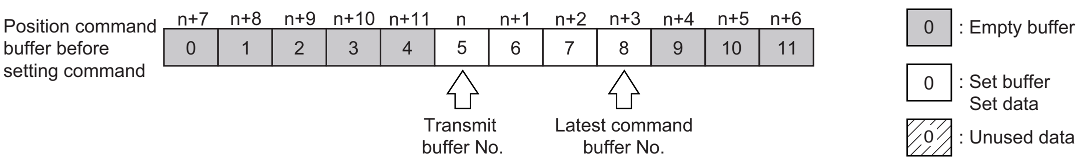
The following is the control method when interrupt output is invalidated (the interrupt output start signal (ITS) is turned OFF).
The user program updates the latest position command buffer No. by checking the latest position command buffer No. and the transmit position command buffer No. at any given time, and by setting the position command for each command data update cycle to an empty buffer. At this time, do not change the contents of the buffers between the transmit position command buffer No. and the latest position command buffer No.*1
The position board transmits the contents of the next buffer for every command data update cycle, and updates the transmit position command buffer No.

*1 When a value outside the range is set to the latest position command buffer No., "Latest Command Buffer Number Setting Error (operation alarm 2DH, detail 01H)" is output, and it stops.

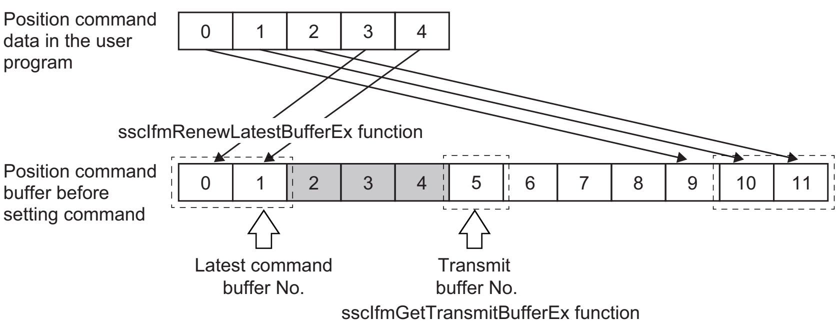
Ex.

The following is an example of when the maximum buffer No. is 11.
When the buffer status is "Example 1: Before setting buffer" as follows, and there are 5 cycles of position command data that have been calculated by the user program, set the latest position command buffer No. to 1 after setting position command data to empty buffers 9 to 11, and buffers 0 to 1. After processing, the buffer status becomes "Example 2: After setting buffer (5 cycles)" as follows.
Under the same conditions, when there are 10 cycles of position command data that have been calculated by the user program, set the latest position command buffer No. to 4 after setting position command data to buffers 9 to 11, and buffers 0 to 4. At this time, because there are only 8 empty buffers, 2 cycles of position command data cannot be set. Set these data the next time the buffers are empty. After processing, the buffer status becomes "Example 3: After setting buffer (10 cycles)" as follows.

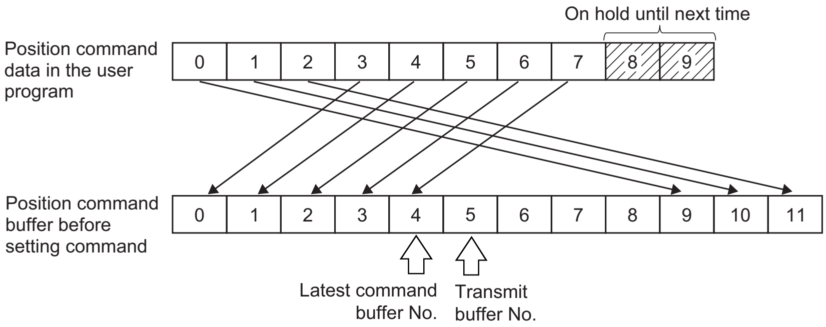
[Example 1: Before setting buffer]



[Example 2: After setting buffer (5 cycles)]

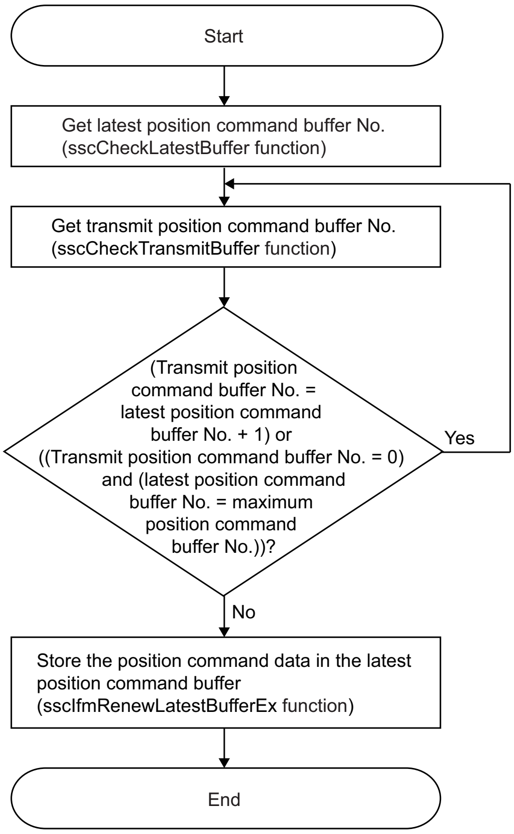


[Example 3: After setting buffer (10 cycles)]



Procedure for updating position command data

The procedure for updating position command data when interrupt output is invalid is shown below.



Point

- During servo off, always perform a follow up (store the current feedback position in the latest position command buffer). Immediately after servo on, the motor may operate at a very high speed.
- When the servo ready signal (RDY) is turned OFF due to an alarm factor etc., turn the servo on signal (SON) OFF. After removing the cause, an unexpected operation may occur.

Control method for interrupt output valid

There is no difference in control method for position control mode, speed control mode, and torque control mode when control method for interrupt output is valid. The control method is as follows.
The following is the control method when interrupt output is validated (the interrupt output start signal (ITS) is turned ON), and the number of command buffers used is 0.
After the system startup, the position board outputs the command set by the user program for every command data update cycle. While the interrupt output start signal (ITS) is turned ON, an interrupt is generated for every interrupt output cycle. Have the user program to update the command buffer 0, and read the high speed monitor within (interrupt output cycle - control cycle/2) from the generation of an interrupt. The command data update cycle and the interrupt output cycle can be set in "Interface mode option (parameter No.000F)".
In the time from the generation of an interrupt until the completion of the above process, turn ON the during user program memory access signal (HMA). When the system program reads the command, it checks the during user program memory access signal (HMA). When the signal is ON, the update is regarded as incomplete. In this case, the command is not read, and the command buffer read error counter is incremented. When this happens, the previous position command value is sent to the servo amplifier, and when in position control mode, be sure that an immediate stop follows. When in speed control mode or torque control mode, operation continues with the command data same as the previous values.
While the position board is reading command and writing high speed monitor, the during system program memory access signal (BMA) is turned ON. (If it is not a control cycle when command data is updated, the during system program memory access signal (BMA) is not turned ON).
When using several buffers in position control mode and with interrupt output valid, perform the same process as the interrupt output invalid at every interrupt output. Clear the interrupt signal (IRQ) by writing 0 to the interrupt clear register. Be sure to clear the interrupt signal within the interrupt handler.

Point

For real time processing, the execution of processes such as a command read and a communication with the high speed monitor and the servo amplifier are guaranteed.

The timing of control differs depending on the settings of the command data update cycle and interrupt output cycle. Use the table below when referring to the timing charts.

Command data update cycle	Interrupt output cycle	Reference
Control cycle × 1	Control cycle × 1	Page 537 When command data update cycle is control cycle × 1, and interrupt output cycle is control cycle × 1.
	Control cycle × n (n = 2 to 16)	*1
Control cycle × 2	Control cycle × 1	Page 538 When command data update cycle > interrupt output cycle*2
	Control cycle × 2	Page 537 When command data update cycle is control cycle × n, and interrupt output cycle is control cycle × n.
	Control cycle × n (n = 3 to 16)	*1
Control cycle × 3	Control cycle × 1	Page 538 When command data update cycle > interrupt output cycle*2
	Control cycle × 2	Unavailable
	Control cycle × 3	Page 537 When command data update cycle is control cycle × n, and interrupt output cycle is control cycle × n.
	Control cycle × n (n = 4 to 16)	*1
Control cycle × 4	Control cycle × 1	Page 538 When command data update cycle > interrupt output cycle*2
	Control cycle × 2	Page 538 When command data update cycle > interrupt output cycle*2
	Control cycle × 3	Unavailable
	Control cycle × 4	Page 537 When command data update cycle is control cycle × n, and interrupt output cycle is control cycle × n.
	Control cycle × n (n = 5 to 16)	*1
⋮	⋮	⋮
Control cycle × m (m = 5 to 16)	Control cycle × n (when n < m, and m is a factor of n)	Page 538 When command data update cycle > interrupt output cycle*2
	Control cycle × n (when n < m, and m is not a factor of n)	Unavailable
	Control cycle × n (when n = m)	Page 537 When command data update cycle is control cycle × n, and interrupt output cycle is control cycle × n.
	Control cycle × n (when n > m)	*1

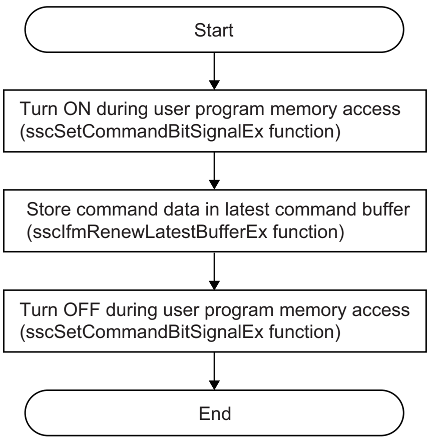
*1 When command data update cycle < interrupt output cycle, if a command is updated for every interrupt output cycle, the timing of the update of command data is still too late.
For position control mode, the update of several position command buffers is necessary for every interrupt output cycle. Set the maximum buffer No. so that (command data update cycle) × (maximum buffer No. + 1) > (interrupt output cycle), and perform the control method for interrupt output invalid at the timing of the interrupt generation.
For speed control mode or torque control mode, the above setting cannot be used.

*2 Used when the in-position signal and the current feedback position of the servo amplifier must be imported in a cycle shorter than the command data update cycle even if the update of the command is later than the control cycle.

Procedure for updating command data

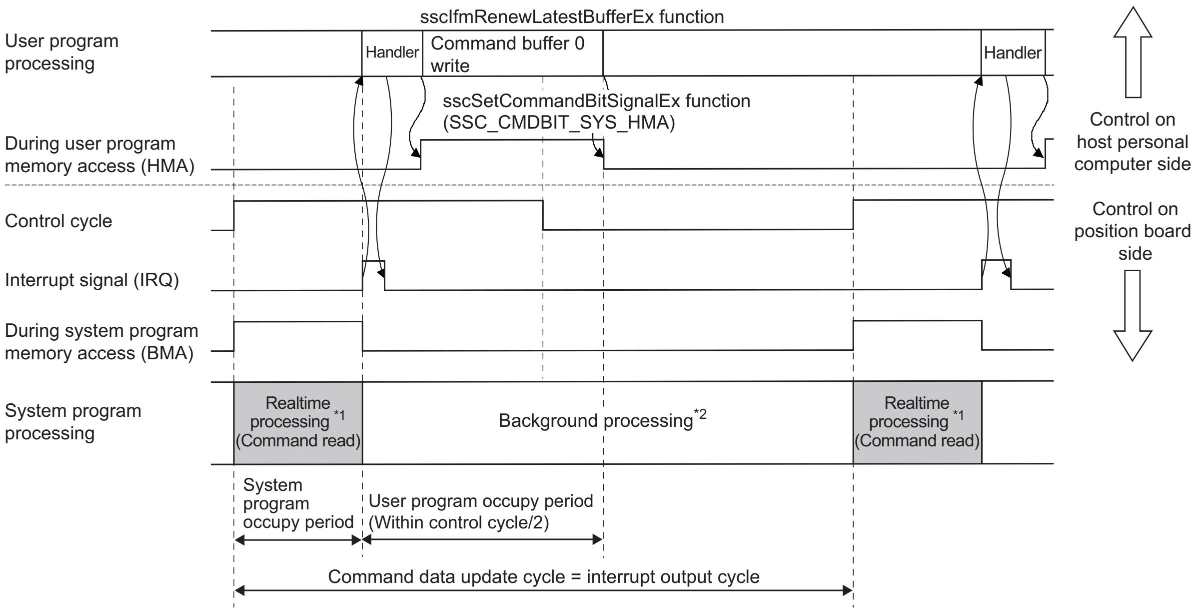
The procedure for storing command data is shown below.

There is no difference in the procedure for position control mode, speed control mode, or torque control mode.



When command data update cycle = interrupt output cycle

■When command data update cycle is control cycle × 1, and interrupt output cycle is control cycle × 1.

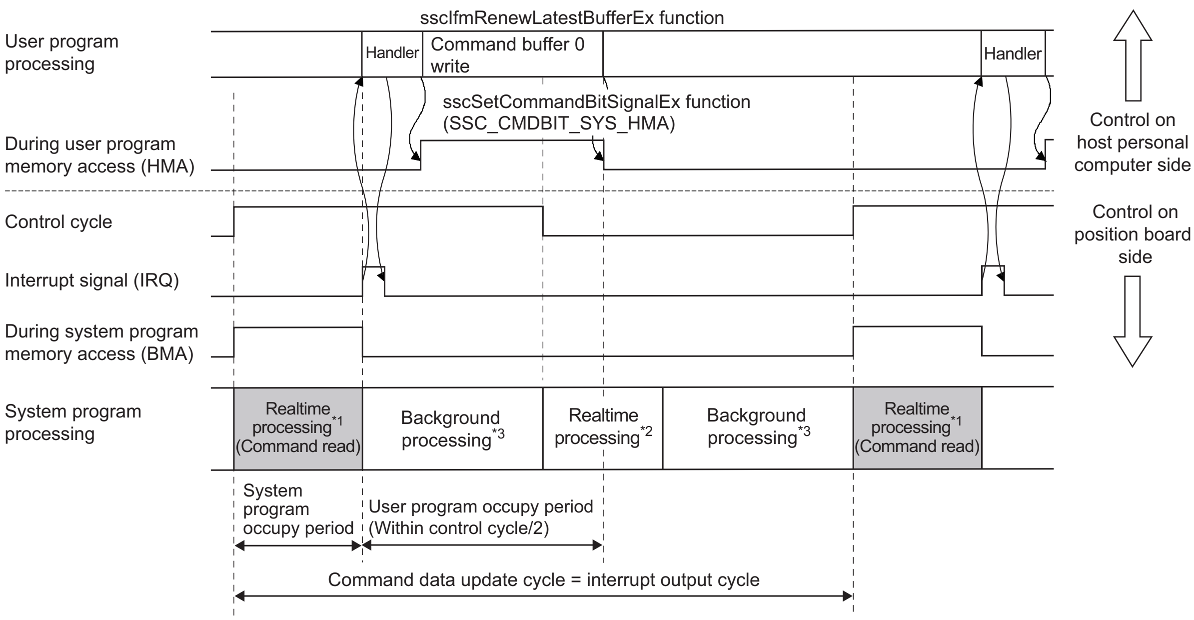


*1 For real time processing, the execution of processes such as a command read and a communication with the high speed monitor and the servo amplifier are guaranteed.

*2 For background processing, the execution of processes such as a monitoring and a parameter read/write are not guaranteed.

■When command data update cycle is control cycle × n, and interrupt output cycle is control cycle × n.

The following is an example of when command data update cycle = interrupt output cycle = control cycle × 2.



*1 For real time processing, the execution of processes such as a command read and a communication with the high speed monitor and the servo amplifier are guaranteed.

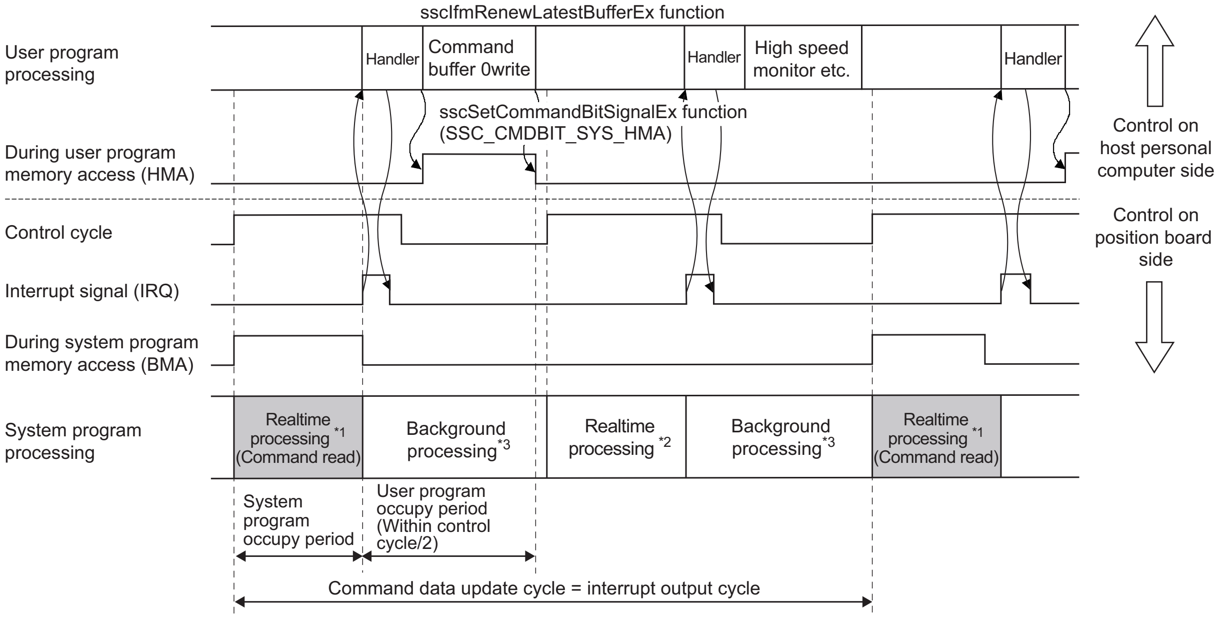
*2 Reading of command is not performed for this real time process. (During system program memory access signal (BMA) does not turn ON)

*3 For background processing, the execution of processes such as a monitoring and a parameter read/write are not guaranteed.

When command data update cycle > interrupt output cycle

The following is an example of when command data update cycle is control cycle × 2, and interrupt output cycle is control cycle × 1.

Using the interrupt output cycle as a reference, the user program updates the command buffer during the command data update cycle once only. Make sure the user program occupy period is within (interrupt output cycle) - (control cycle/2).



*1 For real time processing, the execution of processes such as a command read and a communication with the high speed monitor and the servo amplifier are guaranteed.

*2 Reading of command is not performed for this real time process. (The during system program memory access signal (BMA) does not turn ON)

*3 For background processing, the execution of processes such as a monitoring and a parameter read/write are not guaranteed.

Procedure for switching control mode

The procedure when switching control mode is as follows.

Position control mode

Switch to position control mode is performed with the following procedure.

1. Confirm that the zero speed signal (ZSP) is turned ON.
2. Perform a follow up to update the position command to match the current feedback position.
3. Input "0000h: Position control mode" to the control mode command.
4. Confirm that control mode status is "0000h: Position control mode".
5. Stop follow up.

Point

[API library]

- To confirm if the zero speed signal (ZSP) is ON/OFF in 1., set "SSC_STSBIT_AX_ZSP" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.
- To perform follow up in 2., use the ssclfmRenewLatestBufferEx function.
- To set control mode command in 3., use the ssclfmSetControlMode function
- To confirm control mode status in 4., use the ssclfmGetControlMode function.

Speed control mode

Switch to speed control mode is performed with the following procedure.

1. Confirm that the zero speed signal (ZSP) is turned ON. (Not required when switching from torque control mode)
2. Input "0001h: Speed control mode" to the control mode command.
3. Confirm that control mode status is "0001h: Speed control mode".

Point

Use "Forward rotation torque limit value (parameter No.0210)", "Reverse rotation torque limit value (parameter No. 0211)" during speed control mode. Set the value before switching modes.

Point

[API library]

- To confirm if the zero speed signal (ZSP) is ON/OFF in 1., set "SSC_STSBIT_AX_ZSP" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.
- To set control mode command in 2., use the sscIfmSetControlMode function.
- To confirm control mode status in 3., use the sscIfmGetControlMode function.

Torque control mode

Switch to torque control mode is performed with the following procedure.

1. Confirm that the zero speed signal (ZSP) is turned ON. (Not required when switching from speed control mode)
2. Input the speed limit value during torque control mode to the torque control speed limit value.
3. Input "0002h: Torque control mode" to the control mode command.
4. Confirm that control mode status is "0002h: Torque control mode".

Point

Set the torque control speed limit value before switching modes.

Point

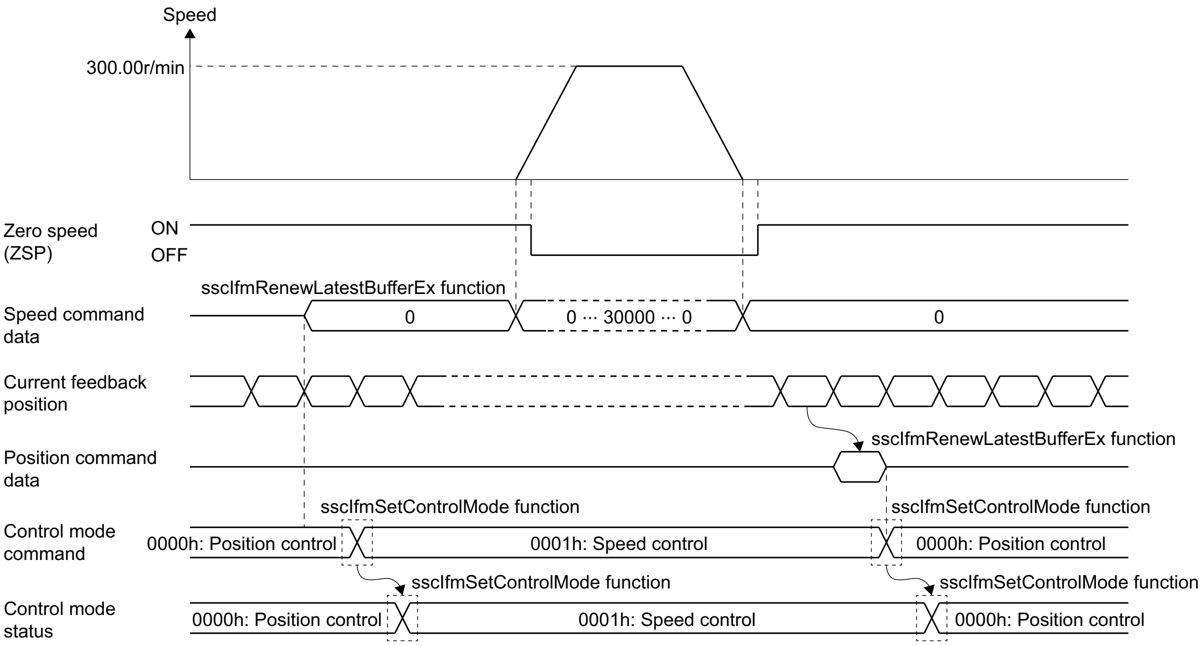
[API library]

- To confirm if the zero speed signal (ZSP) is ON/OFF in 1., set "SSC_STSBIT_AX_ZSP" to the status bit No. with the sscGetStatusBitSignalEx function/sscWaitStatusBitSignalEx function.
- To set torque control speed limit value in 2., use the sscIfmTrqSetSpeedLimit function.
- To set control mode command in 3., use the sscIfmSetControlMode function
- To confirm control mode status in 4., use the sscIfmGetControlMode function.

Examples of switching control mode

The switch timing for every setting of position control mode, speed control mode, and torque control mode when using interface mode is as follows.

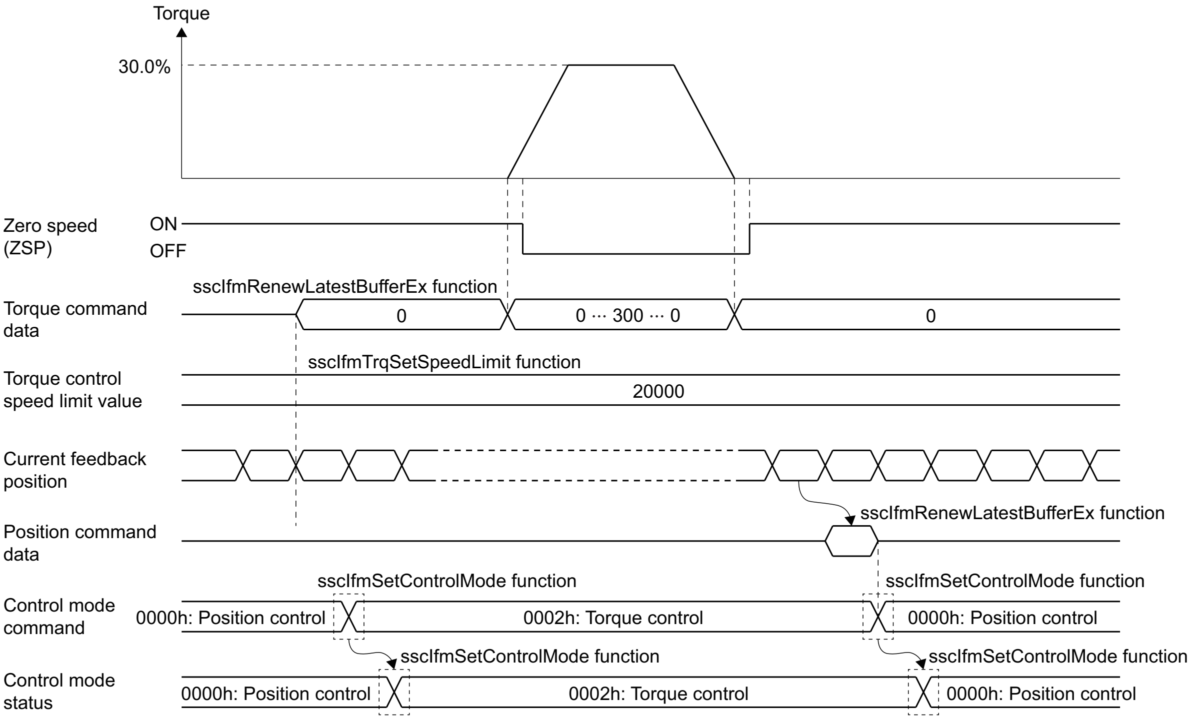
Position control mode ⇔ speed control mode



Point

When switching to position control mode and the movement amount at follow up exceeds 20000000, set position command data to the position command buffer in order to ensure that the movement amount per cycle is 20000000 or less.

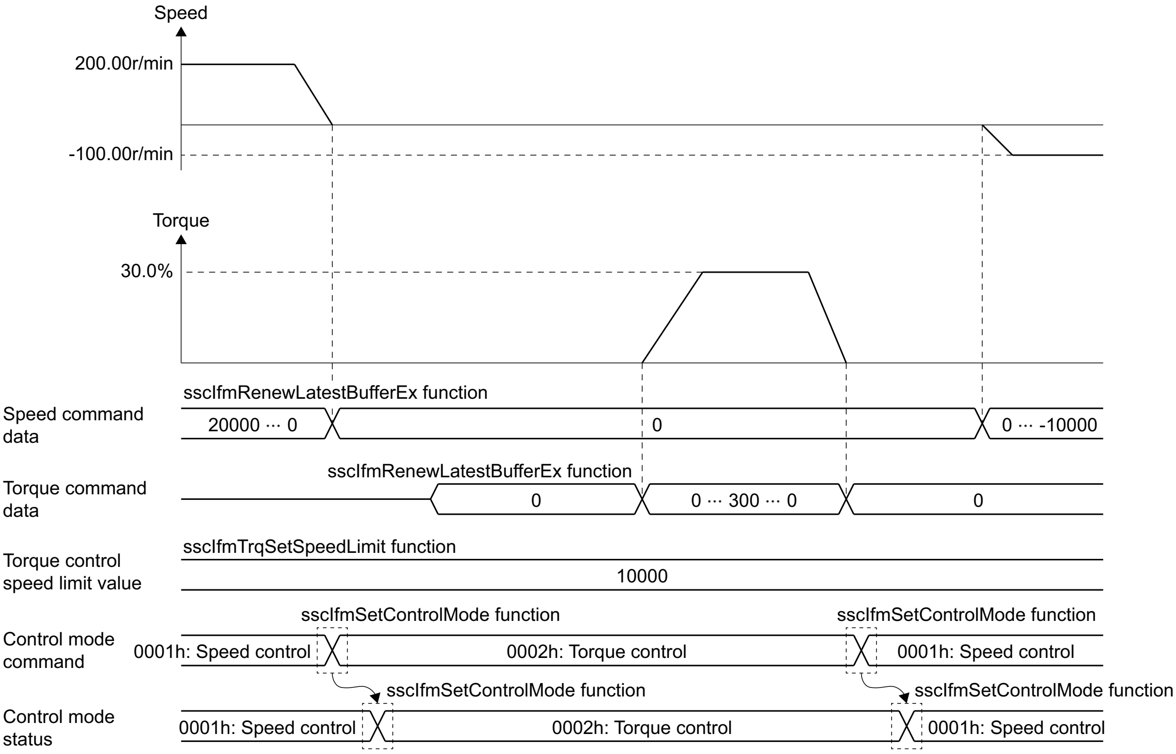
Position control mode ⇔ torque control mode



Point

- Set the torque control speed limit value before switching control modes.
- When returning to position control mode, switch control modes after confirming that the zero speed signal (ZSP) is turned ON. If control mode is switched while the zero speed signal (ZSP) is OFF, "Control Mode Switch Error (operation alarm 2EH, detail 01H)" occurs.
- When switching to position control mode and the movement amount at follow up exceeds 20000000, set position command data to the position command buffer in order to ensure that the movement amount per cycle is 20000000 or less.

Speed control mode ⇔ torque control mode



The torque at speed control, and the speed at torque control depend on the system the servo motor is connected to.
When returning to speed control during torque control, set the speed command data before switching to torque control.
Depending on the speed command data at this time, the torque may increase/decrease due to torque control.

Point

Set the torque control speed limit value before switching control modes.

9.5 Interrupt Output Cycle

When several buffers are used in interrupt valid, and interrupt output for every control cycle is not needed, the cycle of interrupt output can be changed by "Interrupt output cycle" of "Interface mode option (parameter No.000F)".

System parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
000F	*IFMO	Interface mode option	0000h	—	0000h to 0F0Fh	■■■□ (Interrupt output cycle) When interrupt by interface mode is valid, set the cycle for which the interrupt is output. • Interrupt output cycle: Control cycle × (setting value + 1) <Example> When interrupt output cycle is set to 1 and control cycle is 0.88ms Interrupt is output approximately every 1.77ms.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Interrupt output cycle

The relationship between interrupt output cycle and control cycle is shown in the table below.

Setting range	0	1	2	3	...	8	...	15
Control cycle 0.88ms	0.88ms	1.77ms	2.66ms	3.55ms	...	8.00ms	...	14.22ms
Control cycle 0.44ms	0.44ms	0.88ms	1.33ms	1.77ms	...	4.00ms	...	7.11ms
Control cycle 0.22ms	0.22ms	0.44ms	0.66ms	0.88ms	...	2.00ms	...	3.55ms

9.6 Command Data Update Cycle

The update cycle of command can be changed by "Command data update cycle" of "Interface mode option (parameter No.000F)". Generate the command for every command data update cycle by the user program, and set it to the command buffer.

Point

Because communication with the servo amplifier is performed every control cycle, the current feedback position and other high speed monitors are updated every control cycle.

System parameter

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
000F	*IFMO	Interface mode option	0000h	—	0000h to 0F0Fh	■□■■ (Command data update cycle) Set the cycle for which command is updated in interface mode. Command data update cycle: Control cycle × (setting value + 1) <Example> When command data update cycle is set to 2 and control cycle is 0.88ms Command is updated approximately every 2.66ms.

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

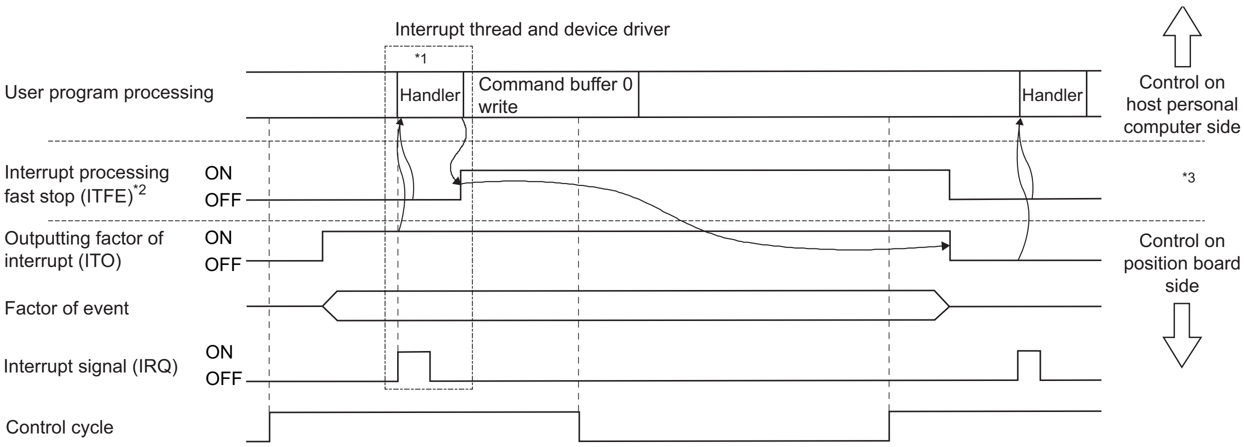
Command data update cycle

The relationship between command data update cycle and control cycle is shown in the table below.

Setting range	0	1	2	3	...	8	...	15
Control cycle 0.88ms	0.88ms	1.77ms	2.66ms	3.55ms	...	8.00ms	...	14.22ms
Control cycle 0.44ms	0.44ms	0.88ms	1.33ms	1.77ms	...	4.00ms	...	7.11ms
Control cycle 0.22ms	0.22ms	0.44ms	0.66ms	0.88ms	...	2.00ms	...	3.55ms

9.7 Event Detection Function

The event detection function detects the ON/OFF edges of specified status bits. Using this function eliminates the process of getting the status bits for every control cycle, reducing the processing load of the user program.
The event detection function outputs the factor of event to the dual port memory when an event (alarm occurrence, change in the status of sensor input) occurs. The user program monitors the factor of event in addition to referring to the outputting factor of interrupt signal (ITO), and information of outputting with factor of interrupt.
The event detection function can be used at any time, and no settings are required to use it.
For clearing the factor of event, turn ON the interrupt processing fast stop signal (ITFE). When the position board receives the interrupt processing fast stop signal (ITFE), it turns OFF the interrupt processing fast stop signal (ITFE), and clears the factor of event.



*1 The outputting factor of interrupt signal (ITO), information of outputting with factor of interrupt, and factor of axis event are read by the interrupt handler.
*2 The position board gets the commands for every control cycle.
*3 ON is performed on the API library side (interrupt handler), and OFF is performed by the position board.

Point

- When more than one event is detected in the same control cycle, all applicable factors of event turn ON.
- Factors of event are held until the interrupt processing fast stop signal (ITFE) turns ON. However, if the status of a signal changes while it is being held, the last status is retained. (Example: While a factor of event is being held, when an OFF edge is detected after the detection of an ON edge, only the OFF edge is output.)
- A factor of event in the system is the same as a system interrupt factor. Refer to the following.
☞ Page 377 Interrupt

Point

[API library]

- Getting the factor of event and turning ON the interrupt processing fast stop signal (ITFE) are processed by the interrupt thread and the device driver that are created when calling the sscIntStart function. Thus processing by user program is unnecessary.
- To get factor of event, use the sscIfmGetEventStatusBits function.

Factor of axis event

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0EE0	0043E0	Factor of event Axis 1
0EE1	0043E1	
0EE2	0043E2	
0EE3	0043E3	
—	0043E4	
	0043E5	
	0043E6	
	0043E7	
0EE4	0043E8	Factor of event Axis 2
0EE5	0043E9	
0EE6	0043EA	
0EE7	0043EB	
—	0043EC	
	0043ED	
	0043EE	
	0043EF	
0EE8	0043F0	⋮
⋮	⋮	
0F5B	0044D7	
0F5C	0044D8	Factor of event Axis 32
0F5D	0044D9	
0F5E	0044DA	
0F5F	0044DB	
—	0044DC	
	0044DD	
	0044DE	
	0044DF	
0F60	0044E0	Factor of event Axis 33*1
0F61	0044E1	
0F62	0044E2	
0F63	0044E3	
—	0044E4	
	0044E5	
	0044E6	
	0044E7	
0F64	0044E8	⋮
⋮	⋮	
0F9B	004557	
0F9C	004558	Factor of event Axis 48*1
0F9D	004559	
0F9E	00455A	
0F9F	00455B	
—	00455C	
	00455D	
	00455E	
	00455F	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
—	004560	Factor of event Axis 49
	004561	
	004562	
	004563	
	004564	
	004565	
	004566	
	004567	
	004568	Factor of event Axis 50
	004569	
	00456A	
	00456B	
	00456C	
	00456D	
	00456E	
	00456F	
	004570	⋮
	⋮	
	0045D7	
	0045D8	Factor of event Axis 64
	0045D9	
	0045DA	
	0045DB	
	0045DC	
	0045DD	
	0045DE	
	0045DF	
	0045E0	For manufacturer setting
	⋮	
	0047DF	

*1 When using MR-MC2_ _, 0F60 to 0F9F are "For manufacturer setting"

■Details on factor of event on axis n

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +4h
- Using MR-MC3_ _: +8h

Address (hexadecimal)		Bit	Symbol*1	Signal name
MR-MC2_ _	MR-MC3_ _			
0EE0 to 0EE3	0043E0 to 0043E7	0	iRDYON	Servo ready (ON edge)
		1	iINPON	In-position (ON edge)
		2	iZSPON	Zero speed (ON edge)
		3	iTLCON	Torque limit effective (ON edge)
		4	iSALMON	Servo alarm (ON edge)
		5	iSWRNON	Servo warning (ON edge)
		6	iABSEON	Absolute position erased (ON edge)
		7	iOALMON	Operation alarm (ON edge)
		8	iMAK1ON	Mark detection 1 (ON edge)
		9	iMAK2ON	Mark detection 2 (ON edge)
		10	—	For manufacturer setting
		11		
		12		
		13	iLSPON	+ side limit switch (ON edge)
		14	iLSNON	- side limit switch (ON edge)
		15	iDOGON	Proximity dog (ON edge)
		16	iRDYOF	Servo ready (OFF edge)
		17	iINPOF	In-position (OFF edge)
		18	iZSPOF	Zero speed (OFF edge)
		19	iTLCOF	Torque limit effective (OFF edge)
		20	iSALMOF	Servo alarm (OFF edge)
		21	iSWRNOF	Servo warning (OFF edge)
		22	iABSEOF	Absolute position erased (OFF edge)
		23	iOALMOF	Operation alarm (OFF edge)
		24	iMAK1OF	Mark detection 1 (OFF edge)
		25	iMAK2OF	Mark detection 2 (OFF edge)
		26	—	For manufacturer setting
		27		
		28		
		29	iLSPOF	+ side limit switch (OFF edge)
		30	iLSNOF	- side limit switch (OFF edge)
		31	iDOGOF	Proximity dog (OFF edge)
—		32	—	For manufacturer setting
		⋮		
		63		

*1 OFF: No factor of event exists.
ON : A factor of event exists.

9.8 Servo Off

If an axis has moved due to an external force during servo off, perform a follow up (refer to the formula below) to update the position command in accordance with the movement (current feedback position).

Position command = Feedback position

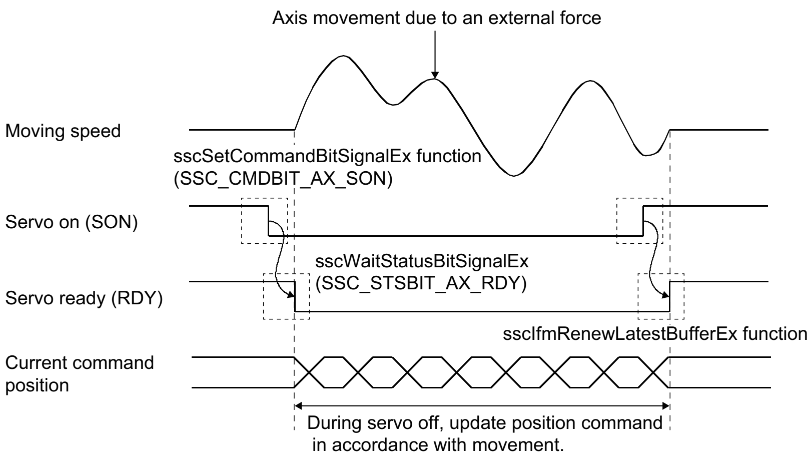
Machinery command position = Position command - Home position offset

⚠CAUTION

If a follow up is not performed, the servo amplifiers may align the current command position with the position command at servo on, and the motors may operate at a very high speed.

The coordinate return processing such as home position return after servo off is not necessary.

If servo off is performed during axis operation, a free-run state occurs which is very dangerous. Be sure to servo off after stopping operation.



Point

- After updating the position command in accordance with the current feedback position, do not servo on until the transmit position command buffer No. is the same as the latest position command buffer No.
- When the command data update cycle (control cycle × 2 or more) is set, the time of the command data update cycle set to the position board follow up applies. When the command data update cycle is set, make sure servo on is performed at the next command data update or later.

9.9 Home Position Return

When startup is performed in interface mode, the operational function home position return cannot be used. Therefore, for an absolute position detection system, use the following method to perform the home position return. For an incremental system, home position set is not necessary. (The position at power supply ON is treated as 0).

1. Update the position command buffer and move to the home position.
2. Confirm that the in-position signal (INP) is ON.
3. Turn ON the home position set command signal (ZSC).
4. Confirm that the home position set complete signal (ZSF) turns ON.
5. Read "Home position multiple revolution data (parameter No.024D)", and "Home position within 1 revolution position (parameter No.024E, 024F)", and save to the user program.
6. The next time power supply is ON, set the parameters read in 5.
7. The position board restores the absolute position based on the parameters above.

When home position return is performed by this function, coordinate systems such as the current command position and current feedback position are in the same state before home position return and do not change until the power supply is turned OFF/ON again. Therefore, after home position return, perform a home position offset for position commands at home position return as shown in the formula below.

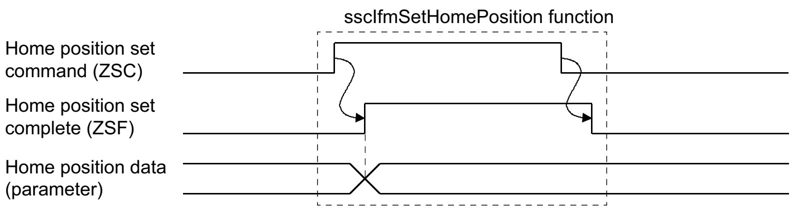
Position command = Machinery command position + Home position offset

- Position command: Position provided to the position board. [pulse]
- Machinery command position: The actual position to move the machine to. [pulse]
- Home position offset: The difference between machinery command position and position command. [pulse]

When the home position coordinates are set by parameters, the absolute position is restored so that the place of set home position is the same as the home position coordinates.

When the home position set command signal (ZSC) turns ON while the in-position signal (INP) is OFF, the home position set error signal (ZSE) turns ON, and home position return is not completed.

Also, when position command exceeds 32bit or motor exceeds ±32767 revolutions when moving from the home position in an absolute position detection system, the current command position cannot be normally restored at power supply on. Use absolute position detection system within ±32767 revolutions and with position commands within 32bit.



Axis data command/status bit

■Axis data command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100A	00500A	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	ZSC	Home position set command	—
		5	—	For manufacturer setting	—
		6			
		7			

- Details on axis data command bit

Symbol	Signal name	Function details	
		Function	Operation
ZSC	Home position set command	Commands home position set.	When the home position set command signal (ZSC) is turned ON, the current position is set as home position. This is used when absolute position detection system is valid.

■Axis data status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106A	0050AA	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	ZSF	Home position set complete	—
		5	ZSE	Home position set error	—
		6	—	For manufacturer setting	—
		7			

- Details on axis data status bit

Symbol	Signal name	Function details		
		Function	Operation	
			Conditions for turning ON	Conditions for turning OFF
ZSF	Home position set complete	Notifies the home position set is complete.	Home position set is completed.	The home position set command signal (ZSC) is turned OFF.
ZSE	Home position set error	Notifies the home position set failed.	• During an operation alarm. • During servo off (including servo alarm). • During test mode. • The in-position signal (INP) is OFF.	The home position set command signal (ZSC) is turned FOFF.

9.10 Coordinate Management

This section shows an example of how to approach coordination management.

Incremental system

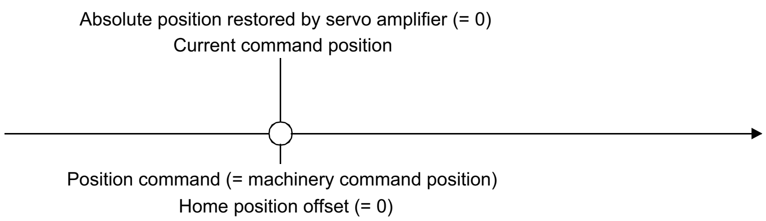
When using servo amplifiers with incremental system setting, the current command position (position command) when SSCNET connection is restored is 0. Afterwards, a coordinate system value for a position of 0 when the SSCNET is connected needs to be used for the position command that the user program applies to position board until connecting to SSCNET again. In many cases, the actual home position of the machine and the home position of the position command (position when SSCNET is connected) are different, therefore, the position command is calculated using the machinery command position and home position offset with the following formula.

Position command = Machinery command position + Home position offset

When connected to SSCNET

Because the current command position (position command) when SSCNET connection is restored is 0, set home position offset to 0.

Until home position is determined, machinery command position is undefined. Use the position that is referred to when connected to SSCNET (= 0) as the machinery command position.

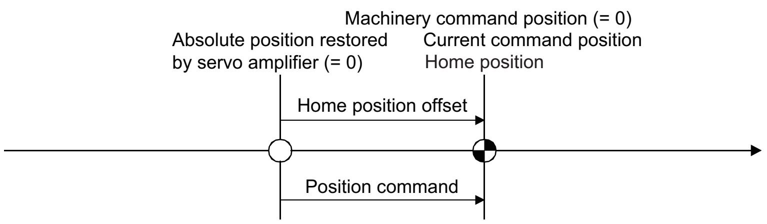


Home position return

When home position return is required, move to home position on the user program side.

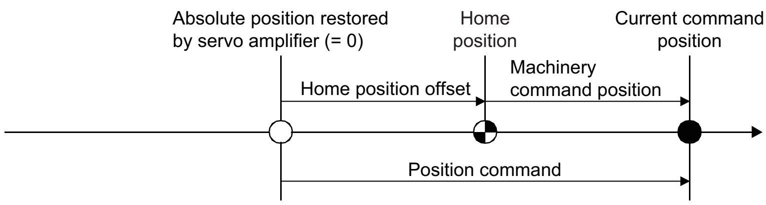
The home position of the position command (distance from position when connected to SSCNET to home position) is the home position offset after home position return.

In an incremental system, home position set for position board is not required.



After home position return

Calculate the position command (= machinery command position + home position offset) by using the home position offset determined at home position return.



Absolute position system

When using servo amplifiers with absolute position system setting, the absolute position restored when connected to SSCNET is a position calculated from "home position coordinates", "home position within 1 revolution", and "home position multiple revolution data" set to the parameters. Afterwards, a coordinate system value for when the SSCNET is connected needs to be used for the position command that the user program applies to position board until connecting to SSCNET again.

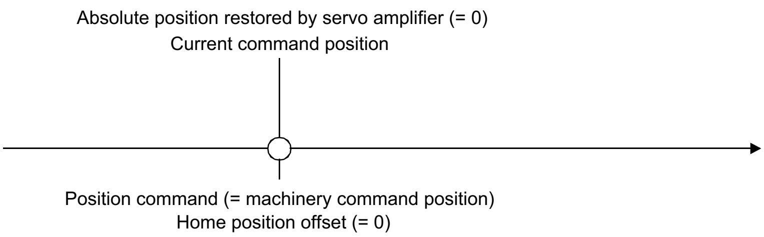
Similar to an incremental system, the coordinate system does not change after home position return operation (after home position set). As a result, the actual home position of the machine and the home position of the position command (position when SSCNET is connected) is different, therefore, the position command is calculated using the machinery command position and home position offset with the following formula.

Position command = Machinery command position + Home position offset

When connected to SSCNET (home position is not determined)

Because the current command position (position command) when SSCNET connection is restored is 0, set home position offset to 0.

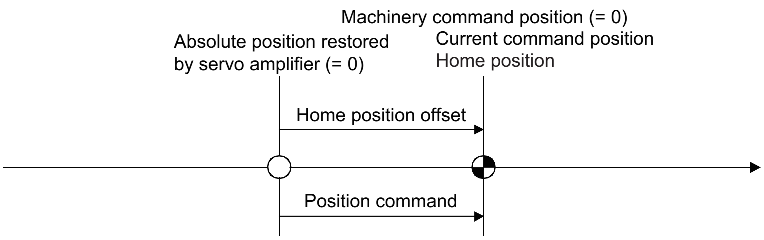
Until home position is determined, machinery command position is undefined. Use the position that is referred to when connected to SSCNET (= 0) as the machinery command position.



Home position return

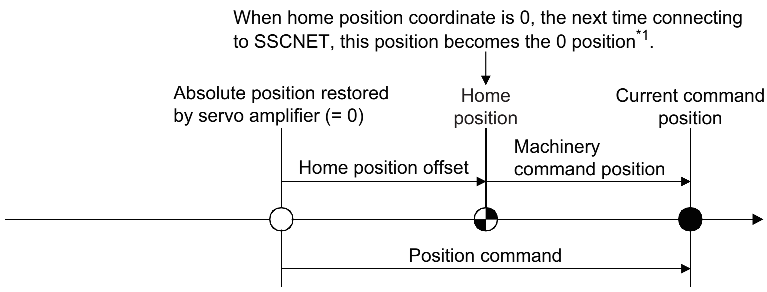
Move to home position on the user program side, execute home position set, and determine the home position.

The home position of the position command (distance from position when connected to SSCNET to home position) is the home position offset after home position return.



After home position return

Position board also operates with the same coordinate system as when connected to SSCNET after home position return. As a result, the machinery command position and position command deviate by the difference between the new coordinate system and the coordinate system when connected to SSCNET. Set the amount of deviation to the home position offset.



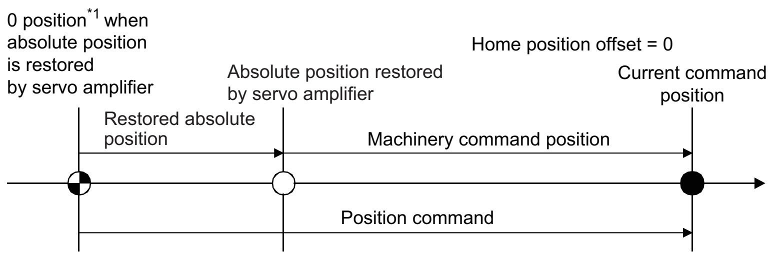
*1 0 position is the position in the coordinate system where machinery command position is 0 when restoring absolute position, or after home position return. (When the home position coordinate is 0, this is the position after performing home position return)

Except for when home position coordinate is 0, the formula for calculating home position offset is as follows.

Home position offset = Position command at home position return - Home position coordinate

After restoring absolute position

After restoring the home position, the machinery command position and position command are equivalent, thus set home position offset to 0.



*1 0 position is the position in the coordinate system where machinery command position is 0 when restoring absolute position, or after home position return. (When the home position coordinate is 0, this is the position after performing home position return)

9.11 Precautions

When performing interface mode, the following precautions apply.

- For the setting value of the position command buffer, ensure that the difference between the previous command value and the current command value is no more than 20000000. When the difference between the previous command value and the current command value exceeds 20000000, "Command Data Error (operation alarm A7H, detail 03H)" occurs, followed by an immediate stop.
- If a value outside of the range is input to the speed command buffer, "Command Data Error (operation alarm A7H, detail 01H)" occurs. The speed command value becomes 0 [0.01r/min], followed by an immediate stop.
- If a value outside of the range is input to the torque command buffer, "Command Data Error (operation alarm A7H, detail 02H)" occurs. The torque command value becomes the value before the change.

10 TABLE MAP

10.1 Table Map List

Point

- Do not write to manufacturer setting areas.
- The start No. in the point table for each axis can be designated by using point No. offset.

MR-MC2_ _ table

- Dual port memory

Address (hexadecimal)	Table area content			Reference
0000h ⋮	System information (992bytes)			Page 560 System Information
03E0h ⋮	System command/status (224bytes)			Page 564 System Command/status
04C0h ⋮	Outputting information with factor of interrupt (16bytes)			Page 578 Outputting information with factor of interrupt
04D0h ⋮	Interrupt factor for each axis (192bytes)			Page 579 Interrupt factor for each axis
0590h ⋮	System interrupt factor (32bytes)			Page 582 System interrupt factor
05B0h ⋮	Interrupt factor for each station (16bytes)			Page 593 Interrupt factor for each station
05C0h ⋮	For manufacturer setting (272bytes)			—
06D0h ⋮	System configuration information (176bytes)			Page 598 System Configuration Information
0780h ⋮	For manufacturer setting (1888bytes)			—
0EE0h ⋮	Factor of event (192bytes)			Page 595 Factor of Event
0FA0h ⋮	Details on factor of pass position interrupt (64bytes)			Page 592 Details on factor of pass position interrupt
0FE0h ⋮	Details on factor of other axes start interrupt (32bytes)			Page 586 Details on factor of other axes start interrupt
1000h ⋮	Command/status for each axis (7680bytes)	Axis 1 (192bytes)	Command	Page 599 Axis Data
			Status	
10C0h ⋮		Axis 2 (192bytes)	Command	
			Status	
1180h ⋮		Axis 3 (192bytes)	Command	
			Status	
⋮		⋮	Command	
			Status	
2740h ⋮		Axis 32 (192bytes)	Command	
			Status	
2800h ⋮		For manufacturer setting (1536bytes)		—
2E00h ⋮	For manufacturer setting (1536bytes)			—

Address (hexadecimal)	Table area content			Reference
3400h ⋮	RIO command/status (1024bytes)	Station 1 (128bytes)	Command	Page 628 Remote I/O Data
			Status	
3480h ⋮		Station 2 (128bytes)	Command	
			Status	
3500h ⋮		Station 3 (128bytes)	Command	
			Status	
3580h ⋮		Station 4 (128bytes)	Command	
			Status	
3600h ⋮		For manufacturer setting (512bytes)		—
3800h ⋮	For manufacturer setting (112bytes)			—
3870h ⋮	Servo parameter change No. (J4) (1024bytes)			Page 635 Servo Parameter Change No. (SSCNETIII/H)
39F0h ⋮	For manufacturer setting (5552bytes)			—
4FA0h ⋮	Point No. offset (80bytes)			Page 641 Point No. Offset
4FF0h ⋮	For manufacturer setting (16bytes)			—
5000h(0000h)*1 ⋮	Point table/position command buffer (10240bytes)	Axis 1 (256bytes)		Page 643 Position command buffer
5100h(0008h)*1 ⋮		Axis 2 (256bytes)		
5200h(0010h)*1 ⋮		Axis 3 (256bytes)		
⋮		⋮		
6F00h(00F8h)*1 ⋮		Axis 32 (256bytes)		
7000h(0100h)*1 ⋮		For manufacturer setting (2048bytes)		—
7800h ⋮	Speed command buffer (5120bytes)			Page 645 Speed command buffer
8C00h ⋮	Torque command buffer (5120bytes)			Page 645 Torque command buffer
A000h ⋮	High speed monitor (1280bytes)			—
A500h ⋮	For manufacturer setting (320bytes)			—
A640h ⋮	Pass position interrupt (512bytes)			Page 251 Pass position interrupt table
A840h ⋮	Continuous operation to torque control data (1536bytes)			Page 654 Continuous Operation to Torque Control Data
AE40h ⋮	For manufacturer setting (448bytes)			—
B000h ⋮	Digital I/O (256bytes)			Page 646 Digital I/O [MC200]
B100h ⋮	For manufacturer setting (1008bytes)			—
B4F0h ⋮	Mark detection command/status data (1536bytes)			Page 649 Mark Detection Command/status
BAF0h ⋮	Mark detection edge data (64bytes)			Page 650 Mark detection edge data
BB30h ⋮	Mark detection positioning data (256bytes)			Page 652 Mark detection positioning data
BC30h ⋮	Alarm history data (256bytes)			Page 469 Alarm History Function

Address (hexadecimal)	Table area content	Reference
BD30h ⋮	For manufacturer setting (112bytes)	—
BDA0h ⋮	Sampling data (96bytes)	Page 405 Command/status data
BE00h ⋮	Sampling data read (4224bytes)	Page 426 Sampling data read
CE80h ⋮	For manufacturer setting (1408bytes)	—
D400h ⋮	Transient transmit command/status (1792bytes)	Page 640 Transient Transmit Command/status
DB00h ⋮	I/O device (1024bytes)	Page 647 I/O Device
DF00h ⋮	Log data (256bytes)	Page 436 Log
E000h ⋮	For manufacturer setting (64bytes)	—
E040h ⋮	Interpolation group No. being executed (64bytes)	Page 655 Interpolation Group No. Being Executed
E080h ⋮	Other axes start command/status (128bytes)	Page 221 Other axes start command/status table
E100h ⋮	Other axes start data (3328bytes)	Page 214 Other axes start data table
EE00h ⋮	For manufacturer setting (384bytes)	—
EF80h ⋮	Dual port memory exclusive control (16bytes)	Page 248 Exclusive control of output signals
EF90h ⋮ EFFFh	For manufacturer setting (4208bytes)	—

Address (hexadecimal)	Table area content	Reference
20000h ⋮ 2000Fh	Board information (16bytes)	Page 45 Board information

*1 "( )" in the address refers to the point No. offset.

MR-MC3_ _ table

- Dual port memory

Address (hexadecimal)	Table area content			Reference
000000h ⋮	System information (2816bytes)			Page 560 System Information
000B00h ⋮	System command/status (448bytes)			Page 564 System Command/status
000CC0h ⋮	System configuration information (832bytes)			Page 598 System Configuration Information
001000h ⋮	Board information (32bytes)			Page 45 Board information
001020h ⋮	For manufacturer setting (4064bytes)			—
002000h ⋮	Outputting information with factor of interrupt (32bytes)			Page 578 Outputting information with factor of interrupt
002020h ⋮	Interrupt factor for each axis (512bytes)			Page 579 Interrupt factor for each axis
002220h ⋮	System interrupt factor (128bytes)			Page 582 System interrupt factor
0022A0h ⋮	Interrupt factor for each station (16bytes)			Page 593 Interrupt factor for each station
0022E0h ⋮	For manufacturer setting (8448bytes)			—
0043E0h ⋮	Factor of event (1024bytes)			Page 595 Factor of Event
0047E0h ⋮	Details on factor of pass position interrupt (128bytes)			Page 592 Details on factor of pass position interrupt
004860h ⋮	For manufacturer setting (128bytes)			—
0048E0h ⋮	Details on factor of other axes start interrupt (64bytes)			Page 586 Details on factor of other axes start interrupt
004920h ⋮	For manufacturer setting (1760bytes)			—
005000h ⋮	Command/status for each axis (40960bytes)	Axis 1 (320bytes)	Command	Page 599 Axis Data
			Status	
005140h ⋮		Axis 2 (320bytes)	Command	
			Status	
005280h ⋮		Axis 3 (320bytes)	Command	
			Status	
⋮		⋮	Command	
			Status	
009EC0h ⋮		Axis 64 (320bytes)	Command	
			Status	
00A000h ⋮		For manufacturer setting (20480bytes)		—

Address (hexadecimal)	Table area content			Reference
00F000h ⋮	RIO command/status (6144bytes)	Station 1 (192bytes)	Command	Page 628 Remote I/O Data
			Status	
00F0C0h ⋮		Station 2 (192bytes)	Command	
			Status	
00F180h ⋮		Station 3 (192bytes)	Command	
			Status	
⋮		⋮	Command	
			Status	
00FB40h ⋮		Station 16 (192bytes)	Command	
			Status	
00FC00h ⋮		For manufacturer setting (3072bytes)		—
010800h ⋮	Servo parameter change No. (J4) (1024bytes)			Page 635 Servo Parameter Change No. (SSCNETIII/H)
010C00h ⋮	For manufacturer setting (256bytes)			—
010D00h ⋮	Servo parameter change No. (J5) (1024bytes)			Page 638 Servo parameter change No. (SSCNETIII/H) (J5) [MC300]
011100h ⋮	For manufacturer setting (60928bytes)			—
01FF00h ⋮	Point No. offset (256bytes)			Page 641 Point No. Offset
020000h ⋮	Point table (196608bytes)	Axis 1 (1536bytes)		—
020600h ⋮		Axis 2 (1536bytes)		
020C00h ⋮		Axis 3 (1536bytes)		
⋮		⋮		
037A00h ⋮		Axis 64 (1536bytes)		
038000h ⋮		For manufacturer setting (98304bytes)		—
050000h ⋮	For manufacturer setting (589824bytes)			—
0E0000h ⋮	High speed monitor (4096bytes)			—
0E1000h ⋮	Pass position interrupt (1024bytes)			Page 251 Pass position interrupt table
0E1400h ⋮	For manufacturer setting (1024bytes)			—
0E1800h ⋮	Continuous operation to torque control data (4096bytes)			Page 654 Continuous Operation to Torque Control Data
0E2800h ⋮	For manufacturer setting (512bytes)			—
0E2A00h ⋮	Mark detection command/status data (4096bytes)			Page 649 Mark Detection Command/status
0E3A00h ⋮	Mark detection edge data (128bytes)			Page 650 Mark detection edge data
0E3A80h ⋮	For manufacturer setting (128bytes)			—
0E3B00h ⋮	Mark detection positioning data (512bytes)			Page 652 Mark detection positioning data
0E3D00h ⋮	For manufacturer setting (512bytes)			—
0E3F00h ⋮	Alarm history data (256bytes)			Page 469 Alarm History Function

Address (hexadecimal)	Table area content	Reference
0E4000h ⋮	For manufacturer setting (96bytes)	—
0E4060h ⋮	Sampling data (160bytes)	Page 405 Command/status data
0E4100h ⋮	Sampling data read (16896bytes)	Page 426 Sampling data read
0E8300h ⋮	For manufacturer setting (67584bytes)	—
0F8B00h ⋮	Transient transmit command/status (5120bytes)	Page 640 Transient Transmit Command/status
0F9F00h ⋮	I/O device (2304bytes)	Page 647 I/O Device
0FA800h ⋮	For manufacturer setting (2304bytes)	—
0FB100h ⋮	Log data (256bytes)	Page 436 Log
0FB200h ⋮	For manufacturer setting (512bytes)	—
0FB400h ⋮	Interpolation group No. being executed (128bytes)	Page 655 Interpolation Group No. Being Executed
0FB480h ⋮	Other axes start command/status (256bytes)	Page 221 Other axes start command/status table
0FB580h ⋮	For manufacturer setting (256bytes)	—
0FB680h ⋮	Other axes start data (8192bytes)	Page 214 Other axes start data table
0FD680h ⋮	For manufacturer setting (9216bytes)	—
0FFA80h ⋮	Exclusive control (16bytes)	Page 248 Exclusive control of output signals
0FFA90h ⋮	For manufacturer setting (5488bytes)	—
101000h ⋮	Position command buffer (32768bytes)	Page 643 Position command buffer
109000h ⋮	Speed command buffer (32768bytes)	Page 645 Speed command buffer
111000h ⋮	Torque command buffer (32768bytes)	Page 645 Torque command buffer
119000h ⋮	For manufacturer setting (4096bytes)	—
11A000h ⋮	Expanded parameter (4096bytes)	Page 656 Expanded parameter [MC300]
11B000h ⋮ 7FFFFFh	For manufacturer setting (7229440bytes)	—

10.2 System Information

Address (hexadecimal)		Content	
MR-MC2_ _	MR-MC3_ _		
0000	000000	CH No.	
0001	000001		
0002	000002	Number of lines	
0003	000003		
0004	000004	Control cycle status	0001h: 0.88ms 0002h: 0.44ms 0003h: 0.22ms
0005	000005		
0006	000006	For manufacturer setting	
0007	000007		
0008	000008	SSCNET communication method	0: Not connected 1: SSCNETⅢ/H
0009	000009		
000A	00000A	For manufacturer setting	
⋮	⋮		
000F	00000F		
0010	000010	Interrupt output cycle	
0011	000011		
0012	000012	Command data update cycle	
0013	000013		
0014	000014	Operation cycle current time	
0015	000015		
0016	000016	Operation cycle maximum time	
0017	000017		
0018	000018	Operation cycle over time	
0019	000019		
001A	00001A	For manufacturer setting	
⋮	⋮		
002F	00002F		
—	000030		
	⋮		
	0000BF		
—	0000C0	Serial No.	
	0000C1		
	0000C2		
	0000C3		
	0000C4		
	0000C5		
	0000C6		
	0000C7		
	0000C8		
	0000C9		
	0000CA		
	0000CB		
	0000CC		
	0000CD		
	0000CE		
	0000CF		

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0030	0000D0	System program software version
0031	0000D1	
0032	0000D2	
0033	0000D3	
0034	0000D4	
0035	0000D5	
0036	0000D6	
0037	0000D7	
0038	0000D8	
0039	0000D9	
003A	0000DA	
003B	0000DB	
003C	0000DC	
003D	0000DD	
003E	0000DE	
003F	0000DF	
0040	0000E0	For manufacturer setting
⋮	⋮	
005F	0000FF	
0060	000100	Servo amplifier software version (Axis 1)
0061	000101	
0062	000102	
0063	000103	
0064	000104	
0065	000105	
0066	000106	
0067	000107	
0068	000108	
0069	000109	
006A	00010A	
006B	00010B	
006C	00010C	
006D	00010D	
006E	00010E	
006F	00010F	
0070	000110	Servo amplifier software version (Axis 2)
⋮	⋮	
007F	00011F	
0080	000120	Servo amplifier software version (Axis 3)
⋮	⋮	
008F	00012F	
0090	000130	Servo amplifier software version (Axis 4)
⋮	⋮	
009F	00013F	
00A0	000140	⋮
⋮	⋮	
024F	0002EF	
0250	0002F0	Servo amplifier software version (Axis 32)
⋮	⋮	
025F	0002FF	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0260	000300	Servo amplifier software version (Axis 33)*1
⋮	⋮	
026F	00030F	
0270	000310	⋮
⋮	⋮	
034F	0003EF	
0350	0003F0	Servo amplifier software version (Axis 48)*1
⋮	⋮	
035F	0003FF	
—	000400	Servo amplifier software version (Axis 49)
	⋮	
	00040F	
	000410	⋮
	⋮	
	0004EF	
	0004F0	Servo amplifier software version (Axis 64)
	⋮	
	0004FF	
—	000500	For manufacturer setting
	⋮	
	0008FF	
0360	000900	Remote I/O software version (Station 1)
0361	000901	
0362	000902	
0363	000903	
0364	000904	
0365	000905	
0366	000906	
0367	000907	
0368	000908	
0369	000909	
036A	00090A	
036B	00090B	
036C	00090C	
036D	00090D	
036E	00090E	
036F	00090F	
0370	000910	Remote I/O software version (Station 2)
⋮	⋮	
037F	00091F	
0380	000920	Remote I/O software version (Station 3)
⋮	⋮	
038F	00092F	
0390	000930	Remote I/O software version (Station 4)
⋮	⋮	
039F	00093F	
03A0	000940	Remote I/O software version (Station 5)*1
⋮	⋮	
03AF	00094F	
03B0	000950	⋮
⋮	⋮	
03CF	00096F	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
03D0	000970	Remote I/O software version (Station 8)*1
⋮	⋮	
03DF	00097F	
—	000980	Remote I/O software version (Station 9)
	⋮	
	00098F	
	000990	⋮
	⋮	
	0009EF	
	0009F0	Remote I/O software version (Station 16)
	⋮	
	0009FF	
	000A00	For manufacturer setting
	⋮	
	000AFF	

*1 When using MR-MC2_ _, 0260 to 035F, and 03A0 to 03DF are "For manufacturer setting".

10.3 System Command/status

System commands

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
03E0	000B00	Command bit
03E1	000B01	
03E2	000B02	
03E3	000B03	
03E4	000B04	
03E5	000B05	
03E6	000B06	
03E7	000B07	
03E8	000B08	
03E9	000B09	
03EA	000B0A	
03EB	000B0B	
03EC	000B0C	
03ED	000B0D	
03EE	000B0E	
03EF	000B0F	
03F0	000B10	
03F1	000B11	
03F2	000B12	
03F3	000B13	
03F4	000B14	
03F5	000B15	
03F6	000B16	
03F7	000B17	
03F8	000B18	
03F9	000B19	
03FA	000B1A	
03FB	000B1B	
03FC	000B1C	
03FD	000B1D	
03FE	000B1E	
03FF	000B1F	
—	000B20	
	000B21	
	000B22	
	000B23	
	000B24	
	000B25	
	000B26	
	000B27	
	000B28	
	000B29	
	000B2A	
	000B2B	
	000B2C	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
—	000B2D	For manufacturer setting
	000B2E	
	000B2F	
0400	000B30	System command code
0401	000B31	
0402	000B32	Watchdog check counter
0403	000B33	
0404	000B34	Watchdog timer start counter
0405	000B35	
0406	000B36	Reboot ID
0407	000B37	
0408	000B38	Flash ROM transfer ID (Flash ROM initialization ID)
0409	000B39	
040A	000B3A	For manufacturer setting
⋮	⋮	
040F	000B3F	
0410	000B40	Monitor No.1
0411	000B41	
0412	000B42	Monitor No.2
0413	000B43	
0414	000B44	For manufacturer setting
⋮	⋮	
0417	000B47	
0418	000B48	Parameter write No.1
0419	000B49	
041A	000B4A	Parameter write data 1
041B	000B4B	
041C	000B4C	Parameter write No.2
041D	000B4D	
041E	000B4E	Parameter write data 2
041F	000B4F	
0420	000B50	Parameter read No.1
0421	000B51	
0422	000B52	For manufacturer setting
0423	000B53	
0424	000B54	Parameter read No.2
0425	000B55	
0426	000B56	For manufacturer setting
0427	000B57	
0428	000B58	Log data read page No.
0429	000B59	
042A	000B5A	For manufacturer setting
⋮	⋮	
0433	000B63	
0434	000B64	Disconnection axis No.
0435	000B65	
0436	000B66	For manufacturer setting
⋮	⋮	
0443	000B73	
0444	000B74	Alarm history read page No.
0445	000B75	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0446	000B76	Alarm history initialization ID
0447	000B77	
0448	000B78	System startup time
0449	000B79	
044A	000B7A	
044B	000B7B	
044C	000B7C	
044D	000B7D	
044E	000B7E	
044F	000B7F	
—	000B80	For manufacturer setting
	⋮	
	000BDF	

System command code

System command code	Content
0000	Initial value
0003	Parameter initialization
0004	Flash ROM parameter reading
000A	Start system startup

Reboot ID

Reboot ID	Remarks
1EA5	Set when rebooting software.

Flash ROM transfer ID (Flash ROM initialization ID)

Flash ROM transfer ID (Flash ROM initialization ID)	Remarks
A51E	Set when transferring data to flash ROM.
A55A	Set when initializing flash ROM.

Command bit

For each bit, "0" stands for invalid and "1" stands for valid.

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E0	000B00	0	ITE	Interrupt processing stop
		1	ITS	Interrupt output start
		2	—	For manufacturer setting
		3		
		4	HMA	During user program memory access
		5	—	For manufacturer setting
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E1	000B01	0	SMPS	Sampling start
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E2	000B02	0	SEMI	Software forced stop*1
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

*1 Software forced stop is a normally-open contact (an external forced stop is a normally-closed contact). When the signal is turned ON, the status becomes forced stop status. This is different than an external forced stop, in that it is performed through software processing.

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E3	000B03	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E4	000B04	0	ITFE	Interrupt processing fast stop
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E5	000B05	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E6	000B06	0	ASYN1	Non-synchronous command (group 1)
		1	ASYN2	Non-synchronous command (group 2)
		2	ASYN3	Non-synchronous command (group 3)
		3	ASYN4	Non-synchronous command (group 4)
		4	ASYN5	Non-synchronous command (group 5)
		5	ASYN6	Non-synchronous command (group 6)
		6	ASYN7	Non-synchronous command (group 7)
		7	ASYN8	Non-synchronous command (group 8)

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E7	000B07	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E8	000B08	0	RBR	Reboot preparation
		1	RBS	Execution of reboot
		2	CRST	System alarm reset
		3	—	For manufacturer setting
		4	SMON	System monitor command
		5	SMONR	System monitor latch command
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03E9	000B09	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03EA	000B0A	0	LOGC	Log command
		1	LOGR	Reading of log data command
		2	—	For manufacturer setting
		3	LOGI	Log data initialization command
		4	—	For manufacturer setting
		5	OCMC	Operation cycle monitor clear
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03EB	000B0B	0	RCC	Reconnection command
		1	—	For manufacturer setting
		2		
		3	CCC	Disconnection command
		4	—	For manufacturer setting
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03EC ⋮ 03EF	000B0C ⋮ 000B0F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F0	000B10	0	SPWRT	Parameter write command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F1	000B11	0	SPRD	Parameter read command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F2	000B12	0	SMPSW	Sampling setting write command
		1	—	For manufacturer setting
		2		
		3		
		4	SMPSR	Sampling setting read command
		5	—	For manufacturer setting
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F3 ⋮ 03F5	000B13 ⋮ 000B15	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F6	000B16	0	FTR	Flash ROM transfer preparation
		1	FTS	Flash ROM transfer execution
		2	—	For manufacturer setting
		3		
		4	FIR	Flash ROM initialization preparation
		5	FIS	Flash ROM initialization execution
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F7	000B17	0	ALHR	Alarm history read command
		1	—	For manufacturer setting
		2	ALHI	Alarm history initialization command
		3	—	For manufacturer setting
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
03F8 ⋮ 03FF	000B18 ⋮ 000B1F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
—	000B20 ⋮ 000B2F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

System status

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0450	000BE0	Status bit
0451	000BE1	
0452	000BE2	
0453	000BE3	
0454	000BE4	
0455	000BE5	
0456	000BE6	
0457	000BE7	
0458	000BE8	
0459	000BE9	
045A	000BEA	
045B	000BEB	
045C	000BEC	
045D	000BED	
045E	000BEE	
045F	000BEF	
0460	000BF0	
0461	000BF1	
0462	000BF2	
0463	000BF3	
0464	000BF4	
0465	000BF5	
0466	000BF6	
0467	000BF7	
0468	000BF8	
0469	000BF9	
046A	000BFA	
046B	000BFB	
046C	000BFC	
046D	000BFD	
046E	000BFE	
046F	000BFF	
—	000C00	
	000C01	
	000C02	
	000C03	
	000C04	
	000C05	
	000C06	
	000C07	
	000C08	
	000C09	
	000C0A	
	000C0B	
	000C0C	
	000C0D	
	000C0E	
	000C0F	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0470	000C10	System status code
0471	000C11	
0472	000C12	Watchdog timer
0473	000C13	
0474	000C14	System alarm No.
0475	000C15	
0476	000C16	Specific system alarm No.
0477	000C17	
0478	000C18	Command buffer read error counter
0479	000C19	
047A	000C1A	For manufacturer setting
⋮	⋮	
047F	000C1F	
0480	000C20	Monitor No.1
0481	000C21	
0482	000C22	Monitor No.2
0483	000C23	
0484	000C24	Monitor data 1
0485	000C25	
0486	000C26	Monitor data 2
0487	000C27	
0488	000C28	Parameter write No.1
0489	000C29	
048A	000C2A	Parameter write data 1
048B	000C2B	
048C	000C2C	Parameter write No.2
048D	000C2D	
048E	000C2E	Parameter write data 2
048F	000C2F	
0490	000C30	Parameter read No.1
0491	000C31	
0492	000C32	Parameter read data 1
0493	000C33	
0494	000C34	Parameter read No.2
0495	000C35	
0496	000C36	Parameter read data 2
0497	000C37	
0498	000C38	Log data read page No.
0499	000C39	
049A	000C3A	Number of valid log data events
049B	000C3B	
049C	000C3C	For manufacturer setting
⋮	⋮	
04A3	000C43	
04A4	000C44	Error code of reconnection/disconnection
04A5	000C45	
04A6	000C46	For manufacturer setting
⋮	⋮	
04B3	000C53	
04B4	000C54	Alarm history read page No.
04B5	000C55	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
04B6	000C56	Number of valid alarm history events
04B7	000C57	
04B8	000C58	For manufacturer setting
⋮	⋮	
04BF	000C5F	
—	000C60	
	⋮	
	000CBF	

System status code

System status code	Content
0000	During system preparation
0001	System preparation completion
0003	Parameter initialization completion
0004	Flash ROM parameter read completion
0005	Flash ROM parameter read error
0009	Waiting for SSCNET response
000A	During system running
000F	Rebooting
E□□□	System error*1

*1 Notification items when a system error (E□□□H to) occurs.

- Forced stop is executed for servo amplifier. However, depending on the system status, there are cases where forced stop is not executed.
- System errors (E400h to) are SSCNET communication errors. Confirm the status of the servo amplifiers as well as the SSCNETⅢ cable. For details, refer to the following.

☞ Page 745 System Error

Error code of reconnection/disconnection

Error code of reconnection/ disconnection	Content
0000	No error
0001	Disconnected axis specification error
0002	Reconnected axis No. duplication error
0003	Reconnected axis type code error
0004	Reconnection error during communication error
0006	Communication cycle error

Status bit

For each bit, "0" stands for invalid and "1" stands for valid.

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0450	000BE0	0	ITO	Outputting factor of interrupt
		1	IITO	During interface mode interrupt valid
		2	EVDO	Event detection enabled
		3	HRIF	Highly response I/F enabled
		4	BMA	During system program memory access
		5	PRINF	Continuous operation to torque control compatible information
		6	—	For manufacturer setting
		7	IFMO	In interface mode

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0451	000BE1	0	SMPW	Waiting for sampling trigger
		1	SMPO	Sampling is being performed
		2	SMPF	Sampling completed
		3	SMPE	Sampling error
		4	—	For manufacturer setting
		5	AHINF	Alarm history information
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0452	000BE2	0	EMIO	Being executed forced stop
		1	—	For manufacturer setting
		2	TSTO	In test mode
		3	—	For manufacturer setting
		4		
		5		
		6	EMID	External forced stop disabled
		7	—	For manufacturer setting

*1 If test mode is selected from MR Configurator2, the in test mode signal (TSTO) turns ON. The following items concerning control exist during test mode.
- Operation from the position board (such as automatic operation) cannot be performed.
- In order to perform operations using the position board, the system must be restarted.

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0453	000BE3	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6	IPCH	Changeable interpolation group
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0454, 0455	000BE4, 000BE5	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0456	000BE6	0	ASYO1	In non-synchronous mode (group 1)
		1	ASYO2	In non-synchronous mode (group 2)
		2	ASYO3	In non-synchronous mode (group 3)
		3	ASYO4	In non-synchronous mode (group 4)
		4	ASYO5	In non-synchronous mode (group 5)
		5	ASYO6	In non-synchronous mode (group 6)
		6	ASYO7	In non-synchronous mode (group 7)
		7	ASYO8	In non-synchronous mode (group 8)

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0457	000BE7	0	SYEO1	Synchronizing (group 1)
		1	SYEO2	Synchronizing (group 2)
		2	SYEO3	Synchronizing (group 3)
		3	SYEO4	Synchronizing (group 4)
		4	SYEO5	Synchronizing (group 5)
		5	SYEO6	Synchronizing (group 6)
		6	SYEO7	Synchronizing (group 7)
		7	SYEO8	Synchronizing (group 8)

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0458	000BE8	0	RBOK	Reboot preparation completed
		1	RBNG	Reboot preparation error
		2	CALM	Current system alarm
		3	—	For manufacturer setting
		4	SMOUT	Monitor output
		5	SMRCH	Monitor latch
		6	SMER1	Monitor No. error 1
		7	SMER2	Monitor No. error 2

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0459	000BE9	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
045A	000BEA	0	LOGO	Log operation being performed
		1	LOGRF	Reading of log data complete
		2	LOGRE	Reading of log data error
		3	LOGIF	Log data initialization is complete
		4	LOGIE	Log data initialization error
		5	OCMCO	During operation cycle monitor clear
		6	OCME	Operation cycle alarm
		7	OCMW	Operation cycle warning

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
045B	000BEB	0	RCO	During reconnection processing
		1	RCF	Reconnection complete
		2	RCE	Reconnection error
		3	CCO	During disconnection processing
		4	CCF	Disconnection complete
		5	CCE	Disconnection error
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
045C ⋮ 045F	000BEC ⋮ 000BEF	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0460	000BF0	0	SPWFIN1	Parameter write completed 1
		1	SPWEN1	Parameter No. error 1
		2	SPWED1	Parameter data out of bounds 1
		3	—	For manufacturer setting
		4	SPWFIN2	Parameter write completed 2
		5	SPWEN2	Parameter No. error 2
		6	SPWED2	Parameter data out of bounds 2
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0461	000BF1	0	SPRFIN1	Parameter read completed 1
		1	SPREN1	Parameter No. error 1
		2	SPRFIN2	Parameter read completed 2
		3	SPREN2	Parameter No. error 2
		4	—	For manufacturer setting
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0462	000BF2	0	SWFIN	Sampling setting write completed
		1	SWEN	Sampling setting No. error
		2	SWED	Sampling setting data out of bounds
		3	—	For manufacturer setting
		4	SRFIN	Sampling setting read completed
		5	SREN	Sampling setting No. error
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0463 ⋮ 0465	000BF3 ⋮ 000BF5	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0466	000BF6	0	FROK	Flash ROM transfer preparation complete
		1	FRNG	Flash ROM transfer preparation error
		2	FSOK	Flash ROM transfer complete
		3	FSNG	Flash ROM transfer error
		4	FIROK	Flash ROM initialization preparation complete
		5	FIRNG	Flash ROM initialization preparation error
		6	FIOK	Flash ROM initialization complete
		7	FING	Flash ROM initialization error

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0467	000BF7	0	ALHRF	Alarm history read complete
		1	ALHRE	Alarm history read error
		2	ALHIF	Alarm history initialization complete
		3	ALHIE	Alarm history initialization error
		4	—	For manufacturer setting
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0468 ⋮ 046F	000BF8 ⋮ 000BFF	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
—	000C00 ⋮ 000C0F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

10.4 Factor of Interrupt

Outputting information with factor of interrupt

When an interrupt occurs, the bit corresponding to the axis No., station No., or system which is the factor of the interrupt turns ON.

Address (hexadecimal)		Content	Remarks
MR-MC2_ _	MR-MC3_ _		
04C0	002000	Outputting with factor of axis interrupt 1	Axis 1 (bit0) to axis 32 (bit31)
04C1	002001		
04C2	002002		
04C3	002003		
04C4	002004	Outputting with factor of axis interrupt 2*1	Axis 33 (bit0) to axis 64 (bit31)
04C5	002005		
04C6	002006		
04C7	002007		
—	002008	For manufacturer setting	—
	⋮		
	00200F		
04C8	002010	Outputting with factor of station interrupt*1	Station 1 (bit0) to station 4 (bit3) [MC200] Station 1 (bit0) to station 16 (bit15) [MC300]
04C9	002011		
—	002012		
	002013		
04CA	002014	Outputting with factor of system interrupt	System (bit0)
04CB	002015	For manufacturer setting	—
⋮	⋮		
04CF	002019		
—	00201A		
	⋮		
	00201F		

*1 When using MR-MC2_ _, 04C4 to 04C7, and 04C9 are "For manufacturer setting".

Interrupt factor for each axis

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
04D0	002020	Factor of interrupt Axis 1
04D1	002021	
04D2	002022	
04D3	002023	
04D4	002024	Factor of interrupt Axis 2
04D5	002025	
04D6	002026	
04D7	002027	
04D8	002028	Factor of interrupt Axis 3
04D9	002029	
04DA	00202A	
04DB	00202B	
04DC	00202C	Factor of interrupt Axis 4
04DD	00202D	
04DE	00202E	
04DF	00202F	
04E0	002030	Factor of interrupt Axis 5
04E1	002031	
04E2	002032	
04E3	002033	
04E4	002034	Factor of interrupt Axis 6
04E5	002035	
04E6	002036	
04E7	002037	
04E8	002038	Factor of interrupt Axis 7
04E9	002039	
04EA	00203A	
04EB	00203B	
04EC	00203C	Factor of interrupt Axis 8
04ED	00203D	
04EE	00203E	
04EF	00203F	
04F0	002040	Factor of interrupt Axis 9
04F1	002041	
04F2	002042	
04F3	002043	
04F4	002044	Factor of interrupt Axis 10
04F5	002045	
04F6	002046	
04F7	002047	
04F8	002048	Factor of interrupt Axis 11
04F9	002049	
04FA	00204A	
04FB	00204B	
04FC	00204C	Factor of interrupt Axis 12
04FD	00204D	
04FE	00204E	
04FF	00204F	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0500	002050	Factor of interrupt Axis 13
0501	002051	
0502	002052	
0503	002053	
0504	002054	⋮
⋮	⋮	
054B	00209B	
054C	00209C	Factor of interrupt Axis 32
054D	00209D	
054E	00209E	
054F	00209F	
0550	0020A0	Factor of interrupt Axis 33*1
0551	0020A1	
0552	0020A2	
0553	0020A3	
0554	0020A4	⋮
⋮	⋮	
058B	0020DB	
058C	0020DC	Factor of interrupt Axis 48*1
058D	0020DD	
058E	0020DE	
058F	0020DF	
—	0020E0	Factor of interrupt Axis 49
	0020E1	
	0020E2	
	0020E3	
	0020E4	⋮
	⋮	
	00211B	
	00211C	Factor of interrupt Axis 64
	00211D	
	00211E	
	00211F	
	002120	For manufacturer setting
	⋮	
	00221F	

*1 When using MR-MC2_ _, 0550 to 058F are "For manufacturer setting".

Details on factor of interrupt on axis n

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+4h" for each axis.

Address (hexadecimal)		Bit	Symbol*1	Signal name
MR-MC2_ _	MR-MC3_ _			
04D0 to 04D3	002020 to 002023	0	iRDY	Servo ready (interrupt)
		1	iINP	In-position (interrupt)
		2	iZSP	Zero speed (interrupt)
		3	iZPAS	Passed Z-phase (interrupt)
		4	iTLC	Torque limit effective (interrupt)
		5	iSALM	Servo alarm (interrupt)
		6	iSWRN	Servo warning (interrupt)
		7	iABSE	Absolute position erased (interrupt)
		8	iOP	During operation (interrupt)
		9	iCPO	Rough match (interrupt)
		10	iPF	Positioning complete (interrupt)
		11	iZP	Home position return complete (interrupt)
		12	iSMZ	During smoothing of stopping (interrupt)
		13	iOALM	Operation alarm (interrupt)
		14	iOPF	Completion of operation (interrupt)
		15	iPSW	Position switch (interrupt)
		16	iGAINO	During gain switching (interrupt)
		17	iFCLSO	Fully closed loop control changing (interrupt)
		18	iTLSO	Selecting torque limit (interrupt)
		19	iSPC	During PID control (interrupt)
		20	—	For manufacturer setting
		21	iMAK1	Mark detection 1 (interrupt)
		22	iMAK2	Mark detection 2 (interrupt)
		23	iPRSMO	During continuous operation to torque control (interrupt)
		24	iIWT	Interference check standby (interrupt)
		25	iSINP	Servo amplifier in-position (interrupt)
		26	—	For manufacturer setting
		⋮		
		31		

*1 OFF: No factor of interrupt exists.
ON : A factor of interrupt exists.

System interrupt factor

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0590	002220	System interrupt factors
0591	002221	
0592	002222	For manufacturer setting
0593	002223	
—	002224	
	⋮	
	002227	
0594	002228	Factor of other axes start interrupt [MC200]/Factor of other axes start interrupt 1 [MC300]
0595	002229	
0596	00222A	
0597	00222B	
—	00222C	Factor of other axes start interrupt 2
	00222D	
	00222E	
	00222F	
	002230	For manufacturer setting
	⋮	
	002237	
0598	002238	Factor of pass position interrupt 1
0599	002239	
059A	00223A	
059B	00223B	
059C	00223C	Factor of pass position interrupt 2
059D	00223D	
059E	00223E	
059F	00223F	
—	002240	Factor of pass position interrupt 3
	002241	
	002242	
	002243	
	002244	Factor of pass position interrupt 4
	002245	
	002246	
	002247	
05A0	002248	For manufacturer setting
⋮	⋮	
05AF	00229F	

Details on factor of system interrupt

Address (hexadecimal)		Bit	Symbol*1	Signal name
MR-MC2_ _	MR-MC3_ _			
0590, 0591	002220, 002221	0	iSYSE	System error (interrupt)
		1	iCALM	System alarm (interrupt)
		2	iEMIO	During forced stop (interrupt)
		3	—	For manufacturer setting
		4		
		5		
		6		
		7	iOCME	Operation cycle alarm (interrupt)
		8	iOASF	Factor of other axes start interrupt is being sent (interrupt)
		9	iPPI	Factor of pass position interrupt is being sent (interrupt)
		10	—	For manufacturer setting
		11		
		12		
		13		
		14		
		15		

*1 OFF: No factor of interrupt exists.
ON : A factor of interrupt exists.

Factor of other axes start interrupt

When the factor of other axes start interrupt is being sent (interrupt) signal (iOASF) is ON, the bit corresponding to other axes start data No. turns ON.

■Factor of other axes start interrupt [MC200]/Factor of other axes start interrupt 1 [MC300]

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0594 to 0597	002228 to 00222B	0	iOAS1	Other axes start data 1 (interrupt)
		1	iOAS2	Other axes start data 2 (interrupt)
		2	iOAS3	Other axes start data 3 (interrupt)
		3	iOAS4	Other axes start data 4 (interrupt)
		4	iOAS5	Other axes start data 5 (interrupt)
		5	iOAS6	Other axes start data 6 (interrupt)
		6	iOAS7	Other axes start data 7 (interrupt)
		7	iOAS8	Other axes start data 8 (interrupt)
		8	iOAS9	Other axes start data 9 (interrupt)
		9	iOAS10	Other axes start data 10 (interrupt)
		10	iOAS11	Other axes start data 11 (interrupt)
		11	iOAS12	Other axes start data 12 (interrupt)
		12	iOAS13	Other axes start data 13 (interrupt)
		13	iOAS14	Other axes start data 14 (interrupt)
		14	iOAS15	Other axes start data 15 (interrupt)
		15	iOAS16	Other axes start data 16 (interrupt)
		16	iOAS17	Other axes start data 17 (interrupt)
		17	iOAS18	Other axes start data 18 (interrupt)
		18	iOAS19	Other axes start data 19 (interrupt)
		19	iOAS20	Other axes start data 20 (interrupt)
		20	iOAS21	Other axes start data 21 (interrupt)
		21	iOAS22	Other axes start data 22 (interrupt)
		22	iOAS23	Other axes start data 23 (interrupt)
		23	iOAS24	Other axes start data 24 (interrupt)
		24	iOAS25	Other axes start data 25 (interrupt)
		25	iOAS26	Other axes start data 26 (interrupt)
		26	iOAS27	Other axes start data 27 (interrupt)
		27	iOAS28	Other axes start data 28 (interrupt)
		28	iOAS29	Other axes start data 29 (interrupt)
		29	iOAS30	Other axes start data 30 (interrupt)
		30	iOAS31	Other axes start data 31 (interrupt)
		31	iOAS32	Other axes start data 32 (interrupt)

■Factor of other axes start interrupt 2

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
—	00222C to 00222F	0	iOAS33	Other axes start data 33 (interrupt)
		1	iOAS34	Other axes start data 34 (interrupt)
		2	iOAS35	Other axes start data 35 (interrupt)
		3	iOAS36	Other axes start data 36 (interrupt)
		4	iOAS37	Other axes start data 37 (interrupt)
		5	iOAS38	Other axes start data 38 (interrupt)
		6	iOAS39	Other axes start data 39 (interrupt)
		7	iOAS40	Other axes start data 40 (interrupt)
		8	iOAS41	Other axes start data 41 (interrupt)
		9	iOAS42	Other axes start data 42 (interrupt)
		10	iOAS43	Other axes start data 43 (interrupt)
		11	iOAS44	Other axes start data 44 (interrupt)
		12	iOAS45	Other axes start data 45 (interrupt)
		13	iOAS46	Other axes start data 46 (interrupt)
		14	iOAS47	Other axes start data 47 (interrupt)
		15	iOAS48	Other axes start data 48 (interrupt)
		16	iOAS49	Other axes start data 49 (interrupt)
		17	iOAS50	Other axes start data 50 (interrupt)
		18	iOAS51	Other axes start data 51 (interrupt)
		19	iOAS52	Other axes start data 52 (interrupt)
		20	iOAS53	Other axes start data 53 (interrupt)
		21	iOAS54	Other axes start data 54 (interrupt)
		22	iOAS55	Other axes start data 55 (interrupt)
		23	iOAS56	Other axes start data 56 (interrupt)
		24	iOAS57	Other axes start data 57 (interrupt)
		25	iOAS58	Other axes start data 58 (interrupt)
		26	iOAS59	Other axes start data 59 (interrupt)
		27	iOAS60	Other axes start data 60 (interrupt)
		28	iOAS61	Other axes start data 61 (interrupt)
		29	iOAS62	Other axes start data 62 (interrupt)
		30	iOAS63	Other axes start data 63 (interrupt)
		31	iOAS64	Other axes start data 64 (interrupt)

Details on factor of other axes start interrupt

When the other axes start data □ (interrupt) signal (iOAS□) is ON, the interrupt factor of other axes start status bit corresponding to other axes start data No. turns ON.

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0FE0	0048E0	Details on factor of other axes start interrupt 1
0FE1	0048E1	Details on factor of other axes start interrupt 2
0FE2	0048E2	Details on factor of other axes start interrupt 3
0FE3	0048E3	Details on factor of other axes start interrupt 4
0FE4	0048E4	Details on factor of other axes start interrupt 5
0FE5	0048E5	Details on factor of other axes start interrupt 6
0FE6	0048E6	Details on factor of other axes start interrupt 7
0FE7	0048E7	Details on factor of other axes start interrupt 8
0FE8	0048E8	Details on factor of other axes start interrupt 9
0FE9	0048E9	Details on factor of other axes start interrupt 10
0FEA	0048EA	Details on factor of other axes start interrupt 11
0FEB	0048EB	Details on factor of other axes start interrupt 12
0FEC	0048EC	Details on factor of other axes start interrupt 13
0FED	0048ED	Details on factor of other axes start interrupt 14
0FEE	0048EE	Details on factor of other axes start interrupt 15
0FEF	0048EF	Details on factor of other axes start interrupt 16
0FF0	0048F0	Details on factor of other axes start interrupt 17
0FF1	0048F1	Details on factor of other axes start interrupt 18
0FF2	0048F2	Details on factor of other axes start interrupt 19
0FF3	0048F3	Details on factor of other axes start interrupt 20
0FF4	0048F4	Details on factor of other axes start interrupt 21
0FF5	0048F5	Details on factor of other axes start interrupt 22
0FF6	0048F6	Details on factor of other axes start interrupt 23
0FF7	0048F7	Details on factor of other axes start interrupt 24
0FF8	0048F8	Details on factor of other axes start interrupt 25
0FF9	0048F9	Details on factor of other axes start interrupt 26
0FFA	0048FA	Details on factor of other axes start interrupt 27
0FFB	0048FB	Details on factor of other axes start interrupt 28
0FFC	0048FC	Details on factor of other axes start interrupt 29
0FED	0048FD	Details on factor of other axes start interrupt 30
0FFE	0048FE	Details on factor of other axes start interrupt 31
0FFF	0048FF	Details on factor of other axes start interrupt 32
—	004900	Details on factor of other axes start interrupt 33
	004901	Details on factor of other axes start interrupt 34
	004902	Details on factor of other axes start interrupt 35
	004903	Details on factor of other axes start interrupt 36
	004904	Details on factor of other axes start interrupt 37
	004905	Details on factor of other axes start interrupt 38
	004906	Details on factor of other axes start interrupt 39
	004907	Details on factor of other axes start interrupt 40
	004908	Details on factor of other axes start interrupt 41
	004909	Details on factor of other axes start interrupt 42
	00490A	Details on factor of other axes start interrupt 43
	00490B	Details on factor of other axes start interrupt 44
	00490C	Details on factor of other axes start interrupt 45
	00490D	Details on factor of other axes start interrupt 46
	00490E	Details on factor of other axes start interrupt 47
	00490F	Details on factor of other axes start interrupt 48

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
—	004910	Details on factor of other axes start interrupt 49
	004911	Details on factor of other axes start interrupt 50
	004912	Details on factor of other axes start interrupt 51
	004913	Details on factor of other axes start interrupt 52
	004914	Details on factor of other axes start interrupt 53
	004915	Details on factor of other axes start interrupt 54
	004916	Details on factor of other axes start interrupt 55
	004917	Details on factor of other axes start interrupt 56
	004918	Details on factor of other axes start interrupt 57
	004919	Details on factor of other axes start interrupt 58
	00491A	Details on factor of other axes start interrupt 59
	00491B	Details on factor of other axes start interrupt 60
	00491C	Details on factor of other axes start interrupt 61
	00491D	Details on factor of other axes start interrupt 62
	00491E	Details on factor of other axes start interrupt 63
	00491F	Details on factor of other axes start interrupt 64

■Details on factor of other axes start interrupt □

The addresses in the table are the addresses for the other axes start status table 1. For the other axes status table 2 and after, add "+1h" for each other axes start status table.

Address (hexadecimal)		Bit	Symbol*1	Signal name*1
MR-MC2_ _	MR-MC3_ _			
0FE0	0048E0	0	iOSOP□	Other axes start notice □ (interrupt)
		1	iOSFIN□	Other axes start completed □ (interrupt)
		2	iOSERR□	Other axes start incompleted □ (interrupt)
		3	—	For manufacturer setting
		4		
		5		
		6		
		7		

*1 □: Other axes start No.

Factor of pass position interrupt

When the outputting with the factor of pass position interrupt is being sent (interrupt) signal (iPPI) is ON, the bit corresponding to the pass position condition No. of the factor of the pass position interrupt turns ON.

■Factor of pass position interrupt 1

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
0598 to 059B	002238 to 00223B	0	iPPI1	Pass position condition 1 (interrupt)
		1	iPPI2	Pass position condition 2 (interrupt)
		2	iPPI3	Pass position condition 3 (interrupt)
		3	iPPI4	Pass position condition 4 (interrupt)
		4	iPPI5	Pass position condition 5 (interrupt)
		5	iPPI6	Pass position condition 6 (interrupt)
		6	iPPI7	Pass position condition 7 (interrupt)
		7	iPPI8	Pass position condition 8 (interrupt)
		8	iPPI9	Pass position condition 9 (interrupt)
		9	iPPI10	Pass position condition 10 (interrupt)
		10	iPPI11	Pass position condition 11 (interrupt)
		11	iPPI12	Pass position condition 12 (interrupt)
		12	iPPI13	Pass position condition 13 (interrupt)
		13	iPPI14	Pass position condition 14 (interrupt)
		14	iPPI15	Pass position condition 15 (interrupt)
		15	iPPI16	Pass position condition 16 (interrupt)
		16	iPPI17	Pass position condition 17 (interrupt)
		17	iPPI18	Pass position condition 18 (interrupt)
		18	iPPI19	Pass position condition 19 (interrupt)
		19	iPPI20	Pass position condition 20 (interrupt)
		20	iPPI21	Pass position condition 21 (interrupt)
		21	iPPI22	Pass position condition 22 (interrupt)
		22	iPPI23	Pass position condition 23 (interrupt)
		23	iPPI24	Pass position condition 24 (interrupt)
		24	iPPI25	Pass position condition 25 (interrupt)
		25	iPPI26	Pass position condition 26 (interrupt)
		26	iPPI27	Pass position condition 27 (interrupt)
		27	iPPI28	Pass position condition 28 (interrupt)
		28	iPPI29	Pass position condition 29 (interrupt)
		29	iPPI30	Pass position condition 30 (interrupt)
		30	iPPI31	Pass position condition 31 (interrupt)
		31	iPPI32	Pass position condition 32 (interrupt)

■Factor of pass position interrupt 2

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
059C to 059F	00223C to 00223F	0	iPPI33	Pass position condition 33 (interrupt)
		1	iPPI34	Pass position condition 34 (interrupt)
		2	iPPI35	Pass position condition 35 (interrupt)
		3	iPPI36	Pass position condition 36 (interrupt)
		4	iPPI37	Pass position condition 37 (interrupt)
		5	iPPI38	Pass position condition 38 (interrupt)
		6	iPPI39	Pass position condition 39 (interrupt)
		7	iPPI40	Pass position condition 40 (interrupt)
		8	iPPI41	Pass position condition 41 (interrupt)
		9	iPPI42	Pass position condition 42 (interrupt)
		10	iPPI43	Pass position condition 43 (interrupt)
		11	iPPI44	Pass position condition 44 (interrupt)
		12	iPPI45	Pass position condition 45 (interrupt)
		13	iPPI46	Pass position condition 46 (interrupt)
		14	iPPI47	Pass position condition 47 (interrupt)
		15	iPPI48	Pass position condition 48 (interrupt)
		16	iPPI49	Pass position condition 49 (interrupt)
		17	iPPI50	Pass position condition 50 (interrupt)
		18	iPPI51	Pass position condition 51 (interrupt)
		19	iPPI52	Pass position condition 52 (interrupt)
		20	iPPI53	Pass position condition 53 (interrupt)
		21	iPPI54	Pass position condition 54 (interrupt)
		22	iPPI55	Pass position condition 55 (interrupt)
		23	iPPI56	Pass position condition 56 (interrupt)
		24	iPPI57	Pass position condition 57 (interrupt)
		25	iPPI58	Pass position condition 58 (interrupt)
		26	iPPI59	Pass position condition 59 (interrupt)
		27	iPPI60	Pass position condition 60 (interrupt)
		28	iPPI61	Pass position condition 61 (interrupt)
		29	iPPI62	Pass position condition 62 (interrupt)
		30	iPPI63	Pass position condition 63 (interrupt)
		31	iPPI64	Pass position condition 64 (interrupt)

■Factor of pass position interrupt 3

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
—	002240 to 002243	0	iPPI65	Pass position condition 65 (interrupt)
		1	iPPI66	Pass position condition 66 (interrupt)
		2	iPPI67	Pass position condition 67 (interrupt)
		3	iPPI68	Pass position condition 68 (interrupt)
		4	iPPI69	Pass position condition 69 (interrupt)
		5	iPPI70	Pass position condition 70 (interrupt)
		6	iPPI71	Pass position condition 71 (interrupt)
		7	iPPI72	Pass position condition 72 (interrupt)
		8	iPPI73	Pass position condition 73 (interrupt)
		9	iPPI74	Pass position condition 74 (interrupt)
		10	iPPI75	Pass position condition 75 (interrupt)
		11	iPPI76	Pass position condition 76 (interrupt)
		12	iPPI77	Pass position condition 77 (interrupt)
		13	iPPI78	Pass position condition 78 (interrupt)
		14	iPPI79	Pass position condition 79 (interrupt)
		15	iPPI80	Pass position condition 80 (interrupt)
		16	iPPI81	Pass position condition 81 (interrupt)
		17	iPPI82	Pass position condition 82 (interrupt)
		18	iPPI83	Pass position condition 83 (interrupt)
		19	iPPI84	Pass position condition 84 (interrupt)
		20	iPPI85	Pass position condition 85 (interrupt)
		21	iPPI86	Pass position condition 86 (interrupt)
		22	iPPI87	Pass position condition 87 (interrupt)
		23	iPPI88	Pass position condition 88 (interrupt)
		24	iPPI89	Pass position condition 89 (interrupt)
		25	iPPI90	Pass position condition 90 (interrupt)
		26	iPPI91	Pass position condition 91 (interrupt)
		27	iPPI92	Pass position condition 92 (interrupt)
		28	iPPI93	Pass position condition 93 (interrupt)
		29	iPPI94	Pass position condition 94 (interrupt)
		30	iPPI95	Pass position condition 95 (interrupt)
		31	iPPI96	Pass position condition 96 (interrupt)

■Factor of pass position interrupt 4

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
—	002244 to 002247	0	iPPI97	Pass position condition 97 (interrupt)
		1	iPPI98	Pass position condition 98 (interrupt)
		2	iPPI99	Pass position condition 99 (interrupt)
		3	iPPI100	Pass position condition 100 (interrupt)
		4	iPPI101	Pass position condition 101 (interrupt)
		5	iPPI102	Pass position condition 102 (interrupt)
		6	iPPI103	Pass position condition 103 (interrupt)
		7	iPPI104	Pass position condition 104 (interrupt)
		8	iPPI105	Pass position condition 105 (interrupt)
		9	iPPI106	Pass position condition 106 (interrupt)
		10	iPPI107	Pass position condition 107 (interrupt)
		11	iPPI108	Pass position condition 108 (interrupt)
		12	iPPI109	Pass position condition 109 (interrupt)
		13	iPPI110	Pass position condition 110 (interrupt)
		14	iPPI111	Pass position condition 111 (interrupt)
		15	iPPI112	Pass position condition 112 (interrupt)
		16	iPPI113	Pass position condition 113 (interrupt)
		17	iPPI114	Pass position condition 114 (interrupt)
		18	iPPI115	Pass position condition 115 (interrupt)
		19	iPPI116	Pass position condition 116 (interrupt)
		20	iPPI117	Pass position condition 117 (interrupt)
		21	iPPI118	Pass position condition 118 (interrupt)
		22	iPPI119	Pass position condition 119 (interrupt)
		23	iPPI120	Pass position condition 120 (interrupt)
		24	iPPI121	Pass position condition 121 (interrupt)
		25	iPPI122	Pass position condition 122 (interrupt)
		26	iPPI123	Pass position condition 123 (interrupt)
		27	iPPI124	Pass position condition 124 (interrupt)
		28	iPPI125	Pass position condition 125 (interrupt)
		29	iPPI126	Pass position condition 126 (interrupt)
		30	iPPI127	Pass position condition 127 (interrupt)
		31	iPPI128	Pass position condition 128 (interrupt)

Details on factor of pass position interrupt

When the pass position condition □ (interrupt) signal (iPPI□) is ON, the pass position status bit corresponding to the pass position condition No. turns ON.

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0FA0	0047E0	Details on factor of pass position interrupt 1
0FA1	0047E1	Details on factor of pass position interrupt 2
0FA2	0047E2	Details on factor of pass position interrupt 3
0FA3	0047E3	Details on factor of pass position interrupt 4
⋮	⋮	⋮
0FDF	00481F	Details on factor of pass position interrupt 64
—	004820	Details on factor of pass position interrupt 65
	⋮	⋮
	00485F	Details on factor of pass position interrupt 128

■Details on factor of pass position interrupt □

The address in the table is the address for the pass position condition No.1. For the pass position condition No.2 and after, add "+1h" for each pass position condition No.

Address (hexadecimal)		Bit	Symbol*1	Signal name*1
MR-MC2_ _	MR-MC3_ _			
0FA0	0047E0	0	iPPIF□	Pass position interrupt complete □ (interrupt)
		1	iPPIE□	Pass position interrupt incomplete □ (interrupt)
		2	—	For manufacturer setting
		3		
		4		
		5		
		6		
		7		

*1 □: Pass position condition No.

Interrupt factor for each station

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
05B0	0022A0	Station interrupt factor station 1
05B1	0022A1	
05B2	0022A2	Station interrupt factor station 2
05B3	0022A3	
05B4	0022A4	Station interrupt factor station 3
05B5	0022A5	
05B6	0022A6	Station interrupt factor station 4
05B7	0022A7	
05B8	0022A8	Station interrupt factor station 5*1
05B9	0022A9	
05BA	0022AA	Station interrupt factor station 6*1
05BB	0022AB	
05BC	0022AC	Station interrupt factor station 7*1
05BD	0022AD	
05BE	0022AE	Station interrupt factor station 8*1
05BF	0022AF	
—	0022B0	Station interrupt factor station 9
	0022B1	
	0022B2	Station interrupt factor station 10
	0022B3	
	0022B4	Station interrupt factor station 11
	0022B5	
	0022B6	Station interrupt factor station 12
	0022B7	
	0022B8	Station interrupt factor station 13
	0022B9	
	0022BA	Station interrupt factor station 14
	0022BB	
	0022BC	Station interrupt factor station 15
	0022BD	
	0022BE	Station interrupt factor station 16
	0022BF	
	0022C0	For manufacturer setting
	⋮	
	0022DF	

*1 When using MR-MC2_ _, 05B8 to 05BF are "For manufacturer setting".

Details on station n interrupt factors

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+2h" for each axis.

Address (hexadecimal)		Bit	Symbol*1	Signal name
MR-MC2_ _	MR-MC3_ _			
05B0, 05B1	0022A0, 0022A1	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5	iRUALM	RIO module alarm (interrupt)
		6	iRUWRN	RIO module warning (interrupt)
		7	—	For manufacturer setting
		8		
		9		
		10		
		11		
		12		
		13	iRCALM	RIO control alarm (interrupt)
		14	—	For manufacturer setting
		15		

*1 OFF: No factor of interrupt exists.
ON : A factor of interrupt exists.

10.5 Factor of Event

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0EE0	0043E0	Factor of event Axis 1
0EE1	0043E1	
0EE2	0043E2	
0EE3	0043E3	
—	0043E4	
	0043E5	
	0043E6	
	0043E7	
0EE4	0043E8	Factor of event Axis 2
0EE5	0043E9	
0EE6	0043EA	
0EE7	0043EB	
—	0043EC	
	0043ED	
	0043EE	
	0043EF	
0EE8	0043F0	⋮
⋮	⋮	
0F5B	0044D7	
0F5C	0044D8	Factor of event Axis 32
0F5D	0044D9	
0F5E	0044DA	
0F5F	0044DB	
—	0044DC	
	0044DD	
	0044DE	
	0044DF	
0F60	0044E0	Factor of event Axis 33[*1]
0F61	0044E1	
0F62	0044E2	
0F63	0044E3	
—	0044E4	
	0044E5	
	0044E6	
	0044E7	
0F64	0044E8	⋮
⋮	⋮	
0F9B	004557	
0F9C	004558	Factor of event Axis 48[*1]
0F9D	004559	
0F9E	00455A	
0F9F	00455B	
—	00455C	
	00455D	
	00455E	
	00455F	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
—	004560	Factor of event Axis 49
	004561	
	004562	
	004563	
	004564	
	004565	
	004566	
	004567	
	004568	Factor of event Axis 50
	004569	
	00456A	
	00456B	
	00456C	
	00456D	
	00456E	
	00456F	
	004570	⋮
	⋮	
	0045D7	
	0045D8	Factor of event Axis 64
	0045D9	
	0045DA	
	0045DB	
	0045DC	
	0045DD	
	0045DE	
	0045DF	
—	0045E0	For manufacturer setting
	⋮	
	0047DF	

*1 When using MR-MC2_ _, 0F60 to 0F9F are "For manufacturer setting".

Details on factor of event on axis n

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +4h
- Using MR-MC3_ _: +8h

Address (hexadecimal)		Bit	Symbol*1	Signal name
MR-MC2_ _	MR-MC3_ _			
0EE0 to 0EE3	0043E0 to 0043E7	0	iRDYON	Servo ready (ON edge)
		1	iINPON	In-position (ON edge)
		2	iZSPON	Zero speed (ON edge)
		3	iTLCON	Torque limit effective (ON edge)
		4	iSALMON	Servo alarm (ON edge)
		5	iSWRNON	Servo warning (ON edge)
		6	iABSEON	Absolute position erased (ON edge)
		7	iOALMON	Operation alarm (ON edge)
		8	iMAK1ON	Mark detection 1 (ON edge)
		9	iMAK2ON	Mark detection 2 (ON edge)
		10	—	For manufacturer setting
		11		
		12		
		13	iLSPON	+ side limit switch (ON edge)
		14	iLSNON	- side limit switch (ON edge)
		15	iDOGON	Proximity dog (ON edge)
		16	iRDYOF	Servo ready (OFF edge)
		17	iINPOF	In-position (OFF edge)
		18	iZSPOF	Zero speed (OFF edge)
		19	iTLCOF	Torque limit effective (OFF edge)
		20	iSALMOF	Servo alarm (OFF edge)
		21	iSWRNOF	Servo warning (OFF edge)
		22	iABSEOF	Absolute position erased (OFF edge)
		23	iOALMOF	Operation alarm (OFF edge)
		24	iMAK1OF	Mark detection 1 (OFF edge)
		25	iMAK2OF	Mark detection 2 (OFF edge)
		26	—	For manufacturer setting
		27		
		28		
		29	iLSPOF	+ side limit switch (OFF edge)
		30	iLSNOF	- side limit switch (OFF edge)
		31	iDOGOF	Proximity dog (OFF edge)
—		32	—	For manufacturer setting
		⋮		
		63		

*1 OFF: No factor of event exists.
ON : A factor of event exists.

10.6 System Configuration Information

Address (hexadecimal)		Content	Remarks
MR-MC2_ _	MR-MC3_ _		
06D0	000CC0	For manufacturer setting	—
⋮	⋮		
06DF	000CCF		
06E0	000CD0	Controlling axis information (lower) [MC200]/Controlling axis information 1 [MC300]	The bit corresponding to the axis which is currently controllable (SSCNET communicating axis or amplifier-less axis) turns ON. The bit is the axis 1 (bit0) to the axis 32 (bit31).
06E1	000CD1		
06E2	000CD2		
06E3	000CD3		
06E4	000CD4	Controlling axis information (upper) [MC200]/Controlling axis information 2 [MC300]	• Using MR-MC2_ _ Fixed at 0. • Using MR-MC3_ _ The bit corresponding to the axis which is currently controllable (SSCNET communicating axis or amplifier-less axis) turns ON. The bit is the axis 33 (bit0) to the axis 64 (bit31).
06E5	000CD5		
06E6	000CD6		
06E7	000CD7		
—	000CD8	For manufacturer setting	—
	⋮		
	000CDF		
06E8	000CE0	Controlling station information	The bit corresponding to the station which is currently controllable (SSCNET communicating station or the remote I/O disconnect station) turns ON. The bit is the station 1 (bit0) to the station 4 (bit3). [MC200] The bit is the station 1 (bit0) to the station 16 (bit15). [MC300]
06E9	000CE1		
—	000CE2		
	000CE3		
06EA	000CE4	For manufacturer setting	—
⋮	⋮		
0777	000FF7		
0778	000FF8	Time synchronization information	Set the time when starting up system, or reconnecting. When the set value is 0, the time is 0000hrs on January 1st, 2000.
0779	000FF9		
077A	000FFA		
077B	000FFB		
077C	000FFC		
077D	000FFD		
077E	000FFE		
077F	000FFF		

Details on time synchronization information

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
0778	000FF8	Year
0779	000FF9	
077A	000FFA	Month
077B	000FFB	Date
077C	000FFC	Hour
077D	000FFD	Minute
077E	000FFE	Seconds
077F	000FFF	Day • 0: Sunday • 1: Monday • 2: Tuesday • 3: Wednesday • 4: Thursday • 5: Friday • 6: Saturday

10.7 Axis Data

Axis data command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

The when in tandem drive (synchronous) column in the table is for axis data classification for when using tandem drive.

- Master : The data only valid for the master axis (☞ Page 493 Data only valid for the master axis)
- Each axis : The data valid for both the master axis and slave axis (☞ Page 493 Individual data for master axis/slave axis)

Address (hexadecimal)		Content	When in tandem drive (synchronous)
MR-MC2_ _	MR-MC3_ _		
1000	005000	Command bit	Refer to the following. ☞ Page 602 Command bit
1001	005001		
1002	005002		
1003	005003		
1004	005004		
1005	005005		
1006	005006		
1007	005007		
1008	005008		
1009	005009		
100A	00500A		
100B	00500B		
100C	00500C		
100D	00500D		
100E	00500E		
100F	00500F		
1010	005010		
1011	005011		
1012	005012		
1013	005013		
1014	005014		
1015	005015		
1016	005016		
1017	005017		
1018	005018		
1019	005019		
101A	00501A		
101B	00501B		
101C	00501C		
101D	00501D		
101E	00501E		
101F	00501F		

Address (hexadecimal)		Content	When in tandem drive (synchronous)
MR-MC2_ _	MR-MC3_ _		
—	005020	Command Bit	Refer to the following. ☞ Page 602 Command bit
	005021		
	005022		
	005023		
	005024		
	005025		
	005026		
	005027		
	005028		
	005029		
	00502A		
	00502B		
	00502C		
	00502D		
	00502E		
	00502F		
1020	005030	Manual feed speed*1	Master
1021	005031		
1022	005032		
1023	005033		
1024	005034	Manual feed acceleration time constant	Master
1025	005035		
1026	005036	Manual feed deceleration time constant	Master
1027	005037		
1028	005038	Incremental feed movement amount	Master
1029	005039		
102A	00503A		
102B	00503B		
102C	00503C	Start point No.	Master
102D	00503D		
102E	00503E	End point No.	Master
102F	00503F		
1030	005040	Latest position command buffer No.	—
1031	005041		
1032	005042	Control mode command	—
1033	005043		
1034	005044	Pass position condition start No.	Each axis
1035	005045		
1036	005046	Pass position condition end No.	Each axis
1037	005047		
1038	005048	For manufacturer setting	—
1039	005049		
103A	00504A	Latest command point No.	Master
103B	00504B		
103C	00504C	For manufacturer setting	—
⋮	⋮		
103F	00504F		
1040	005050	Monitor No.1	Each axis
1041	005051		
1042	005052	Monitor No.2	Each axis
1043	005053		

Address (hexadecimal)		Content	When in tandem drive (synchronous)
MR-MC2_ _	MR-MC3_ _		
1044	005054	Monitor No.3	Each axis
1045	005055		
1046	005056	Monitor No.4	Each axis
1047	005057		
1048	005058	Torque control speed limit value	—
1049	005059		
104A	00505A		
104B	00505B		
104C	00505C	For manufacturer setting	—
⋮	⋮		
104F	00505F		
1050	005060	Parameter write No.1	Each axis
1051	005061		
1052	005062	Parameter write data 1	Each axis
1053	005063		
1054	005064	Parameter write No.2	Each axis
1055	005065		
1056	005066	Parameter write data 2	Each axis
1057	005067		
1058	005068	Parameter read No.1	Each axis
1059	005069		
105A	00506A	For manufacturer setting	—
105B	00506B		
105C	00506C	Parameter read No.2	Each axis
105D	00506D		
105E	00506E	For manufacturer setting	—
105F	00506F		
—	005070		
	⋮		
	00509F		

*1 The manual feed speed is the moving speed for manual operation (JOG operation as well as incremental feed).

Command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

The when in tandem drive column in the table is for axis data classification for when using tandem drive synchronous mode.

- Master : The data only valid for the master axis (☞ Page 493 Data only valid for the master axis)
- Each axis : The data valid for both the master axis and slave axis (☞ Page 493 Individual data for master axis/slave axis)
- Special: ☞ Page 511 Servo On and Servo Off During Tandem Drive Axis Operation
- Not supported : The data not supported by tandem drive.

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1000	005000	0	SON	Servo on	Special
		1	—	For manufacturer setting	—
		2			
		3			
		4	TL	Torque limit	Each axis
		5	SRST	Servo alarm reset	Each axis
		6	—	For manufacturer setting	—
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1001	005001	0	ST	Start operation	Master
		1	DIR	Movement direction	Master
		2	STP	Stop operation	Master
		3	RSTP	Rapid stop	Master
		4	—	For manufacturer setting	—
		5	ORST	Operation alarm reset	Master
		6	—	For manufacturer setting	—
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1002	005002	0	AUT	Automatic operation mode	Master
		1	ZRN	Home position return mode	Master
		2	JOG	JOG operation mode	Master
		3	S	Incremental feed mode	Master
		4	—	For manufacturer setting	—
		5	LIP	Linear interpolation mode [MC200]/interpolation operation mode [MC300]	Master
		6	DST	Home position reset mode	Master
		7	—	For manufacturer setting	—

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1003	005003	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1004	005004	0	ITL	Interlock	Master
		1	RMONR	High speed monitor latch command	Each axis
		2	—	For manufacturer setting	—
		3			
		4	LSPC	+ side limit switch input	Each axis
		5	LSNC	- side limit switch input	Each axis
		6	DOGC	Proximity dog input	Each axis
		7	—	For manufacturer setting	—

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1005	005005	0	SCHG	Change speed	Master
		1	TACHG	Change acceleration time constant	Master
		2	TDCHG	Change deceleration time constant	Master
		3	PCHG	Change position	Master
		4	—	For manufacturer setting	—
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1006	005006	0	FST	Fast start operation	Master
		1	—	For manufacturer setting	—
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1007	005007	0	PPISTP	Pass position interrupt cancel	Master
		1	—	For manufacturer setting	—
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1008	005008	0	GAIN	Gain switching command	Each axis
		1	FCLS	Fully closed loop control change command	Each axis
		2	—	For manufacturer setting	—
		3	CPC	PID control command	Each axis
		4	—	For manufacturer setting	—
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1009	005009	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100A	00500A	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	ZSC	Home position set command	Not supported
		5	—	For manufacturer setting	—
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100B	00500B	0	—	For manufacturer setting	—
		1	MKC1	Mark detection clear command 1	Each axis
		2	MKD1	Mark detection disable command 1	Each axis
		3	MKSEN1	Mark detection setting enable command 1	Each axis
		4	—	For manufacturer setting	—
		5	MKC2	Mark detection clear command 2	Each axis
		6	MKD2	Mark detection disable command 2	Each axis
		7	MKSEN2	Mark detection setting enable command 2	Each axis

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100C	00500C	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	CTLMC	Control mode switch command	Not supported
		5	—	For manufacturer setting	—
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100D, 100E	00500D, 00500E	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
100F	00500F	0	GAIN2	Gain switching command 2	Each axis
		1	—	For manufacturer setting	—
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1010	005010	0	MON	Monitor command	Each axis
		1	MONR	Monitor latch command	Each axis
		2	—	For manufacturer setting	—
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1011 ⋮ 1013	005011 ⋮ 005013	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1014	005014	0	PWRT	Parameter write command	Each axis
		1	—	For manufacturer setting	—
		2			
		3			
		4			
		5			
		6			
		7	PSF	Servo parameter read complete	Each axis

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1015	005015	0	PRD	Parameter read command	Each axis
		1	—	For manufacturer setting	—
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1016 : 101F	005016 : 00501F	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
—	005020 : 00502F	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Axis data status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

The when in tandem drive (synchronous) column in the table is for axis data classification for when using tandem drive.

- Master: The data only valid for the master axis (☞ Page 493 Data only valid for the master axis)
- Each axis: The data valid for both the master axis and slave axis (☞ Page 493 Individual data for master axis/slave axis)

Address (hexadecimal)		Content	When in tandem drive (synchronous)
MR-MC2_ _	MR-MC3_ _		
1060	0050A0	Status bit	Refer to the following. ☞ Page 610 Status bit
1061	0050A1		
1062	0050A2		
1063	0050A3		
1064	0050A4		
1065	0050A5		
1066	0050A6		
1067	0050A7		
1068	0050A8		
1069	0050A9		
106A	0050AA		
106B	0050AB		
106C	0050AC		
106D	0050AD		
106E	0050AE		
106F	0050AF		
1070	0050B0		
1071	0050B1		
1072	0050B2		
1073	0050B3		
1074	0050B4		
1075	0050B5		
1076	0050B6		
1077	0050B7		
1078	0050B8		
1079	0050B9		
107A	0050BA		
107B	0050BB		
107C	0050BC		
107D	0050BD		
107E	0050BE		
107F	0050BF		

Address (hexadecimal)		Content	When in tandem drive (synchronous)
MR-MC2_ _	MR-MC3_ _		
—	0050C0	Status bit	Refer to the following. ☞ Page 610 Status bit
	0050C1		
	0050C2		
	0050C3		
	0050C4		
	0050C5		
	0050C6		
	0050C7		
	0050C8		
	0050C9		
	0050CA		
	0050CB		
	0050CC		
	0050CD		
	0050CE		
	0050CF		
1080	0050D0	Operation alarm No.	Master
1081	0050D1		
1082	0050D2	Specific operation alarm No.	Master
1083	0050D3		
1084	0050D4	Servo alarm No.	Each axis
1085	0050D5		
1086	0050D6	Specific servo alarm No.	Each axis
1087	0050D7		
1088	0050D8	For manufacturer setting	—
⋮	⋮		
108B	0050DB		
108C	0050DC	Operation point No.	Master
108D	0050DD		
108E	0050DE	Maximum position command buffer No.	—
108F	0050DF		
1090	0050E0	Transmit position command buffer No.	—
1091	0050E1		
1092	0050E2	Control mode status	—
1093	0050E3		
1094	0050E4	Executing pass position condition No.	Master
1095	0050E5		
1096	0050E6	For manufacturer setting	—
⋮	⋮		
109F	0050EF		
10A0	0050F0	Monitor No.1	Each axis
10A1	0050F1		
10A2	0050F2	Monitor No.2	Each axis
10A3	0050F3		
10A4	0050F4	Monitor No.3	Each axis
10A5	0050F5		
10A6	0050F6	Monitor No.4	Each axis
10A7	0050F7		
10A8	0050F8	Monitor data 1	Each axis
10A9	0050F9		
10AA	0050FA	Monitor data 2	Each axis
10AB	0050FB		

Address (hexadecimal)		Content	When in tandem drive (synchronous)
MR-MC2_ _	MR-MC3_ _		
10AC	0050FC	Monitor data 3	Each axis
10AD	0050FD		
10AE	0050FE	Monitor data 4	Each axis
10AF	0050FF		
10B0	005100	Parameter write No.1	Each axis
10B1	005101		
10B2	005102	Parameter write data 1	Each axis
10B3	005103		
10B4	005104	Parameter write No.2	Each axis
10B5	005105		
10B6	005106	Parameter write data 2	Each axis
10B7	005107		
10B8	005108	Parameter read No.1	Each axis
10B9	005109		
10BA	00510A	Parameter read data 1	Each axis
10BB	00510B		
10BC	00510C	Parameter read No.2	Each axis
10BD	00510D		
10BE	00510E	Parameter read data 2	Each axis
10BF	00510F		
—	005110	For manufacturer setting	—
	⋮		
	00513F		

Status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

For each bit, "0" stands for invalid and "1" stands for valid.

The when in tandem drive column in the table is for axis data classification for when using tandem drive synchronous mode.

- Master: The data only valid for the master axis (☞ Page 493 Data only valid for the master axis)
- Each axis: The data valid for both the master axis and slave axis (☞ Page 493 Individual data for master axis/slave axis)
- Not supported : The data not supported by tandem drive

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1060	0050A0	0	RDY	Servo ready	Each axis
		1	INP	In-position	Each axis
		2	ZSP	Zero speed	Each axis
		3	ZPAS	Passed Z-phase	Each axis
		4	TLC	Torque limit effective	Each axis
		5	SALM	Servo alarm	Each axis
		6	SWRN	Servo warning	Each axis
		7	ABSE	Absolute position erased	Each axis

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1061	0050A1	0	OP	Operation processing	Master
		1	CPO	Rough match	Master
		2	PF	Positioning completed	Master
		3	ZP	Home position return completed	Master
		4	SMZ	Smoothing stop	Master
		5	OALM	Operation alarm	Master
		6	OPF	Operation completed	Master
		7	PSW	Position switch	Each axis

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1062	0050A2	0	AUTO	In automatic operation mode	Master
		1	ZRNO	In home position return mode	Master
		2	JO	In JOG operation mode	Master
		3	SO	In incremental feed mode	Master
		4	—	For manufacturer setting	—
		5	LIPO	In linear interpolation mode [MC200]/In interpolation operation mode [MC300]	Master
		6	DSTO	In home position reset mode	Master
		7	—	For manufacturer setting	—

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1063	0050A3	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1064	0050A4	0	ISTP	Interlock stop	Master
		1	RMRCH	High speed monitor being latched	Each axis
		2	POV	Exceeded stop position	Master
		3	STO	Start up acceptance completed	Master
		4	—	For manufacturer setting	—
		5			
		6	ZREQ	Home position return request	Master
		7	—	For manufacturer setting	—

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1065	0050A5	0	SCF	Preparation for changing speed completed	Master
		1	TACF	Preparation for changing acceleration time constant completed	Master
		2	TDCF	Preparation for changing deceleration time constant completed	Master
		3	PCF	Preparation for changing position completed	Master
		4	SCE	Speed change error	Master
		5	TACE	Acceleration time constant change error	Master
		6	TDCE	Deceleration time constant change error	Master
		7	PCE	Position change error	Master

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1066	0050A6	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1067	0050A7	0	PPIOP	Operating pass position interrupt	Master
		1	PPIFIN	Pass position interrupt completed	Master
		2	PPIERR	Pass position interrupt incompleted	Master
		3	—	For manufacturer setting	—
		4			
		5			
		6			
		7	AUTLO	In point table loop	Master

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1068	0050A8	0	GAINO	During gain switching	Each axis
		1	FCLSO	Fully closed loop control changing	Each axis
		2	TLSO	Selecting torque limit	Each axis
		3	SPC	During PID control	Each axis
		4	—	For manufacturer setting	—
		5			
		6			
		7	PRSMO	During continuous operation to torque control	Not supported

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1069	0050A9	0	IWT	Interference check standby	Each axis
		1	SINP	Servo amplifier in-position	Each axis
		2	—	For manufacturer setting	—
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106A	0050AA	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	ZSF	Home position set complete	Not supported
		5	ZSE	Home position set error	Not supported
		6	—	For manufacturer setting	—
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106B	0050AB	0	MKIF1	Mark detection compatible information 1	Each axis
		1	MKCF1	Mark detection clear complete 1	Each axis
		2	MKDO1	Mark detection disabled 1	Each axis
		3	MKSEF1	Mark detection setting enable complete 1	Each axis
		4	MKIF2	Mark detection compatible information 2	Each axis
		5	MKCF2	Mark detection clear complete 2	Each axis
		6	MKDO2	Mark detection disabled 2	Each axis
		7	MKSEF2	Mark detection setting enable complete 2	Each axis

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106C	0050AC	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4	CTLMCF	Control mode switch complete	Not supported
		5	CTLMCE	Control mode switch error	Not supported
		6	—	For manufacturer setting	—
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106D, 106E	0050AD, 0050AE	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
106F	0050AF	0	GAIN2O	Selecting gain switching 2	Each axis
		1	—	For manufacturer setting	—
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1070	0050B0	0	MOUT	Monitor output	Each axis
		1	MRCH	Monitor latch	Each axis
		2	MER1	Monitor No. error 1	Each axis
		3	MER2	Monitor No. error 2	Each axis
		4	MER3	Monitor No. error 3	Each axis
		5	MER4	Monitor No. error 4	Each axis
		6	MESV	Servo amplifier is not connected	Each axis
		7	—	For manufacturer setting	—

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1071 ⋮ 1073	0050B1 ⋮ 0050B3	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1074	0050B4	0	PWFIN1	Parameter write completed 1	Each axis
		1	PWEN1	Parameter No. error 1	Each axis
		2	PWED1	Parameter data out of bounds 1	Each axis
		3	—	For manufacturer setting	—
		4	PWFIN2	Parameter write completed 2	Each axis
		5	PWEN2	Parameter No. error 2	Each axis
		6	PWED2	Parameter data out of bounds 2	Each axis
		7	PSCHG	Changes to servo parameters exist	Each axis

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1075	0050B5	0	PRFIN1	Parameter read completed 1	Each axis
		1	PREN1	Parameter No. error 1	Each axis
		2	PRFIN2	Parameter read completed 2	Each axis
		3	PREN2	Parameter No. error 2	Each axis
		4	—	For manufacturer setting	—
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
1076 ⋮ 107F	0050B6 ⋮ 0050BF	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive
MR-MC2_ _	MR-MC3_ _				
—	0050C0 ⋮ 0050CF	0	—	For manufacturer setting	—
		1			
		2			
		3			
		4			
		5			
		6			
		7			

10.8 Axis Data (Sensing Module (Axis Mode))

Axis data command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
1000	005000	Command bit
1001	005001	
1002	005002	
1003	005003	
1004	005004	
1005	005005	
1006	005006	
1007	005007	
1008	005008	
1009	005009	
100A	00500A	
100B	00500B	
100C	00500C	
100D	00500D	
100E	00500E	
100F	00500F	
1010	005010	
1011	005011	
1012	005012	
1013	005013	
1014	005014	
1015	005015	
1016	005016	
1017	005017	
1018	005018	
1019	005019	
101A	00501A	
101B	00501B	
101C	00501C	
101D	00501D	
101E	00501E	
101F	00501F	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
—	005020	Command bit
	005021	
	005022	
	005023	
	005024	
	005025	
	005026	
	005027	
	005028	
	005029	
	00502A	
	00502B	
	00502C	
	00502D	
	00502E	
	00502F	
1020	005030	Manual feed speed*1
1021	005031	
1022	005032	
1023	005033	
1024	005034	Manual feed acceleration time constant
1025	005035	
1026	005036	Manual feed deceleration time constant
1027	005037	
1028	005038	Incremental feed movement amount
1029	005039	
102A	00503A	
102B	00503B	
102C	00503C	Start point No.
102D	00503D	
102E	00503E	End point No.
102F	00503F	
1030	005040	Latest position command buffer No.
1031	005041	
1032	005042	For manufacturer setting
1033	005043	
1034	005044	Pass position condition start No.
1035	005045	
1036	005046	Pass position condition end No.
1037	005047	
1038	005048	For manufacturer setting
1039	005049	
103A	00504A	Latest command point No.
103B	00504B	
103C	00504C	For manufacturer setting
⋮	⋮	
103F	00504F	
1040	005050	Monitor No.1
1041	005051	
1042	005052	Monitor No.2
1043	005053	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
1044	005054	Monitor No.3
1045	005055	
1046	005056	Monitor No.4
1047	005057	
1048	005058	Torque control speed limit value
1049	005059	
104A	00505A	
104B	00505B	
104C	00505C	For manufacturer setting
⋮	⋮	
104F	00505F	
1050	005060	Parameter write No.1
1051	005061	
1052	005062	Parameter write data 1
1053	005063	
1054	005064	Parameter write No.2
1055	005065	
1056	005066	Parameter write data 2
1057	005067	
1058	005068	Parameter read No.1
1059	005069	
105A	00506A	For manufacturer setting
105B	00506B	
105C	00506C	Parameter read No.2
105D	00506D	
105E	00506E	For manufacturer setting
105F	00506F	
—	005070	
	⋮	
	00509F	

*1 The manual feed speed is the moving speed for manual operation (JOG operation as well as incremental feed).

Command bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1000	005000	0	SON	Servo on
		1	—	For manufacturer setting
		2		
		3		
		4		
		5	SRST	Servo alarm reset
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1001	005001	0	ST	Start operation
		1	DIR	Movement direction
		2	STP	Stop operation
		3	RSTP	Rapid stop
		4	—	For manufacturer setting
		5	ORST	Operation alarm reset
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1002	005002	0	AUT	Automatic operation mode
		1	ZRN	Home position return mode
		2	JOG	JOG operation mode
		3	S	Incremental feed mode
		4	—	For manufacturer setting
		5	LIP	Linear interpolation mode [MC200]/interpolation operation mode [MC300]
		6	DST	Home position reset mode
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1003	005003	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1004	005004	0	ITL	Interlock
		1	RMONR	High speed monitor latch command
		2	—	For manufacturer setting
		3		
		4	LSPC	+ side limit switch input
		5	LSNC	- side limit switch input
		6	DOGC	Proximity dog input
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1005	005005	0	SCHG	Change speed
		1	TACHG	Change acceleration time constant
		2	TDCHG	Change deceleration time constant
		3	PCHG	Change position
		4	—	For manufacturer setting
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1006	005006	0	FST	Fast start operation
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1007	005007	0	PPISTP	Pass position interrupt cancel
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1008 ⋮ 100F	005008 ⋮ 00500F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1010	005010	0	MON	Monitor command
		1	MONR	Monitor latch command
		2	—	For manufacturer setting
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1011 ⋮ 1013	005011 ⋮ 005013	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1014	005014	0	PWRT	Parameter write command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7	PSF	Servo parameter read complete

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1015	005015	0	PRD	Parameter read command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1016 ⋮ 101F	005016 ⋮ 00501F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
—	005020 ⋮ 00502F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Axis data status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
1060	0050A0	Status bit
1061	0050A1	
1062	0050A2	
1063	0050A3	
1064	0050A4	
1065	0050A5	
1066	0050A6	
1067	0050A7	
1068	0050A8	
1069	0050A9	
106A	0050AA	
106B	0050AB	
106C	0050AC	
106D	0050AD	
106E	0050AE	
106F	0050AF	
1070	0050B0	
1071	0050B1	
1072	0050B2	
1073	0050B3	
1074	0050B4	
1075	0050B5	
1076	0050B6	
1077	0050B7	
1078	0050B8	
1079	0050B9	
107A	0050BA	
107B	0050BB	
107C	0050BC	
107D	0050BD	
107E	0050BE	
107F	0050BF	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
—	0050C0	Status bit
	0050C1	
	0050C2	
	0050C3	
	0050C4	
	0050C5	
	0050C6	
	0050C7	
	0050C8	
	0050C9	
	0050CA	
	0050CB	
	0050CC	
	0050CD	
	0050CE	
	0050CF	
1080	0050D0	Operation alarm No.
1081	0050D1	
1082	0050D2	Specific operation alarm No.
1083	0050D3	
1084	0050D4	Servo alarm No.
1085	0050D5	
1086	0050D6	Specific servo alarm No.
1087	0050D7	
1088	0050D8	For manufacturer setting
⋮	⋮	
108B	0050DB	
108C	0050DC	Operation point No.
108D	0050DD	
108E	0050DE	Maximum position command buffer No.
108F	0050DF	
1090	0050E0	Transmit position command buffer No.
1091	0050E1	
1092	0050E2	For manufacturer setting
1093	0050E3	
1094	0050E4	Executing pass position condition No.
1095	0050E5	
1096	0050E6	For manufacturer setting
⋮	⋮	
109F	0050EF	
10A0	0050F0	Monitor No.1
10A1	0050F1	
10A2	0050F2	Monitor No.2
10A3	0050F3	
10A4	0050F4	Monitor No.3
10A5	0050F5	
10A6	0050F6	Monitor No.4
10A7	0050F7	
10A8	0050F8	Monitor data 1
10A9	0050F9	
10AA	0050FA	Monitor data 2
10AB	0050FB	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
10AC	0050FC	Monitor data 3
10AD	0050FD	
10AE	0050FE	Monitor data 4
10AF	0050FF	
10B0	005100	Parameter write No.1
10B1	005101	
10B2	005102	Parameter write data 1
10B3	005103	
10B4	005104	Parameter write No.2
10B5	005105	
10B6	005106	Parameter write data 2
10B7	005107	
10B8	005108	Parameter read No.1
10B9	005109	
10BA	00510A	Parameter read data 1
10BB	00510B	
10BC	00510C	Parameter read No.2
10BD	00510D	
10BE	00510E	Parameter read data 2
10BF	00510F	
—	005110	For manufacturer setting
	⋮	
	00513F	

Status bit

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +C0h
- Using MR-MC3_ _: +140h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1060	0050A0	0	RDY	Servo ready
		1	INP	In-position
		2	—	For manufacturer setting
		3	ZPAS	Passed Z-phase
		4	TLC	Torque limit effective
		5	SALM	Servo alarm
		6	SWRN	Servo warning
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1061	0050A1	0	OP	Operation processing
		1	CPO	Rough match
		2	PF	Positioning completed
		3	ZP	Home position return completed
		4	SMZ	Smoothing stop
		5	OALM	Operation alarm
		6	OPF	Operation completed
		7	PSW	Position switch

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1062	0050A2	0	AUTO	In automatic operation mode
		1	ZRNO	In home position return mode
		2	JO	In JOG operation mode
		3	SO	In incremental feed mode
		4	—	For manufacturer setting
		5	LIPO	In linear interpolation mode [MC200]/in interpolation operation mode [MC300]
		6	DSTO	In home position reset mode
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1063	0050A3	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1064	0050A4	0	ISTP	Interlock stop
		1	RMRCH	High speed monitor being latched
		2	POV	Exceeded stop position
		3	STO	Start up acceptance completed
		4	—	For manufacturer setting
		5		
		6	ZREQ	Home position return request
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1065	0050A5	0	SCF	Preparation for changing speed completed
		1	TACF	Preparation for changing acceleration time constant completed
		2	TDCF	Preparation for changing deceleration time constant completed
		3	PCF	Preparation for changing position completed
		4	SCE	Speed change error
		5	TACE	Acceleration time constant change error
		6	TDCE	Deceleration time constant change error
		7	PCE	Position change error

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1066	0050A6	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1067	0050A7	0	PPIOP	Operating pass position interrupt
		1	PPIFIN	Pass position interrupt completed
		2	PPIERR	Pass position interrupt incompleted
		3	—	For manufacturer setting
		4		
		5		
		6		
		7	AUTLO	In point table loop

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1068	0050A8	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1069	0050A9	0	IWT	Interference check standby
		1	SINP	Servo amplifier in-position
		2	—	For manufacturer setting
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
106A ⋮ 106F	0050AA ⋮ 0050AF	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1070	0050B0	0	MOUT	Monitor output
		1	MRCH	Monitor latch
		2	MER1	Monitor No. error 1
		3	MER2	Monitor No. error 2
		4	MER3	Monitor No. error 3
		5	MER4	Monitor No. error 4
		6	MESV	Servo amplifier is not connected
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1071 ⋮ 1073	0050B1 ⋮ 0050B3	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1074	0050B4	0	PWFIN1	Parameter write completed 1
		1	PWEN1	Parameter No. error 1
		2	PWED1	Parameter data out of bounds 1
		3	—	For manufacturer setting
		4	PWFIN2	Parameter write completed 2
		5	PWEN2	Parameter No. error 2
		6	PWED2	Parameter data out of bounds 2
		7	PSCHG	Changes to servo parameters exist

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1075	0050B5	0	PRFIN1	Parameter read completed 1
		1	PREN1	Parameter No. error 1
		2	PRFIN2	Parameter read completed 2
		3	PREN2	Parameter No. error 2
		4	—	For manufacturer setting
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
1076 ⋮ 107F	0050B6 ⋮ 0050BF	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
—	0050C0 ⋮ 0050CF	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

10.9 Remote I/O Data

RIO data command table

The addresses in the table are the addresses for the first station. For the second station and after, add the following value for each station.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +C0h

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
3400	00F000	Command bit
3401	00F001	
3402	00F002	
3403	00F003	
3404	00F004	
3405	00F005	
3406	00F006	
3407	00F007	
3408	00F008	
3409	00F009	
340A	00F00A	
340B	00F00B	
340C	00F00C	
340D	00F00D	
340E	00F00E	
340F	00F00F	
3410	00F010	For manufacturer setting
⋮	⋮	
341F	00F01F	
3420	00F020	Monitor No.1
3421	00F021	
3422	00F022	Monitor No.2
3423	00F023	
3424	00F024	Monitor No.3
3425	00F025	
3426	00F026	Monitor No.4
3427	00F027	
3428	00F028	For manufacturer setting
⋮	⋮	
342F	00F02F	
3430	00F030	Parameter write No.1
3431	00F031	
3432	00F032	Parameter write data 1
3433	00F033	
3434	00F034	Parameter write No.2
3435	00F035	
3436	00F036	Parameter write data 2
3437	00F037	
3438	00F038	Parameter read No.1
3439	00F039	
343A	00F03A	For manufacturer setting
343B	00F03B	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
343C	00F03C	Parameter read No.2
343D	00F03D	
343E	00F03E	For manufacturer setting
343F	00F03F	
—	00F040	
	⋮	
	00F05F	

Command bit

For each bit, "0" stands for invalid and "1" stands for valid.

The addresses in the table are the addresses for the first station. For the second station and after, add the following value for each station.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +C0h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3400	00F000	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5	RURST	RIO module alarm reset
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3401	00F001	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5	RCRST	RIO control alarm reset
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3402, 3403	00F002, 00F003	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3404	00F004	0	MON	Monitor command
		1	MONR	Monitor latch command
		2	—	For manufacturer setting
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3405	00F005	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3406	00F006	0	PWRT	Parameter write command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3407	00F007	0	PRD	Parameter read command
		1	—	For manufacturer setting
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3408 ⋮ 340F	00F008 ⋮ 00F00F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

RIO data status table

The addresses in the table are the addresses for the first station. For the second station and after, add the following value for each station.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +C0h

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
3440	00F060	Status bit
3441	00F061	
3442	00F062	
3443	00F063	
3444	00F064	
3445	00F065	
3446	00F066	
3447	00F067	
3448	00F068	
3449	00F069	
344A	00F06A	
344B	00F06B	
344C	00F06C	
344D	00F06D	
344E	00F06E	
344F	00F06F	
3450	00F070	RIO control alarm No.
3451	00F071	
3452	00F072	Detail RIO control alarm No.
3453	00F073	
3454	00F074	RIO module alarm No.
3455	00F075	
3456	00F076	Detail RIO module alarm No.
3457	00F077	
3458	00F078	For manufacturer setting
⋮	⋮	
345F	00F07F	
3460	00F080	Monitor No.1
3461	00F081	
3462	00F082	Monitor No.2
3463	00F083	
3464	00F084	Monitor No.3
3465	00F085	
3466	00F086	Monitor No.4
3467	00F087	
3468	00F088	Monitor data 1
3469	00F089	
346A	00F08A	Monitor data 2
346B	00F08B	
346C	00F08C	Monitor data 3
346D	00F08D	
346E	00F08E	Monitor data 4
346F	00F08F	
3470	00F090	Parameter write No.1
3471	00F091	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
3472	00F092	Parameter write data 1
3473	00F093	
3474	00F094	Parameter write No.2
3475	00F095	
3476	00F096	Parameter write data 2
3477	00F097	
3478	00F098	Parameter read No.1
3479	00F099	
347A	00F09A	Parameter read data 1
347B	00F09B	
347C	00F09C	Parameter read No.2
347D	00F09D	
347E	00F09E	Parameter read data 2
347F	00F09F	
—	00F0A0	For manufacturer setting
	⋮	
	00F0BF	

Status bit

For each bit, "0" stands for invalid and "1" stands for valid.

The addresses in the table are the addresses for the first station. For the second station and after, add the following value for each station.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +C0h

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3440	00F060	0	RURDY	Receiving controller ready on
		1	RUA	Outputting DO
		2	—	For manufacturer setting
		3		
		4		
		5	RUALM	RIO module alarm
		6	RUWRN	RIO module warning
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3441	00F061	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5	RCALM	RIO control alarm
		6	—	For manufacturer setting
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3442, 3443	00F062, 00F063	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3444	00F064	0	MOUT	Monitor output
		1	MRCH	Monitor latch
		2	MER1	Monitor No. error 1
		3	MER2	Monitor No. error 2
		4	MER3	Monitor No. error 3
		5	MER4	Monitor No. error 4
		6	MERIO	RIO module is not connected
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3445	00F065	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3446	00F066	0	PWFIN1	Parameter write completed 1
		1	PWEN1	Parameter No. error 1
		2	PWED1	Parameter data out of bounds 1
		3	—	For manufacturer setting
		4	PWFIN2	Parameter write completed 2
		5	PWEN2	Parameter No. error 2
		6	PWED2	Parameter data out of bounds 2
		7	—	For manufacturer setting

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3447	00F067	0	PRFIN1	Parameter read completed 1
		1	PREN1	Parameter No. error 1
		2	PRFIN2	Parameter read completed 2
		3	PREN2	Parameter No. error 2
		4	—	For manufacturer setting
		5		
		6		
		7		

Address (hexadecimal)		Bit	Symbol	Signal name
MR-MC2_ _	MR-MC3_ _			
3448 ⋮ 344F	00F068 ⋮ 00F06F	0	—	For manufacturer setting
		1		
		2		
		3		
		4		
		5		
		6		
		7		

10.10 Servo Parameter Change No. (SSCNETIII/H)

When parameter settings within the servo amplifier are changed using the auto tuning function or parameter changes using MR Configurator2 (set up software), the bit corresponding to the servo parameter No. that was changed is turned ON to notify concerning which parameter No. was changed (in units of 16). To identify the changed parameter, confirm "Servo parameter change No. (MR-J4(W_)-_B: monitor No.0590H to 05B7H, MR-J5(W_)-_B: monitor No.0980H to 09BFH [MC300])" corresponding to the bit which is turned ON. For more information, refer to the following.

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Servo parameter change No. (SSCNETIII/H) (J4)

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
3870	010800	Servo parameter change No.1□□□ Axis 1
3871	010801	
3872	010802	
3873	010803	
3874	010804	
3875	010805	
3876	010806	
3877	010807	
3878	010808	Servo parameter change No.1□□□ Axis 2
3879	010809	
387A	01080A	
387B	01080B	
387C	01080C	
387D	01080D	
387E	01080E	
387F	01080F	
3880	010810	Servo parameter change No.1□□□ Axis 3
3881	010811	
3882	010812	
3883	010813	
3884	010814	
3885	010815	
3886	010816	
3887	010817	
3888	010818	Servo parameter change No.1□□□ Axis 4
3889	010819	
388A	01081A	
388B	01081B	
388C	01081C	
388D	01081D	
388E	01081E	
388F	01081F	
3890	010820	Servo parameter change No.1□□□ Axis 5
3891	010821	
3892	010822	
3893	010823	
3894	010824	
3895	010825	
3896	010826	
3897	010827	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
3898	010828	Servo parameter change No.1□□□ Axis 6
3899	010829	
389A	01082A	
389B	01082B	
389C	01082C	
389D	01082D	
389E	01082E	
389F	01082F	
38A0	010830	Servo parameter change No.1□□□ Axis 7
38A1	010831	
38A2	010832	
38A3	010833	
38A4	010834	
38A5	010835	
38A6	010836	
38A7	010837	
38A8	010838	Servo parameter change No.1□□□ Axis 8
38A9	010839	
38AA	01083A	
38AB	01083B	
38AC	01083C	
38AD	01083D	
38AE	01083E	
38AF	01083F	
38B0	010840	⋮
⋮	⋮	
3967	0108F7	
3968	0108F8	Servo parameter change No.1□□□ Axis 32
3969	0108F9	
396A	0108FA	
396B	0108FB	
396C	0108FC	
396D	0108FD	
396E	0108FE	
396F	0108FF	
3970	010900	Servo parameter change No.1□□□ Axis 33[*1]
3971	010901	
3972	010902	
3973	010903	
3974	010904	
3975	010905	
3976	010906	
3977	010907	
3978	010908	⋮
⋮	⋮	
39E7	010977	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
39E8	010978	Servo parameter change No.1□□□ Axis 48[*1]
39E9	010979	
39EA	01097A	
39EB	01097B	
39EC	01097C	
39ED	01097D	
39EE	01097E	
39EF	01097F	
—	010980	Servo parameter change No.1□□□ Axis 49
	010981	
	010982	
	010983	
	010984	
	010985	
	010986	
	010987	
	010988	⋮
	⋮	
	0109F7	
	0109F8	Servo parameter change No.1□□□ Axis 64
	0109F9	
	0109FA	
	0109FB	
	0109FC	
	0109FD	
	0109FE	
	0109FF	
	010A00	For manufacturer setting
	⋮	
	010BFF	

*1 When using MR-MC2_ _, 3970 to 39EF are "For manufacturer setting".

■Details on servo amplifier change No. on axis n (SSCNETIII/H) (J4)

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+8h" for each axis.

Address (hexadecimal)		Name	Symbol	Remarks
MR-MC2_ _	MR-MC3_ _			
3870	010800	Servo parameter change No.11□□	PSN11	Bit0 (parameter No.1100 to 110F) to bit15 (parameter No.11F0 to 11FF)
3871	010801			
3872	010802	Servo parameter change No.12□□	PSN12	Bit0 (parameter No.1200 to 120F) to bit15 (parameter No.12F0 to 12FF)
3873	010803			
3874	010804	Servo parameter change No.13□□	PSN13	Bit0 (parameter No.1300 to 130F) to bit15 (parameter No.1370 to 137F)
3875	010805			
3876	010806	For manufacturer setting	—	—
3877	010807			

Servo parameter change No. (SSCNETIII/H) (J5) [MC300]

Address (hexadecimal) MR-MC3_ _	Content
010D00	Servo parameter change No.2□□□ Axis1
010D01	
010D02	
010D03	
010D04	
010D05	
010D06	
010D07	
010D08	Servo parameter change No.2□□□ Axis2
010D09	
010D0A	
010D0B	
010D0C	
010D0D	
010D0E	
010D0F	
010D10	Servo parameter change No.2□□□ Axis3
010D11	
010D12	
010D13	
010D14	
010D15	
010D16	
010D17	
010D18	Servo parameter change No.2□□□ Axis4
010D19	
010D1A	
010D1B	
010D1C	
010D1D	
010D1E	
010D1F	
010D20	Servo parameter change No.2□□□ Axis5
010D21	
010D22	
010D23	
010D24	
010D25	
010D26	
010D27	
010D28	Servo parameter change No.2□□□ Axis6
010D29	
010D2A	
010D2B	
010D2C	
010D2D	
010D2E	
010D2F	

Address (hexadecimal)	Content
MR-MC3_ _	
010D30	Servo parameter change No.2□□□ Axis7
010D31	
010D32	
010D33	
010D34	
010D35	
010D36	
010D37	
010D38	Servo parameter change No.2□□□ Axis8
010D39	
010D3A	
010D3B	
010D3C	
010D3D	
010D3E	
010D3F	
010D40	⋮
⋮	
010EF7	
010EF8	Servo parameter change No.2□□□ Axis64
010EF9	
010EFA	
010EFB	
010EFC	
010EFD	
010EFE	
010EFF	
010F00	For manufacturer setting
⋮	
0110FF	

■Details on servo amplifier change No. on axis n (SSCNETIII/H) (J5)

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+8h" for each axis.

Address (hexadecimal)	Name	Symbol	Remarks
MR-MC3_ _			
010D00	Servo parameter change No.20□□	PSN20	Bit0 (parameter No.2000 to 200F) to Bit15 (parameter No.20F0 to 20FF)
010D01			
010D02	Servo parameter change No.21□□	PSN21	Bit0 (parameter No.2100 to 210F) to Bit15 (parameter No.21F0 to 21FF)
010D03			
010D04	Servo parameter change No.22□□	PSN22	Bit0 (parameter No.2200 to 220F) to Bit15 (parameter No.22F0 to 22FF)
010D05			
010D06	Servo parameter change No.23□□	PSN23	Bit0 (parameter No.2300 to 230F) to Bit15 (parameter No.23F0 to 23FF)
010D07			

10.11 Transient Transmit Command/status

Transient transmit command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.
The start address for the first station is as follows. For the second station and after, add "+20h" for each station.

- Using MR-MC2_ _: DA00h
- Using MR-MC3_ _: 0F9B00h

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
D400	0F8B00	Command transmission request
D401	0F8B01	
D402	0F8B02	Transient command
D403	0F8B03	
D404	0F8B04	Request data 1
D405	0F8B05	
D406	0F8B06	Request data 2
D407	0F8B07	
D408	0F8B08	Request data 3
D409	0F8B09	
D40A	0F8B0A	Request data 4
D40B	0F8B0B	
D40C	0F8B0C	For manufacturer setting
⋮	⋮	
D40F	0F8B0F	

Transient transmit status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.
The start address for the first station is as follows. For the second station and after, add "+20h" for each station.

- Using MR-MC2_ _: DA10h
- Using MR-MC3_ _: 0F9B10h

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
D410	0F8B10	Transient status
D411	0F8B11	
D412	0F8B12	For manufacturer setting
D413	0F8B13	
D414	0F8B14	Response data 1
D415	0F8B15	
D416	0F8B16	Response data 2
D417	0F8B17	
D418	0F8B18	Response data 3
D419	0F8B19	
D41A	0F8B1A	Response data 4
D41B	0F8B1B	
D41C	0F8B1C	For manufacturer setting
⋮	⋮	
D41F	0F8B1F	

10.12 Point No. Offset

10

The start No. in the point table for each axis can be designated using point No. offset.
The amount of offset from the start point in the point table is set by the point No. for the point No. offset.
When setting up the point table, use the following equation to derive the 2-point memory address.

- Using MR-MC2_ _

  The address of the dual port memory = 5000h + 20h × point No. offset

<Example> When the point No. offset of the axis 2 is "0020h", the dual port memory address calculates to.
5000h + 20h × 0020h = 5400h
Set the point table for the axis 2 from "5400h".

- Using MR-MC3_ _

  The address of the dual port memory = 020000h + 30h × point No. offset

<Example> When the point No. offset of the axis 2 is "0020h", the dual port memory address calculates to.
020000h + 30h × 0020h = 020600h
Set the point table for the axis 2 from "020600h".

Address (hexadecimal)		Content	Initial value	
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _
4FA0	01FF00	Axis 1 point No. offset	0000h	0000h
4FA1	01FF01			
4FA2	01FF02	Axis 2 point No. offset	0008h	0020h
4FA3	01FF03			
4FA4	01FF04	Axis 3 point No. offset	0010h	0040h
4FA5	01FF05			
4FA6	01FF06	Axis 4 point No. offset	0018h	0060h
4FA7	01FF07			
4FA8	01FF08	Axis 5 point No. offset	0020h	0080h
4FA9	01FF09			
4FAA	01FF0A	Axis 6 point No. offset	0028h	00A0h
4FAB	01FF0B			
4FAC	01FF0C	Axis 7 point No. offset	0030h	00C0h
4FAD	01FF0D			
4FAE	01FF0E	Axis 8 point No. offset	0038h	00E0h
4FAF	01FF0F			
4FB0	01FF10	Axis 9 point No. offset	0040h	0100h
4FB1	01FF11			
4FB2	01FF12	Axis 10 point No. offset	0048h	0120h
4FB3	01FF13			
4FB4	01FF14	Axis 11 point No. offset	0050h	0140h
4FB5	01FF15			
4FB6	01FF16	Axis 12 point No. offset	0058h	0160h
4FB7	01FF17			
4FB8	01FF18	Axis 13 point No. offset	0060h	0180h
4FB9	01FF19			
4FBA	01FF1A	⋮	⋮	⋮
⋮	⋮			
4FDD	01FF3D			
4FDE	01FF3E	Axis 32 point No. offset	0098h	03E0h
4FDF	01FF3F			

Address (hexadecimal)		Content	Initial value	
MR-MC2_ _	MR-MC3_ _		MR-MC2_ _	MR-MC3_ _
4FE0	01FF40	Axis 33 point no. offset*1	—	0400h
4FE1	01FF41			
4FE2	01FF42	⋮		⋮
⋮	⋮			
4FFD	01FF5D			
4FFE	01FF5E	Axis 48 point no. offset*1		05E0h
4FFF	01FF5F			
—	01FF60	Axis 49 point No. offset		0600h
	01FF61			
	01FF62	⋮		⋮
	⋮			
	01FF7D			
	01FF7E	Axis 64 point No. offset		07E0h
	01FF7F			
	01FF80	For manufacturer setting		—
	⋮			
	01FFFF			

*1 When using MR-MC2_ _, 4FE0 to 4FFF are "For manufacturer setting".

10.13 Command Buffers

Position command buffer

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+100h" for each axis.

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
5000	101000	Position command buffer 0 [pulse]
5001	101001	
5002	101002	
5003	101003	
5004	101004	Position command buffer 1 [pulse]
5005	101005	
5006	101006	
5007	101007	
5008	101008	Position command buffer 2 [pulse]
5009	101009	
500A	10100A	
500B	10100B	
500C	10100C	Position command buffer 3 [pulse]
500D	10100D	
500E	10100E	
500F	10100F	
5010	101010	Position command buffer 4 [pulse]
5011	101011	
5012	101012	
5013	101013	
5014	101014	Position command buffer 5 [pulse]
5015	101015	
5016	101016	
5017	101017	
5018	101018	Position command buffer 6 [pulse]
5019	101019	
501A	10101A	
501B	10101B	
501C	10101C	Position command buffer 7 [pulse]
501D	10101D	
501E	10101E	
501F	10101F	
5020	101020	Position command buffer 8 [pulse]
5021	101021	
5022	101022	
5023	101023	
5024	101024	Position command buffer 9 [pulse]
5025	101025	
5026	101026	
5027	101027	
5028	101028	Position command buffer 10 [pulse]
5029	101029	
502A	10102A	
502B	10102B	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
502C	10102C	Position command buffer 11 [pulse]
502D	10102D	
502E	10102E	
502F	10102F	
5030	101030	Position command buffer 12 [pulse]
5031	101031	
5032	101032	
5033	101033	
5034	101034	Position command buffer 13 [pulse]
5035	101035	
5036	101036	
5037	101037	
5038	101038	Position command buffer 14 [pulse]
5039	101039	
503A	10103A	
503B	10103B	
503C	10103C	Position command buffer 15 [pulse]
503D	10103D	
503E	10103E	
503F	10103F	
5040	101040	Position command buffer 16 [pulse]
5041	101041	
5042	101042	
5043	101043	
5044	101044	⋮
⋮	⋮	
50EF	1010EF	
50F0	1010F0	Position command buffer 60 [pulse]
50F1	1010F1	
50F2	1010F2	
50F3	1010F3	
50F4	1010F4	Position command buffer 61 [pulse]
50F5	1010F5	
50F6	1010F6	
50F7	1010F7	
50F8	1010F8	Position command buffer 62 [pulse]
50F9	1010F9	
50FA	1010FA	
50FB	1010FB	
50FC	1010FC	Position command buffer 63 [pulse]
50FD	1010FD	
50FE	1010FE	
50FF	1010FF	

Speed command buffer

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +100h

Setting range: -1000000000 (-10000000r/min) to 1000000000 (10000000r/min)

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
7800	109000	Speed command buffer 0 (0.01r/min)
7801	109001	
7802	109002	
7803	109003	
7804	109004	For manufacturer setting
⋮	⋮	
787F	10907F	
—	109080	
	⋮	
	1090FF	

Torque command buffer

The addresses in the table are the addresses for the first axis. For the second axis and after, add the following value for each axis.

- Using MR-MC2_ _: +80h
- Using MR-MC3_ _: +100h

Setting range: -32768 (-3276.8%) to 32767 (3276.7%)

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
8C00	111000	Torque command buffer 0 (0.1%) (MR-J4(W_)-_B: When "Rotation direction selection/travel direction selection (parameter No.110D)" is "0", positive: CCW negative: CW) (MR-J5(W_)-_B: When "Travel direction selection (parameter No.200D)" is "0", positive: CCW negative: CW [MC300])
8C01	111001	
8C02	111002	
8C03	111003	
8C04	111004	For manufacturer setting
⋮	⋮	
8C7F	11107F	
—	111080	
	⋮	
	1110FF	

10.14 Digital I/O [MC200]

Digital input table

Address (hexadecimal)	Digital input area No.	Digital input No.	Symbol	Remarks
B000	Digital input area 0 (2bytes)	Digital output 0 to digital output 15	DI_000 to DI_00F	Notify the status of the digital input signal. The bits are DI_000 (bit0) to DI_00F (bit15).
B002	Digital input area 1 (2bytes)	Digital output 16 to digital output 31	DI_010 to DI_01F	Notify the status of the digital input signal. The bits are DI_010 (bit0) to DI_01F (bit15).
B004	Digital input area 2 (2bytes)	Digital output 32 to digital output 47	DI_020 to DI_02F	Notify the status of the digital input signal. The bits are DI_020 (bit0) to DI_02F (bit15).
B006	Digital input area 3 (2bytes)	Digital output 48 to digital output 63	DI_030 to DI_03F	Notify the status of the digital input signal. The bits are DI_030 (bit0) to DI_03F (bit15).
B008	Digital input area 4 (2bytes)	Digital output 64 to digital output 79	DI_040 to DI_04F	Notify the status of the digital input signal. The bits are DI_040 (bit0) to DI_04F (bit15).
B00A	Digital input area 5 (2bytes)	Digital output 80 to digital output 95	DI_050 to DI_05F	Notify the status of the digital input signal. The bits are DI_050 (bit0) to DI_05F (bit15).
B00C	Digital input area 6 (2bytes)	Digital output 96 to digital output 111	DI_060 to DI_06F	Notify the status of the digital input signal. The bits are DI_060 (bit0) to DI_06F (bit15).
B00E	Digital input area 7 (2bytes)	Digital output 112 to digital output 127	DI_070 to DI_07F	Notify the status of the digital input signal. The bits are DI_070 (bit0) to DI_07F (bit15).
⋮	⋮	⋮	⋮	⋮
B07E	Digital input area 63 (2bytes)	Digital output 1008 to digital output 1023	DI_3F0 to DI_3FF	Notify the status of the digital input signal. The bits are DI_3F0 (bit0) to DI_3FF (bit15).

Digital output table

Address (hexadecimal)	Digital output area No.	Digital output No.	Symbol	Remarks
B080	Digital output area 0 (2bytes)	Digital output 0 to digital output 15	DO_000 to DO_00F	Turn ON/OFF the digital output signal. The bits are DO_000 (bit0) to DO_00F (bit15).
B082	Digital output area 1 (2bytes)	Digital output 16 to digital output 31	DO_010 to DO_01F	Turn ON/OFF the digital output signal. The bits are DO_010 (bit0) to DO_01F (bit15).
B084	Digital output area 2 (2bytes)	Digital output 32 to digital output 47	DO_020 to DO_02F	Turn ON/OFF the digital output signal. The bits are DO_020 (bit0) to DO_02F (bit15).
B086	Digital output area 3 (2bytes)	Digital output 48 to digital output 63	DO_030 to DO_03F	Turn ON/OFF the digital output signal. The bits are DO_030 (bit0) to DO_03F (bit15).
B088	Digital output area 4 (2bytes)	Digital output 64 to digital output 79	DO_040 to DO_04F	Turn ON/OFF the digital output signal. The bits are DO_040 (bit0) to DO_04F (bit15).
B08A	Digital output area 5 (2bytes)	Digital output 80 to digital output 95	DO_050 to DO_05F	Turn ON/OFF the digital output signal. The bits are DO_050 (bit0) to DO_05F (bit15).
B08C	Digital output area 6 (2bytes)	Digital output 96 to digital output 111	DO_060 to DO_06F	Turn ON/OFF the digital output signal. The bits are DO_060 (bit0) to DO_06F (bit15).
B08E	Digital output area 7 (2bytes)	Digital output 112 to digital output 127	DO_070 to DO_07F	Turn ON/OFF the digital output signal. The bits are DO_070 (bit0) to DO_07F (bit15).
⋮	⋮	⋮	⋮	⋮
B0FE	Digital output area 63 (2bytes)	Digital output 1008 to digital output 1023	DO_3F0 to DO_3FF	Turn ON/OFF the digital output signal. The bits are DO_3F0 (bit0) to DO_3FF (bit15).

10.15 I/O Device

Input device table

Address (hexadecimal)		Input word device No.	Input bit device No.
MR-MC2_ _	MR-MC3_ _		
DB00	0F9F00	Input word device 00	Input bit device 000 to input bit device 00F
DB01	0F9F01		
DB02	0F9F02	Input word device 01	Input bit device 010 to input bit device 01F
DB03	0F9F03		
DB04	0F9F04	Input word device 02	Input bit device 020 to input bit device 02F
DB05	0F9F05		
DB06	0F9F06	Input word device 03	Input bit device 030 to input bit device 03F
DB07	0F9F07		
DB08	0F9F08	Input word device 04	Input bit device 040 to input bit device 04F
DB09	0F9F09		
DB0A	0F9F0A	Input word device 05	Input bit device 050 to input bit device 05F
DB0B	0F9F0B		
DB0C	0F9F0C	Input word device 06	Input bit device 060 to input bit device 06F
DB0D	0F9F0D		
DB0E	0F9F0E	Input word device 07	Input bit device 070 to input bit device 07F
DB0F	0F9F0F		
DB10	0F9F10	Input word device 08	Input bit device 080 to input bit device 08F
DB11	0F9F11		
DB12	0F9F12	Input word device 09	Input bit device 090 to input bit device 09F
DB13	0F9F13		
DB14	0F9F14	Input word device 0A	Input bit device 0A0 to input bit device 0AF
DB15	0F9F15		
DB16	0F9F16	⋮	⋮
⋮	⋮		
DCF9	0FA0F9		
DCFA	0FA0FA	Input word device FD	Input bit device FD0 to input bit device FDF
DCFB	0FA0FB		
DCFC	0FA0FC	Input word device FE	Input bit device FE0 to input bit device FEF
DCFD	0FA0FD		
DCFE	0FA0FE	Input word device FF	Input bit device FF0 to input bit device FFF
DCFF	0FA0FF		
—	0FA100	Input word device 100	Input bit device 1000 to input bit device 100F
	0FA101		
	⋮	⋮	⋮
	0FA37E	Input word device 23F	Input bit device 23F0 to input bit device 23FF
	0FA37F		

Output device table

Address (hexadecimal)		Output word device No.	Output bit device No.
MR-MC2_ _	MR-MC3_ _		
DD00	0FA380	Output word device 00	Output bit device 000 to output bit device 00F
DD01	0FA381		
DD02	0FA382	Output word device 01	Output bit device 010 to output bit device 01F
DD03	0FA383		
DD04	0FA384	Output word device 02	Output bit device 020 to output bit device 02F
DD05	0FA385		
DD06	0FA386	Output word device 03	Output bit device 030 to output bit device 03F
DD07	0FA387		
DD08	0FA388	Output word device 04	Output bit device 040 to output bit device 04F
DD09	0FA389		
DD0A	0FA38A	Output word device 05	Output bit device 050 to output bit device 05F
DD0B	0FA38B		
DD0C	0FA38C	Output word device 06	Output bit device 060 to output bit device 06F
DD0D	0FA38D		
DD0E	0FA38E	Output word device 07	Output bit device 070 to output bit device 07F
DD0F	0FA38F		
DD10	0FA390	Output word device 08	Output bit device 080 to output bit device 08F
DD11	0FA391		
DD12	0FA392	Output word device 09	Output bit device 090 to output bit device 09F
DD13	0FA393		
DD14	0FA394	Output word device 0A	Output bit device 0A0 to output bit device 0AF
DD15	0FA395		
DD16	0FA396	⋮	⋮
⋮	⋮		
DEF9	0FA579		
DEFA	0FA57A	Output word device FD	Output bit device FD0 to output bit device FDF
DEFB	0FA57B		
DEFC	0FA57C	Output word device FE	Output bit device FE0 to output bit device FEF
DEFD	0FA57D		
DEFE	0FA57E	Output word device FF	Output bit device FF0 to output bit device FFF
DEFF	0FA57F		
—	0FA580	Output word device 100	Output bit device 1000 to output bit device 100F
	0FA581		
	⋮	⋮	⋮
	0FA7FE	Output word device 23F	Output bit device 23F0 to output bit device 23FF
	0FA7FF		

10.16 Mark Detection Command/status

Mark detection command table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

The when in tandem drive column in the table is for axis data classification for when using tandem drive synchronous mode.

- Each axis: The data valid for both the master axis and slave axis (☞ Page 493 Individual data for master axis/slave axis)

Address (hexadecimal)		Name	When in tandem drive
MR-MC2_ _	MR-MC3_ _		
B4F0	0E2A00	Read complete buffer No.1	Each axis
B4F1	0E2A01	Read complete buffer No.2	Each axis
B4F2	0E2A02	For manufacturer setting	—
⋮	⋮		
B4FF	0E2A0F		

Mark detection status table

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

The when in tandem drive column in the table is for axis data classification for when using tandem drive synchronous mode.

- Each axis: The data valid for both the master axis and slave axis (☞ Page 493 Individual data for master axis/slave axis)

Address (hexadecimal)		Name	When in tandem drive
MR-MC2_ _	MR-MC3_ _		
B500	0E2A10	Start data storage area 1	Each axis
B501	0E2A11	Number of continuous latch data storages 1	Each axis
B502	0E2A12	Number of mark detections counter 1	Each axis
B503	0E2A13	Mark detection mode 1	Each axis
B504	0E2A14	Start data storage area 2	Each axis
B505	0E2A15	Number of continuous latch data storages 2	Each axis
B506	0E2A16	Number of mark detections counter 2	Each axis
B507	0E2A17	Mark detection mode 2	Each axis
B508	0E2A18	For manufacturer setting	—
⋮	⋮		
B50F	0E2A1F		

10.17 Mark Detection Data

Mark detection edge data

This data shows the detection edges for every positioning data of the mark detection positioning data table.

- 0: Not detected
- 1: OFF edge
- 2: ON edge

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
BAF0	0E3A00	Mark detection edge data 0
BAF1	0E3A01	Mark detection edge data 1
BAF2	0E3A02	Mark detection edge data 2
BAF3	0E3A03	Mark detection edge data 3
BAF4	0E3A04	Mark detection edge data 4
BAF5	0E3A05	Mark detection edge data 5
BAF6	0E3A06	Mark detection edge data 6
BAF7	0E3A07	Mark detection edge data 7
BAF8	0E3A08	Mark detection edge data 8
BAF9	0E3A09	Mark detection edge data 9
BAFA	0E3A0A	Mark detection edge data 10
BAFB	0E3A0B	Mark detection edge data 11
BAFC	0E3A0C	Mark detection edge data 12
BAFD	0E3A0D	Mark detection edge data 13
BAFE	0E3A0E	Mark detection edge data 14
BAFF	0E3A0F	Mark detection edge data 15
BB00	0E3A10	Mark detection edge data 16
BB01	0E3A11	Mark detection edge data 17
BB02	0E3A12	Mark detection edge data 18
BB03	0E3A13	Mark detection edge data 19
BB04	0E3A14	Mark detection edge data 20
BB05	0E3A15	Mark detection edge data 21
BB06	0E3A16	Mark detection edge data 22
BB07	0E3A17	Mark detection edge data 23
BB08	0E3A18	Mark detection edge data 24
BB09	0E3A19	Mark detection edge data 25
BB0A	0E3A1A	Mark detection edge data 26
BB0B	0E3A1B	Mark detection edge data 27
BB0C	0E3A1C	Mark detection edge data 28
BB0D	0E3A1D	Mark detection edge data 29
BB0E	0E3A1E	Mark detection edge data 30
BB0F	0E3A1F	Mark detection edge data 31
BB10	0E3A20	Mark detection edge data 32
BB11	0E3A21	Mark detection edge data 33
BB12	0E3A22	Mark detection edge data 34
BB13	0E3A23	Mark detection edge data 35
BB14	0E3A24	Mark detection edge data 36
BB15	0E3A25	Mark detection edge data 37
BB16	0E3A26	Mark detection edge data 38
BB17	0E3A27	Mark detection edge data 39
BB18	0E3A28	Mark detection edge data 40
BB19	0E3A29	Mark detection edge data 41
BB1A	0E3A2A	Mark detection edge data 42

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
BB1B	0E3A2B	Mark detection edge data 43
BB1C	0E3A2C	Mark detection edge data 44
BB1D	0E3A2D	Mark detection edge data 45
BB1E	0E3A2E	Mark detection edge data 46
BB1F	0E3A2F	Mark detection edge data 47
BB20	0E3A30	Mark detection edge data 48
BB21	0E3A31	Mark detection edge data 49
BB22	0E3A32	Mark detection edge data 50
BB23	0E3A33	Mark detection edge data 51
BB24	0E3A34	Mark detection edge data 52
BB25	0E3A35	Mark detection edge data 53
BB26	0E3A36	Mark detection edge data 54
BB27	0E3A37	Mark detection edge data 55
BB28	0E3A38	Mark detection edge data 56
BB29	0E3A39	Mark detection edge data 57
BB2A	0E3A3A	Mark detection edge data 58
BB2B	0E3A3B	Mark detection edge data 59
BB2C	0E3A3C	Mark detection edge data 60
BB2D	0E3A3D	Mark detection edge data 61
BB2E	0E3A3E	Mark detection edge data 62
BB2F	0E3A3F	Mark detection edge data 63
—	0E3A40	Mark detection edge data 64
	0E3A41	Mark detection edge data 65
	⋮	⋮
	0E3A7F	Mark detection edge data 127

Mark detection positioning data

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
BB30	0E3B00	Mark detection positioning data 0
BB31	0E3B01	
BB32	0E3B02	
BB33	0E3B03	
BB34	0E3B04	Mark detection positioning data 1
BB35	0E3B05	
BB36	0E3B06	
BB37	0E3B07	
BB38	0E3B08	Mark detection positioning data 2
BB39	0E3B09	
BB3A	0E3B0A	
BB3B	0E3B0B	
BB3C	0E3B0C	Mark detection positioning data 3
BB3D	0E3B0D	
BB3E	0E3B0E	
BB3F	0E3B0F	
BB40	0E3B10	Mark detection positioning data 4
BB41	0E3B11	
BB42	0E3B12	
BB43	0E3B13	
BB44	0E3B14	Mark detection positioning data 5
BB45	0E3B15	
BB46	0E3B16	
BB47	0E3B17	
BB48	0E3B18	Mark detection positioning data 6
BB49	0E3B19	
BB4A	0E3B1A	
BB4B	0E3B1B	
BB4C	0E3B1C	Mark detection positioning data 7
BB4D	0E3B1D	
BB4E	0E3B1E	
BB4F	0E3B1F	
BB50	0E3B20	Mark detection positioning data 8
BB51	0E3B21	
BB52	0E3B22	
BB53	0E3B23	
BB54	0E3B24	Mark detection positioning data 9
BB55	0E3B25	
BB56	0E3B26	
BB57	0E3B27	
BB58	0E3B28	Mark detection positioning data 10
BB59	0E3B29	
BB5A	0E3B2A	
BB5B	0E3B2B	
BB5C	0E3B2C	Mark detection positioning data 11
BB5D	0E3B2D	
BB5E	0E3B2E	
BB5F	0E3B2F	

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
BB60	0E3B30	Mark detection positioning data 12
BB61	0E3B31	
BB62	0E3B32	
BB63	0E3B33	
BB64	0E3B34	Mark detection positioning data 13
BB65	0E3B35	
BB66	0E3B36	
BB67	0E3B37	
BB68	0E3B38	Mark detection positioning data 14
BB69	0E3B39	
BB6A	0E3B3A	
BB6B	0E3B3B	
BB6C	0E3B3C	Mark detection positioning data 15
BB6D	0E3B3D	
BB6E	0E3B3E	
BB6F	0E3B3F	
BB70	0E3B40	Mark detection positioning data 16
BB71	0E3B41	
BB72	0E3B42	
BB73	0E3B43	
BB74	0E3B44	⋮
⋮	⋮	
BC2B	0E3BFB	
BC2C	0E3BFC	Mark detection positioning data 63
BC2D	0E3BFD	
BC2E	0E3BFE	
BC2F	0E3BFF	
—	0E3C00	Mark detection positioning data 64
	0E3C01	
	0E3C02	
	0E3C03	
	0E3C04	⋮
	⋮	
	0E3CFB	
	0E3CFC	Mark detection positioning data 127
	0E3CFD	
	0E3CFE	
	0E3CFF	

10.18 Continuous Operation to Torque Control Data

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)		Symbol	Name	At manual switch selection
MR-MC2_ _	MR-MC3_ _			
A840	0E1800	PRCPS	Continuous operation to torque control switching position (4bytes)	Invalid
A841	0E1801			
A842	0E1802			
A843	0E1803			
A844	0E1804	PRLMPS	Press limit position (4bytes)	Valid
A845	0E1805			
A846	0E1806			
A847	0E1807			
A848	0E1808	PRCTSP	Continuous operation to torque control speed limit value (4bytes)	Valid
A849	0E1809			
A84A	0E180A			
A84B	0E180B			
A84C	0E180C	PRTGTR	Target torque (2bytes)	Valid
A84D	0E180D			
A84E	0E180E	PRTM	Press time (2bytes)	Invalid
A84F	0E180F			
A850	0E1810	PRTRW	Torque settle width (2bytes)	Valid
A851	0E1811			
A852	0E1812	PRWTM	Torque settle waiting time (2bytes)	Valid
A853	0E1813			
A854	0E1814	PRCA	Continuous operation to torque control acceleration time constant (2bytes)	Valid
A855	0E1815			
A856	0E1816	PRCD	Continuous operation to torque control deceleration time constant (2bytes)	Valid
A857	0E1817			
A858	0E1818	PRCOP	Continuous operation to torque control operating conditions (2bytes)	Valid
A859	0E1819			
A85A	0E181A	—	For manufacturer setting	—
⋮	⋮			
A85F	0E181F			

10.19 Interpolation Group No. Being Executed

Address (hexadecimal)		Content
MR-MC2_ _	MR-MC3_ _	
E040	0FB400	Interpolation group No. being executed (Axis 1)
E041	0FB401	Interpolation group No. being executed (Axis 2)
E042	0FB402	Interpolation group No. being executed (Axis 3)
E043	0FB403	Interpolation group No. being executed (Axis 4)
E044	0FB404	Interpolation group No. being executed (Axis 5)
E045	0FB405	Interpolation group No. being executed (Axis 6)
E046	0FB406	Interpolation group No. being executed (Axis 7)
E047	0FB407	Interpolation group No. being executed (Axis 8)
E048	0FB408	Interpolation group No. being executed (Axis 9)
E049	0FB409	Interpolation group No. being executed (Axis 10)
E04A	0FB40A	Interpolation group No. being executed (Axis 11)
E04B	0FB40B	Interpolation group No. being executed (Axis 12)
E04C	0FB40C	Interpolation group No. being executed (Axis 13)
E04D	0FB40D	Interpolation group No. being executed (Axis 14)
E04E	0FB40E	Interpolation group No. being executed (Axis 15)
E04F	0FB40F	Interpolation group No. being executed (Axis 16)
E050	0FB410	Interpolation group No. being executed (Axis 17)
E051	0FB411	Interpolation group No. being executed (Axis 18)
E052	0FB412	Interpolation group No. being executed (Axis 19)
E053	0FB413	Interpolation group No. being executed (Axis 20)
E054	0FB414	Interpolation group No. being executed (Axis 21)
E055	0FB415	Interpolation group No. being executed (Axis 22)
E056	0FB416	Interpolation group No. being executed (Axis 23)
E057	0FB417	Interpolation group No. being executed (Axis 24)
E058	0FB418	Interpolation group No. being executed (Axis 25)
E059	0FB419	Interpolation group No. being executed (Axis 26)
E05A	0FB41A	Interpolation group No. being executed (Axis 27)
E05B	0FB41B	Interpolation group No. being executed (Axis 28)
E05C	0FB41C	Interpolation group No. being executed (Axis 29)
E05D	0FB41D	Interpolation group No. being executed (Axis 30)
E05E	0FB41E	Interpolation group No. being executed (Axis 31)
E05F	0FB41F	Interpolation group No. being executed (Axis 32)
E060	0FB420	Interpolation group No. being executed (Axis 33)[*1]
⋮	⋮	⋮
E06F	0FB42F	Interpolation group No. being executed (Axis 48)[*1]
—	0FB430	Interpolation group No. being executed (Axis 49)
	⋮	⋮
	0FB43F	Interpolation group No. being executed (Axis 64)
	0FB440	For manufacturer setting
	⋮	
	0FB47F	

*1 When using MR-MC2_ _, E060 to E06F are "For manufacturer setting".

Interpolation group No. being executed

Stores the linear interpolation group No. in axes that are executing linear interpolation.

When linear interpolation operation is completed, the interpolation group No. being executed is cleared and changes to "0".

10.20 Expanded parameter [MC300]

Expanded parameter data command

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)	Content
11A000	Expanded parameter write data 1 (Axis 1)
11A001	
11A002	
11A003	
11A004	Expanded parameter write data 2 (Axis 1)
11A005	
11A006	
11A007	
11A008	For manufacturer setting
⋮	
11A00F	

Expanded parameter data status

The addresses in the table are the addresses for the first axis. For the second axis and after, add "+20h" for each axis.

Address (hexadecimal)	Content
11A010	Expanded parameter write data 1 (Axis 1)
11A011	
11A012	
11A013	
11A014	Expanded parameter write data 2 (Axis 1)
11A015	
11A016	
11A017	
11A018	Expanded parameter read data 1 (Axis 1)
11A019	
11A01A	
11A01B	
11A01C	Expanded parameter read data 2 (Axis 1)
11A01D	
11A01E	
11A01F	

11 PARAMETERS

Concerning the parameters for which the parameter name shows that it is set by manufacturer, do not use other than the default values. If erroneous values are set, unexpected movement can occur.
The parameters are classified as is shown below.

Classification		Parameter No.*1	Remarks	Reference
System parameters		No.0001 to 007F	—	Page 658 System Parameters
Servo amplifier MR-J4(W_)-_B	Servo parameters	No.1100 to 137F	Each axis	Page 660 Servo amplifier MR-J4(W_)-_B
	Control parameters	No.0200 to 02FF	Each axis	Page 677 Servo amplifier MR-J4(W_)-_B/ MR-J5(W_)-_B
Servo amplifier MR-J5(W_)-_B [MC300]	Servo parameters	No.2000 to 23FF	Each axis	Page 666 Servo amplifier MR-J5(W_)-_B [MC300]
	Control parameters	No.0200 to 02FF	Each axis	Page 677 Servo amplifier MR-J4(W_)-_B/ MR-J5(W_)-_B
Sensing module (axis mode)	Servo parameters	No.1100 to 11BF	Each axis	Page 675 Sensing module (axis mode)
	Control parameters	No.0200 to 02FF	Each axis	Page 690 Sensing module (axis mode)
SSCNETⅢ/H head module	RIO module parameters	—	Each station	Page 699 SSCNETIII/H head module
	RIO control parameters	No.0200 to 023F	Each station	Page 707 RIO Control Parameters
Sensing module (station mode)	RIO module parameters	No.1100 to 13FF	Each station	Page 699 Sensing module (station mode)
	RIO control parameters	No.0200 to 023F	Each station	Page 707 RIO Control Parameters

*1 Parameter Nos. are given in hexadecimal.

11.1 System Parameters

Point

The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0001	*SYSOP1	System option 1	0000h	—	0000h to 0002h	■■■□ (Control cycle setting) Set the control cycle. • 0: 0.88ms • 1: 0.44ms • 2: 0.22ms ■□■■ (SSCNET communication method) Set the SSCNET communication method. (SSCNET communication method is shared in lines 1 and 2.) • 0: SSCNETⅢ/H
0002	*SYSOP2	System option 2	0000h	—	0000h to 1101h	■■■□ (Axis/station No. assignment) Set "1: Valid" when validating axis/station No. assignment. When axis/station No. assignment is "0: invalid", axis/station No. is automatically assigned. • 0: Invalid • 1: Valid ■□■■ (Consistency check selection at system startup) Set whether to perform consistency check for controlled axes setting at system startup. • 0: Valid • 1: Invalid □■■■ (Control mode selection) Set the control mode. • 0: Standard mode • 1: Interface mode
0003	—	For manufacturer setting	0	—	—	—
0004	SITM	System interrupt conditions	0000h	—	0000h to FFFFh	Set the interrupt conditions for the system.
0005	—	For manufacturer setting	0	—	—	—
⋮			⋮			
000D			0			
000E	*EMID	External forced stop disabled	0000h	—	0000h to FFFFh	Disable the forced stop by EMI signal. • 5AE1h: Forced stop disabled • Other than 5AE1h: Forced stop enabled
000F	*IFMO	Interface mode option	0000h	—	0000h to 0F0Fh	■■■□ (Interrupt output cycle) When interrupt by interface mode is valid, set the cycle for which the interrupt is output. • Interrupt output cycle: Control cycle × (setting value + 1) <Example> When interrupt output cycle is set to 1 and control cycle is 0.88ms Interrupt is output approximately every 1.77ms. ■□■■ (Command data update cycle) Set the cycle for which command is updated in interface mode. Command data update cycle: Control cycle × (setting value + 1) <Example> When command data update cycle is set to 2 and control cycle is 0.88ms. Command is updated approximately every 2.66ms.
0010	—	For manufacturer setting	0	—	—	—
⋮			⋮			
003F			0			
0040	LGS1	Log acquiring selection 1 *1	0000h	—	0000h to 0001h	Set whether to acquire the log of the system when the log function is used. System (bit0) • 0: Not acquire • 1: Acquire

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0041	LGS2	Log acquiring selection 2 *1	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 1 (bit0) to axis 16 (bit15) • 0: Not acquire • 1: Acquire
0042	LGS3	Log acquiring selection 3 *1	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 17 (bit0) to axis 32 (bit15) • 0: Not acquire • 1: Acquire
0043	LGS4	Log acquiring selection 4 [MC300] *1	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 33 (bit0) to axis 48 (bit15) • 0: Not acquire • 1: Acquire
0044	LGS5	Log acquiring selection 5 *1	0000h	—	0000h to FFFFh	Set the station No. for which the log is to be acquired. Station 1 (bit0) to station 4 (bit3) [MC200] Station 1 (bit0) to station 16 (bit15) [MC300] • 0: Not acquire • 1: Acquire
0045	—	For manufacturer setting	0	—	—	—
⋮			⋮			
0049			0			
004A	*IOTBL	I/O table	0000h	—	[MC200] 0000h to 0001h [MC300] 0000h to 0002h	■■■□ (I/O table selection) Set the I/O table to be used. • 0: Use digital I/O table • 1: Use I/O device table (MR-MC2_ _ method) • 2: Use I/O device table (expanded points method) [MC300]
004B	LGS6	Log acquiring selection 6 [MC300] *1	0000h	—	0000h to FFFFh	Set the axis No. for which the log is to be acquired. Axis 49 (bit0) to axis 64 (bit15) • 0: Not acquire • 1: Acquire
004C	*SYSOP5	System option 5	0000h	—	0000h to 0001h	■■■□ (Interpolation axis setting method) Specify the interpolation axis setting method. • 0: Use control parameter • 1: Use point table
004D	—	For manufacturer setting	0	—	—	—
⋮			⋮			
007F			0			

*1 When all the system parameters of the log acquiring selection (parameters No.0040 to 0042, 0044/No.0043, 004B [MC300]) are set to "0000h" (initial value), log for all axes, stations and systems are acquired.

11.2 Servo Parameters

Servo amplifier MR-J4(W_)-_B

The parameters described in this section are for using the servo amplifier MR-J4(W_)-_B. For details, refer to the servo amplifier instruction manual for your servo amplifier.

Point

The parameters with a * mark at the front of the symbol are validated according to the following conditions.
- *: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
- **: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Menu A) Basic settings

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1100	PA01	**STY	Operation mode	1000h	—
1101	PA02	**REG	Regenerative option	0000h	—
1102	PA03	*ABS	Absolute position detection system	0000h	—
1103	PA04	*AOP1	Function selection A-1	2000h	—
1104	PA05	—	For manufacturer setting	10000	—
1105	PA06			1	—
1106	PA07			1	—
1107	PA08	ATU	Auto tuning mode	0001h	—
1108	PA09	RSP	Auto tuning response	16	—
1109	PA10	INP	In-position range	1600	pulse
110A	PA11	—	For manufacturer setting	10000	—
110B	PA12			10000	—
110C	PA13			0000h	—
110D	PA14	*POL	Rotation direction selection/travel direction selection	0	—
110E	PA15	*ENR	Encoder output pulses	4000	pulse/rev
110F	PA16	*ENR2	Encoder output pulses 2	1	—
1110	PA17	**MSR	Servo motor series setting	0000h	—
1111	PA18	**MTY	Servo motor type setting	0000h	—
1112	PA19	*BLK	Parameter writing inhibit	00ABh	—
1113	PA20	*TDS	Tough drive setting	0000h	—
1114	PA21	*AOP3	Function selection A-3	0001h	—
1115	PA22	**PCS	Position control composition selection	0000h	—
1116	PA23	DRAT	Drive recorder arbitrary alarm trigger setting	0000h	—
1117	PA24	AOP4	Function selection A-4	0000h	—
1118	PA25	OTHOV	One-touch tuning - Overshoot permissible level	0000h	%
1119	PA26	*AOP5	Function selection A-5*1	0000h	—
111A	PA27	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
113F	PA64			0000h	

*1 MR-J4-_B use.

Menu B) Gain filter settings

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1140	PB01	FILT	Adaptive tuning mode (adaptive filter Ⅱ)	0000h	—
1141	PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control Ⅱ)	0000h	—
1142	PB03	TFBGN	Torque feedback loop gain	18000	rad/s
1143	PB04	FFC	Feed forward gain	0	%
1144	PB05	—	For manufacturer setting	500	—
1145	PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	700	0.01 times
1146	PB07	PG1	Model loop gain	150	0.1rad/s
1147	PB08	PG2	Position loop gain	370	0.1rad/s
1148	PB09	VG2	Speed loop gain	823	rad/s
1149	PB10	VIC	Speed integral compensation	337	0.1ms
114A	PB11	VDC	Speed differential compensation	980	—
114B	PB12	OVA	Overshoot amount compensation	0	%
114C	PB13	NH1	Machine resonance suppression filter 1	4500	Hz
114D	PB14	NHQ1	Notch shape selection 1	0000h	—
114E	PB15	NH2	Machine resonance suppression filter 2	4500	Hz
114F	PB16	NHQ2	Notch shape selection 2	0000h	—
1150	PB17	NHF	Shaft resonance suppression filter	0000h	—
1151	PB18	LPF	Low-pass filter setting	3141	rad/s
1152	PB19	VRF11	Vibration suppression control 1 - Vibration frequency	1000	0.1Hz
1153	PB20	VRF12	Vibration suppression control 1 - Resonance frequency	1000	0.1Hz
1154	PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	0	0.01
1155	PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	0	0.01
1156	PB23	VFBF	Low-pass filter selection	0000h	—
1157	PB24	*MVS	Slight vibration suppression control	0000h	—
1158	PB25	*BOP1	Function selection B-1	0000h	—
1159	PB26	*CDP	Gain switching function	0000h	—
115A	PB27	CDL	Gain switching condition	10	kpps, pulse, r/min
115B	PB28	CDT	Gain switching time constant	1	ms
115C	PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching	700	0.01 times
115D	PB30	PG2B	Position loop gain after gain switching	0	0.1rad/s
115E	PB31	VG2B	Speed loop gain after gain switching	0	rad/s
115F	PB32	VICB	Speed integral compensation after gain switching	0	0.1ms
1160	PB33	VRF11B	Vibration suppression control 1 - Vibration frequency after gain switching	0	0.1Hz
1161	PB34	VRF12B	Vibration suppression control 1 - Resonance frequency after gain switching	0	0.1Hz
1162	PB35	VRF13B	Vibration suppression control 1- Vibration frequency damping after gain switching	0	0.01
1163	PB36	VRF14B	Vibration suppression control 1- Resonance frequency damping after gain switching	0	0.01
1164	PB37	—	For manufacturer setting	1600	—
⋮	⋮			⋮	
116B	PB44			0	
116C	PB45	CNHF	Command notch filter	0000h	—
116D	PB46	NH3	Machine resonance suppression filter 3	4500	Hz
116E	PB47	NHQ3	Notch shape selection 3	0000h	—
116F	PB48	NH4	Machine resonance suppression filter 4	4500	Hz
1170	PB49	NHQ4	Notch shape selection 4	0000h	—
1171	PB50	NH5	Machine resonance suppression filter 5	4500	Hz

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1172	PB51	NHQ5	Notch shape selection 5	0000h	—
1173	PB52	VRF21	Vibration suppression control 2 - Vibration frequency	1000	0.1Hz
1174	PB53	VRF22	Vibration suppression control 2 - Resonance frequency	1000	0.1Hz
1175	PB54	VRF23	Vibration suppression control 2 - Vibration frequency damping	0	0.01
1176	PB55	VRF24	Vibration suppression control 2 - Resonance frequency damping	0	0.01
1177	PB56	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching	0	0.1Hz
1178	PB57	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching	0	0.1Hz
1179	PB58	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching	0	0.01
117A	PB59	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching	0	0.01
117B	PB60	PG1B	Model loop gain after gain switching	0	0.1rad/s
117C	PB61	—	For manufacturer setting	0	—
⋮	⋮			⋮	
117F	PB64			0000h	

Menu C) Expansion settings 1

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1180	PC01	ERZ	Error excessive alarm level	0	rev or mm
1181	PC02	MBR	Electromagnetic brake sequence output	0	ms
1182	PC03	*ENRS	Encoder output pulse selection	0000h	—
1183	PC04	**COP1	Function selection C-1	0000h	—
1184	PC05	**COP2	Function selection C-2	0000h	—
1185	PC06	*COP3	Function selection C-3	0000h	—
1186	PC07	ZSP	Zero speed	50	r/min or mm/s
1187	PC08	OSL	Overspeed alarm detection level	0	r/min or mm/s
1188	PC09	MOD1	Analog monitor 1 output	0000h	—
1189	PC10	MOD2	Analog monitor 2 output	0001h	—
118A	PC11	MO1	Analog monitor 1 offset	0	mV
118B	PC12	MO2	Analog monitor 2 offset	0	mV
118C	PC13	MOSDL	Analog monitor - Feedback position output standard data - Low	0	pulse
118D	PC14	MOSDH	Analog monitor - Feedback position output standard data - High	0	10000pulses
118E	PC15	—	For manufacturer setting	0	—
118F	PC16			0000h	
1190	PC17	**COP4	Function selection C-4	0000h	—
1191	PC18	*COP5	Function selection C-5	1000h*1	—
1192	PC19	—	For manufacturer setting	0000h	—
1193	PC20	*COP7	Function selection C-7	0000h	—
1194	PC21	*BPS	Alarm history clear	0000h	—
1195	PC22	—	For manufacturer setting	0	—
1196	PC23			0000h	
1197	PC24	RSBR	Forced stop deceleration time constant	100	ms
1198	PC25	—	For manufacturer setting	0	—
1199	PC26	**COP8	Function selection C-8*2	0000h	—
119A	PC27	**COP9	Function selection C-9	0000h	—
119B	PC28	—	For manufacturer setting	0000h	—
119C	PC29	*COPB	Function selection C-B	0000h	—
119D	PC30	—	For manufacturer setting	0	—
119E	PC31	RSUP1	Vertical axis freefall prevention compensation amount	0	0.0001rev or 0.01mm

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
119F	PC32	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
11A4	PC37			0000h	
11A5	PC38	ERW	Error excessive warning level	0	rev or mm
11A6	PC39	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
11BF	PC64			0000h	

*1 For position board, the initial value is "1000h".

*2 MR-J4-_B use.

Menu D) I/O settings

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
11C0	PD01	—	For manufacturer setting	0000h	—
11C1	PD02	*DIA2	Input signal automatic on selection 2	0000h	—
11C2	PD03	—	For manufacturer setting	0020h	—
⋮	⋮			⋮	
11C5	PD06			0000h	
11C6	PD07	*DO1	Output device selection 1	0005h	—
11C7	PD08	*DO2	Output device selection 2	0004h	—
11C8	PD09	*DO3	Output device selection 3	0003h	—
11C9	PD10	—	For manufacturer setting	0000h	—
11CA	PD11	*DIF	Input filter setting	0004h	ms
11CB	PD12	*DOP1	Function selection D-1	0000h	—
11CC	PD13	*DOP2	Function selection D-2	0000h	—
11CD	PD14	*DOP3	Function selection D-3	0000h	—
11CE	PD15	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
11FF	PD64			0000h	

Menu E) Expansion settings 2

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1200	PE01	**FCT1	Fully closed loop function selection 1	0000h	—
1201	PE02	—	For manufacturer setting	0000h	—
1202	PE03	*FCT2	Fully closed loop function selection 2	0003h	—
1203	PE04	**FBN	Fully closed loop control - Feedback pulse electronic gear 1 - Numerator	1	—
1204	PE05	**FBD	Fully closed loop control - Feedback pulse electronic gear 2 - Denominator	1	—
1205	PE06	BC1	Fully closed loop control - Speed deviation error detection level	400	r/min
1206	PE07	BC2	Fully closed loop control - Position deviation error detection level	100	kpulse
1207	PE08	DUF	Fully closed loop dual feedback filter	10	rad/s
1208	PE09	—	For manufacturer setting	0000h	—
1209	PE10	FCT3	Fully closed loop function selection 3	0000h	—
120A	PE11	—	For manufacturer setting	0	—
⋮	⋮			⋮	
1220	PE33			0000h	
1221	PE34	**FBN2	Fully closed loop control - Feedback pulse electronic gear 2 - Numerator	1	—
1222	PE35	**FBD2	Fully closed loop control - Feedback pulse electronic gear 2 - Denominator	1	—

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1223	PE36	—	For manufacturer setting	0	—
⋮	⋮			⋮	
1227	PE40			0000h	
1228	PE41	EOP3	Function selection E-3	0000h	—
1229	PE42	—	For manufacturer setting	0	—
122A	PE43			0	
122B	PE44	LMCP	Lost motion compensation positive-side compensation value selection*1	0	0.01%
122C	PE45	LMCN	Lost motion compensation negative-side compensation value selection*1	0	0.01%
122D	PE46	LMFLT	Lost motion filter setting*1	0	0.1ms
122E	PE47	TOF	Torque offset	0	0.01%
122F	PE48	*LMOP	Lost motion compensation function selection*1	0000h	—
1230	PE49	LMCD	Lost motion compensation timing*1	0	0.1ms
1231	PE50	LMCT	Lost motion compensation non-sensitive band*1	0	pulse or kpulse
1232	PE51	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
123F	PE64			0	

*1 MR-J4-_B use.

Menu F) Expansion settings 3

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1240	PF01	—	For manufacturer setting	0000h	—
1241	PF02	*FOP2	Function selection F-2*1	0000h	—
1242	PF03	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
1244	PF05			0000h	
1245	PF06	*FOP5	Function selection F-5	0000h	—
1246	PF07	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
124A	PF11			0	
124B	PF12	DBT	Electronic dynamic brake operating time	2000	ms
124C	PF13	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
1253	PF20			0000h	
1254	PF21	DRT	Drive recorder switching time setting	0	s
1255	PF22	—	For manufacturer setting	200	—
1256	PF23	OSCL1	Vibration tough drive - Oscillation detection level	50	%
1257	PF24	*OSCL2	Vibration tough drive function selection	0000h	—
1258	PF25	CVAT	SEMI-F47 function instantaneous power failure detection time	200	ms
1259	PF26	—	For manufacturer setting	0	—
⋮	⋮			⋮	
125D	PF30			0	
125E	PF31	FRIC	Machine diagnosis function - Friction judgment speed	0	r/min or mm/s
125F	PF32	—	For manufacturer setting	50	—
⋮	⋮			⋮	
127F	PF64			0000h	

*1 MR-J4W_-_B use.

Menu O) Option setting

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1280	Po01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
12BF	Po64			0000h	

Menu S) Special settings

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
12C0	PS01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
12FF	PS64			0000h	

Menu L) Linear servo motor/DD motor settings

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1300	PL01	**LIT1	Linear servo motor/DD motor function selection 1	0301h	—
1301	PL02	**LIM	Linear encoder resolution - Numerator	1000	μm
1302	PL03	**LID	Linear encoder resolution - Denominator	1000	μm
1303	PL04	*LIT2	Linear servo motor/DD motor function selection 2	0003h	—
1304	PL05	LB1	Position deviation error detection level	0	mm or 0.01rev
1305	PL06	LB2	Speed deviation error detection level	0	r/min or mm/s
1306	PL07	LB3	Torque/thrust deviation error detection level	100	%
1307	PL08	*LIT3	Linear servo motor/DD motor function selection 3	0010h	—
1308	PL09	LPWM	Magnetic pole detection voltage level	30	%
1309	PL10	—	For manufacturer setting	5	—
⋮	⋮			⋮	
130F	PL16			0	
1310	PL17	LTSTS	Magnetic pole detection - Minute position detection method - Function selection	0000h	—
1311	PL18	IDLV	Magnetic pole detection - Minute position detection method - Identification signal amplitude	0	%
1312	PL19	—	For manufacturer setting	0	—
⋮	⋮			⋮	
133F	PL64			0000h	

Menu T) Parameter for manufacturer setting

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
1340	PT01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
137F	PT64			0000h	

Servo amplifier MR-J5(W_)-_B [MC300]

The parameters described in this section are for using the servo amplifier MR-J5(W_)-_B. For details, refer to the following manual.

MR-J5-B/MR-J5W-B User's Manual (Parameters)

Point

The parameters with a * mark at the front of the symbol are validated according to the following conditions.
- *: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
- **: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Menu A) Basic setting

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2000	PA01	**STY	Operation mode	00003000h	—
2001	PA02	**REG	Regenerative option	00000000h	—
2002	PA03	*ABS	Absolute position detection system	00000000h	—
2003	PA04	*AOP1	Function selection A-1	00002000h	—
2004	PA05	—	For manufacturer setting	10000	—
2005	PA06	*CMX	Electronic gear - Numerator	1	—
2006	PA07	*CDV	Electronic gear - Denominator	1	—
2007	PA08	ATU	Auto tuning mode	00000001h	—
2008	PA09	RSP	Auto tuning response	16	—
2009	PA10	INP	In-position range	25600	pulse
200A	PA11	—	For manufacturer setting	10000	—
200B	PA12			10000	—
200C	PA13			00000000h	—
200D	PA14	*POL	Travel direction selection	0	—
200E	PA15	*ENR	Encoder output pulses	4000	pulse/rev
200F	PA16	*ENR2	Encoder output pulses 2	1	—
2010	PA17	**MSR	Servo motor series setting	00000000h	—
2011	PA18	**MTY	Servo motor type setting	00000000h	—
2012	PA19	—	For manufacturer setting	000000ABh	—
2013	PA20	*TDS	Tough drive setting	00000000h	—
2014	PA21	*AOP3	Function selection A-3	00000001h	—
2015	PA22	**PCS	Position control composition selection	00000000h	—
2016	PA23	DRAT	Drive recorder arbitrary alarm trigger setting	00000000h	—
2017	PA24	AOP4	Function selection A-4	00000000h	—
2018	PA25	OTHOV	One-touch tuning - Overshoot permissible level	0	%
2019	PA26	*AOP5	Function selection A-5	00000000h	—
201A	PA27	—	For manufacturer setting	000000ABh	—
201B	PA28	**AOP6	Function selection A-6	00000000h	—
201C	PA29	—	For manufacturer setting	0	—
⋮	⋮			⋮	
2020	PA33			0	
2021	PA34	QDIS	Quick tuning - Permissible travel distance	0	0.1rev or mm
2022	PA35	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
202F	PA48			00000000h	

Menu B) Gain filter settings

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2030	PB01	FILT	Adaptive tuning mode (adaptive filter Ⅱ)	00000000h	—
2031	PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control Ⅱ)	00000000h	—
2032	PB03	TFBGN	Torque feedback loop gain	36000	rad/s
2033	PB04	FFC	Feed forward gain	0	%
2034	PB05	—	For manufacturer setting	500	—
2035	PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	700	0.01times
2036	PB07	PG1	Model control gain	150	0.1rad/s
2037	PB08	PG2	Position control gain	370	0.1rad/s
2038	PB09	VG2	Speed control gain	823	rad/s
2039	PB10	VIC	Speed integral compensation	337	0.1ms
203A	PB11	VDC	Speed differential compensation	980	—
203B	PB12	OVA	Overshoot amount compensation	0	%
203C	PB13	NH1	Machine resonance suppression filter 1	4500	Hz
203D	PB14	NHQ1	Notch shape selection 1	00000000h	—
203E	PB15	NH2	Machine resonance suppression filter 2	4500	Hz
203F	PB16	NHQ2	Notch shape selection 2	00000000h	—
2040	PB17	NHF	Shaft resonance suppression filter	00000000h	—
2041	PB18	LPF	Low-pass filter setting	3141	rad/s
2042	PB19	VRF11	Vibration suppression control 1 - Vibration frequency	1000	0.1Hz
2043	PB20	VRF12	Vibration suppression control 1 - Resonance frequency	1000	0.1Hz
2044	PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	0	—
2045	PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	0	—
2046	PB23	VFBF	Low-pass filter selection	00001000h	—
2047	PB24	*MVS	Slight vibration suppression control	00000000h	—
2048	PB25	*BOP1	Function selection B-1	00000000h	—
2049	PB26	*CDP	Gain switching function	00000000h	—
204A	PB27	CDL	Gain switching condition	10	—
204B	PB28	CDT	Gain switching time constant	1	ms
204C	PB29	GD2B	Gain switching - Load to motor inertia ratio/load to motor mass ratio	700	0.01times
204D	PB30	PG2B	Gain switching - Position control gain	0	0.1rad/s
204E	PB31	VG2B	Gain switching - Speed control gain	0	rad/s
204F	PB32	VICB	Gain switching - Speed integral compensation	0	0.1ms
2050	PB33	VRF11B	Gain switching - Vibration suppression control 1 - Vibration frequency	0	0.1Hz
2051	PB34	VRF12B	Gain switching - Vibration suppression control 1 - Resonance frequency	0	0.1Hz
2052	PB35	VRF13B	Gain switching - Vibration suppression control 1 - Vibration frequency damping	0	—
2053	PB36	VRF14B	Gain switching - Vibration suppression control 1 - Resonance frequency damping	0	—
2054	PB37	—	For manufacturer setting	1600	—
⋮	⋮			⋮	
205B	PB44			0	
205C	PB45	CNHF	Command notch filter	00000000h	—
205D	PB46	NH3	Machine resonance suppression filter 3	4500	Hz
205E	PB47	NHQ3	Notch shape selection 3	00000000h	—
205F	PB48	NH4	Machine resonance suppression filter 4	4500	Hz
2060	PB49	NHQ4	Notch shape selection 4	00000000h	—
2061	PB50	NH5	Machine resonance suppression filter 5	4500	Hz

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2062	PB51	NHQ5	Notch shape selection 5	00000000h	—
2063	PB52	VRF21	Vibration suppression control 2 - Vibration frequency	1000	0.1Hz
2064	PB53	VRF22	Vibration suppression control 2 - Resonance frequency	1000	0.1Hz
2065	PB54	VRF23	Vibration suppression control 2 - Vibration frequency damping	0	—
2066	PB55	VRF24	Vibration suppression control 2 - Resonance frequency damping	0	—
2067	PB56	VRF21B	Gain switching - Vibration suppression control 2 - Vibration frequency	0	0.1Hz
2068	PB57	VRF22B	Gain switching - Vibration suppression control 2 - Resonance frequency	0	0.1Hz
2069	PB58	VRF23B	Gain switching - Vibration suppression control 2 - Vibration frequency damping	0	—
206A	PB59	VRF24B	Gain switching - Vibration suppression control 2 - Resonance frequency damping	0	—
206B	PB60	PG1B	Gain switching - Model control gain	0	0.1rad/s
206C	PB61	—	For manufacturer setting	0	—
⋮	⋮			⋮	
206F	PB64			00000000h	
2070	PB65	CDL2	Gain switching 2 condition	10	—
2071	PB66	CDT2	Gain switching 2 time constant	1	ms
2072	PB67	GD2C	Gain switching 2 - Load to motor inertia ratio/load to motor mass ratio	700	0.01times
2073	PB68	PG2C	Gain switching 2 - Position control gain	0	0.1rad/s
2074	PB69	VG2C	Gain switching 2 - Speed control gain	0	rad/s
2075	PB70	VICC	Gain switching 2 - Speed integral compensation	0	0.1ms
2076	PB71	VRF11C	Gain switching 2 - Vibration suppression control 1 - Vibration frequency	0	0.1Hz
2077	PB72	VRF12C	Gain switching 2 - Vibration suppression control 1 - Resonance frequency	0	0.1Hz
2078	PB73	VRF13C	Gain switching 2 - Vibration suppression control 1 - Vibration frequency damping	0	0.01
2079	PB74	VRF14C	Gain switching 2 - Vibration suppression control 1 - Resonance frequency damping	0	0.01
207A	PB75	VRF21C	Gain switching 2 - Vibration suppression control 2 - Vibration frequency	0	0.1Hz
207B	PB76	VRF22C	Gain switching 2 - Vibration suppression control 2 - Resonance frequency	0	0.1Hz
207C	PB77	VRF23C	Gain switching 2 - Vibration suppression control 2 - Vibration frequency damping	0	0.01
207D	PB78	VRF24C	Gain switching 2 - Vibration suppression control 2 - Resonance frequency damping	0	0.01
207E	PB79	PG1C	Gain switching 2 - Model control gain	0	0.1rad/s
207F	PB80	—	For manufacturer setting	1770	—
2080	PB81	*CFIL	Command filter	00000001h	—
2081	PB82	PFT	Position command smoothing filtering time constant	0	0.1ms
2082	PB83	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
2092	PB99			00000000h	

Menu C) Expansion settings 1

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2093	PC01	ERZ	Error excessive alarm level	0	rev or mm
2094	PC02	MBR	Electromagnetic brake sequence output	0	ms
2095	PC03	*ENRS	Encoder output pulse selection	00000000h	—
2096	PC04	**COP1	Function selection C-1	00000000h	—
2097	PC05	**COP2	Function selection C-2	00000000h	—
2098	PC06	*COP3	Function selection C-3	00000000h	—
2099	PC07	ZSP	Zero speed	50	r/min or mm/s
209A	PC08	OSL	Overspeed alarm detection level	0	r/min or mm/s
209B	PC09	MOD1	Analog monitor 1 output	00000000h	—
209C	PC10	MOD2	Analog monitor 2 output	00000001h	—
209D	PC11	MO1	Analog monitor 1 offset	0	mV
209E	PC12	MO2	Analog monitor 2 offset	0	mV
209F	PC13	—	For manufacturer setting	0	—
⋮	⋮			⋮	
20A2	PC16			00000000h	
20A3	PC17	**COP4	Function selection C-4	00000000h	—
20A4	PC18	*COP5	Function selection C-5	00001000h	—
20A5	PC19	*COP6	Function selection C-6	00000000h	—
20A6	PC20	*COP7	Function selection C-7	00000000h	—
20A7	PC21	*BPS	Alarm history clear	00000000h	—
20A8	PC22	—	For manufacturer setting	0	—
20A9	PC23			00000000h	
20AA	PC24	RSBR	Forced stop deceleration time constant	100	ms
20AB	PC25	—	For manufacturer setting	0	—
20AC	PC26	**COP8	Function selection C-8	00000050h	—
20AD	PC27	**COP9	Function selection C-9	00000000h	—
20AE	PC28	—	For manufacturer setting	00000000h	—
20AF	PC29	*COPB	Function selection C-B	00000000h	—
20B0	PC30	—	For manufacturer setting	0	—
20B1	PC31	RSUP1	Vertical axis freefall prevention compensation amount	0	0.0001rev or 0.01mm
20B2	PC32	—	For manufacturer setting	0	—
⋮	⋮			⋮	
20B7	PC37			00000000h	
20B8	PC38	ERW	Error excessive warning level	0	rev or mm
20B9	PC39	—	For manufacturer setting	0	—
⋮	⋮			⋮	
20E5	PC83			0	
20E6	PC84	SVDT1	Data 1 for servo amplifier replacement	00000000h	—
20E7	PC85	SVDT2	Data 2 for servo amplifier replacement	00000000h	—
20E8	PC86	SVDT3	Data 3 for servo amplifier replacement	00000000h	—
20E9	PC87	SVDT4	Data 4 for servo amplifier replacement	00000000h	—
20EA	PC88	SVDT5	Data 5 for servo amplifier replacement	00000000h	—
20EB	PC89	SVDT6	Data 6 for servo amplifier replacement	00000000h	—
20EC	PC90	SVDT7	Data 7 for servo amplifier replacement	00000000h	—
20ED	PC91	SVDT8	Data 8 for servo amplifier replacement	00000000h	—
20EE	PC92	SVDT9	Data 9 for servo amplifier replacement	00000000h	—
20EF	PC93	SVDT10	Data 10 for servo amplifier replacement	00000000h	—
20F0	PC94	SVDT11	Data 11 for servo amplifier replacement	00000000h	—
20F1	PC95	SVDT12	Data 12 for servo amplifier replacement	00000000h	—

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
20F2	PC96	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
20F5	PC99			00000000h	

Menu D) I/O settings

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
20F6	PD01	—	For manufacturer setting	00000000h	—
20F7	PD02	*DIA2	Input signal automatic on selection 2	00000000h	—
20F8	PD03	—	For manufacturer setting	00000020h	—
⋮	⋮			⋮	
20FB	PD06			00000000h	
20FC	PD07	*DO1	Output device selection 1	00000005h	—
20FD	PD08	*DO2	Output device selection 2	00000004h	—
20FE	PD09	*DO3	Output device selection 3	00000003h	—
20FF	PD10	—	For manufacturer setting	00000000h	—
2100	PD11	*DIF	Input filter setting	00000007h	ms
2101	PD12	*DOP1	Function selection D-1	00000000h	—
2102	PD13	*DOP2	Function selection D-2	00000000h	—
2103	PD14	*DOP3	Function selection D-3	00000000h	—
2104	PD15	*IDCS	Driver communication setting	00000000h	—
2105	PD16	*MD1	Driver communication setting - Master - Transmit data selection 1	00000000h	—
2106	PD17	*MD2	Driver communication setting - Master - Transmit data selection 2	00000000h	—
2107	PD18	—	For manufacturer setting	00000000h	—
2108	PD19			00000000h	
2109	PD20	*SLA1	Driver communication setting - Slave - Master axis No. selection 1	0	—
210A	PD21	—	For manufacturer setting	0	—
⋮	⋮			⋮	
2112	PD29			00000000h	
2113	PD30	TLS	Master-slave operation - Torque command coefficient on slave	0	%
2114	PD31	VLC	Master-slave operation - Speed limit coefficient on slave	0	%
2115	PD32	VLL	Master-slave operation - Speed limit adjusted value on slave	0	r/min
2116	PD33	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
2158	PD99			00000000h	

Menu E) Expansion settings 2

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2159	PE01	**FCT1	Fully closed loop function selection 1	00000000h	—
215A	PE02	—	For manufacturer setting	00000000h	—
215B	PE03	*FCT2	Fully closed loop function selection 2	00000003h	—
215C	PE04	**FBN	Fully closed loop control - Feedback pulse electronic gear 1 - Numerator	1	—
215D	PE05	**FBD	Fully closed loop control - Feedback pulse electronic gear 2 - Denominator	1	—
215E	PE06	BC1	Fully closed loop control - Speed deviation error detection level	400	r/min
215F	PE07	BC2	Fully closed loop control - Position deviation error detection level	100	kpulse
2160	PE08	DUF	Fully closed loop dual feedback filter	10	rad/s

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2161	PE09	—	For manufacturer setting	00000000h	—
2162	PE10	FCT3	Fully closed loop function selection 3	00000000h	—
2163	PE11	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
2180	PE40			00000000h	
2181	PE41	EOP3	Function selection E-3	00000000h	—
2182	PE42	—	For manufacturer setting	0	—
2183	PE43			0	
2184	PE44	LMCP	Lost motion compensation positive-side compensation value selection*1	0	0.01%
2185	PE45	LMCN	Lost motion compensation negative-side compensation value selection*1	0	0.01%
2186	PE46	LMFLT	Lost motion filter setting*1	0	0.1ms
2187	PE47	TOF	Unbalanced torque offset	0	0.01%
2188	PE48	*LMOP	Lost motion compensation function selection	00000000h	—
2189	PE49	LMCD	Lost motion compensation timing	0	0.1ms
218A	PE50	LMCT	Lost motion compensation non-sensitive band	0	pulse or kpulse
218B	PE51	**EDV2	Load-side encoder resolution setting	0	pulse
218C	PE52	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
21BB	PE99			00000000h	

Menu F) Expansion settings 3

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
21BC	PF01	—	For manufacturer setting	00000000h	—
21BD	PF02	*FOP2	Function selection F-2	00000000h	—
21BE	PF03	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
21C0	PF05			00000000h	
21C1	PF06	*FOP5	Function selection F-5	00000013h	—
21C2	PF07	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
21C6	PF11			0	
21C7	PF12	DBT	Electronic dynamic brake operating time	2000	ms
21C8	PF13	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
21CC	PF17			00000000h	
21CD	PF18	**STOD	STO diagnosis error detection time	10	s
21CE	PF19	TSL	Friction failure prediction - Compensation coefficient 1	0	0.0001%/℃
21CF	PF20	TIC	Friction failure prediction - Compensation coefficient 2	0	0.1%
21D0	PF21	DRT	Drive recorder switching time setting	0	s
21D1	PF22	—	For manufacturer setting	200	—
21D2	PF23	OSCL1	Vibration tough drive - Oscillation detection level	20	%
21D3	PF24	*FOP9	Function selection F-9	00000000h	—
21D4	PF25	CVAT	SEMI-F47 Function - Instantaneous power failure detection time (Instantaneous power failure tough drive detection time)	200	ms
21D5	PF26	—	For manufacturer setting	0	—
⋮	⋮			⋮	
21D9	PF30			0	
21DA	PF31	FRIC	Machine diagnosis function - Friction estimate area judgment speed at low speed	0	r/min or mm/s

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
21DB	PF32	—	For manufacturer setting	50	—
21DC	PF33			00000000h	
21DD	PF34	*MFP	Machine diagnosis function selection	00000000h	—
21DE	PF35	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
21E2	PF39			00000000h	
21E3	PF40	MFPP	Machine failure prediction parameter	00000000h	—
21E4	PF41	FPMT	Failure prediction - Servo motor total travel distance	0	10rev or m
21E5	PF42	PAV	Friction failure prediction - Average characteristics	0	0.1%
21E6	PF43	PSD	Friction failure prediction - Standard deviation	0	0.1%
21E7	PF44	—	For manufacturer setting	0	—
21E8	PF45	VAV	Vibration failure prediction - Average characteristics	0	0.1%
21E9	PF46	VSD	Vibration failure prediction - Standard deviation	0	0.1%
21EA	PF47	TMO	Servo motor total travel distance offset	0	10rev or m
21EB	PF48	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
21F9	PF62			00000000h	
21FA	PF63	*FOP15	Function selection F-15	00000000h	—
21FB	PF64	—	For manufacturer setting	0	—
21FC	PF65			00000000h	
21FD	PF66	BLG	Gear setting for backlash estimation	00000000h	—
21FE	PF67	BLN	Backlash nominal value	0	0.01degree
21FF	PF68	BLTT	Backlash threshold multiplication	0	—
2200	PF69	SPAV2	Static friction failure prediction - Average characteristics	0	0.1%
2201	PF70	SPSD2	Static friction failure prediction - Standard deviation	0	0.1%
2202	PF71	BFP	Belt failure prediction function selection	00000000h	—
2203	PF72	SBT	Belt tension on installation	0	0.1N
2204	PF73	ABT	Belt tension when extended	0	0.1N
2205	PF74	SSF	Static friction during installation	0	0.1%
2206	PF75	ASF	Static friction when extended	0	0.1%
2207	PF76	BTS	Belt tension irregular threshold	0	0.1%
2208	PF77	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
220A	PF79			00110010h	
220B	PF80	DRMC	Drive recorder - Operation condition selection	00000000h	—
220C	PF81	DRMS	Drive recorder - Sampling operation selection	00000000h	—
220D	PF82	DRTM	Drive recorder - Trigger operation selection	00000000h	—
220E	PF83	**DRTAX	Drive recorder - Trigger operation axis common selection	00000000h	—
220F	PF84	DRTC	Drive recorder - Trigger channel selection	005A8101h	—
2210	PF85	DRTL1	Drive recorder - Trigger level setting 1	0	—
2211	PF86	DRTL2	Drive recorder - Trigger level setting 2	0	—
2212	PF87	DRAC1	Drive recorder - Analog channel setting 1	0020201h	—
2213	PF88	DRAC2	Drive recorder - Analog channel setting 2	02040003h	—
2214	PF89	DRAC3	Drive recorder - Analog channel setting 3	00090205h	—
2215	PF90	DRAC4	Drive recorder - Analog channel setting 4	0000000Ch	—
2216	PF91	DRDC1	Drive recorder - Digital channel setting 1	001F0000h	—
2217	PF92	DRDC2	Drive recorder - Digital channel setting 2	80058010h	—
2218	PF93	DRDC3	Drive recorder - Digital channel setting 3	8000800Ah	—
2219	PF94	DRDC4	Drive recorder - Digital channel setting 4	801D8015h	—
221A	PF95	**DRCLR	Drive recorder - Clear history	00000000h	—

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
221B	PF96	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
221E	PF99			00000000h	

Menu O) Option setting

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
221F	PO01	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
2281	PO99			00000000h	

Menu S) Special settings

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2282	PS01	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
22E4	PS99			00000000h	

Menu L) Motor expansion settings

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
22E5	PL01	**LIT1	Function selection L-1	00000301h	—
22E6	PL02	**LIM	Linear encoder resolution setting - Numerator	1000	μm
22E7	PL03	**LID	Linear encoder resolution setting - Denominator	1000	μm
22E8	PL04	*LIT2	Function selection L-2	00000003h	—
22E9	PL05	LB1	Position deviation error detection level	0	mm or 0.01rev
22EA	PL06	LB2	Speed deviation error detection level	0	mm/s or r/min
22EB	PL07	LB3	Torque deviation error detection level	100	%
22EC	PL08	*LIT3	Function selection L-3	00001010h	—
22ED	PL09	LPWM	Magnetic pole detection - Voltage level	30	%
22EE	PL10	—	For manufacturer setting	5	—
⋮	⋮			⋮	
23F0	PL12			500	
22F2	PL14	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
23F4	PL16			0	
22F5	PL17	LTSTS	Magnetic pole detection - Minute position detection method - Function selection	00000000h	—
22F6	PL18	IDLV	Magnetic pole detection - Minute position detection method - Identification signal amplitude	0	%
22F7	PL19	—	For manufacturer setting	0	—
⋮	⋮			⋮	
2347	PL99			00000000h	

Menu U) Multi-encoder settings

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
2348	PU01	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
23AA	PU99			00000000h	

Menu W) Expansion settings 4

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol	Name	Initial value	Unit
23AB	PW01	—	For manufacturer setting	00000000h	—
⋮	⋮			⋮	
23FF	PW99			00000000h	

Sensing module (axis mode)

The parameters described in this section are for using the sensing module (axis mode). For details, refer to the sensing module instruction manual.

Point

The parameters with a * mark in front of the symbol are validated according to the following conditions.
- *: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
- **: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

11

Menu A) Basic setting

Parameter No.	Sensing pulse I/O module parameter No.	Symbol	Name	Initial value	Unit
1100	PA01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
1104	PA05			0000h	
1105	PA06	*EGM	Output-side electronic gear multiplication	1	—
1106	PA07	*EGS	Input-side electronic gear multiplication	1	—
1107	PA08	—	For manufacturer setting	0	—
⋮	⋮			⋮	
110C	PA13			0000h	
110D	PA14	*POL	Rotation direction selection	0	—
110E	PA15	*PRL	Number of pulses per revolution setting Lower	4000	pulse/rev
110F	PA16	*PRH	Number of pulses per revolution setting Upper	0	10000pulse/rev
1110	PA17	*DIL	Input signal logic selection	0000h	—
1111	PA18	*DOL	Output signal logic selection	0000h	—
1112	PA19	—	For manufacturer setting	000Bh	—
⋮	⋮			⋮	
113F	PA64			0000h	

Menu B) Gain filter settings

Parameter No.	Sensing pulse I/O module parameter No.	Symbol	Name	Initial value	Unit
1140	PB01	*DEL	[AL. 35 I/O pulse frequency error] alarm level selection	0000h	—
1141	PB02	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
1147	PB08			0	
1148	PB09	*TOP	Motor maximum speed	6000	r/min
1149	PB10	—	For manufacturer setting	0	—
114A	PB11	RDT	Virtual RD signal delay time	0	ms
114B	PB12	CRT	Clear signal output pulse width time	10	ms
114C	PB13	—	For manufacturer setting	0	—
114D	PB14	*PLSO	Command pulse output form	0000h	—
114E	PB15	—	For manufacturer setting	0	—
114F	PB16	*IOP	Input function selection	0000h	—
1150	PB17	*FPI	Feedback pulse input form	0000h	—
1151	PB18	*BAS	Motor rated speed	3000	r/min

Parameter No.	Sensing pulse I/O module parameter No.	Symbol	Name	Initial value	Unit
1152	PB19	—	For manufacturer setting	0	—
⋮	⋮			⋮	
1158	PB25			0000h	
1159	PB26	*LIS	Home position return input setting	0000h	—
115A	PB27	—	For manufacturer setting	0	—
⋮	⋮			⋮	
117F	PB64			0000h	

Menu C) Expansion settings 1

Parameter No.	Sensing pulse I/O module parameter No.	Symbol	Name	Initial value	Unit
1180	PC01	—	For manufacturer setting	0	—
⋮	⋮			⋮	
119F	PC32			0	
11A0	PC33	*HDI1	Head module DI1 (CN2-13) setting	0000h	—
11A1	PC34	*HDI2	Head module DI2 (CN2-1) setting	0000h	—
11A2	PC35	*HDI3	Head module DI3 (CN2-14) setting	0000h	—
11A3	PC36	*HDI4	Head module DI4 (CN2-2) setting	0000h	—
11A4	PC37	*HDI5	Head module DI5 (CN2-15) setting	0000h	—
11A5	PC38	*HDI6	Head module DI6 (CN2-3) setting	0000h	—
11A6	PC39	*HDI7	Head module DI7 (CN2-16) setting	0000h	—
11A7	PC40	*HDI8	Head module DI8 (CN2-4) setting	0000h	—
11A8	PC41	*HDI9	Head module DI9 (CN2-17) setting	0000h	—
11A9	PC42	*HDI10	Head module DI10 (CN2-5) setting	0000h	—
11AA	PC43	*HDI11	Head module DI11 (CN2-18) setting	0000h	—
11AB	PC44	*HDI12	Head module DI12 (CN2-6) setting	0000h	—
11AC	PC45	—	For manufacturer setting	0000h	—
11AD	PC46			0003h	
11AE	PC47	*HDO1	Head module DO1 (CN2-20) setting	0000h	—
11AF	PC48	*HDO2	Head module DO2 (CN2-8) setting	0000h	—
11B0	PC49	*COP2	Function selection C-2	0000h	—
11B1	PC50	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
11BF	PC64			0000h	

The setting of parameter No.11A0 and after is only required for axes whose "Type code (parameter No.021E)" is set to "3015h: Sensing SSCNETⅢ/H head module + Sensing pulse I/O module (axis mode)". Set the initial value for axes whose "Type code (parameter No.021E)" is to be set to "3025h: Sensing pulse I/O module (axis mode)".

11.3 Control Parameters

Servo amplifier MR-J4(W_)-_B/MR-J5(W_)-_B

Point

- The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
- The when in tandem drive column in the table is for control parameter setting classification of the axis for which the tandem drive is performed.
  Master: The data only valid for the master axis (☞ Page 493 Data only valid for the master axis)
  Each axis: The data valid for both the master axis and slave axis set separately (☞ Page 493 Individual data for master axis/slave axis)
  Same value: The data valid for both the master axis and slave axis set to the same value

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0200	*OPC1	Control option 1	0000h	—	0000h to 2111h	■■■□ (Control axis) Set "1: Controlled" when controlling the servo amplifier. • 0: Not controlled • 1: Controlled ■■□■ (Amplifier-less axis function) Set "1: Valid" when not communicating with the servo amplifier. When setting "1" with "Control axis", the operation without the servo amplifier (simulation) is available. • 0: Invalid • 1: Valid ■□■■ (No home position) Set "1: Valid" when setting the position at the time of power on as the home position. After returning to the home position, the home position becomes the position where the home position return is performed. • 0: Invalid • 1: Valid □■■■ (Speed unit) Set the speed command unit. • 0: Position command unit/min • 1: Position command unit/s • 2: r/min Always set the same value for the master axis and slave axis when in tandem drive.	Same value
0201	OPC2	Control option 2	0000h	—	0000h to 0121h	■■■□ (Position switch judgment conditions) Set the position switch judgment conditions • 0: Current command position • 1: Current feedback position ■■□■ (Continuous operation position over-bound processing) Defines processing for when the stop position exceeds the command position during operation. Operates through "2: Stop firmly at command position" when using circular interpolation. • 0: Alarm • 1: Return to command position • 2: Stop firmly at command position ■□■■ (Change of position over-bound processing) Set processing for when the stop position exceeds the command position during position change. • 0: Alarm • 1: Return to command position	Master

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0202	*OPC3	Control option 3	0001h	—	0000h to 0001h	■■■□ (Interlock signal polarity) Set the polarity of the Interlock signal. • 0: B-contact • 1: A-contact	Master
0203	*AXALC	Axis No. assignment	0000h	—	[MC200] 0000h to 011Fh [MC300] 0000h to 012Fh	■■□□ (Servo amplifier axis No.) Set the servo amplifier axis No. to be assigned to the axis Nos. on the position board. • 00h: No axis No. assignment • 01h to 14h: Axis No. [MC200] • 01h to 20h: Axis No. [MC300] <Example> 0Ah Axis No.10 ■□■■ (Servo amplifier line No.) Set the servo amplifier line No. to be assigned to the axis Nos. on the position board. • 0 to 1: Line No.-1	Each axis
0204	ITM1	Interrupt condition 1	0000h	—	0000h to FFFFh	Set interrupt condition 1.	Each axis
0205	ITM2	Interrupt condition 2	0000h	—	0000h to FFFFh	Set interrupt condition 2.	Each axis
0206	*OPC4	Control option 4	0000h	—	[MC200] 0000h to 1001h [MC300] 0000h to 1101h	■■■□ (Predwell setting range) Set the setting range of predwell. • 0: 0 to 3000ms • 1: 0 to 65535ms ■□■■ (High-speed update of monitor data) [MC300] Set to "1: Enabled" for high-speed update of monitor data 1 to 4. • 0: Disabled • 1: Enabled □■■■ (Re-acceleration setting for position change during deceleration) Set the re-acceleration setting for position change during deceleration to enabled/disabled. • 0: Disabled • 1: Enabled	Master
0207	—	For manufacturer setting	0	—	—	—	—
0208	*BKC	Backlash compensation amount	0000h	pulse	0 to 65535	Setting for performing compensation of machine backlash.	Same value
0209	—	For manufacturer setting	0	—	—	—	—
020A	*CMXL	Electronic gear numerator (lower)	0001h	—	1 to 5242879 (32bit)	Set the numerator for electronic gears.	Master
020B	*CMXH	Electronic gear numerator (upper)	0000h				
020C	*CDVL	Electronic gear denominator (lower)	0001h	—	1 to 589823 (32bit)	Set the denominator for electronic gears.	Master
020D	*CDVH	Electronic gear denominator (upper)	0000h				
020E	SUML	Speed units multiplication factor (lower)	2000h	—	1 to 32768 (32bit)	Set the multiplication factor for the speed command.	Master
020F	SUMH	Speed units multiplication factor (upper)	0000h				
0210	TLP	Forward rotation torque limit value	3000	0.1%	0 to 32767	Set for limiting torque generated in the CW direction when the servo motor is exerting in the CCW direction.	Master
0211	TLN	Reverse rotation torque limit value	3000	0.1%	0 to 32767	Set for limiting torque generated in the CCW direction when the servo motor is exerting in the CW direction.	Master
0212	—	For manufacturer setting	0	—	—	—	—

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0213	*GIOO	General I/O option	0000h	—	0000h to 0011h	■■■□ (Servo amplifier general input setting) Set whether to use the general input of the servo amplifier. • 0: Not used • 1: Used When the general input is "1: Used", the limit switch signal and the dog signal cannot be input from the servo amplifier. Set other than "1: Driver input" to "Sensor input system" of "Sensor input options (parameter No.0219)". ■■□■ (Servo amplifier general output setting) Set whether to use the general output of the servo amplifier. • 0: Not used • 1: Used	Each axis
0214	*GDNA	General I/O No. assignment	0000h	—	0000h to FFFFh	Set assignment of the general I/O No. The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)". [When using "0: Use digital I/O table"] ■■□□ (General input assignment) Specify the first digital input area No. to assign the general input. • 00h to 3Fh: Digital input area 0 to 63 <Example> When the digital input area No.1 is specified Assign 16 points of DI_010 to DI_01F. However, DI_013 to DI_01F are unavailable. □□■■ (General output assignment) Specify the first digital output area No. to assign the general output. • 00h to 3Fh: Digital output area 0 to 63 <Example> When the digital output area No.2 is specified Assign 16 points of DO_020 to DO_02F. However, DO_023 to DO_02F are unavailable. [When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 00h to FFh: Input word device No.00 to FF <Example> When the input word device No.01 is specified Assign 16 points of DVI_010 to DVI_01F. However, DVI_013 to DVI_01F are unavailable. □□■■ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general input. • 00h to FFh: Output word device No.00 to FF <Example> When the output word device No.02 is specified Assign 16 points of DVO_020 to DVO_02F. However, DVO_023 to DVO_02F are unavailable. [When using "2: Use I/O device table (expanded points method)"] [MC300] Set in "General input No. assignment (parameter No.0215)" and "General output No. assignment (parameter No.0216)".	Each axis

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0215	*GDINA	General input No. assignment[MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" is "2: Use I/O device table (expanded points method)". ■□□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 000h to 23Fh: Input word device No.000 to 23F <Example> When the input word device No.001 is specified Assign 16 points of DVI_0010 to DVI_001F. However, DVI_0013 to DVI_001F are unavailable.	Each axis
0216	*GDONA	General output No. assignment [MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" is "2: Use I/O device table (expanded points method)". ■□□□ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general output. • 000h to 23Fh: Output word device No.000 to 23F <Example>When the output word device No.002 is specified Assign 16 points of DVO_0020 to DVO_002F. However, DVO_0023 to DVO_002F are unavailable.	Each axis
0217	—	For manufacturer setting	0000h	—	—	—	—
0218	*SSIA	Sensor signal input assignment [MC300]	0000h	—	0000h to 0111h	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" is "2: Use I/O device table (expanded points method)". ■■■□ (Input device assignment (LSP)) Set the input device assignment connecting LSP to valid/invalid. • 0: Assignment not set • 1: Assignment valid ■■□■ (Input device assignment (LSN)) Set the input device assignment connecting LSN to valid/invalid. • 0: Assignment not set • 1: Assignment valid ■□■■ (Input device assignment (DOG)) Set the input device assignment connecting DOG to valid/invalid. • 0: Assignment not set • 1: Assignment valid	Each axis
0219	*SOP	Sensor input options	0000h	—	0000h to 0304h	■■■□ (Sensor input system) Set the input system of the sensor (LSP, LSN, DOG). • 0: Not use • 1: Driver input • 2: Digital or input device input • 3: Not connected (does not detect LSP, LSN, DOG) • 4: Dual port memory input ■□■■ (Limit switch signal selection) Set valid/invalid of limit switch. • 0: LSP/LSN are valid • 1: LSP is valid, LSN is invalid • 2: LSP is invalid, LSN is valid • 3: LSP/LSN are invalid	Each axis

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
021A	*SLSP	Sensor signal (LSP) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)".	Each axis
						[When using "0: Use digital I/O table"] ■■■□ (Digital input assignment) Set valid/invalid for the digital input assignment where LSP is connected. • 0: Not assigned • 1: Assigned □□□■ (Digital input No. assignment) Set the digital input No. where the LSP is connected. • 000h to 3FFh: DI_000 to DI_3FF	
						[When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■■□ (Input device assignment) Set valid/invalid for the input device assignment where LSP is connected. • 0: Not assigned • 1: Assigned □□□■ (Input device No. assignment) Set the input device No. where the LSP is connected. • 000h to FFFh: DVI_000 to DVI_3FF	
						[When using "2: Use I/O device table (expanded points method))"] [MC300] Set the input device assignment connecting LSP to valid/invalid in "Sensor signal input assignment (parameter No.0218)". □□□□ (Input device No. assignment) Set the input device No. where the LSP is connected. • 0000h to 23FFh: DVI_0000 to DVI_23FF	
021B	*SLSN	Sensor signal (LSN) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)".	Each axis
						[When using "0: Use digital I/O table"] ■■■□ (Digital input assignment) Set valid/invalid for the digital input assignment where LSN is connected. • 0: Not assigned • 1: Assigned □□□■ (Digital input No. assignment) Set the digital input No. where the LSN is connected. • 000h to 3FFh: DI_000 to DI_3FF	
						[When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■■□ (Input device assignment) Set valid/invalid for the input device assignment where LSN is connected. • 0: Not assigned • 1: Assigned □□□■ (Input device No. assignment) Set the input device No. where the LSN is connected. • 000h to FFFh: DVI_000 to DVI_3FF	
						[When using "2: Use I/O device table (expanded points method))"] [MC300] Set the input device assignment connecting LSN to valid/invalid in "Sensor signal input assignment (parameter No.0218)". □□□□ (Input device No. assignment) Set the input device No. where the LSN is connected. • 0000h to 23FFh: DVI_0000 to DVI_23FF	

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
021C	*SDOG	Sensor signal (DOG) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)". [When using "0: Use digital I/O table"] ■■■□ (Digital input assignment) Set valid/invalid for the digital input assignment where DOG is connected. • 0: Not assigned • 1: Assigned □□□■ (Digital input No. assignment) Set the digital input No. where the DOG is connected. • 000h to 3FFh: DI_000 to DI_3FF [When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■■□ (Input device assignment) Set valid/invalid for the input device assignment where DOG is connected. • 0: Not assigned • 1: Assigned □□□■ (Input device No. assignment) Set the input device No. where the DOG is connected. • 000h to FFFh: DVI_000 to DVI_3FF [When using "2: Use I/O device table (expanded points method))"] [MC300] Set the input device assignment connecting DOG to valid/invalid in "Sensor signal input assignment (parameter No.0218)". □□□□ (Input device No. assignment) Set the input device No. where the DOG is connected. • 0000h to 23FFh: DVI_0000 to DVI_23FF	Each axis
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. (SSCNETⅢ/H communication) • 0000h: Mitsubishi Electric	Same value
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Sets the type code. • 1000h: MR-J4(W_)-_B • 1400h: MR-J5(W_)-_B [MC300]	Same value
021F	—	For manufacturer setting	0	—	—	—	—
0220	OPS	Speed options	0000h	—	[MC200] 0000h to 0002h [MC300] 0000h to 0012h	■■■□ (Acceleration/deceleration method) Set the type of acceleration/deceleration. • 0: Linear acceleration/deceleration • 1: Smoothing filter • 2: Start up speed enable ■■□■ (Smoothing time constant setting method) [MC300] Specify the smoothing time constant setting method. • 0: Use control parameter • 1: Use point table When setting the smoothing time constants from the point table, only the automatic operation and the interpolation operation are supported.	Master

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0221	SRATE	S-curve ratio	0	%	0 to 100	Set the S-curve ratio of the S-curve acceleration/ deceleration (sine acceleration/deceleration). • 0 to 29: S-curve acceleration/deceleration invalid • 30 to 100: S-curve acceleration/deceleration The S-curve acceleration/deceleration is performed for the acceleration/deceleration method selected in "Speed options (parameter No.0220)". The S-curve ratio set by this parameter is used in the JOG operation, the incremental feed operation, and the home position return. For the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300], set the S-curve ratio in the point table.	Master
0222	SPLL	Speed limit value (lower)	0BB8h	Speed units	0000h to FFFFh	Set the value for the moving speed limit.	Master
0223	SPLH	Speed limit value (upper)	0000h		0000h to 7FFFh		
0224	LSPL	Start up speed (lower)	0000h	Speed units	0000h to FFFFh	Set the start up speed.	Master
0225	LSPH	Start up speed (upper)	0000h		0000h to 7FFFh		
0226	STC	Smoothing time constant	0	ms	0 to 100	Set the time constant of the smoothing filter. This parameter is used when "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "0: Use control parameter". When the operation mode is the automatic operation or the interpolation operation and "Smoothing time constant setting method" of "Speed options (parameter No.0220)" is set to "1: Use point table", set the smoothing time constant to the point table.	Master
0227	STE	Rapid stop time constant	20	ms	0 to 20000	Set the deceleration time constant for when operation rapid stop or limit switch is input.	Master
0228	SLPL	Software limit upper limit (lower)	0000h	Command units	0000h to FFFFh	Set the + side of the software limit.	Master
0229	SLPH	Software limit upper limit (upper)					
022A	SLNL	Software limit lower limit (lower)	0000h	Command units	0000h to FFFFh	Set the - side of the software limit.	Master
022B	SLNH	Software limit lower limit (upper)					
022C	PSPL	Position switch upper limit (lower)	0000h	Command units	0000h to FFFFh	Set the + end position for turning ON the position switch.	Master
022D	PSPH	Position switch upper limit (upper)					
022E	PSNL	Position switch lower limit (lower)	0000h	Command units	0000h to FFFFh	Set the - end position for turning ON the position switch.	Master
022F	PSNH	Position switch lower limit (upper)					
0230	CRPL	Rough match output limits (lower)	0000h	Command units	0000h to FFFFh	Set the remaining distance limits for outputting a command for rough matching.	Master
0231	CRPH	Rough match output limits (upper)			0000h to 7FFFh		
0232	—	For manufacturer setting	0	—	—	—	—
⋮			⋮				
023E			0				

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
023F	*IFBN	Interface mode maximum buffer No.	0	—	0 to 63	Set the maximum value for buffer No. used during interface mode. Set value + 1 is the number of buffers. When controlling interface mode with interrupt output invalid, 1 or more must be set.	—
0240	*OPZ1	Home position return option 1	0000h	—	0000h to 112Dh	■■■□ (Home position return method)*1*2 Set the method for home position return. • 0: Dog method • 2: Data set method • 3: Stopper method • 4: Dog cradle method • 5: Limit switch combined method • 6: Scale home position signal detection method • 7: Limit switch front end method • 8: Dog front end method • C: Z-phase detection method • D: Scale home position signal detection method 2 ■■□■ (Home position return direction) Set the home position return direction with respect to the proximity dog. Or the movement direction for creep speed movement. • 0: - direction • 1: + direction • 2: Shortcut direction*1 ■□■■ (Proximity dog input polarity) Set the input polarity for the proximity dog • 0: Normally closed contact • 1: Normally open contact □■■■ (Home position signal re-search)*2 Set "1: Searching again" when using an incremental encoder or incremental linear scale. • 0: Do not search again • 1: Searching again	Master
0241	*OPZ2	Home position return option 2	0000h	—	0000h to 0011h	■■■□ (Absolute position data) Set the validity/invalidity of restoring the absolute position. • 0: Invalid (The position at the system startup is defined to be 0. The home position return must be executed prior to performing the automatic operation or the linear interpolation operation [MC200]/interpolation operation [MC300].) • 1: Valid (The absolute position is restored at the system startup based on the home position multiple revolution data and the home position within 1 revolution position.) ■■□■ (Change of absolute position data on home position reset) If "1: Valid" is set, the home position multiple revolution data and home position within 1 revolution position are renewed when the home position is reset. • 0: Invalid • 1: Valid	Master
0242	ZSPL	Home position return speed (lower)	00C8h	Speed units	0000h to FFFFh	Set the moving speed for home position return.	Master
0243	ZSPH	Home position return speed (upper)	0000h		0000h to 7FFFh		
0244	ZTCA	Home position return acceleration time constant	100	ms	0 to 20000	Set the acceleration time constant for home position return.	Master
0245	ZTCD	Home position return deceleration time constant	100	ms	0 to 20000	Set the deceleration time constant for home position return.	
0246	ZPSL	Home position coordinates (lower)	0000h	Command units	0000h to FFFFh	Set the home position coordinates (position after completing home position return).	Master
0247	ZPSH	Home position coordinates (upper)					

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0248	ZSTL	Amount of home position shift (lower)	0000h	Command units	0000h to FFFFh	Set the shift movement amount from the Z-phase pulse detection position in the detector.	Master
0249	ZSTH	Amount of home position shift (upper)					
024A	ZLL	Home position search limit (lower)	0000h	Command units	0000h to FFFFh	Set a limit on the movement amount when searching for the home position.	Master
024B	ZLH	Home position search limit (upper)			0000h to 7FFFh		
024C	CRF	Creep speed	0014h	Speed units	0000h to 7FFFh	Set the creep speed after detecting the proximity dog.	Master
024D	*LS0	Home position multiple revolution data	0000h	rev	0000h to FFFFh	Set the home position multiple revolution data. (Only using with the absolute position detection system.)	Each axis
024E	*CY0L	Home position within 1 revolution position (lower)	0000h	pulse	0000h to FFFFh	Set the within 1 revolution home position. (Only using with the absolute position detection system.)	Each axis
024F	*CY0H	Home position within 1 revolution position (upper)					
0250	ZPML	Z-phase mask amount (lower)	0000h	Command units	0000h to FFFFh	Set the reference encoder Z-phase mask amount when the home position return method is set to the Z-phase detection method.	Master
0251	ZPMH	Z-phase mask amount (upper)			0000h to 7FFFh		
0252	—	For manufacturer setting	0	—	—	—	—
⋮			⋮				
025B			0				
025C	FREQ	Vibration suppression command filter 1 frequency[MC300]	0	0.1Hz	0 to 22500	Set the vibration suppression command filter 1 frequency in increments of 0.1Hz. The setting range for each control cycle is shown below. When a frequency outside of the range is set, vibration suppression command filter 1 becomes invalid. • 0.88ms: 2.2 to 562.5 [Hz] • 0.44ms: 4.4 to 1125.0 [Hz] • 0.22ms: 8.8 to 2250.0 [Hz]	Master
025D	ATT	Vibration suppression command filter 1 attenuation [MC300]	0	—	0 to 32	Set the attenuation of the vibration component. • 0: Maximum filter attenuation	Master
025E	EDRP	Vibration suppression command filter 1 operation ending droop [MC300]	0	pulse	0 to 10000	Set the operation ending droop for when operation finishes. When the amount of droop by vibration suppression command filter 1 is equal to or less than the set value, all remaining pulses are output and operation ends. • 0: 5 [pulse]	Master
025F	—	For manufacturer setting	0	—	—	—	—
0260	*LGRP	Linear interpolation group [MC200]/interpolation group [MC300]	0000h	—	[MC200] 0000h to 0008h [MC300] 0000h to 0010h	■■□□ (Group No.) Set the group No. for the linear interpolation [MC200]/interpolation operation [MC300] group. • 00h: Invalid • 01h to 08h: Group No. [MC200] • 01h to 10h: Group No. [MC300] <Example> 0Ah Group No.10	Master
0261	LOP	Linear interpolation options [MC200]/ interpolation options [MC300]	0000h	—	[MC200] 0000h to 0002h [MC300] 0000h to 0102h	■■■□ (Excessive speed processing) Set the operation when the speed is exceeded. • 0: Speed clamp • 1: Alarm stop • 2: No processing ■□■■ (Trajectory processing during continuous operation) [MC300] When using continuous operation for interpolation operation, select the trajectory processing to use when the point data is switched. • 0: Position adjustment • 1: Proximity pass	Master

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
0262	LSLL	Linear interpolation speed limit value (lower) [MC200]/interpolation speed limit value (lower) [MC300]	0BB8h	Speed units	0000h to FFFFh	Set the limit for linear interpolation speed [MC200]/ interpolation speed [MC300].	Master
0263	LSLH	Linear interpolation speed limit value (upper) [MC200]/interpolation speed limit value (upper) [MC300]	0000h		0000h to 7FFFh		
0264	*TGRP	Tandem drive group	0	—	0000h to 0008h	■■■□ (Group No.) Set the group No. for the tandem drive group. • 0: Invalid • 1 to 8: Group No.	Same value
0265	TOP	Tandem drive options	0000h	—	0000h to 1011h	■■■□ (Method of to home position return) Set the operation method when the home position return using a scale home position signal detection method is used for return to home position. • 0: Normal mode • 1: Adjustment mode ■■□■ (Synchronization setting) Set the validity/invalidity of synchronization for turning servo on. • 0: Valid • 1: Invalid □■■■ (Compensation of home position return deviation) Set the validity/invalidity of deviation compensation for home position return. • 0: Deviation compensation invalid • 1: Deviation compensation valid In home position return using the home position return using a scale home position signal detection method, the deviation compensation becomes valid regardless of this setting.	Master
0266	*TEV	Tandem drive synchronous alignment valid width	10000	Command units	0 to 32767	Set the valid width for performing compensation of the deviation between the master axis and slave axis when the servo is turned on. (0: The check with the synchronous alignment valid width is invalid.)	Master
0267	*TES	Tandem drive synchronous alignment speed	10000	Speed units	1 to 32767	Set the speed for performing compensation of the deviation between the master axis and slave axis when the servo is turned on.	Master
0268	*TEO	Tandem drive excessive deviation width	10000	Command units	0 to 32767	Set the detection level for the excessive deviation alarm for deviation between the master axis and the slave axis. (0: The check with the excessive deviation width is invalid.)	Master
0269	*TMAG	Tandem drive unit multiplication factor	1	—	1 to 32767	Set the multiplication factor for excessive deviation width, synchronization speed, and synchronization valid width for tandem drive axes.	Master
026A	*TED	Late starting of tandem drive excessive deviation detection	50	ms	0 to 500	Set the delay time for from completion of synchronization for turning servo on until detection of excessive deviation is started.	Master
026B	*TOFL	Valid width of tandem drive deviation compensation	10000	Command units	0 to 32767	Set the permissible width for performing compensation of the deviation between the master axis and slave axis when home position return is performed while in tandem drive axes mode. (0: The check with the valid width of deviation compensation is invalid.)	Master

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
026C	TZOFL	Tandem drive home position signal offset (lower)	0000h	Command units	0000h to FFFFh	Set the amount of offset for the home position signal position while in tandem drive axes mode. (Used when performing home position return using the home position return using a scale home position signal detection method.)	Master
026D	TZOFH	Tandem drive home position signal offset (upper)					
026E	*TOFS	Tandem drive deviation compensation units multiplication	0	—	0 to 32767	Set the multiplication for valid width of tandem drive deviation compensation. When the setting value is 0, the multiplication is 1 times.	Master
026F	—	For manufacturer setting	0	—	—	—	—
⋮			⋮				
0280			0				
0281	*IOP	Interference check options	0000h	—	[MC200] 0000h to 12F1h [MC300] 0000h to 13F1h	■■■□ (Interference check) Set validity/invalidity of interference check. • 0: Invalid • 1: Valid ■□□■ (Interference check axis) Set the other axis for which interference check is performed. • 00h to 1Fh: Interference check axis -1 [MC200] • 00h to 3Fh: Interference check axis -1 [MC300] <Example> 00h Axis No.1 □■■■ (Interference check coordinate direction) Set the direction of the coordinate system for the axis from the perspective of the standard coordinate system. • 0: Same direction • 1: Opposite direction	Master
0282	*IOP2	Interference check options 2	0000h	—	0000h to 0011h	■■■□ (Interference check direction) Set the direction for which interference check is performed. • 0: + direction of coordinate system for the axis • 1: - direction of coordinate system for the axis ■■□■ (Interference check standby) Set validity/invalidity of interference check standby. • 0: Invalid • 1: Valid	Master
0283	—	For manufacturer setting	0	—	—	—	—
0284	IOFL	Interference check offset (lower)	0000h	Command units	0000h to FFFFh	Set the position on the home position standard coordinate system.	Master
0285	IOFH	Interference check offset (upper)					
0286	IWL	Interference check width (lower)	0000h	Command units	0000h to FFFFh	Set the width from the interference check axis target position of the area where interference check is performed.	Master
0287	IWH	Interference check width (upper)			0000h to 7FFFh		
0288	—	For manufacturer setting	0	—	—	—	—
⋮			⋮				
02AF			0				

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
02B0	*MKOP1	Mark detection option 1	0000h	—	[MC200] 0000h to 3F23h [MC300] 0000h to 7F23h	■■■□ (Mark detection signal No. specification 1) Set the mark detection signal No. to be used. • 0: Invalid • 1 to 3: Mark detection signal No. (DI1 to DI3) ■■□■ (Mark detection mode) Set the mark detection mode. • 0: Continuous detection • 1: Specified number of detection • 2: Ring buffer □□■■ (Number of continuous latch data storages)[*3] Set the number of data that can be latched continuously. • 00h to 3Fh: Number of continuous latch data storages -1 [MC200] • 00h to 7Fh: Number of continuous latch data storages -1 [MC300]	Each axis
02B1	MKDS1	Mark detection data setting 1	0000h	—	0000h to 0111h	■■■□ (ON edge detection setting) Set enable/disable for detection at ON edge. • 0: Disable • 1: Enable ■■□■ (OFF edge detection setting) Set enable/disable for detection at OFF edge. • 0: Disable • 1: Enable ■□■■ (Mark detection data type) Set the type of data to be stored as mark detection data. • 0: Current feedback position [command units] • 1: Current feedback position [pulse]	Each axis
02B2	*MKOP2	Mark detection option 2	0000h	—	[MC200] 0000h to 3F23h [MC300] 0000h to 7F23h	■■■□ (Mark detection signal No. specification 2) Set the mark detection signal No. to be used. • 0: Invalid • 1 to 3: Mark detection signal No. (DI1 to DI3) ■■□■ (Mark detection mode) Set the mark detection mode. • 0: Continuous detection • 1: Specified number of detection • 2: Ring buffer □□■■ (Number of continuous latch data storages)[*3] Set the number of data that can be latched continuously. • 00h to 3Fh: Number of continuous latch data storages -1 [MC200] • 00h to 7Fh: Number of continuous latch data storages -1 [MC300]	Each axis
02B3	MKDS2	Mark detection data setting 2	0000h	—	0000h to 0111h	■■■□ (ON edge detection setting) Set enable/disable for detection at ON edge. • 0: Disable • 1: Enable ■■□■ (OFF edge detection setting) Set enable/disable for detection at OFF edge. • 0: Disable • 1: Enable ■□■■ (Mark detection data type) Set the type of data to be stored as mark detection data. • 0: Current feedback position [command units] • 1: Current feedback position [pulse]	Each axis
02B4	MKNL1	Latch data range lower limit 1 (lower)	0000h	—	0000h to FFFFh	Specify the range (lower limit) of data to be latched at detection of the mark detection signal of mark detection signal No. specification 1.[*4*5]	Each axis
02B5	MKNH1	Latch data range lower limit 1 (upper)					

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description	When in tandem drive
02B6	MKXL1	Latch data range upper limit 1 (lower)	0000h	—	0000h to FFFFh	Specify the range (upper limit) of data to be latched at detection of the mark detection signal of mark detection signal No. specification 1.*4*5	Each axis
02B7	MKXH1	Latch data range upper limit 1 (upper)					
02B8	MKNL2	Latch data range lower limit 2 (lower)	0000h	—	0000h to FFFFh	Specify the range (lower limit) of data to be latched at detection of the mark detection signal of mark detection signal No. specification 2.*4*5	Each axis
02B9	MKNH2	Latch data range lower limit 2 (upper)					
02BA	MKXL2	Latch data range upper limit 2 (lower)	0000h	—	0000h to FFFFh	Specify the range (upper limit) of data to be latched at detection of the mark detection signal of mark detection signal No. specification 2.*4*5	Each axis
02BB	MKXH2	Latch data range upper limit 2 (upper)					
02BC	—	For manufacturer setting	0	—	—	—	—
⋮			⋮				
02CB			0				
02CC	CIERL	Allowable error range for circular interpolation (lower) [MC300]	0000h	Command units	0 to 1000000 (32bit)	Set the allowable range for the calculated arc trajectory and the end point coordinate. (For central point-specified 2-axis circular interpolation control, the trajectory of the arc calculated from the start and central point coordinates may not coincide with the end point coordinate.) When the error between the calculated arc trajectory and end coordinate is within the set range, both circular interpolation to the set end point coordinate and error compensation are executed simultaneously by means of spiral interpolation. For allowable error range for circular interpolation, the primary axis settings are valid.	Master
02CD	CIERH	Allowable error range for circular interpolation (upper) [MC300]					
02CE	—	For manufacturer setting	0	—	—	—	—
⋮			⋮				
02FF			0				

*1 Shortcut direction is available only by Z-phase detection method.
*2 Can be changed while system is running. (When using MR-MC2_ _, compatible with software version A5 or later)
*3 The following number of continuous latch data storages can be set in the whole system.
Using MR-MC2_ _: 64
Using MR-MC3_ _: 128
*4 When changed while system is running, changes are enabled when a mark detection settings enable command is input.
*5 The set units are regarded as command units, or pulse units (the unit set in "Mark detection data type" of "Mark detection data setting 1 (parameter No.02B1)").

Sensing module (axis mode)

Point

The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 2101h	■■■□ (Control axis) Set "1: Controlled" when controlling the servo amplifier. • 0: Not controlled • 1: Controlled ■□■■ (No home position) Set "1: Valid" when setting the position at the time of power on as the home position. After returning to the home position, the home position becomes the position where the home position return is performed. • 0: Invalid • 1: Valid □■■■ (Speed unit) Set the speed command unit. • 0: Position command unit/min • 1: Position command unit/s • 2: r/min
0201	OPC2	Control option 2	0000h	—	0000h to 0121h	■■■□ (Position switch judgment conditions) Set the position switch judgment conditions • 0: Current command position • 1: Current feedback position ■■□■ (Continuous operation position over-bound processing) Defines processing for when the stop position exceeds the command position during operation. Operates through "2: Stop firmly at command position" when using circular interpolation. • 0: Alarm • 1: Return to command position • 2: Stop firmly at command position ■□■■ (Change of position over-bound processing) Set processing for when the stop position exceeds the command position during position change. • 0: Alarm • 1: Return to command position
0202	*OPC3	Control option 3	0001h	—	0000h to 1001h	■■■□ (Interlock signal polarity) Set the polarity of the Interlock signal. • 0: B-contact • 1: A-contact □■■■ (Incompletion of home position return after servo off) Set "1: Make home position return incomplete" to make the home position return incomplete after servo off. • 0: Do not make home position return incomplete • 1: Make home position return incomplete
0203	*AXALC	Axis No. assignment	0000h	—	[MC200] 0000h to 011Fh [MC300] 0000h to 012Fh	■■□□ (Servo amplifier axis No.) Set the servo amplifier axis No. to be assigned to the axis Nos. on the position board. • 00h: No axis No. assignment • 01h to 14h: Axis No. [MC200] • 01h to 20h: Axis No. [MC300] <Example> 0Ah Axis No.10 ■□■■ (Servo amplifier line No.) Set the servo amplifier line No. to be assigned to the axis Nos. on the position board. • 0 to 1: Line No. -1
0204	ITM1	Interrupt condition 1	0000h	—	0000h to FFFFh	Set interrupt condition 1.
0205	ITM2	Interrupt condition 2	0000h	—	0000h to FFFFh	Set interrupt condition 2.

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0206	*OPC4	Control option 4	0000h	—	[MC200] 0000h to 1001h [MC300] 0000h to 1101h	■■■□ (Predwell setting range) Set the setting range of predwell. • 0: 0 to 3000ms • 1: 0 to 65535ms ■□■■ (High-speed update of monitor data) [MC300] Set to "1: Enabled" for high-speed update of monitor data 1 to 4. • 0: Disabled • 1: Enabled □■■■ (Re-acceleration setting for position change during deceleration) Set the re-acceleration setting for position change during deceleration to enabled/disabled. • 0: Disabled • 1: Enabled
0207	—	For manufacturer setting	0	—	—	—
0208	*BKC	Backlash compensation amount	0000h	pulse	0 to 65535	Setting for performing compensation of machine backlash.
0209	—	For manufacturer setting	0	—	—	—
020A	*CMXL	Electronic gear numerator (lower)	0001h	—	1 to 5242879 (32bit)	Set the numerator for electronic gears.
020B	*CMXH	Electronic gear numerator (upper)	0000h			
020C	*CDVL	Electronic gear denominator (lower)	0001h	—	1 to 589823 (32bit)	Set the denominator for electronic gears.
020D	*CDVH	Electronic gear denominator (upper)	0000h			
020E	SUML	Speed units multiplication factor (lower)	2000h	—	1 to 32768 (32bit)	Set the multiplication factor for the speed command.
020F	SUMH	Speed units multiplication factor (upper)	0000h			
0210	—	For manufacturer setting	3000	—	—	—
⋮			⋮			
0212			0			
0213	*GIOO	General I/O option	0000h	—	0000h to 0011h	■■■□ (Servo amplifier general input setting) Set whether to use the general input of the servo amplifier. • 0: Not used • 1: Used ■■□■ (Servo amplifier general output setting) Set whether to use the general output of the servo amplifier. • 0: Not used • 1: Used

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0214	*GDNA	General I/O No. assignment	0000h	—	0000h to FFFFh	Set assignment of the general I/O No. The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)".
						[When using "0: Use digital I/O table"] ■■□□ (General input assignment) Specify the first digital input area No. to assign the general input. • 00h to 3Fh: Digital input area 0 to 63 <Example> When the digital input area No.1 is specified Assign 16 points of DI_010 to DI_01F. However, DI_013 to DI_01F are unavailable. □□■■ (General output assignment) Specify the first digital output area No. to assign the general output. • 00h to 3Fh: Digital output area 0 to 63 <Example> When the digital output area No.2 is specified Assign 16 points of DO_020 to DO_02F. However, DO_023 to DO_02F are unavailable.
						[When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 00h to FFh: Input word device No.00 to FF <Example> When the input word device No.01 is specified Assign 16 points of DVI_010 to DVI_01F. However, DVI_013 to DVI_01F are unavailable. □□■■ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general input. • 00h to FFh: Output word device No.00 to FF <Example> When the output word device No.02 is specified Assign 16 points of DVO_020 to DVO_02F. However, DVO_023 to DVO_02F are unavailable.
						[When using "2: Use I/O device table (expanded points method)"] [MC300] Set in "General input No. assignment (parameter No.0215)" and "General output No. assignment (parameter No.0216)".
0215	*GDINA	General input No. assignment [MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" is "2: Use I/O device table (expanded points method)". ■□□□ (General input assignment) Specify the first input word device No. that corresponds with the input bit device No. to assign the general input. • 000h to 23Fh: Input word device No.000 to 23F <Example> When the input word device No.001 is specified Assign 16 points of DVI_0010 to DVI_001F. However, DVI_0013 to DVI_001F are unavailable.
0216	*GDONA	General output No. assignment [MC300]	0000h	—	0000h to 023Fh	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" is "2: Use I/O device table (expanded points method)". ■□□□ (General output assignment) Specify the first output word device No. that corresponds with the output bit device No. to assign the general output. • 000h to 23Fh: Output word device No.000 to 23F <Example>When the output word device No.002 is specified Assign 16 points of DVO_0020 to DVO_002F. However, DVO_0023 to DVI_002F are unavailable.
0217	—	For manufacturer setting	0	—	—	—

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0218	*SSIA	Sensor signal input assignment [MC300]	0000h	—	0000h to 0111h	Only valid when "I/O table selection" of "I/O table (parameter No.004A)" is "2: Use I/O device table (expanded points method)". ■■■□ (Input device assignment (LSP)) Set the input device assignment connecting LSP to valid/invalid. • 0: Assignment not set • 1: Assignment valid ■■□■ (Input device assignment (LSN)) Set the input device assignment connecting LSN to valid/invalid. • 0: Assignment not set • 1: Assignment valid ■□■■ (Input device assignment (DOG)) Set the input device assignment connecting DOG to valid/invalid. • 0: Assignment not set • 1: Assignment valid
0219	*SOP	Sensor input options	0000h	—	0000h to 0304h	■■■□ (Sensor input system) Set the input system of the sensor (LSP, LSN, DOG). • 0: Not use • 1: Driver input • 2: Digital or input device input • 3: Not connected (does not detect LSP, LSN, DOG) • 4: Dual port memory input ■□■■ (Limit switch signal selection) Set valid/invalid of limit switch. • 0: LSP/LSN are valid • 1: LSP is valid, LSN is invalid • 2: LSP is invalid, LSN is valid • 3: LSP/LSN are invalid
021A	*SLSP	Sensor signal (LSP) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)".
						[When using "0: Use digital I/O table"] ■■■□ (Digital input assignment) Set valid/invalid for the digital input assignment where LSP is connected. • 0: Not assigned • 1: Assigned □□□■ (Digital input No. assignment) Set the digital input No. where the LSP is connected. • 000h to 3FFh: DI_000 to DI_3FF
						[When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■■□ (Input device assignment) Set valid/invalid for the input device assignment where LSP is connected. • 0: Not assigned • 1: Assigned □□□■ (Input device No. assignment) Set the input device No. where the LSP is connected. • 000h to FFFh: DVI_000 to DVI_3FF
						[When using "2: Use I/O device table (expanded points method))"] [MC300] Set the input device assignment connecting LSP to valid/invalid in "Sensor signal input assignment (parameter No.0218)". □□□□ (Input device No. assignment) Set the input device No. where the LSP is connected. • 0000h to 23FFh: DVI_0000 to DVI_23FF

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
021B	*SLSN	Sensor signal (LSN) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)".
						[When using "0: Use digital I/O table"] ■■■□ (Digital input assignment) Set valid/invalid for the digital input assignment where LSN is connected. • 0: Not assigned • 1: Assigned □□□■ (Digital input No. assignment) Set the digital input No. where the LSN is connected. • 000h to 3FFh: DI_000 to DI_3FF
						[When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■■□ (Input device assignment) Set valid/invalid for the input device assignment where LSN is connected. • 0: Not assigned • 1: Assigned □□□■ (Input device No. assignment) Set the input device No. where the LSN is connected. • 000h to FFFh: DVI_000 to DVI_3FF
						[When using "2: Use I/O device table (expanded points method))"] [MC300] Set the input device assignment connecting LSN to valid/invalid in "Sensor signal input assignment (parameter No.0218)". □□□□ (Input device No. assignment) Set the input device No. where the LSN is connected. • 0000h to 23FFh: DVI_0000 to DVI_23FF
021C	*SDOG	Sensor signal (DOG) connection specification	0000h	—	[MC200] 0000h to FFF1h [MC300] 0000h to FFFFh	The setting target differs depending on "I/O table selection" of "I/O table (parameter No.004A)".
						[When using "0: Use digital I/O table"] ■■■□ (Digital input assignment) Set valid/invalid for the digital input assignment where DOG is connected. • 0: Not assigned • 1: Assigned □□□■ (Digital input No. assignment) Set the digital input No. where the DOG is connected. • 000h to 3FFh: DI_000 to DI_3FF
						[When using "1: Use I/O device table (MR-MC2_ _ method)"] ■■■□ (Input device assignment) Set valid/invalid for the input device assignment where DOG is connected. • 0: Not assigned • 1: Assigned □□□■ (Input device No. assignment) Set the input device No. where the DOG is connected. • 000h to FFFh: DVI_000 to DVI_3FF
						[When using "2: Use I/O device table (expanded points method))"] [MC300] Set the input device assignment connecting DOG to valid/invalid in "Sensor signal input assignment (parameter No.0218)". □□□□ (Input device No. assignment) Set the input device No. where the DOG is connected. • 0000h to 23FFh: DVI_0000 to DVI_23FF
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. (SSCNETⅢ/H communication) • 0000h: Mitsubishi Electric
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Set the type code. • 3015h: Sensing SSCNETⅢ/H head module + Sensing pulse I/O module (axis mode) • 3025h: Sensing pulse I/O module (axis mode)
021F	—	For manufacturer setting	0	—	—	—

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0220	OPS	Speed options	0000h	—	0000h to 0002h	■■■□ (Acceleration/deceleration method) Set the type of acceleration/deceleration. • 0: Linear acceleration/deceleration • 1: Smoothing filter • 2: Start up speed enable
0221	SRATE	S-curve ratio	0	%	0 to 100	Set the S-curve ratio of the S-curve acceleration/deceleration (sine acceleration/deceleration). • 0: S-curve acceleration/deceleration invalid • 1 to 100: S-curve acceleration/deceleration The S-curve acceleration/deceleration is performed for the acceleration/deceleration method selected in "Speed options (parameter No.0220)". The S-curve ratio set by this parameter is used in the JOG operation, the incremental feed operation, and the home position return. For the automatic operation and the linear interpolation operation [MC200]/interpolation operation [MC300], set the S-curve ratio in the point table.
0222	SPLL	Speed limit value (lower)	0BB8h	Speed units	0000h to FFFFh	Set the value for the moving speed limit.
0223	SPLH	Speed limit value (upper)	0000h		0000h to 7FFFh	
0224	LSPL	Start up speed (lower)	0000h	Speed units	0000h to FFFFh	Set the start up speed.
0225	LSPH	Start up speed (upper)	0000h		0000h to 7FFFh	
0226	STC	Smoothing time constant	0	ms	0 to 100	Sets the time constant of the smoothing filter.
0227	STE	Rapid stop time constant	20	ms	0 to 20000	Set the deceleration time constant for when operation rapid stop or limit switch is input.
0228	SLPL	Software limit upper limit (lower)	0000h	Command units	0000h to FFFFh	Set the + side of the software limit.
0229	SLPH	Software limit upper limit (upper)				
022A	SLNL	Software limit lower limit (lower)	0000h	Command units	0000h to FFFFh	Set the - side of the software limit.
022B	SLNH	Software limit lower limit (upper)				
022C	PSPL	Position switch upper limit (lower)	0000h	Command units	0000h to FFFFh	Set the + end position for turning ON the position switch.
022D	PSPH	Position switch upper limit (upper)				
022E	PSNL	Position switch lower limit (lower)	0000h	Command units	0000h to FFFFh	Set the - end position for turning ON the position switch.
022F	PSNH	Position switch lower limit (upper)				
0230	CRPL	Rough match output limits (lower)	0000h	Command units	0000h to FFFFh	Set the remaining distance limits for outputting a command for rough matching.
0231	CRPH	Rough match output limits (upper)			0000h to 7FFFh	
0232	INPC	In-position range (controller)	0	pulse	0 to 65535	Set the in-position range to be determined by the position board.
0233	—	For manufacturer setting	0	—	—	—
⋮			⋮			
023E			0			
023F	*IFBN	Interface mode maximum buffer No.	0	—	0 to 63	Set the maximum value for buffer No. used during interface mode. Set value + 1 is the number of buffers. When controlling interface mode with interrupt output invalid, 1 or more must be set.

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0240	*OPZ1	Home position return option 1	0000h	—	0000h to 011Ch	■■■□ (Home position return method) Set the method for home position return. • 0: Dog method • 2: Data set method • 4: Dog cradle method • 5: Limit switch combined method • 7: Limit switch front end method • 8: Dog front end method • C: Z-phase detection method ■■□■ (Home position return direction) Set the home position return direction with respect to the proximity dog. Or the movement direction for creep speed movement. • 0: - direction • 1: + direction ■□■■ (Proximity dog input polarity) Set the input polarity for the proximity dog. • 0: Normally closed contact • 1: Normally open contact
0241	—	For manufacturer setting	0000h	—	—	—
0242	ZSPL	Home position return speed (lower)	00C8h	Speed units	0000h to FFFFh	Set the moving speed for home position return.
0243	ZSPH	Home position return speed (upper)	0000h		0000h to 7FFFh	
0244	ZTCA	Home position return acceleration time constant	100	ms	0 to 20000	Set the acceleration time constant for home position return.
0245	ZTCD	Home position return deceleration time constant	100	ms	0 to 20000	Set the deceleration time constant for home position return.
0246	ZPSL	Home position coordinates (lower)	0000h	Command units	0000h to FFFFh	Set the home position coordinates (position after completing home position return).
0247	ZPSH	Home position coordinates (upper)				
0248	ZSTL	Amount of home position shift (lower)	0000h	Command units	0000h to FFFFh	Set the shift movement amount from the Z-phase pulse detection position in the detector.
0249	ZSTH	Amount of home position shift (upper)				
024A	ZLL	Home position search limit (lower)	0000h	Command units	0000h to FFFFh	Set a limit on the movement amount when searching for the home position.
024B	ZLH	Home position search limit (upper)			0000h to 7FFFh	
024C	CRF	Creep speed	0014h	Speed units	0000h to 7FFFh	Set the creep speed after detecting the proximity dog.
024D	—	For manufacturer setting	0000h	—	—	—
⋮			⋮			
0251			0000h			
0252	COW	Standby time after clear signal output	0	ms	0 to 1000	Set the standby time from the clear signal output until position settling is completed during home position return. • 0: 100ms • 1 to 1000: 1 to 1000ms
0253	—	For manufacturer setting	0	—	—	—
⋮			⋮			
025B			0			
025C	FREQ	Vibration suppression command filter 1 frequency [MC300]	0	0.1Hz	0 to 22500	Set the vibration suppression command filter 1 frequency in increments of 0.1Hz. The setting range for each control cycle is shown below. When a frequency outside of the range is set, vibration suppression command filter 1 becomes invalid. • 0.88ms: 2.2 to 562.5 [Hz] • 0.44ms: 4.4 to 1125.0 [Hz] • 0.22ms: 8.8 to 2250.0 [Hz]
025D	ATT	Vibration suppression command filter 1 attenuation [MC300]	0	—	0 to 32	Set the attenuation of the vibration component. • 0: Maximum filter attenuation

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
025E	EDRP	Vibration suppression command filter 1 operation ending droop [MC300]	0	pulse	0 to 10000	Set the operation ending droop for when operation finishes. When the amount of droop by vibration suppression command filter 1 is equal to or less than the set value, all remaining pulses are output and operation ends. • 0: 5 [pulse]
025F	—	For manufacturer setting	0	—	—	—
0260	*LGRP	Linear interpolation group [MC200]/interpolation group [MC300]	0000h	—	[MC200] 0000h to 0008h [MC300] 0000h to 0010h	■■□□ (Group No.) Set the group No. for the linear interpolation [MC200]/ interpolation operation [MC300] group. • 00h: Invalid • 01h to 08h: Group No. [MC200] • 01h to 10h: Group No. [MC300] <Example> 0Ah Group No.10
0261	LOP	Linear interpolation options [MC200]/ interpolation options [MC300]	0000h	—	[MC200] 0000h to 0002h [MC300] 0000h to 0102h	■■■□ (Excessive speed processing) Set the operation when the speed is exceeded. • 0: Speed clamp • 1: Alarm stop • 2: No processing ■□■■ (Trajectory processing during continuous operation) [MC300] When using continuous operation for interpolation operation, select the trajectory processing to use when the point data is switched. • 0: Position adjustment • 1: Proximity pass
0262	LSLL	Linear interpolation speed limit value (lower) [MC200]/interpolation speed limit value (lower) [MC300]	0BB8h	Speed units	0000h to FFFFh	Set the limit for linear interpolation speed [MC200]/interpolation speed [MC300].
0263	LSLH	Linear interpolation speed limit value (upper) [MC200]/interpolation speed limit value (upper) [MC300]	0000h		0000h to 7FFFh	
0264	—	For manufacturer setting	0	—	—	—
⋮			⋮			
0280			0			
0281	*IOP	Interference check options	0000h	—	[MC200] 0000h to 12F1h [MC300] 0000h to 13F1h	■■■□ (Interference check) Set validity/invalidity of interference check. • 0: Invalid • 1: Valid ■□□■ (Interference check axis) Set the other axis for which interference check is performed. • 00h to 1Fh: Interference check axis -1 [MC200] • 00h to 3Fh: Interference check axis -1 [MC300] <Example> 00h Axis No.1 □■■■ (Interference check coordinate direction) Set the direction of the coordinate system for the axis from the perspective of the standard coordinate system. • 0: Same direction • 1: Opposite direction
0282	*IOP2	Interference check options 2	0000h	—	0000h to 0011h	■■■□ (Interference check direction) Set the direction for which interference check is performed. • 0: + direction of coordinate system for the axis • 1: - direction of coordinate system for the axis ■■□■ (Interference check standby) Set validity/invalidity of interference check standby. • 0: Invalid • 1: Valid
0283	—	For manufacturer setting	0	—	—	—

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0284	IOFL	Interference check offset (lower)	0000h	Command units	0000h to FFFFh	Set the position on the home position standard coordinate system.
0285	IOFH	Interference check offset (upper)				
0286	IWL	Interference check width (lower)	0000h	Command units	0000h to FFFFh	Set the width from the interference check axis target position of the area where interference check is performed.
0287	IWH	Interference check width (upper)			0000h to 7FFFh	
0288	—	For manufacturer setting	0	—	—	—
⋮			⋮			
02CB			0			
02CC	CIERL	Allowable error range for circular interpolation (lower) [MC300]	0000h	Command units	0 to 1000000 (32bit)	Sets the allowable range for the calculated arc trajectory and the end point coordinate. (For central point-specified 2-axis circular interpolation control, the trajectory of the arc calculated from the start and central point coordinates may not coincide with the end point coordinate.) When the error between the calculated arc trajectory and end coordinate is within the set range, both circular interpolation to the set end point coordinate and error compensation are executed simultaneously by means of spiral interpolation. For allowable error range for circular interpolation, the primary axis settings are valid.
02CD	CIERH	Allowable error range for circular interpolation (upper) [MC300]				
02CE	—	For manufacturer setting	0	—	—	—
⋮			⋮			
02FF			0			

11.4 RIO Module Parameters

SSCNETIII/H head module

For the RIO module parameters of the SSCNETⅢ/H head module, refer to the following manual.

MELSEC-L SSCNETⅢ/H Head Module User's Manual

Sensing module (station mode)

The RIO module parameters of the sensing module are shown below. For details about the sensing module, refer to the sensing module instruction manual.

Point

The parameters with a * mark at the front of the symbol are validated according to the following conditions.

- *: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
- **: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Sensing SSCNETIII/H head module parameters

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
1100	PTA001	*HDI11	DI1 (CN2-13) setting 1	0000h	—
1101	PTA002	*HDI12	DI1 (CN2-13) setting 2	0000h	—
1102	PTA003	*HDI21	DI2 (CN2-1) setting 1	0000h	—
1103	PTA004	*HDI22	DI2 (CN2-1) setting 2	0000h	—
1104	PTA005	*HDI31	DI3 (CN2-14) setting 1	0000h	—
1105	PTA006	*HDI32	DI3 (CN2-14) setting 2	0000h	—
1106	PTA007	*HDI41	DI4 (CN2-2) setting 1	0000h	—
1107	PTA008	*HDI42	DI4 (CN2-2) setting 2	0000h	—
1108	PTA009	*HDI51	DI5 (CN2-15) setting 1	0000h	—
1109	PTA010	*HDI52	DI5 (CN2-15) setting 2	0000h	—
110A	PTA011	*HDI61	DI6 (CN2-3) setting 1	0000h	—
110B	PTA012	*HDI62	DI6 (CN2-3) setting 2	0000h	—
110C	PTA013	*HDI71	DI7 (CN2-16) setting 1	0000h	—
110D	PTA014	*HDI72	DI7 (CN2-16) setting 2	0000h	—
110E	PTA015	*HDI81	DI8 (CN2-4) setting 1	0000h	—
110F	PTA016	*HDI82	DI8 (CN2-4) setting 2	0000h	—
1110	PTA017	*HDI91	DI9 (CN2-17) setting 1	0000h	—
1111	PTA018	*HDI92	DI9 (CN2-17) setting 2	0000h	—
1112	PTA019	*HDIA1	DI10 (CN2-5) setting 1	0000h	—
1113	PTA020	*HDIA2	DI10 (CN2-5) setting 2	0000h	—
1114	PTA021	*HDIB1	DI11 (CN2-18) setting 1	0000h	—
1115	PTA022	*HDIB2	DI11 (CN2-18) setting 2	0000h	—
1116	PTA023	*HDIC1	DI12 (CN2-6) setting 1	0000h	—
1117	PTA024	*HDIC2	DI12 (CN2-6) setting 2	0000h	—
1118	PTA025	—	For manufacturer setting	0000h	—
1119	PTA026			0003h	
111A	PTA027	*HDO11	DO1 (CN2-20) setting 1	0000h	—
111B	PTA028	*HDO12	DO1 (CN2-20) setting 2	0000h	—
111C	PTA029	*HDO21	DO2 (CN2-8) setting 1	0000h	—
111D	PTA030	*HDO22	DO2 (CN2-8) setting 2	0000h	—

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
111E	PTA031	—	For manufacturer setting	0000h	—
111F	PTA032	*AOP1	Function selection A-1	0000h	—
1120	PTA033	*LO1	Level output function - Setting group 1 - Detailed setting 1	0000h	—
1121	PTA034	LONL1	Level output function - Setting group 1 - Lower limit setting - Lower	0000h	—
1122	PTA035	LONH1	Level output function - Setting group 1 - Lower limit setting - Upper	0000h	—
1123	PTA036	LOFL1	Level output function - Setting group 1 - Upper limit setting - Lower	0000h	—
1124	PTA037	LOFH1	Level output function - Setting group 1 - Upper limit setting - Upper	0000h	—
1125	PTA038	*LO2	Level output function - Setting group 2 - Detailed setting 1	0000h	—
1126	PTA039	LONL2	Level output function - Setting group 2 - Lower limit setting - Lower	0000h	—
1127	PTA040	LONH2	Level output function - Setting group 2 - Lower limit setting - Upper	0000h	—
1128	PTA041	LOFL2	Level output function - Setting group 2 - Upper limit setting - Lower	0000h	—
1129	PTA042	LOFH2	Level output function - Setting group 2 - Upper limit setting - Upper	0000h	—
112A	PTA043	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
117F	PTA128			0000h	

Sensing I/O module parameters

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
1180	PTB001	*IDI11	DI1 (CN1-10) setting 1	0000h	—
1181	PTB002	*IDI12	DI1 (CN1-10) setting 2	0000h	—
1182	PTB003	*IDI21	DI2 (CN1-1) setting 1	0000h	—
1183	PTB004	*IDI22	DI2 (CN1-1) setting 2	0000h	—
1184	PTB005	*IDI31	DI3 (CN1-11) setting 1	0000h	—
1185	PTB006	*IDI32	DI3 (CN1-11) setting 2	0000h	—
1186	PTB007	*IDI41	DI4 (CN1-2) setting 1	0000h	—
1187	PTB008	*IDI42	DI4 (CN1-2) setting 2	0000h	—
1188	PTB009	*IDI51	DI5 (CN1-12) setting 1	0000h	—
1189	PTB010	*IDI52	DI5 (CN1-12) setting 2	0000h	—
118A	PTB011	*IDI61	DI6 (CN1-3) setting 1	0000h	—
118B	PTB012	*IDI62	DI6 (CN1-3) setting 2	0000h	—
118C	PTB013	*IDI71	DI7 (CN1-13) setting 1	0000h	—
118D	PTB014	*IDI72	DI7 (CN1-13) setting 2	0000h	—
118E	PTB015	*IDI81	DI8 (CN1-4) setting 1	0000h	—
118F	PTB016	*IDI82	DI8 (CN1-4) setting 2	0000h	—
1190	PTB017	*IDI91	DI9 (CN1-14) setting 1	0000h	—
1191	PTB018	*IDI92	DI9 (CN1-14) setting 2	0000h	—
1192	PTB019	*IDIA1	DI10 (CN1-5) setting 1	0000h	—
1193	PTB020	*IDIA2	DI10 (CN1-5) setting 2	0000h	—
1194	PTB021	*IDIB1	DI11 (CN1-15) setting 1	0000h	—
1195	PTB022	*IDIB2	DI11 (CN1-15) setting 2	0000h	—
1196	PTB023	*IDIC1	DI12 (CN1-6) setting 1	0000h	—
1197	PTB024	*IDIC2	DI12 (CN1-6) setting 2	0000h	—
1198	PTB025	*IDID1	DI13 (CN1-16) setting 1	0000h	—
1199	PTB026	*IDID2	DI13 (CN1-16) setting 2	0000h	—
119A	PTB027	*IDIE1	DI14 (CN1-7) setting 1	0000h	—
119B	PTB028	*IDIE2	DI14 (CN1-7) setting 2	0000h	—
119C	PTB029	*IDIF1	DI15 (CN1-17) setting 1	0000h	—
119D	PTB030	*IDIF2	DI15 (CN1-7) setting 2	0000h	—
119E	PTB031	*IDIG1	DI16 (CN1-8) setting 1	0000h	—
119F	PTB032	*IDIG2	DI16 (CN1-8) setting 2	0000h	—

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
11A0	PTB033	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
11A3	PTB036			0000h	
11A4	PTB037	*IDO11	DO1 (CN2-11) setting 1	0000h	—
11A5	PTB038	*IDO12	DO1 (CN2-11) setting 2	0000h	—
11A6	PTB039	*IDO21	DO2 (CN2-1) setting 1	0000h	—
11A7	PTB040	*IDO22	DO2 (CN2-1) setting 2	0000h	—
11A8	PTB041	*IDO31	DO3 (CN2-12) setting 1	0000h	—
11A9	PTB042	*IDO32	DO3 (CN2-12) setting 2	0000h	—
11AA	PTB043	*IDO41	DO4 (CN2-2) setting 1	0000h	—
11AB	PTB044	*IDO42	DO4 (CN2-2) setting 2	0000h	—
11AC	PTB045	*IDO51	DO5 (CN2-13) setting 1	0000h	—
11AD	PTB046	*IDO52	DO5 (CN2-13) setting 2	0000h	—
11AE	PTB047	*IDO61	DO6 (CN2-3) setting 1	0000h	—
11AF	PTB048	*IDO62	DO6 (CN2-3) setting 2	0000h	—
11B0	PTB049	*IDO71	DO7 (CN2-14) setting 1	0000h	—
11B1	PTB050	*IDO72	DO7 (CN2-14) setting 2	0000h	—
11B2	PTB051	*IDO81	DO8 (CN2-4) setting 1	0000h	—
11B3	PTB052	*IDO82	DO8 (CN2-4) setting 2	0000h	—
11B4	PTB053	*IDO91	DO9 (CN2-15) setting 1	0000h	—
11B5	PTB054	*IDO92	DO9 (CN2-15) setting 2	0000h	—
11B6	PTB055	*IDOA1	DO10 (CN2-5) setting 1	0000h	—
11B7	PTB056	*IDOA2	DO10 (CN2-5) setting 2	0000h	—
11B8	PTB057	*IDOB1	DO11 (CN2-16) setting 1	0000h	—
11B9	PTB058	*IDOB2	DO11 (CN2-16) setting 2	0000h	—
11BA	PTB059	*IDOC1	DO12 (CN2-6) setting 1	0000h	—
11BB	PTB060	*IDOC2	DO12 (CN2-6) setting 2	0000h	—
11BC	PTB061	*IDOD1	DO13 (CN2-17) setting 1	0000h	—
11BD	PTB062	*IDOD2	DO13 (CN2-17) setting 2	0000h	—
11BE	PTB063	*IDOE1	DO14 (CN2-7) setting 1	0000h	—
11BF	PTB064	*IDOE2	DO14 (CN2-7) setting 2	0000h	—
11C0	PTB065	*IDOF1	DO15 (CN2-18) setting 1	0000h	—
11C1	PTB066	*IDOF2	DO15 (CN2-18) setting 2	0000h	—
11C2	PTB067	*IDOG1	DO16 (CN2-8) setting 1	0000h	—
11C3	PTB068	*IDOG2	DO16 (CN2-8) setting 2	0000h	—
11C4	PTB069	*IDO	Digital output connection setting	0000h	—
11C5	PTB070	—	For manufacturer setting	0000h	—
11C6	PTB071			0000h	
11C7	PTB072			0000h	
11C8	PTB073	*ILO1	Level output function - Setting group 1 - Detailed setting 1	0000h	—
11C9	PTB074	ILONL1	Level output function - Setting group 1 - Lower limit setting - Lower	0000h	—
11CA	PTB075	ILONH1	Level output function - Setting group 1 - Lower limit setting - Upper	0000h	—
11CB	PTB076	ILOFL1	Level output function - Setting group 1 - Upper limit setting - Lower	0000h	—
11CC	PTB077	ILOFH1	Level output function - Setting group 1 - Upper limit setting - Upper	0000h	—
11CD	PTB078	*ILO2	Level output function - Setting group 2 - Detailed setting 1	0000h	—
11CE	PTB079	ILONL2	Level output function - Setting group 2 - Lower limit setting - Lower	0000h	—
11CF	PTB080	ILONH2	Level output function - Setting group 2 - Lower limit setting - Upper	0000h	—
11D0	PTB081	ILOFL2	Level output function - Setting group 2 - Upper limit setting - Lower	0000h	—
11D1	PTB082	ILOFH2	Level output function - Setting group 2 - Upper limit setting - Upper	0000h	—
11D2	PTB083	*ILO3	Level output function - Setting group 3 - Detailed setting 1	0000h	—
11D3	PTB084	ILONL3	Level output function - Setting group 3 - Lower limit setting - Lower	0000h	—
11D4	PTB085	ILONH3	Level output function - Setting group 3 - Lower limit setting - Upper	0000h	—

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
11D5	PTB086	ILOFL3	Level output function - Setting group 3 - Upper limit setting - Lower	0000h	—
11D6	PTB087	ILOFH3	Level output function - Setting group 3 - Upper limit setting - Upper	0000h	—
11D7	PTB088	*ILO4	Level output function - Setting group 4 - Detailed setting 1	0000h	—
11D8	PTB089	ILONL4	Level output function - Setting group 4 - Lower limit setting - Lower	0000h	—
11D9	PTB090	ILONH4	Level output function - Setting group 4 - Lower limit setting - Upper	0000h	—
11DA	PTB091	ILOFL4	Level output function - Setting group 4 - Upper limit setting - Lower	0000h	—
11DB	PTB092	ILOFH4	Level output function - Setting group 4 - Upper limit setting - Upper	0000h	—
11DC	PTB093	*ILO5	Level output function - Setting group 5 - Detailed setting 1	0000h	—
11DD	PTB094	ILONL5	Level output function - Setting group 5 - Lower limit setting - Lower	0000h	—
11DE	PTB095	ILONH5	Level output function - Setting group 5 - Lower limit setting - Upper	0000h	—
11DF	PTB096	ILOFL5	Level output function - Setting group 5 - Upper limit setting - Lower	0000h	—
11E0	PTB097	ILOFH5	Level output function - Setting group 5 - Upper limit setting - Upper	0000h	—
11E1	PTB098	*ILO6	Level output function - Setting group 6 - Detailed setting 1	0000h	—
11E2	PTB099	ILONL6	Level output function - Setting group 6 - Lower limit setting - Lower	0000h	—
11E3	PTB100	ILONH6	Level output function - Setting group 6 - Lower limit setting - Upper	0000h	—
11E4	PTB101	ILOFL6	Level output function - Setting group 6 - Upper limit setting - Lower	0000h	—
11E5	PTB102	ILOFH6	Level output function - Setting group 6 - Upper limit setting - Upper	0000h	—
11E6	PTB103	*ILO7	Level output function - Setting group 7 - Detailed setting 1	0000h	—
11E7	PTB104	ILONL7	Level output function - Setting group 7 - Lower limit setting - Lower	0000h	—
11E8	PTB105	ILONH7	Level output function - Setting group 7 - Lower limit setting - Upper	0000h	—
11E9	PTB106	ILOFL7	Level output function - Setting group 7 - Upper limit setting - Lower	0000h	—
11EA	PTB107	ILOFH7	Level output function - Setting group 7 - Upper limit setting - Upper	0000h	—
11EB	PTB108	*ILO8	Level output function - Setting group 8 - Detailed setting 1	0000h	—
11EC	PTB109	ILONL8	Level output function - Setting group 8 - Lower limit setting - Lower	0000h	—
11ED	PTB110	ILONH8	Level output function - Setting group 8 - Lower limit setting - Upper	0000h	—
11EE	PTB111	ILOFL8	Level output function - Setting group 8 - Upper limit setting - Lower	0000h	—
11EF	PTB112	ILOFH8	Level output function - Setting group 8 - Upper limit setting - Upper	0000h	—
11F0	PTB113	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
127F	PTB256			0000h	

Sensing pulse I/O module parameters

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
1280	PTC001	*PFSA	A-axis setting	0000h	—
1281	PTC002	*PIFA1	A-axis input function setting 1	0000h	—
1282	PTC003	*PIFA2	A-axis input function setting 2	0000h	—
1283	PTC004	*POFA1	A-axis output function selection 1	0000h	—
1284	PTC005	*POFA2	A-axis output function selection 2	0000h	—
1285	PTC006	—	For manufacturer setting	0000h	—
1286	PTC007	*CMXA	A-axis input-side electronic gear setting	0000h	—
1287	PTC008	*CDVA	A-axis output-side electronic gear setting	0000h	—
1288	PTC009	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
128F	PTC016			0000h	
1290	PTC017	*PFSB	B-axis setting	0000h	—
1291	PTC018	*PIFB1	B-axis input function setting 1	0000h	—
1292	PTC019	*PIFB2	B-axis input function setting 2	0000h	—
1293	PTC020	*POFB1	B-axis output function selection 1	0000h	—
1294	PTC021	*POFB2	B-axis output function selection 2	0000h	—
1295	PTC022	—	For manufacturer setting	0000h	—
1296	PTC023	*CMXB	B-axis input-side electronic gear setting	0000h	—

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
1297	PTC024	*CDVB	B-axis output-side electronic gear setting	0000h	—
1298	PTC025	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
129F	PTC032			0000h	
12A0	PTC033	*IDI1A1	DI1A (CN1-8) setting 1	0000h	—
12A1	PTC034	—	For manufacturer setting	0000h	—
12A2	PTC035	*IDI2A1	DI2A (CN1-10) setting 1	0000h	—
12A3	PTC036	—	For manufacturer setting	0000h	—
12A4	PTC037	*IDI3A1	DI3A (CN1-7) setting 1	0000h	—
12A5	PTC038	—	For manufacturer setting	0000h	—
12A6	PTC039	*IDI4A1	DI4A (CN1-9) setting 1	0000h	—
12A7	PTC040	—	For manufacturer setting	0000h	—
12A8	PTC041	*IDI5A1	DI5A (CN1-19) setting 1	0000h	—
12A9	PTC042	—	For manufacturer setting	0000h	—
12AA	PTC043	*IDI6A1	DI6A (CN1-20) setting 1	0000h	—
12AB	PTC044	—	For manufacturer setting	0000h	—
12AC	PTC045	*IDI7A1	DI7A (CN1-21) setting 1	0000h	—
12AD	PTC046	—	For manufacturer setting	0000h	—
12AE	PTC047	*IDI1B1	DI1B (CN2-8) setting 1	0000h	—
12AF	PTC048	—	For manufacturer setting	0000h	—
12B0	PTC049	*IDI2B1	DI2B (CN2-10) setting 1	0000h	—
12B1	PTC050	—	For manufacturer setting	0000h	—
12B2	PTC051	*IDI3B1	DI3B (CN2-7) setting 1	0000h	—
12B3	PTC052	—	For manufacturer setting	0000h	—
12B4	PTC053	*IDI4B1	DI4B (CN2-9) setting 1	0000h	—
12B5	PTC054	—	For manufacturer setting	0000h	—
12B6	PTC055	*IDI5B1	DI5B (CN2-19) setting 1	0000h	—
12B7	PTC056	—	For manufacturer setting	0000h	—
12B8	PTC057	*IDI6B1	DI6B (CN2-20) setting 1	0000h	—
12B9	PTC058	—	For manufacturer setting	0000h	—
12BA	PTC059	*IDI7B1	DI7B (CN2-21) setting 1	0000h	—
12BB	PTC060	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
12BF	PTC064			0000h	
12C0	PTC065	*IDO1A1	DO1A (CN1-11) setting 1	0000h	—
12C1	PTC066	*IDO1A2	DO1A (CN1-11) setting 2	0000h	—
12C2	PTC067	*IDO2A1	DO2A (CN1-12) setting 1	0000h	—
12C3	PTC068	*IDO2A2	DO2A (CN1-12) setting 2	0000h	—
12C4	PTC069	*IDO3A1	DO3A (CN1-23) setting 1	0000h	—
12C5	PTC070	*IDO3A2	DO3A (CN1-23) setting 2	0000h	—
12C6	PTC071	*IDO4A1	DO4A (CN1-1) setting 1	0000h	
12C7	PTC072	*IDO4A2	DO4A (CN1-1) setting 2	0000h	
12C8	PTC073	*IDO5A1	DO5A (CN1-13) setting 1	0000h	—
12C9	PTC074	*IDO5A2	DO5A (CN1-13) setting 2	0000h	—
12CA	PTC075	*IDO1B1	DO1B (CN2-11) setting 1	0000h	—
12CB	PTC076	*IDO1B2	DO1B (CN2-11) setting 2	0000h	—
12CC	PTC077	*IDO2B1	DO2B (CN2-12) setting 1	0000h	—
12CD	PTC078	*IDO2B2	DO2B (CN2-12) setting 2	0000h	—
12CE	PTC079	*IDO3B1	DO3B (CN2-23) setting 1	0000h	—
12CF	PTC080	*IDO3B2	DO3B (CN2-23) setting 2	0000h	—
12D0	PTC081	*IDO4B1	DO4B (CN2-1) setting 1	0000h	—
12D1	PTC082	*IDO4B2	DO4B (CN2-1) setting 2	0000h	—

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
12D2	PTC083	*IDO5B1	DO5B (CN2-13) setting 1	0000h	—
12D3	PTC084	*IDO5B2	DO5B (CN2-13) setting 2	0000h	—
12D4	PTC085	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
12FF	PTC128			0000h	

Sensing analog I/O module parameters

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
1300	PTD001	*AIF1	Analog input function selection 1	0000h	—
1301	PTD002	*AI1F2	Analog input ch. 1 - Function selection 2	0000h	—
1302	PTD003	*AI1FT	Analog input ch. 1 - Primary delay filter time constant	0	ms
1303	PTD004	AI1OF	Analog input ch. 1 - Offset voltage setting	0	mV
1304	PTD005	*AI1SH	Analog input ch. 1 - Scaling function - Upper limit setting	20000	—
1305	PTD006	*AI1SL	Analog input ch. 1 - Scaling function - Lower limit setting	-20000	—
1306	PTD007	*AI1SF	Analog input ch. 1 - Scaling function - Shift amount setting	0	—
1307	PTD008	—	For manufacturer setting	0000h	—
1308	PTD009			0000h	
1309	PTD010	*AI2F2	Analog input ch. 2 - Function selection 2	0000h	—
130A	PTD011	*AI2FT	Analog input ch. 2 - Primary delay filter time constant	0	ms
130B	PTD012	AI2OF	Analog input ch. 2 - Offset voltage setting	0	mV
130C	PTD013	*AI2SH	Analog input ch. 2 - Scaling function - Upper limit setting	20000	—
130D	PTD014	*AI2SL	Analog input ch. 2 - Scaling function - Lower limit setting	-20000	—
130E	PTD015	*AI2SF	Analog input ch. 2 - Scaling function - Shift amount setting	0	—
130F	PTD016	—	For manufacturer setting	0000h	—
1310	PTD017			0000h	
1311	PTD018	*AI3F2	Analog input ch. 3 - Function selection 2	0000h	—
1312	PTD019	*AI3FT	Analog input ch. 3 - Primary delay filter time constant	0	ms
1313	PTD020	AI3OF	Analog input ch. 3 - Offset voltage setting	0	mV
1314	PTD021	*AI3SH	Analog input ch. 3 - Scaling function - Upper limit setting	20000	—
1315	PTD022	*AI3SL	Analog input ch. 3 - Scaling function - Lower limit setting	-20000	—
1316	PTD023	*AI3SF	Analog input ch. 3 - Scaling function - Shift amount setting	0	—
1317	PTD024	—	For manufacturer setting	0000h	—
1318	PTD025			0000h	
1319	PTD026	*AI4F2	Analog input ch. 4 - Function selection 2	0000h	—
131A	PTD027	*AI4FT	Analog input ch. 4 - Primary delay filter time constant	0	ms
131B	PTD028	AI4OF	Analog input ch. 4 - Offset voltage setting	0	mV
131C	PTD029	*AI4SH	Analog input ch. 4 - Scaling function - Upper limit setting	20000	—
131D	PTD030	*AI4SL	Analog input ch. 4 - Scaling function - Lower limit setting	-20000	—
131E	PTD031	*AI4SF	Analog input ch. 4 - Scaling function - Shift amount setting	0	—
131F	PTD032	—	For manufacturer setting	0000h	—
1320	PTD033			0000h	
1321	PTD034	AO1OF	Analog output ch. 1 - Offset	0	mV
1322	PTD035	*AO1SH	Analog output ch. 1 - Scaling function - Upper limit setting	20000	—
1323	PTD036	*AO1SL	Analog output ch. 1 - Scaling function - Lower limit setting	-20000	—
1324	PTD037	*AO1SF	Analog output ch. 1 - Scaling function - Shift amount setting	0	—
1325	PTD038	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
1328	PTD041			0000h	
1329	PTD042	AO2OF	Analog output ch. 2 - Offset	0	mV
132A	PTD043	*AO2SH	Analog output ch. 2 - Scaling function - Upper limit setting	20000	—
132B	PTD044	*AO2SL	Analog output ch. 2 - Scaling function - Lower limit setting	-20000	—

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
132C	PTD045	*AO2SF	Analog output ch. 2 - Scaling function - Shift amount setting	0	—
132D	PTD046	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
1330	PTD049			0000h	
1331	PTD050	AO3OF	Analog output ch. 3 - Offset	0	mV
1332	PTD051	*AO3SH	Analog output ch. 3 - Scaling function - Upper limit setting	20000	—
1333	PTD052	*AO3SL	Analog output ch. 3 - Scaling function - Lower limit setting	-20000	—
1334	PTD053	*AO3SF	Analog output ch. 3 - Scaling function - Shift amount setting	0	
1335	PTD054	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
1338	PTD057			0000h	
1339	PTD058	AO4OF	Analog output ch. 4 - Offset	0	mV
133A	PTD059	*AO4SH	Analog output ch. 4 - Scaling function - Upper limit setting	20000	—
133B	PTD060	*AO4SL	Analog output ch. 4 - Scaling function - Lower limit setting	-20000	—
133C	PTD061	*AO4SF	Analog output ch. 4 - Scaling function - Shift amount setting	0	—
133D	PTD062	—	For manufacturer setting	0000h	—
133E	PTD063			⋮	
133F	PTD064			0000h	
1340	PTD065	*AIAVF	Analog input averaging - Signal selection	0000h	—
1341	PTD066	—	For manufacturer setting	0000h	—
1342	PTD067	*AIAV1C1	Analog input average 1 - Ch. 1 weighting	1	—
1343	PTD068	*AIAV1C2	Analog input average 1 - Ch. 2 weighting	1	—
1344	PTD069	*AIAV1C3	Analog input average 1 - Ch. 3 weighting	1	—
1345	PTD070	*AIAV1C4	Analog input average 1 - Ch. 4 weighting	1	—
1346	PTD071	*AIAV2C1	Analog input average 2 - Ch. 1 weighting	1	—
1347	PTD072	*AIAV2C2	Analog input average 2 - Ch. 2 weighting	1	—
1348	PTD073	*AIAV2C3	Analog input average 2 - Ch. 3 weighting	1	—
1349	PTD074	*AIAV2C4	Analog input average 2 - Ch. 4 weighting	1	—
134A	PTD075	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
137F	PTD128			0000h	

Sensing encoder I/F module parameters

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
1380	PTE001	—	For manufacturer setting	0003h	—
⋮	⋮			⋮	
1387	PTE008			0000h	
1388	PTE009	**ENCA	Ch. A function selection	0000h	—
1389	PTE010	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
13A3	PTE036			0000h	
13A4	PTE037	**SECA1	SSI - Ch. A function setting 1	2000h	—
13A5	PTE038	**SECA2	SSI - Ch. A function setting 2	0000h	—
13A6	PTE039	**SECA3	SSI - Ch. A function setting 3	0000h	—
13A7	PTE040	**SECA4	SSI - Ch. A function setting 4	0000h	—
13A8	PTE041	**SECA5	SSI - Ch. A function setting 5	0000h	—
13A9	PTE042	**SECA6	SSI - Ch. A function setting 6	0000h	—
13AA	PTE043	**SDPLA	Ch. A position variation error threshold - Lower	0000h	—
13AB	PTE044	**SDPHA	Ch. A position variation error threshold - Upper	0000h	—

Parameter No.	Sensing module parameter No.	Symbol	Name	Initial value	Unit
13AC	PTE045	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
13BF	PTD064			0000h	
13C0	PTE065	**ENCB	Ch. B function selection	0000h	—
13C1	PTE066	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
13DB	PTE092			0000h	
13DC	PTE093	**SECB1	SSI - Ch. B function setting 1	2000h	—
13DD	PTE094	**SECB2	SSI - Ch. B function setting 2	0000h	—
13DE	PTE095	**SECB3	SSI - Ch. B function setting 3	0000h	—
13DF	PTE096	**SECB4	SSI - Ch. B function setting 4	0000h	—
13E0	PTE097	**SECB5	SSI - Ch. B function setting 5	0000h	—
13E1	PTE098	**SECB6	SSI - Ch. B function setting 6	0000h	—
13E2	PTE099	**SDPLB	Ch. B position variation error threshold - Lower	0000h	—
13E3	PTE100	**SDPHB	Ch. B position variation error threshold - Upper	0000h	—
13E4	PTE101	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
13FF	PTE128			0000h	

11.5 RIO Control Parameters

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 0011h	■■■□ (Control station) Set "1: Controlled" when controlling the remote I/O module. • 0: Not controlled • 1: Controlled ■■□■ (Remote I/O disconnect) Set "1: Valid" when not communicating with the remote I/O. When setting "1" with "Control station", the operation without the remote I/O (simulation) is available. • 0: Invalid • 1: Valid
0201	OPC2	Control option 2	0000h	—	0000h to 0001h	■■■□ (RI control at communication error) Set input device control at communication error (system error E401H to E407H). • 0: All points OFF • 1: Maintain status
0202	*UTALC	Station No. assignment	0001h	—	[MC200] 0000h to 011Fh [MC300] 0000h to 013Fh	■■□□ (Remote I/O station No.) Set the remote I/O station No. to be assigned to the station No. on the position board. • 00h: No station No. assignment • 15h to 18h: Station No. [MC200] • 31h to 38h: Station No. [MC300] <Example> 16h Remote I/O No. 22 ■□■■ (Remote I/O line No.) Set the remote I/O line No. to be assigned to the station No. on the position board. • 0 to 1: Line No. -1
0203	ITM	Interrupt condition	0000h	—	0000h to FFFFh	Set interrupt condition.
0204 ⋮ 020F	—	For manufacturer setting	0 ⋮ 0	—	—	—
0210	*BDIO	Input bit device points	0000h	—	0000h to 0200h	Set the points used for input bit device. (Only a multiple of 16 can be selected.) • 0000h to 0200h: 0 to 512
0211	*BDINA	Input bit device start No.	0000h	—	[MC200] 0000h to 0FF0h [MC300] 0000h to 2FF0h	Set the start of the input bit device No. assigned to RX. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. (Only a multiple of 16 can be selected.) [When using "1: Use I/O device table (MR-MC2_ _ method)"] • 0000h to 0FF0h: DVI_000 to DVI_FF0 [When using "2: Use I/O device table (expanded points method)"] [MC300] • 0000h to 23F0h: DVI_000 to DVI_23F0 <Example> When the input points are 64, and input bit device 020 is specified as the start Assign input bit devices DVI_020 to DVI_05F.
0212	*WDIO	Input word device points	0000h	—	0000h to 0020h	Set the points used for input word device. (The size used is 1 word × set value) • 0000h to 0020h: 0 to 32
0213	*WDINA	Input word device start No.	0000h	—	[MC200] 0000h to 00FFh [MC300] 0000h to 02FFh	Set the start of the input word device No. assigned to RWr. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. [When using "1: Use I/O device table (MR-MC2_ _ method)"] • 0000h to 00FFh: Input word device 00 to input word device FF [When using "2: Use I/O device table (expanded points method)"] [MC300] • 0000h to 023Fh: Input word device 00 to input word device 23F <Example> When the input points are 2, and input word device 06 is specified as the start Assign input word devices 06 to 07.

Parameter No.	Symbol	Name	Initial value	Unit	Setting range	Description
0214	*BDOO	Output bit device points	0000h	—	0000h to 0200h	Set the points used for output bit device. (Only a multiple of 16 can be selected.) • 0000h to 0200h: 0 to 512
0215	*BDONA	Output bit device start No.	0000h	—	[MC200] 0000h to 0FF0h [MC300] 0000h to 2FF0h	Set the start of the output bit device No. assigned to RY. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. (Only a multiple of 16 can be selected.) [When using "1: Use I/O device table (MR-MC2_ _ method)"] • 0000h to 0FF0h: DVO_000 to DVO_FF0 [When using "2: Use I/O device table (expanded points method)"] [MC300] • 0000h to 23F0h: DVO_000 to DVO_23F0 <Example> When the output points are 64, and output bit device 040 is specified as the start Assign the 64 points of DVO_040 to DVO_07F.
0216	*WDOO	Output word device points	0000h	—	0000h to 0020h	Set the points used for output word device. (The size used is 1 word × set value) • 0000h to 0020h: 0 to 32
0217	*WDONA	Output word device start No.	0000h	—	[MC200] 0000h to 00FFh [MC300] 0000h to 02FFh	Set the start of the output word device No. assigned to RWw. The setting varies according to "I/O table selection" of "I/O table (parameter No.004A)" setting. [When using "1: Use I/O device table (MR-MC2_ _ method)"] • 0000h to 00FFh: Output word device 00 to output word device FF [When using "2: Use I/O device table (expanded points method)"] [MC300] • 0000h to 023Fh: Output word device 00 to output word device 23F <Example> When the output points are 2, and output word device 08 is specified as the start Assign output word devices 08 to 09.
0218	—	For manufacturer setting	0	—	—	—
⋮			⋮			
021C			0			
021D	*VEND	Vender ID	0000h	—	0000h to FFFFh	Set the vendor ID. • 0000h: Mitsubishi Electric
021E	*CODE	Type code	3000h	—	0000h to FFFFh	Set the type code. • 3000h: SSCNETⅢ/H head module • 3010h: Sensing SSCNETⅢ/H head module • 3011h: Sensing SSCNETⅢ/H head module + Sensing I/O module • 3012h: Sensing SSCNETⅢ/H head module + Sensing pulse I/O module • 3013h: Sensing SSCNETⅢ/H head module + Sensing analog I/O module • 3014h: Sensing SSCNETⅢ/H head module + Sensing encoder I/F module • 3021h: Sensing I/O module • 3022h: Sensing pulse I/O module • 3023h: Sensing analog I/O module • 3024h: Sensing encoder I/F module
021F	—	For manufacturer setting	0	—	—	—
⋮			⋮			
023F			0			

Point

When a value other than a multiple of 16 is set to parameters where only a multiple of 16 can be set, "Parameter Error (RIO control alarm 37H, detail 01H)" occurs at system startup.

12 MONITOR No.

12.1 Servo Information (1)

Monitor No. (hexadecimal)	Content	Unit	Remarks
0100	Unit type name	—	Hexadecimal ASCII character string (2 Characters per monitor No.)
0101			
0102			
0103			
0104			
0105			
0106			
0107			
0108	Software No.	—	Hexadecimal ASCII character string (2 Characters per monitor No.)
0109			
010A			
010B			
010C			
010D			
010E			
010F			
0110	Type code	—	• 1000h: MR-J4(W_)-_B • 1400h: MR-J5(W_)-_B [MC300] • 3015h: Sensing SSCNETⅢ/H head module + Sensing pulse I/O module (axis mode) • 3025h: Sensing pulse I/O module (axis mode)
0111	Vender ID	—	0000h: Mitsubishi Electric
0112	Motor rated revolution speed	r/min	—
0113	Motor rated current	0.1%	—
0114	Motor maximum revolution speed	r/min	—
0115	Motor maximum torque	0.1%	—
0116	Number of encoder pulses per revolution (lower)	pulse	—
0117	Number of encoder pulses per revolution (upper)		—
0118	For manufacturer setting	—	—
0119	Initial within 1 revolution position (lower)	pulse	—
011A	Initial within 1 revolution position (upper)		—
011B	Initial multiple revolution data	rev	—
011C	For manufacturer setting	—	—
⋮			
011F			
0120	Motor permissible pulse rate (lower)	kpps	Pulse rate of operation at the motor maximum revolution speed.
0121	Motor permissible pulse rate (upper)		
0122	Maximum output pulse rate (lower)	kpps	Maximum pulse rate that can be output by the position board.
0123	Maximum output pulse rate (upper)		
0124	For manufacturer setting	—	—
0125			
0126			

Monitor No. (hexadecimal)	Content	Unit	Remarks
0127	Station No. in order of connection	—	■□□□ (Station No. in order of connection on line) Indicate the place where the station is connected from the position board. Axes and stations are both included in the connection order. □■■■ (Line No.) • 0: Line 1 • 1: Line 2 <Example> Monitor value for the axis connected fifth on line 2 1005h
0128	For manufacturer setting	—	—
⋮			
012F			

12.2 Servo Information (2)

Monitor No. (hexadecimal)	Content	Unit	Remarks
0200	Position feedback (lower)	pulse	When using a sensing pulse I/O module, when there is no feedback pulse input, the position output to the driver by the sensing pulse I/O module is returned.
0201	Position feedback (upper)		
0202	For manufacturer setting	—	—
0203			
0204	Position droop (lower)	pulse	—
0205	Position droop (upper)		
0206	For manufacturer setting	—	—
0207			
0208	Speed feedback (lower)	0.01r/min	—
0209	Speed feedback (upper)		
020A	Electrical current command	0.1%	—
020B	Electrical current feedback	0.1%	—
020C	For manufacturer setting	—	—
020D			
020E	Detector within 1 revolution position (lower)	pulse	—
020F	Detector within 1 revolution position (upper)		
0210	Home position within 1 revolution position (lower)	pulse	—
0211	Home position within 1 revolution position (upper)		
0212	ZCT (lower)	pulse	—
0213	ZCT (upper)		
0214	Multiple revolution counter	rev	—
0215	Home position multiple revolution data	rev	—
0216	Speed command (lower)	0.01r/min	0.01mm/s for linear servo motor
0217	Speed command (upper)		
0218	For manufacturer setting	—	—
⋮			
023F			
0240	Selected droop pulse (lower)	pulse	Select in the parameter when using the fully closed loop control (motor side/load side/motor side - load side)
0241	Selected droop pulse (upper)		
0242	For manufacturer setting	—	—
0243			
0244	Selected cumulative feed pulses (lower)	pulse	Select in the parameter when using the fully closed loop control (motor side/load side)
0245	Selected cumulative feed pulses (upper)		
0246	Load side encoder information data 1 (lower)	pulse	When using the linear servo/fully closed loop control
0247	Load side encoder information data 1 (upper)		
0248	Load side encoder information data 2 (lower)	—	When using the linear servo/fully closed loop control
0249	Load side encoder information data 2 (upper)		
024A	Speed feedback (lower)	0.01mm/s	When using a linear servo
024B	Speed feedback (upper)		
024C	Voltage of generating line	V	—
024D	Regenerative load factor	%	—

Monitor No. (hexadecimal)	Content	Unit	Remarks
024E	Effective load factor	%	—
024F	Peak load factor	%	—
0250	Estimated load inertial ratio	0.1 times	—
0251	Position gain (model position gain)	rad/s	—
0252	Motor thermistor temperature	℃	When using a motor with thermistor attached.
0253	For manufacturer setting	—	—
⋮			
0260			
0261	Alarm/warning No.	—	—
0262	Alarm detailed bits	—	—
0263	For manufacturer setting	—	—
0264	Alarm status AL-1 □	—	□: 0 (bit0) to F (bit15) Bit corresponding to alarm No. is turned ON. Review the alarms when multiple alarms occur simultaneously etc.
0265	Alarm status AL-2 □		
0266	Alarm status AL-3 □		
0267	Alarm status AL-4 □		
0268	Alarm status AL-5 □		
0269	Alarm status AL-6 □		
026A	Alarm status AL-7 □		
026B	Alarm status AL-8 □		
026C	Alarm status AL-9 □		
026D	Alarm status AL-E □		
026E	Alarm status AL-F □		
026F	Alarm status AL-A □		
0270	Alarm/warning No. 3 digits display No.	—	—
0271	For manufacturer setting	—	—
⋮			
029F			
02A0	Module power consumption	W	—
02A1	For manufacturer setting	—	—
02A2	Module cumulative power consumption (lower)	Wh	—
02A3	Module cumulative power consumption (upper)		
02A4	For manufacturer setting	—	—
02A5			
02A6			
02A7	Internal temperature of encoder	℃	—
02A8	Torques corresponding to disturbance	0.1%	Thrust corresponding to disturbance when using the linear
02A9	Instantaneous torque	0.1%	Instantaneous thrust when using the linear
02AA	Overload alarm margin	0.1%	—
02AB	Error excessive alarm margin	16pulse	—
02AC	Settle time	ms	—
02AD	Overshoot amount	pulse	—
02AE	Motor side/load side position deviation (lower)	pulse	When using the fully closed loop control
02AF	Motor side/load side position deviation (upper)		
02B0	Motor side/load side speed deviation (lower)	0.01r/min	When using the fully closed loop control
02B1	Motor side/load side speed deviation (upper)		

Monitor No. (hexadecimal)	Content	Unit	Remarks
02B2	Module power consumption (double word) (lower)	W	—
02B3	Module power consumption (double word) (upper)		
02B4	For manufacturer setting	—	—
⋮			
02CF			

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12.3 RIO Information

Monitor No. (hexadecimal)	Content	Unit	Remarks
0100	For manufacturer setting	—	—
⋮			
010F			
0110	Type code	—	• 3000h: SSCNETⅢ/H head module • 3010h: Sensing SSCNETⅢ/H head module • 3011h: Sensing SSCNETⅢ/H head module + Sensing I/O module • 3012h: Sensing SSCNETⅢ/H head module + Sensing pulse I/O module • 3013h: Sensing SSCNETⅢ/H head module + Sensing analog I/O module • 3014h: Sensing SSCNETⅢ/H head module + Sensing encoder I/F module • 3021h: Sensing I/O module • 3022h: Sensing pulse I/O module • 3023h: Sensing analog I/O module • 3024h: Sensing encoder I/F module
0011	Vendor ID	—	0000h: Mitsubishi Electric
0012	For manufacturer setting	—	—
⋮			
0126			
0127	Station No. in order of connection	—	■□□□ (Station No. in order of connection on line) Indicate the place where the station is connected from the position board. Axes and stations are both included in the connection order. □■■■ (Line No.) • 0: Line 1 • 1: Line 2 <Example> Monitor value for the axis connected fifth on line 2 1005h
0128	For manufacturer setting	—	—
⋮			
0143			
0144	Number of pulses per revolution CH1 (lower)	pulse	—
0145	Number of pulses per revolution CH1 (upper)		
0146	Multiple revolution counter maximum value CH1 (lower)	rev	—
0147	Multiple revolution counter maximum value CH1 (upper)		
0148	For manufacturer setting	—	—
⋮			
014B			
014C	Number of pulses per revolution CH2 (lower)	pulse	—
014D	Number of pulses per revolution CH2 (upper)		
014E	Multiple revolution counter maximum value CH2 (lower)	rev	—
014F	Multiple revolution counter maximum value CH2 (upper)		
0150	Cycle counter at power supply ON CH1	rev	—
0151	For manufacturer setting	—	—
0152			
0153	Multiple revolution counter at power supply ON CH1	rev	—
0154	For manufacturer setting	—	—
0155	Cycle counter at power supply ON CH2	rev	—
0156	For manufacturer setting	—	—
0157			

Monitor No. (hexadecimal)	Content	Unit	Remarks
0158	Multiple revolution counter at power supply ON CH2	rev	—
0159	For manufacturer setting	—	—
⋮			
015F			

12

12.4 Operation Information

Monitor No. (hexadecimal)	Content	Unit	Remarks
0300	Current command position (lower)	Command units	Current command position prior to electronic gear processing
0301	Current command position (upper)		
0302	Current feedback position (lower)	Command units	Current feedback position prior to electronic gear processing
0303	Current feedback position (upper)		
0304	Moving speed (lower)	Speed units	Current speed output to servo amplifier
0305	Moving speed (upper)		
0306	Remaining distance to move (lower)	Command units	Distance from current command position to end point when in automatic operation
0307	Remaining distance to move (upper)		
0308	Grid size (lower)	pulse	Distance from standard position of return to home position (end of dog etc.) to the Z-phase For the home position return method which does not use the Z-phase, 0 is displayed.
0309	Grid size (upper)		
030A	Operation point No.	—	Value equal to operation point number + 1 is displayed. 0 is displayed while stopped.
030B	Remaining dwell time	ms	—
030C	For manufacturer setting	—	—
⋮			
030F			
0310	Current command position (lower)	pulse	Current command position after electronic gear processing
0311	Current command position (upper)		
0312	Current feedback position (lower)	pulse	Current feedback position after electronic gear processing
0313	Current feedback position (upper)		
0314	FΔT (lower)	pulse	Movement amount per control cycle
0315	FΔT (upper)		
0316	Feedback moving speed (lower)	Speed units	The feedback speed converted from the difference of the current feedback position (after electronic gear processing)
0317	Feedback moving speed (upper)		
0318	For manufacturer setting	—	—
⋮			
031F			
0320	External signal status	—	• Bit0: LSP • Bit1: LSN • Bit2: DOG*1
0321	For manufacturer setting	—	—
0322			
0323			
0324	Speed command (lower)	0.01r/min	Notify the speed command during speed control.
0325	Speed command (upper)	0.01r/min	
0326	Torque command	0.1%	Notify the torque command during torque control.
0327	For manufacturer setting	—	—
⋮			
032F			
0330	Control parameter error No.0200H to 020FH		Bit corresponding to parameter No. is turned ON. Bit is No.0200 (bit0) to 020F (bit15).
0331	Control parameter error No.0210H to 021FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0210 (bit0) to 021F (bit15).
0332	Control parameter error No.0220H to 022FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0220 (bit0) to 022F (bit15).
0333	Control parameter error No.0230H to 023FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0230 (bit0) to 023F (bit15).
0334	Control parameter error No.0240H to 024FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0240 (bit0) to 024F (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
0335	Control parameter error No.0250H to 025FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0250 (bit0) to 025F (bit15).
0336	Control parameter error No.0260H to 026FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0260 (bit0) to 026F (bit15).
0337	Control parameter error No.027H0 to 027FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0270 (bit0) to 027F (bit15).
0338	Control parameter error No.0280H to 028FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0280 (bit0) to 028F (bit15).
0339	Control parameter error No.0290H to 029FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0290 (bit0) to 029F (bit15).
033A	Control parameter error No.02A0H to 02AFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.02A0 (bit0) to 02AF (bit15).
033B	Control parameter error No.02B0H to 02BFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.02B0 (bit0) to 02BF (bit15).
033C	Control parameter error No.02C0H to 02CFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.02C0 (bit0) to 02CF (bit15).
033D	Control parameter error No.02D0H to 02DFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.02D0 (bit0) to 02DF (bit15).
033E	Control parameter error No.02E0H to 02EFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.02E0 (bit0) to 02EF (bit15).
033F	Control parameter error No.02F0H to 02FFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.02F0 (bit0) to 02FF (bit15).
0340 ⋮ 037F	For manufacturer setting	—	—
0380	Axis data command bit 1	—	Use these when sampling the axis data command bit. For details, refer to the following. ☞ Page 414 Sampling items
0381	Axis data command bit 2		
0382	Axis data command bit 3		
0383	Axis data command bit 4		
0384	Axis data command bit 5		
0385	Axis data command bit 6		
0386	Axis data command bit 7		
0387	Axis data command bit 8		
0388 ⋮ 039F	For manufacturer setting	—	—
03A0	Axis data status bit 1	—	Use these when sampling the axis data status bit. For details, refer to the following. ☞ Page 414 Sampling items
03A1	Axis data status bit 2		
03A2	Axis data status bit 3		
03A3	Axis data status bit 4		
03A4	Axis data status bit 5		
03A5	Axis data status bit 6		
03A6	Axis data status bit 7		
03A7	Axis data status bit 8		
03A8 ⋮ 03BF	For manufacturer setting	—	—

*1 0: I/O input signal OFF, 1: I/O input signal ON is indicated.

12.5 Operation Information (Double Word)

Monitor No. (hexadecimal)	Content	Unit	Remarks
1300	Current command position	Command units	Command position prior to electronic gear processing
1302	Current feedback position	Command units	Current feedback position prior to electronic gear processing
1304	Moving speed	Speed units	Command speed output to servo amplifier
1306	Remaining distance to move	Command units	Distance from current command position to end point when in automatic operation
1308	Grid size	pulse	Distance from standard position of return to home position (end of dog etc.) to the Z-phase. For the home position return method which does not use the Z-phase, 0 is displayed.
130A ⋮ 130E	For manufacturer setting	—	—
1310	Current command position	pulse	Command position after electronic gear processing
1312	Current feedback position	pulse	Current feedback position after electronic gear processing
1314	F△T	pulse	Movement amount per control cycle
1316	Feedback moving speed	Speed units	The feedback speed converted from the difference of the current feedback position (after electronic gear processing)
1318 ⋮ 1322	For manufacturer setting	—	—
1324	Speed command	0.01r/min	Notify the speed command during speed control.
1326 ⋮ 1356	For manufacturer setting	—	—

12.6 RIO Control Information

Monitor No. (hexadecimal)	Content	Unit	Remarks
0300 ⋮ 032F	For manufacturer setting	—	—
0330	RIO Control parameter error No.0200H to 020FH	—	Bit corresponding to parameter error No. is turned ON. Bit is No.0200 (bit0) to 020F (bit15).
0331	RIO Control parameter error No.0210H to 021FH	—	Bit corresponding to parameter error No. is turned ON. Bit is No.0210 (bit0) to 021F (bit15).
0332	RIO Control parameter error No.0220H to 022FH	—	Bit corresponding to parameter error No. is turned ON. Bit is No.0220 (bit0) to 022F (bit15).
0333	RIO Control parameter error No.0230H to 023FH	—	Bit corresponding to parameter error No. is turned ON. Bit is No.0230 (bit0) to 023F (bit15).
0334 ⋮ 033F	For manufacturer setting	—	—

Point

Information concerning "Parameter Error (RIO control alarm 37H, detail 01H)" that has occurred at system startup can be monitored.

12.7 System Information

Monitor No. (hexadecimal)	Content	Unit	Remarks
0400	For manufacturer setting	—	—
0401	Cause of forced stop[*1]	—	• Bit0: External forced stop • Bit1: Software forced stop • Bit2: User watchdog • Bit3: Communication error • Bit4: An axis that has not been mounted exists • Bit5: During reboot preparation • Bit6: System error E5□□H occurrence
0402	For manufacturer setting	—	—
⋮			
0409			
040A	Parameter backup times	Times	Display the times of write accesses to flash ROM by the parameter backups after system preparation is completed.
040B	For manufacturer setting	—	—
⋮			
040F			
0410	System parameter error No.0001H to 000FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0001 (bit1) to 000F (bit15).
0411	System parameter error No.0010H to 001FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0010 (bit0) to 001F (bit15).
0412	System parameter error No.0020H to 002FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0020 (bit0) to 002F (bit15).
0413	System parameter error No.0030H to 003FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0030 (bit0) to 003F (bit15).
0414	System parameter error No.0040H to 004FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0040 (bit0) to 004F (bit15).
0415	System parameter error No.0050H to 005FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0050 (bit0) to 005F (bit15).
0416	System parameter error No.0060H to 006FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0060 (bit0) to 006F (bit15).
0417	System parameter error No.0070H to 007FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0070 (bit0) to 007F (bit15).
0418	For manufacturer setting	—	—
⋮			
047F			
0480	Information concerning axis that is not mounted 1 (For driver)	—	When "An Axis That Has Not Been Mounted Exists (system error E400H)" is set, this bit is turned ON. Axis 1 (bit0) to axis 16 (bit15)
0481	Information concerning Axis that is not mounted 2 (For driver)	—	When "An Axis That Has Not Been Mounted Exists (system error E400H)" is set, this bit is turned ON. Axis 17 (bit0) to axis 32 (bit15)
0482	Information concerning Axis that is not mounted 3 (For driver) [MC300]	—	When "An Axis That Has Not Been Mounted Exists (system error E400H)" is set, this bit is turned ON. Axis 33 (bit0) to axis 48 (bit15)
0483	Information concerning Axis that is not mounted 4 (For driver) [MC300]	—	When "An Axis That Has Not Been Mounted Exists (system error E400H)" is set, this bit is turned ON. Axis 49 (bit0) to axis 64 (bit15)
0484	Type code erroneous axis information 1 (For driver)	—	When "Driver Type Code Error (system error E405H)" is set, this bit is turned ON. Axis 1 (bit0) to axis 16 (bit15)
0485	Type code erroneous axis information 2 (For driver)	—	When "Driver Type Code Error (system error E405H)" is set, this bit is turned ON. Axis 17 (bit0) to axis 32 (bit15)
0486	Type code erroneous axis information 3 (For driver) [MC300]	—	When "Driver Type Code Error (system error E405H)" is set, this bit is turned ON. Axis 33 (bit0) to axis 48 (bit15)

Monitor No. (hexadecimal)	Content	Unit	Remarks
0487	Type code erroneous axis information 4 (For driver) [MC300]	—	When "Driver Type Code Error (system error E405H)" is set, this bit is turned ON. Axis 49 (bit0) to axis 64 (bit15)
0488	Electronic gear setting error axis information 1	—	When "Electronic gear setting error (system error E500H)" is set, this bit is turned ON. Axis 1 (bit0) to axis 16 (bit15)
0489	Electronic gear setting error axis information 2	—	When "Electronic gear setting error (system error E500H)" is set, this bit is turned ON. Axis 17 (bit0) to axis 32 (bit15)
048A	Electronic gear setting error axis information 3 [MC300]	—	When "Electronic gear setting error (system error E500H)" is set, this bit is turned ON. Axis 33 (bit0) to axis 48 (bit15)
048B	Electronic gear setting error axis information 4 [MC300]	—	When "Electronic gear setting error (system error E500H)" is set, this bit is turned ON. Axis 49 (bit0) to axis 64 (bit15)
048C ⋮ 04BF	For manufacturer setting	—	—
04C0	Information concerning station that is not mounted (For module)	—	When "An Axis That Has Not Been Mounted Exists (system error E400H)" is set, this bit is turned ON. • Station 1 (bit0) to station 4 (bit3) [MC200] • Station 1 (bit0) to station 16 (bit15) [MC300]
04C1	Type code erroneous station information (For module)	—	When "Driver Type Code Error (system error E405H)" is set, this bit is turned ON. • Station 1 (bit0) to station 4 (bit3) [MC200] • Station 1 (bit0) to station 16 (bit15) [MC300]
04C2 ⋮ 04FF	For manufacturer setting	—	—

*1 The bit for the corresponding forced stop factor is turned ON.

12.8 Servo Parameter Information

Servo parameter information of MR-J4(W_)-_B

Servo parameter error No.

Monitor No. (hexadecimal)	Content	Unit	Remarks
0500 ⋮ 050F	For manufacturer setting	—	—
0510	Servo parameter error No.1100H to 110FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1100 (bit0) to 110F (bit15).
0511	Servo parameter error No.1110H to 111FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1110 (bit0) to 111F (bit15).
0512	Servo parameter error No.1120H to 112FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1120 (bit0) to 112F (bit15).
0513	Servo parameter error No.1130H to 113FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1130 (bit0) to 113F (bit15).
0514	Servo parameter error No.1140H to 114FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1140 (bit0) to 114F (bit15).
0515	Servo parameter error No.1150H to 115FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1150 (bit0) to 115F (bit15).
0516	Servo parameter error No.1160H to 116FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1160 (bit0) to 116F (bit15).
0517	Servo parameter error No.1170H to 117FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1170 (bit0) to 117F (bit15).
0518	Servo parameter error No.1180H to 118FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1180 (bit0) to 118F (bit15).
0519	Servo parameter error No.1190H to 119FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1190 (bit0) to 119F (bit15).
051A	Servo parameter error No.11A0H to 11AFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.11A0 (bit0) to 11AF (bit15).
051B	Servo parameter error No.11B0H to 11BFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.11B0 (bit0) to 11BF (bit15).
051C	Servo parameter error No.11C0H to 11CFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.11C0 (bit0) to 11CF (bit15).
051D	Servo parameter error No.11D0H to 11DFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.11D0 (bit0) to 11DF (bit15).
051E	Servo parameter error No.11E0H to 11EFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.11E0 (bit0) to 11EF (bit15).
051F	Servo parameter error No.11F0H to 11FFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.11F0 (bit0) to 11FF (bit15).
0520	Servo parameter error No.1200H to 120FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1200 (bit0) to 120F (bit15).
0521	Servo parameter error No.1210H to 121FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1210 (bit0) to 121F (bit15).
0522	Servo parameter error No.1220H to 122FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1220 (bit0) to 122F (bit15).
0523	Servo parameter error No.1230H to 123FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1230 (bit0) to 123F (bit15).
0524	Servo parameter error No.1240H to 124FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1240 (bit0) to 124F (bit15).
0525	Servo parameter error No.1250H to 125FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1250 (bit0) to 125F (bit15).
0526	Servo parameter error No.1260H to 126FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1260 (bit0) to 126F (bit15).
0527	Servo parameter error No.1270H to 127FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1270 (bit0) to 127F (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
0528	Servo parameter error No.1280H to 128FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1280 (bit0) to 128F (bit15).
0529	Servo parameter error No.1290H to 129FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1290 (bit0) to 129F (bit15).
052A	Servo parameter error No.12A0H to 12AFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.12A0 (bit0) to 12AF (bit15).
052B	Servo parameter error No.12B0H to 12BFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.12B0 (bit0) to 12BF (bit15).
052C	Servo parameter error No.12C0H to 12CFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.12C0 (bit0) to 12CF (bit15).
052D	Servo parameter error No.12D0H to 12DFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.12D0 (bit0) to 12DF (bit15).
052E	Servo parameter error No.12E0H to 12EFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.12E0 (bit0) to 12EF (bit15).
052F	Servo parameter error No.12F0H to 12FFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.12F0 (bit0) to 12FF (bit15).
0530	Servo parameter error No.1300H to 130FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1300 (bit0) to 130F (bit15).
0531	Servo parameter error No.1310H to 131FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1310 (bit0) to 131F (bit15).
0532	Servo parameter error No.1320H to 132FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1320 (bit0) to 132F (bit15).
0533	Servo parameter error No.1330H to 133FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1330 (bit0) to 133F (bit15).
0534	Servo parameter error No.1340H to 134FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1340 (bit0) to 134F (bit15).
0535	Servo parameter error No.1350H to 135FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1350 (bit0) to 135F (bit15).
0536	Servo parameter error No.1360H to 136FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1360 (bit0) to 136F (bit15).
0537	Servo parameter error No.1370H to 137FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.1370 (bit0) to 137F (bit15).
0538 ⋮ 054F	For manufacturer setting	—	—

Point

Information concerning the servo alarm [AL. 37_Parameter error] that has occurred at system startup can be monitored. If the servo alarm [AL. E4_Parameter warning] occurs when the parameter is written while system is running, it is not reflected in this information.

Servo parameter change No.

Monitor No. (hexadecimal)	Content	Unit	Remarks
0580 ⋮ 058F	For manufacturer setting	—	—
0590	Servo parameter change No.1100 to 110F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1100 (bit0) to 110F (bit15).
0591	Servo parameter change No.1110 to 111F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1110 (bit0) to 111F (bit15).
0592	Servo parameter change No.1120 to 112F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1120 (bit0) to 112F (bit15).
0593	Servo parameter change No.1130 to 113F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1130 (bit0) to 113F (bit15).
0594	Servo parameter change No.1140 to 114F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1140 (bit0) to 114F (bit15).
0595	Servo parameter change No.1150 to 115F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1150 (bit0) to 115F (bit15).
0596	Servo parameter change No.1160 to 116F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1160 (bit0) to 116F (bit15).
0597	Servo parameter change No.1170 to 117F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1170 (bit0) to 117F (bit15).
0598	Servo parameter change No.1180 to 118F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1180 (bit0) to 118F (bit15).
0599	Servo parameter change No.1190 to 119F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1190 (bit0) to 119F (bit15).
059A	Servo parameter change No.11A0 to 11AF	—	Bit corresponding to parameter No. is turned ON. Bit is No.11A0 (bit0) to 11AF (bit15).
059B	Servo parameter change No.11B0 to 11BF	—	Bit corresponding to parameter No. is turned ON. Bit is No.11B0 (bit0) to 11BF (bit15).
059C	Servo parameter change No.11C0 to 11CF	—	Bit corresponding to parameter No. is turned ON. Bit is No.11C0 (bit0) to 11CF (bit15).
059D	Servo parameter change No.11D0 to 11DF	—	Bit corresponding to parameter No. is turned ON. Bit is No.11D0 (bit0) to 11DF (bit15).
059E	Servo parameter change No.11E0 to 11EF	—	Bit corresponding to parameter No. is turned ON. Bit is No.11E0 (bit0) to 11EF (bit15).
059F	Servo parameter change No.11F0 to 11FF	—	Bit corresponding to parameter No. is turned ON. Bit is No.11F0 (bit0) to 11FF (bit15).
05A0	Servo parameter change No.1200 to 120F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1200 (bit0) to 120F (bit15).
05A1	Servo parameter change No.1210 to 121F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1210 (bit0) to 121F (bit15).
05A2	Servo parameter change No.1220 to 122F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1220 (bit0) to 122F (bit15).
05A3	Servo parameter change No.1230 to 123F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1230 (bit0) to 123F (bit15).
05A4	Servo parameter change No.1240 to 124F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1240 (bit0) to 124F (bit15).
05A5	Servo parameter change No.1250 to 125F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1250 (bit0) to 125F (bit15).
05A6	Servo parameter change No.1260 to 126F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1260 (bit0) to 126F (bit15).
05A7	Servo parameter change No.1270 to 127F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1270 (bit0) to 127F (bit15).
05A8	Servo parameter change No.1280 to 128F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1280 (bit0) to 128F (bit15).
05A9	Servo parameter change No.1290 to 129F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1290 (bit0) to 129F (bit15).
05AA	Servo parameter change No.12A0 to 12AF	—	Bit corresponding to parameter No. is turned ON. Bit is No.12A0 (bit0) to 12AF (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
05AB	Servo parameter change No.12B0 to 12BF	—	Bit corresponding to parameter No. is turned ON. Bit is No.12B0 (bit0) to 12BF (bit15).
05AC	Servo parameter change No.12C0 to 12CF	—	Bit corresponding to parameter No. is turned ON. Bit is No.12C0 (bit0) to 12CF (bit15).
05AD	Servo parameter change No.12D0 to 12DF	—	Bit corresponding to parameter No. is turned ON. Bit is No.12D0 (bit0) to 12DF (bit15).
05AE	Servo parameter change No.12E0 to 12EF	—	Bit corresponding to parameter No. is turned ON. Bit is No.12E0 (bit0) to 12EF (bit15).
05AF	Servo parameter change No.12F0 to 12FF	—	Bit corresponding to parameter No. is turned ON. Bit is No.12F0 (bit0) to 12FF (bit15).
05B0	Servo parameter change No.1300 to 130F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1300 (bit0) to 130F (bit15).
05B1	Servo parameter change No.1310 to 131F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1310 (bit0) to 131F (bit15).
05B2	Servo parameter change No.1320 to 132F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1320 (bit0) to 132F (bit15).
05B3	Servo parameter change No.1330 to 133F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1330 (bit0) to 133F (bit15).
05B4	Servo parameter change No.1340 to 134F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1340 (bit0) to 134F (bit15).
05B5	Servo parameter change No.1350 to 135F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1350 (bit0) to 135F (bit15).
05B6	Servo parameter change No.1360 to 136F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1360 (bit0) to 136F (bit15).
05B7	Servo parameter change No.1370 to 137F	—	Bit corresponding to parameter No. is turned ON. Bit is No.1370 (bit0) to 137F (bit15).
05B8 ⋮ 05BF	For manufacturer setting	—	—

Servo parameter information of MR-J5(W_)-_B [MC300]

Servo parameter error No.

Monitor No. (hexadecimal)	Content	Unit	Remarks
0900	Servo parameter error No. PA.01 to PA.16	—	Bit corresponding to parameter No. is turned ON. Bit is PA.01 (bit0) to 16 (bit15).
0901	Servo parameter error No. PA.17 to PA.32	—	Bit corresponding to parameter No. is turned ON. Bit is PA.17 (bit0) to 32 (bit15).
0902	Servo parameter error No. PA.33 to PA.48	—	Bit corresponding to parameter No. is turned ON. Bit is PA.33 (bit0) to 48 (bit15).
0903	Servo parameter error No. PB.01 to PB.16	—	Bit corresponding to parameter No. is turned ON. Bit is PB.01 (bit0) to 16 (bit15).
0904	Servo parameter error No. PB.17 to PB.32	—	Bit corresponding to parameter No. is turned ON. Bit is PB.17 (bit0) to 32 (bit15).
0905	Servo parameter error No. PB.33 to PB.48	—	Bit corresponding to parameter No. is turned ON. Bit is PB.33 (bit0) to 48 (bit15).
0906	Servo parameter error No. PB.49 to PB.64	—	Bit corresponding to parameter No. is turned ON. Bit is PB.49 (bit0) to 64 (bit15).
0907	Servo parameter error No. PB.65 to PB.80	—	Bit corresponding to parameter No. is turned ON. Bit is PB.65 (bit0) to 80 (bit15).
0908	Servo parameter error No. PB.81 to PB.96	—	Bit corresponding to parameter No. is turned ON. Bit is PB.81 (bit0) to 96 (bit15).
0909	Servo parameter error No. PB.97 to PB.99	—	Bit corresponding to parameter No. is turned ON. Bit is PB.97 (bit0) to 99 (bit2).
090A	Servo parameter error No. PC.01 to PC.16	—	Bit corresponding to parameter No. is turned ON. Bit is PC.01 (bit0) to 16 (bit15).
090B	Servo parameter error No. PC.17 to PC.32	—	Bit corresponding to parameter No. is turned ON. Bit is PC.17 (bit0) to 32 (bit15).
090C	Servo parameter error No. PC.33 to PC.48	—	Bit corresponding to parameter No. is turned ON. Bit is PC.33 (bit0) to 48 (bit15).
090D	Servo parameter error No. PC.49 to PC.64	—	Bit corresponding to parameter No. is turned ON. Bit is PC.49 (bit0) to 64 (bit15).
090E	Servo parameter error No. PC.65 to PC.80	—	Bit corresponding to parameter No. is turned ON. Bit is PC.65 (bit0) to 80 (bit15).
090F	Servo parameter error No. PC.81 to PC.96	—	Bit corresponding to parameter No. is turned ON. Bit is PC.81 (bit0) to 96 (bit15).
0910	Servo parameter error No. PC.97 to PC.99	—	Bit corresponding to parameter No. is turned ON. Bit is PC.97 (bit0) to 99 (bit2).
0911	Servo parameter error No. PD.01 to PD.16	—	Bit corresponding to parameter No. is turned ON. Bit is PD.01 (bit0) to 16 (bit15).
0912	Servo parameter error No. PD.17 to PD.32	—	Bit corresponding to parameter No. is turned ON. Bit is PD.17 (bit0) to 32 (bit15).
0913	Servo parameter error No. PD.33 to PD.48	—	Bit corresponding to parameter No. is turned ON. Bit is PD.33 (bit0) to 48 (bit15).
0914	Servo parameter error No. PD.49 to PD.64	—	Bit corresponding to parameter No. is turned ON. Bit is PD.49 (bit0) to 64 (bit15).
0915	Servo parameter error No. PD.65 to PD.80	—	Bit corresponding to parameter No. is turned ON. Bit is PD.65 (bit0) to 80 (bit15).
0916	Servo parameter error No. PD.81 to PD.96	—	Bit corresponding to parameter No. is turned ON. Bit is PD.81 (bit0) to 96 (bit15).
0917	Servo parameter error No. PD.97 to PD.99	—	Bit corresponding to parameter No. is turned ON. Bit is PD.97 (bit0) to 99 (bit2).
0918	Servo parameter error No. PE.01 to PE.16	—	Bit corresponding to parameter No. is turned ON. Bit is PE.01 (bit0) to 16 (bit15).
0919	Servo parameter error No. PE.17 to PE.32	—	Bit corresponding to parameter No. is turned ON. Bit is PE.17 (bit0) to 32 (bit15).
091A	Servo parameter error No. PE.33 to PE.48	—	Bit corresponding to parameter No. is turned ON. Bit is PE.33 (bit0) to 48 (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
091B	Servo parameter error No. PE.49 to PE.64	—	Bit corresponding to parameter No. is turned ON. Bit is PE.49 (bit0) to 64 (bit15).
091C	Servo parameter error No. PE.65 to PE.80	—	Bit corresponding to parameter No. is turned ON. Bit is PE.65 (bit0) to 80 (bit15).
091D	Servo parameter error No. PE.81 to PE.96	—	Bit corresponding to parameter No. is turned ON. Bit is PE.81 (bit0) to 96 (bit15).
091E	Servo parameter error No. PE.97 to PE.99	—	Bit corresponding to parameter No. is turned ON. Bit is PE.97 (bit0) to 99 (bit2).
091F	Servo parameter error No. PF.01 to PF.16	—	Bit corresponding to parameter No. is turned ON. Bit is PF.01 (bit0) to 16 (bit15).
0920	Servo parameter error No. PF.17 to PF.32	—	Bit corresponding to parameter No. is turned ON. Bit is PF.17 (bit0) to 32 (bit15).
0921	Servo parameter error No. PF.33 to PF.48	—	Bit corresponding to parameter No. is turned ON. Bit is PF.33 (bit0) to 48 (bit15).
0922	Servo parameter error No. PF.49 to PF.64	—	Bit corresponding to parameter No. is turned ON. Bit is PF.49 (bit0) to 64 (bit15).
0923	Servo parameter error No. PF.65 to PF.80	—	Bit corresponding to parameter No. is turned ON. Bit is PF.65 (bit0) to 80 (bit15).
0924	Servo parameter error No. PF.81 to PF.96	—	Bit corresponding to parameter No. is turned ON. Bit is PF.81 (bit0) to 96 (bit15).
0925	Servo parameter error No. PF.97 to PF.99	—	Bit corresponding to parameter No. is turned ON. Bit is PF.97 (bit0) to 99 (bit2).
0926	Servo parameter error No. PO.01 to PO.16	—	Bit corresponding to parameter No. is turned ON. Bit is PO.01 (bit0) to 16 (bit15).
0927	Servo parameter error No. PO.17 to PO.32	—	Bit corresponding to parameter No. is turned ON. Bit is PO.17 (bit0) to 32 (bit15).
0928	Servo parameter error No. PO.33 to PO.48	—	Bit corresponding to parameter No. is turned ON. Bit is PO.33 (bit0) to 48 (bit15).
0929	Servo parameter error No. PO.49 to PO.64	—	Bit corresponding to parameter No. is turned ON. Bit is PO.49 (bit0) to 64 (bit15).
092A	Servo parameter error No. PO.65 to PO.80	—	Bit corresponding to parameter No. is turned ON. Bit is PO.65 (bit0) to 80 (bit15).
092B	Servo parameter error No. PO.81 to PO.96	—	Bit corresponding to parameter No. is turned ON. Bit is PO.81 (bit0) to 96 (bit15).
092C	Servo parameter error No. PO.97 to PO.99	—	Bit corresponding to parameter No. is turned ON. Bit is PO.97 (bit0) to 99 (bit2).
092D	Servo parameter error No. PS.01 to PS.16	—	Bit corresponding to parameter No. is turned ON. Bit is PS.01 (bit0) to 16 (bit15).
092E	Servo parameter error No. PS.17 to PS.32	—	Bit corresponding to parameter No. is turned ON. Bit is PS.17 (bit0) to 32 (bit15).
092F	Servo parameter error No. PS.33 to PS.48	—	Bit corresponding to parameter No. is turned ON. Bit is PS.33 (bit0) to 48 (bit15).
0930	Servo parameter error No. PS.49 to PS.64	—	Bit corresponding to parameter No. is turned ON. Bit is PS.49 (bit0) to 64 (bit15).
0931	Servo parameter error No. PS.65 to PS.80	—	Bit corresponding to parameter No. is turned ON. Bit is PS.65 (bit0) to 80 (bit15).
0932	Servo parameter error No. PS.81 to PS.96	—	Bit corresponding to parameter No. is turned ON. Bit is PS.81 (bit0) to 96 (bit15).
0933	Servo parameter error No. PS.97 to PS.99	—	Bit corresponding to parameter No. is turned ON. Bit is PS.97 (bit0) to 99 (bit2).
0934	Servo parameter error No. PL.01 to PL.16	—	Bit corresponding to parameter No. is turned ON. Bit is PL.01 (bit0) to 16 (bit15).
0935	Servo parameter error No. PL.17 to PL.32	—	Bit corresponding to parameter No. is turned ON. Bit is PL.17 (bit0) to 32 (bit15).
0936	Servo parameter error No. PL.33 to PL.48	—	Bit corresponding to parameter No. is turned ON. Bit is PL.33 (bit0) to 48 (bit15).
0937	Servo parameter error No. PL.49 to PL.64	—	Bit corresponding to parameter No. is turned ON. Bit is PL.49 (bit0) to 64 (bit15).
0938	Servo parameter error No. PL.65 to PL.80	—	Bit corresponding to parameter No. is turned ON. Bit is PL.65 (bit0) to 80 (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
0939	Servo parameter error No. PL.81 to PL.96	—	Bit corresponding to parameter No. is turned ON. Bit is PL.81 (bit0) to 96 (bit15).
093A	Servo parameter error No. PL.97 to PL.99	—	Bit corresponding to parameter No. is turned ON. Bit is PL.97 (bit0) to 99 (bit2).
093B	Servo parameter error No. PU.01 to PU.16	—	Bit corresponding to parameter No. is turned ON. Bit is PU.01 (bit0) to 16 (bit15).
093C	Servo parameter error No. PU.17 to PU.32	—	Bit corresponding to parameter No. is turned ON. Bit is PU.17 (bit0) to 32 (bit15).
093D	Servo parameter error No. PU.33 to PU.48	—	Bit corresponding to parameter No. is turned ON. Bit is PU.33 (bit0) to 48 (bit15).
093E	Servo parameter error No. PU.49 to PU.64	—	Bit corresponding to parameter No. is turned ON. Bit is PU.49 (bit0) to 64 (bit15).
093F	Servo parameter error No. PU.65 to PU.80	—	Bit corresponding to parameter No. is turned ON. Bit is PU.65 (bit0) to 80 (bit15).
0940	Servo parameter error No. PU.81 to PU.96	—	Bit corresponding to parameter No. is turned ON. Bit is PU.81 (bit0) to 96 (bit15).
0941	Servo parameter error No. PU.97 to PU.99	—	Bit corresponding to parameter No. is turned ON. Bit is PU.97 (bit0) to 99 (bit2).
0942	Servo parameter error No. PW.01 to PW.16	—	Bit corresponding to parameter No. is turned ON. Bit is PW.01 (bit0) to 16 (bit15).
0943	Servo parameter error No. PW.17 to PW.32	—	Bit corresponding to parameter No. is turned ON. Bit is PW.17 (bit0) to 32 (bit15).
0944	Servo parameter error No. PW.33 to PW.40	—	Bit corresponding to parameter No. is turned ON. Bit is PW.33 (bit0) to 40 (bit7).
0945 ⋮ 094F	For manufacturer setting	—	—

Point

Information concerning the servo alarm [AL. 37_Parameter error] that has occurred at system startup can be monitored. If the servo alarm [AL. E4_Parameter warning] occurs when the parameter is written while system is running, it is not reflected in this information.

Servo parameter change No.

Monitor No. (hexadecimal)	Content	Unit	Remarks
0980	Servo parameter change No. 2000 to 200F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2000 (bit0) to 200F (bit15).
0981	Servo parameter change No. 2010 to 201F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2010 (bit0) to 201F (bit15).
0982	Servo parameter change No. 2020 to 202F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2020 (bit0) to 202F (bit15).
0983	Servo parameter change No. 2030 to 203F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2030 (bit0) to 203F (bit15).
0984	Servo parameter change No. 2040 to 204F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2040 (bit0) to 204F (bit15).
0985	Servo parameter change No. 2050 to 205F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2050 (bit0) to 205F (bit15).
0986	Servo parameter change No. 2060 to 206F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2060 (bit0) to 206F (bit15).
0987	Servo parameter change No. 2070 to 207F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2070 (bit0) to 207F (bit15).
0988	Servo parameter change No. 2080 to 208F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2080 (bit0) to 208F (bit15).
0989	Servo parameter change No. 2090 to 209F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2090 (bit0) to 209F (bit15).
098A	Servo parameter change No. 20A0 to 20AF	—	Bit corresponding to parameter No. is turned ON. Bit is No.20A0 (bit0) to 20AF (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
098B	Servo parameter change No. 20B0 to 20BF	—	Bit corresponding to parameter No. is turned ON. Bit is No.20B0 (bit0) to 20BF (bit15).
098C	Servo parameter change No. 20C0 to 20CF	—	Bit corresponding to parameter No. is turned ON. Bit is No.20C0 (bit0) to 20CF (bit15).
098D	Servo parameter change No. 20D0 to 20DF	—	Bit corresponding to parameter No. is turned ON. Bit is No.20D0 (bit0) to 20DF (bit15).
098E	Servo parameter change No. 20E0 to 20EF	—	Bit corresponding to parameter No. is turned ON. Bit is No.20E0 (bit0) to 20EF (bit15).
098F	Servo parameter change No. 20F0 to 20FF	—	Bit corresponding to parameter No. is turned ON. Bit is No.20F0 (bit0) to 20FF (bit15).
0990	Servo parameter change No. 2100 to 210F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2100 (bit0) to 210F (bit15).
0991	Servo parameter change No. 2110 to 211F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2110 (bit0) to 211F (bit15).
0992	Servo parameter change No. 2120 to 212F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2120 (bit0) to 212F (bit15).
0993	Servo parameter change No. 2130 to 213F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2130 (bit0) to 213F (bit15).
0994	Servo parameter change No. 2140 to 214F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2140 (bit0) to 214F (bit15).
0995	Servo parameter change No. 2150 to 215F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2150 (bit0) to 215F (bit15).
0996	Servo parameter change No. 2160 to 216F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2160 (bit0) to 216F (bit15).
0997	Servo parameter change No. 2170 to 217F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2170 (bit0) to 217F (bit15).
0998	Servo parameter change No. 2180 to 218F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2180 (bit0) to 218F (bit15).
0999	Servo parameter change No. 2190 to 219F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2190 (bit0) to 219F (bit15).
099A	Servo parameter change No. 21A0 to 21AF	—	Bit corresponding to parameter No. is turned ON. Bit is No.21A0 (bit0) to 21AF (bit15).
099B	Servo parameter change No. 21B0 to 21BF	—	Bit corresponding to parameter No. is turned ON. Bit is No.21B0 (bit0) to 21FB (bit15).
099C	Servo parameter change No. 21C0 to 21CF	—	Bit corresponding to parameter No. is turned ON. Bit is No.21C0 (bit0) to 21FC (bit15).
099D	Servo parameter change No. 21D0 to 21DF	—	Bit corresponding to parameter No. is turned ON. Bit is No.21D0 (bit0) to 21DF (bit15).
099E	Servo parameter change No. 21E0 to 21EF	—	Bit corresponding to parameter No. is turned ON. Bit is No.21E0 (bit0) to 21EF (bit15).
099F	Servo parameter change No. 21F0 to 21FF	—	Bit corresponding to parameter No. is turned ON. Bit is No.21F0 (bit0) to 21FF (bit15).
09A0	Servo parameter change No. 2200 to 220F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2200 (bit0) to 220F (bit15).
09A1	Servo parameter change No. 2210 to 221F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2210 (bit0) to 221F (bit15).
09A2	Servo parameter change No. 2220 to 222F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2220 (bit0) to 222F (bit15).
09A3	Servo parameter change No. 2230 to 223F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2230 (bit0) to 223F (bit15).
09A4	Servo parameter change No. 2240 to 224F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2240 (bit0) to 224F (bit15).
09A5	Servo parameter change No. 2250 to 225F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2250 (bit0) to 225F (bit15).
09A6	Servo parameter change No. 2260 to 226F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2260 (bit0) to 226F (bit15).
09A7	Servo parameter change No. 2270 to 227F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2270 (bit0) to 227F (bit15).
09A8	Servo parameter change No. 2280 to 228F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2280 (bit0) to 228F (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
09A9	Servo parameter change No. 2290 to 229F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2290 (bit0) to 229F (bit15).
09AA	Servo parameter change No. 22A0 to 22AF	—	Bit corresponding to parameter No. is turned ON. Bit is No.22A0 (bit0) to 22AF (bit15).
09AB	Servo parameter change No. 22B0 to 22BF	—	Bit corresponding to parameter No. is turned ON. Bit is No.22B0 (bit0) to 22BF (bit15).
09AC	Servo parameter change No. 22C0 to 22CF	—	Bit corresponding to parameter No. is turned ON. Bit is No.22C0 (bit0) to 22CF (bit15).
09AD	Servo parameter change No. 22D0 to 22DF	—	Bit corresponding to parameter No. is turned ON. Bit is No.22D0 (bit0) to 22DF (bit15).
09AE	Servo parameter change No. 22E0 to 22EF	—	Bit corresponding to parameter No. is turned ON. Bit is No.22E0 (bit0) to 22EF (bit15).
09AF	Servo parameter change No. 22F0 to 22FF	—	Bit corresponding to parameter No. is turned ON. Bit is No.22F0 (bit0) to 22FF (bit15).
09B0	Servo parameter change No. 2300 to 230F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2300 (bit0) to 230F (bit15).
09B1	Servo parameter change No. 2310 to 231F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2310 (bit0) to 231F (bit15).
09B2	Servo parameter change No. 2320 to 232F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2320 (bit0) to 232F (bit15).
09B3	Servo parameter change No. 2330 to 233F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2330 (bit0) to 233F (bit15).
09B4	Servo parameter change No. 2340 to 234F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2340 (bit0) to 234F (bit15).
09B5	Servo parameter change No. 2350 to 235F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2350 (bit0) to 235F (bit15).
09B6	Servo parameter change No. 2360 to 236F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2360 (bit0) to 236F (bit15).
09B7	Servo parameter change No. 2370 to 237F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2370 (bit0) to 237F (bit15).
09B8	Servo parameter change No. 2380 to 238F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2380 (bit0) to 238F (bit15).
09B9	Servo parameter change No. 2390 to 239F	—	Bit corresponding to parameter No. is turned ON. Bit is No.2390 (bit0) to 239F (bit15).
09BA	Servo parameter change No. 23A0 to 23AF	—	Bit corresponding to parameter No. is turned ON. Bit is No.23A0 (bit0) to 23AF (bit15).
09BB	Servo parameter change No. 23B0 to 23BF	—	Bit corresponding to parameter No. is turned ON. Bit is No.23B0 (bit0) to 23BF (bit15).
09BC	Servo parameter change No. 23C0 to 23CF	—	Bit corresponding to parameter No. is turned ON. Bit is No.23C0 (bit0) to 23CF (bit15).
09BD	Servo parameter change No. 23D0 to 23DF	—	Bit corresponding to parameter No. is turned ON. Bit is No.23D0 (bit0) to 23DF (bit15).
09BE	Servo parameter change No. 23E0 to 23EF	—	Bit corresponding to parameter No. is turned ON. Bit is No.23E0 (bit0) to 23EF (bit15).
09BF	Servo parameter change No. 23F0 to 23FF	—	Bit corresponding to parameter No. is turned ON. Bit is No.23F0 (bit0) to 23FF (bit15).

13 ALARM No.

The position board can raise the following four alarms: system alarm, servo alarm, operation alarm, and system error. The alarm No. are represented in hexadecimal numbers.

Point

[API library]

- To get/reset the alarm No., use the sscGetAlarm function/sscResetAlarm function. Specify the following in the argument for the alarm type.
  · System alarm : SSC_ALARM_SYSTEM
  · Servo alarm : SSC_ALARM_SERVO
  · RIO module alarm : SSC_ALARM_UNIT
  · Operation alarm : SSC_ALARM_OPERATION
  · RIO control alarm : SSC_ALARM_UNIT_CTRL
- To get the system error, use the sscGetSystemStatusCode function.

13

13.1 System Alarm

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
35H	Operation Cycle Alarm	01H	An operation cycle alarm occurred.	Reexamine the following. • Make the control cycle setting longer. (Example: When control cycle is 0.44ms, change to 0.88ms) • Decrease the number of control axes. • Reexamine the operation pattern so that the timing of the operation startup of each axis does not overlap.
		02H	An operation cycle alarm occurred. (Such as SSCNET communication) [MC300]	
36H	Number of Write Accesses to Flash ROM Error	01H	The number of write accesses to flash ROM by parameter backups exceeds 100,000 times.	Data cannot be written to the flash ROM because the flash ROM is expected to reach its service life.
		03H	The number of write accesses to flash ROM by parameter backups exceeds 25 times after system preparation completion.	Check for unnecessary parameter backups. To perform the parameter backup again, reset the system alarm.
37H	Parameter Error*1	01H	Parameter setting is erroneous.	Set the setting to a correct value within the parameter limits.
39H	CPU Temperature Warning [MC300]	01H	The CPU temperature exceeded the warning temperature.	If not stopped, "CPU Temperature Error (system error E504H)" may occur. Check the conditions in the general specifications.
3BH	Mark Detection Setting Error*1	01H	When mark detection is enabled, the total "Number of continuous latch data storages" of "Mark detection option (parameter No.02B0, 02B2)" for the whole system exceeds 64 [MC200]/128 [MC300].	Revise the total "Number of continuous latch data storages" of "Mark detection option (parameter No.02B0, 02B2)" for the whole system.

*1 The system alarm cannot be reset.

13.2 Servo Alarm

Servo amplifier MR-J4(W_)-_B

For the servo alarm No./warning alarm No., refer to the servo amplifier instruction manual for your servo amplifier.

Servo amplifier MR-J5(W_)-_B [MC300]

For the servo alarm No./warning No., refer to the following manual.

MR-J5 User's Manual (Troubleshooting)

Sensing module (axis mode)

The alarms for sensing module (axis mode), are the same as the alarms for sensing module (station mode). Refer to the following.

☞ Page 733 Sensing module (station mode)

13.3 RIO Module Alarm

SSCNETIII/H head module

For SSCNETⅢ/H head module RIO module alarms, refer to the following manual.

MELSEC-L SSCNETⅢ/H Head Module User's Manual

Sensing module (station mode)

The RIO module alarms of the sensing module are shown in the following table. For details, refer to the sensing module instruction manual.

Alarm

Alarm No.	Name
10H	Undervoltage
11H	Switch setting error
12H	Memory error 1 (RAM)
13H	Clock error
14H	Control process error
15H	Memory error 2 (EEP-ROM)
17H	Board error
19H	Memory error 3 (Flash-ROM)
1AH	Incorrect combination of extension modules
1BH	Driver error
1EH	Encoder I/F module - Initial communication error 2
1FH	Encoder I/F module - Initial communication error 3
20H	Encoder I/F module - Ch. A Normal communication error 1
21H	Encoder I/F module - Ch. A Normal communication error 2
28H	Encoder I/F module - Linear encoder error 2
2AH	Encoder I/F module - Ch. A Linear encoder error 1
34H	SSCNET receive error 1
35H	I/O pulse frequency error
36H	SSCNET receive error 2
37H	Parameter error
71H	Encoder I/F module - Ch. B Normal communication error 1
72H	Encoder I/F module - Ch. B Normal communication error 2
75H	Extension module error
76H	Encoder I/F module - Ch. B Linear encoder error 1
8EH	Serial communication error
—	Watchdog

Warning

Warning No.	Name
E4H	Parameter warning
E7H	Controller forced stop warning

Point

For the specific servo alarm No., refer to the sensing module instruction manual.

13.4 Operation Alarm

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
10H	Stop Command On	01H	The stop operation signal (STP) is on.	Turn off the stop operation signal (STP).
		02H	The rapid stop signal (RSTP) is on.	Turn off the rapid stop signal (RSTP).
12H	During Forced Stop	01H	A forced stop is present.	Cancel the forced stop.
13H	Interlock Is On	01H	An Interlock is present.	Cancel the interlock.
16H	Group Error	01H	An alarm occurred on an axis that is part of a group. (Not the axis).	Remove the cause for the alarm from the axis where the alarm occurred.
1AH	In Test Mode	01H	Currently in test mode.	If test mode was selected using MR Configurator2 (set up software), operation (automatic operation etc.) cannot be performed using the position board. For performing operations using the position board, perform a restart.
20H	Operation Mode Error	01H	Operation modes overlap.	Set up the operation modes correctly.
		02H	Operation modes are not set up.	Set up the operation modes correctly.
21H	Command Speed Zero	01H	The command speed is zero or less.	Set the command speed to 1 or more.*1
		02H	The speed limit is zero.	Set the speed limit to 1 or more.
		03H	The command speed is zero or less. [MC300]	Make the command speed higher.*2
22H	Point Number Error	01H	The start point No. or end point No. is a negative value.	Set up the point numbers correctly.
		02H	Start point No. is greater than end point No.	Set up the point numbers correctly.
		03H	Start point No. or end point No. exceeds the point table area of the dual port memory.	Set up the point numbers and point number offset correctly.
23H	Mode Change During Operation	01H	Operation mode was changed during operation.	Do not attempt to change operation modes during operation.
24H	Position Exceeded During Positioning	01H	Stopping of end point or changing position for continuous operation, when the deceleration stop point exceeds the command position.	Perform command position taking into account the minimum distance needed to stop.
25H	Point Table Setting Error	01H	The position command system setting is erroneous.	Set up the position command system correctly.
		02H	The deceleration check system setting is erroneous.	Set up the deceleration check system correctly.
		06H	The S-curve ratio setting is erroneous.	Set up the S-curve ratio correctly.
		07H	The speed switching point specification setting is erroneous.	Set up the help command correctly.
		08H	The point data setting of the next point is erroneous.*3	Reexamine the setting value of the next point in the point table.
		09H	The other axes start specification setting is erroneous.	Set up the other axes start specification correctly.
		0AH	The predwell setting is erroneous.	Set up the predwell correctly.
		0CH	The setting of pass position interrupt specification is erroneous.	Set only the start point for the pass position interrupt specification.
		11H	The interpolation method setting is erroneous. [MC300]	Set the interpolation method correctly.
		12H	The setting for acceleration/deceleration method is outside of the setting range. [MC300]	Set the acceleration/deceleration method correctly.
		13H	A value for acceleration/deceleration data 1 to 4 is outside of the setting range. [MC300]	Set acceleration/deceleration data 1 to 4 correctly.
		14H	The total of the values of acceleration/ deceleration data 1 and 2, or acceleration/ deceleration data 3 and 4 exceed 1000. [MC300]	Set acceleration/deceleration data 1 and 2, or acceleration/deceleration data 3 and 4 correctly.
		15H	The acceleration/deceleration method was set to jerk ratio acceleration/deceleration during interpolation operation. [MC300]	Reexamine the acceleration/deceleration method.
		18H	The setting for smoothing time constant is outside of the setting range.	Set the smoothing time constant correctly.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
26H	Incremental Feed Movement Amount Error	01H	The setting for incremental feed movement amount is a negative number.	Set the incremental feed movement amount using natural numbers including 0. Movement direction is designated by the movement direction signal (DIR).
2DH	Latest Command Buffer Number Setting Error	01H	A value outside of range is set to the latest buffer number.	Set a value inside the range to the latest buffer number.
2EH	Control Mode Switch Error	01H	Control mode was changed during operation.	When changing from position control mode to speed control mode/torque control mode, or changing from speed control mode/torque control mode to position control mode, perform the control mode change while stopped.
		02H	A control mode outside of setting range was set.	Reexamine the value of the control mode command.
		03H*4	Without the control mode changing, a time out occurred.	• If the control mode change was conducted on an axis that does not support control mode change, check that control mode change is possible before performing a control mode change. • An error occurred in communication processing between the position board and the servo amplifier. Make contact with and explain the failure symptoms to an agency or branch office.
		04H	During standard mode, a switch command to a control mode that cannot be switched to was input.	Reexamine the value of the control mode command. (a value that is not speed control mode, torque control mode, or outside of range)
2FH	Torque Control Setting Error	01H	A value outside of range is set to the torque control speed limit value.	Reexamine the value of the torque control speed limit value.
37H	Parameter Error*4	01H	Parameter setting is erroneous.	Set the setting to correct value within the parameter limits.
38H	System Setting Error*4	01H	The setting for the control axis exceeds the maximum number of control axes.	Reexamine the structure of the system.
		02H	When Axis No. assignment is valid, "Servo amplifier axis No." of "Axis No. assignment (parameter No.0203)" is set to "0".	Set the axis No. to "Servo amplifier axis No." of "Axis No. assignment (parameter No.0203)".
		03H	When Axis No. assignment is valid, the setting value of "Servo amplifier axis No." of "Axis No. assignment (parameter No.0203)" is out of range of the valid axis No.	Set the axis No. within the valid range to "Servo amplifier axis No." of "Axis No. assignment (parameter No.0203)".
		04H	When Axis No. assignment is valid, the setting value of "Servo amplifier axis No." of "Axis No. assignment (parameter No.0203)" is the same as other axes.	Reexamine of the setting of "Servo amplifier axis No." of "Axis No. assignment (parameter No.0203)".
39H	I/O No. Assignment Setting Error*4	01H	The general input number assigned to the digital input table or input device table is the same as the setting for other servo amplifiers/ remote I/O modules. Or, the assignment exceeds its allowable range.	Reexamine "General I/O No. assignment (parameter No.0214)" for the servo amplifier.
		02H	The general output number assigned to the digital output table or output device table is the same as the setting for other servo amplifiers/ remote I/O modules. Or, the assignment exceeds its allowable range.	Reexamine "General I/O No. assignment (parameter No.0214)" for the servo amplifier.
3BH	Mark Detection Setting Error*4	01H	Mark detection was enabled in a communication mode that is not compatible.	Use mark detection in a SSCNETⅢ/H system.
		02H	Mark detection function is set to enabled for an axis that does not support mark detection function.	• Change the servo amplifier being used to an axis with a mark detection signal function. • Disable the mark detection settings.
		03H	When the mark detection mode is ring buffer, the number of continuous latch storages was set to 0.	Reexamine the value of "Number of continuous latch data storages" of "Mark detection option (parameter No.02B0, 02B2)".
		04H	Mark detection function was set to enabled for an axis that is set to get sensor input from driver.	• Reexamine the setting of "Sensor input options (parameter No.0219)". • Disable the mark detection settings.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
40H	Linear Interpolation Start Up Error [MC200] Interpolation Start Up Error [MC300]	01H	Axes that have been set to something besides linear interpolation mode signal [MC200]/ interpolation operation mode signal [MC300] (LIP) are included in the same group.	Designate all of the axes in the group as linear interpolation mode signal [MC200]/interpolation operation mode signal [MC300] (LIP).
		02H	There are 5 or more axes in the group formation during linear interpolation; alternatively, a group formation consists of either 1 axis or 3 or more axes during circular interpolation. [MC300]	Reexamine the group formation.
		03H	Start operation was performed for linear interpolation [MC200]/interpolation operation [MC300] with the invalid linear interpolation group number [MC200]/interpolation group number [MC300].	Reexamine "Linear interpolation group [MC200]/ interpolation group [MC300] (parameter No.0260)". For the valid group No., refer to the following. ☞ Page 109 Linear Interpolation ☞ Page 118 Circular Interpolation [MC300]
		04H	The number of points defined for axes in the group is different.	Set the same number of points for all axes.
		05H	"Speed unit" for the primary axis of "Control option 1 (parameter No.0200)" is defined to be "2: r/min".	Change the speed units.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
41H	Linear Interpolation Point Data Error [MC200] Interpolation Point Data Error [MC300]	01H	During linear control, the movement amount in the group exceeds the maximum value "999999999".	Set it to the correct data.
		02H	With "Excessive speed processing" of "Linear interpolation options [MC200]/interpolation options [MC300] (parameter No.0261)" set to "1: Alarm stop", the group formation axis exceeds the speed limit.	Reexamine feed speed and speed limit values.
		03H	The axis No. for interpolation axis No. is outside the valid range.	Reexamine the interpolation axis No. setting value.
		04H	The number of linear interpolation or circular interpolation [MC300] groups operating simultaneously exceeds the valid number of linear interpolation [MC200]/interpolation operation [MC300] groups.	Reexamine the operation pattern so that the number of linear interpolation or circular interpolation [MC300] groups operating simultaneously does not exceed the valid number of interpolation groups.
		05H	The axis No. for the auxiliary axis specified by the point table overlaps with the primary axis or another auxiliary axis.	Reexamine the auxiliary axis No. so that it is not the same as another axis No.
		10H	When executing central point-specified circular interpolation, the difference between the radius of the start/central points and the radius of the end/central points exceeds "Allowable error range for circular interpolation (parameter No.02CC, 02CD)". [MC300]	Reexamine the central point (arc coordinate), the end point (position data), and the allowable error range value.
		11H	During auxiliary point-specified circular interpolation, the start point = auxiliary point. [MC300]	Reexamine the auxiliary point (arc coordinate).
		12H	During auxiliary point-specified circular interpolation, the end point = auxiliary point. [MC300]	Reexamine the auxiliary point (arc coordinate).
		13H	During auxiliary point-specified circular interpolation, the start point, end point, and auxiliary point form a straight line. [MC300]	Reexamine the auxiliary point (arc coordinate).
		14H	During auxiliary point-specified circular interpolation, the auxiliary point coordinate is outside the range of -2147483648 to 2147483647. [MC300]	Reexamine the auxiliary point (arc coordinate).
		15H	During auxiliary point-specified circular interpolation, the start point = end point. [MC300]	Reexamine the end point (position data).
		16H	During either auxiliary point- or central point-specified circular interpolation, the end point position is outside the range of -2147483648 to 2147483647. [MC300]	Reexamine the end point (position data).
		17H	During central point-specified circular interpolation, the start point = central point. [MC300]	Reexamine the central point (arc coordinate).
		18H	During central point-specified circular interpolation, the end point = central point. [MC300]	Reexamine the central point (arc coordinate).
		19H	During central point-specified circular interpolation, the central point position is outside the range of -2147483648 to 2147483647. [MC300]	Reexamine the central point (arc coordinate).
		1AH	The arc radius exceeds 536870912. [MC300]	Reexamine the auxiliary point (arc coordinate), the central point (arc coordinate), and the end point (position data).
42H	Can't Start Linear Interpolation Auxiliary Axis Error [MC200] Can't Start Interpolation Auxiliary Axis Error [MC300]	01H	The auxiliary axis is in operation.	Perform start operation for linear interpolation [MC200]/interpolation operation [MC300] after making sure all axes in the group are stopped.
		02H	The auxiliary axis has an alarm set.	Remove the cause for the alarm on the auxiliary axis.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
43H	Interference Check Axis Setting Error	01H	The axis is set up as the interference check axis.	Set it to the correct data.
		02H	The axis in the same linear interpolation group as the axis is set up as the interference check axis.	Set it to the correct data.
		0FH	An operation that is not compatible with the interference check was started. [MC300]	Check again to make sure that you are not using the following operations. • Circular interpolation
		10H	The same axis No. is set up for interference check axis and interference check axis 2. [MC200]	Set the different axis No. for interference check axis and interference check axis 2.
44H	Command Error in Interference Area	01H	Commanded to move into interference area.	Perform a commanded to move out of the interference area.
45H	Entering Interference Area Error	01H	Entered interference area during operation.	• Confirm that the parameter settings related to interference check are correct. • Change the operation pattern so that the interference area is not entered.
4DH	Other Axes Start Setting Error	01H	The start condition setting is erroneous.	Set correct data.
		02H	The operation setting is erroneous.	Set correct data.
		10H	The axis judgment condition of the other axes start condition is outside limits. [MC300]	Set correct data.
		11H	The axis remaining distance data of other axes start condition is a negative value. [MC300]	Set correct data.
		12H	The position specified in the axis pass position data of other axes start condition cannot be passed. [MC300]	Set correct data.
		13H	The axis judgment coordinates of other axes start condition is outside limits. [MC300]	Set correct data.
		14H	The observed axis specification of other axes start condition is outside limits. [MC300]	Set correct data.
		15H	The observe judgment condition of other axes start condition is outside limits. [MC300]	Set correct data.
		16H	The observed axis judgment coordinates of other axes start condition is outside limits. [MC300]	Set correct data.
		17H	The specified position pass judgment condition of observed axis of other axes start condition is outside limits. [MC300]	Set correct data.
		18H	The observed axis No. of other axes start condition is outside limits. [MC300]	Set correct data.
		19H	A non-existent axis is set in the observed axis No. of other axes start condition. [MC300]	Set the axis specified by the observed axis No. to "1: Controlled" for "Control axis" of "Control option 1 (parameter No.0200)". Or, establish SSCNET communication with the observed axis.
		20H	A self-axis or non-existent axis was set in the start axis designation of the other axes operation content. [MC300]	Set the axis specified as the start axis No. to "1: Controlled" for "Control axis" of "Control option 1 (parameter No.0200)". Or, establish SSCNET communication with the start axis.
		21H	The start axis starting point No. and start axis end point No. settings of other axes operation content are outside limits. [MC300]	Set correct data.
		22H	The digital output signal control/output device signal control of other axes operation content is outside limits. [MC300]	Set correct data.
		23H	The output device signal No. of other axes operation content is outside limits. [MC300]	Set correct data.
		24H	The digital output signal/digital device signal of other axes operation content designated by digital output signal selection/output device signal selection have not been assigned a servo amplifier general output or remote I/O module output. [MC300]	Assign a servo amplifier general output or remote I/O module output to the digital output signal/ digital device signal.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
50H	Tandem Drive Mode Change Error	01H	Drive mode change was attempted while tandem drive axis mode toggling was prohibited.	Change the drive mode when the change conditions are satisfied. For details, refer to the following. ☞ Page 491 Changing of drive mode
51H	While In Tandem Drive Non-synchronous Mode	01H	Home position return, automatic operation, or linear interpolation operation [MC200]/ interpolation operation [MC300] was attempted while in non-synchronous micro-adjustment mode of tandem drive axes.	Perform home position return, automatic operation as well as linear interpolation operation [MC200]/interpolation operation [MC300] while in synchronous mode.
52H	Tandem Drive Axis Setting Error	01H	A home position return method other than dog method, dog cradle method, data set method, scale home position signal detection method, or dog front end method was attempted for home position return while in tandem drive axis mode.	Set "Home position return option 1 (parameter No.0240)" to one of the return to home position methods listed to the left.
		02H	A second axis is not set for the tandem drive axis group. Or 3 or more axes are set up with the same tandem drive group number.	Set up the tandem drive axis group number in pairs.
53H	Tandem Drive Excessive Deviation	01H	The deviation between the master axis and slave axis for tandem drive axes exceeds the tandem drive excessive deviation width of the parameter.	Make adjustments so that the deviation between the master axis and slave axis is reduced. And reexamine excessive deviation width and delay of start detection for excessive deviation, defined in the parameters.
54H	Tandem Drive Synchronous Alignment Valid Width Error	01H	When deviation exceeds the synchronous alignment valid width during calculation error correction performed for servo on, while in tandem drive synchronous mode.	Reexamine the parameter synchronous alignment valid width. As the home position return is incomplete (home position return request (ZREQ) is ON), execute home position return again.
55H	Tandem Drive While Performing Synchronization	01H	When start of operation is executed during calculation error correction performed for turning on of the servo, while in tandem drive synchronous mode.	Do not perform start up while the synchronizing signal (SYEO□) is ON.
56H	Tandem Drive Slave Axis Error	01H	There is a servo alarm for the tandem drive slave axis (including servo warnings [AL. E6_Servo forced stop warning], [AL. E7_Controller forced stop warning], [AL. E9_Main circuit off warning]*5).	Cancel the servo alarm. For details, refer to the servo amplifier instruction manual or the manual for your servo amplifier.
		02H	A communication error or a power outage on the servo amplifier occurred.	Confirm that the connection to the servo amplifier is intact. For details concerning communication errors, refer to the following. ☞ Page 745 System Error
		03H	The tandem drive slave axis entered servo ready off mode.	Confirm that the connection to the servo amplifier is intact. For details concerning communication errors, refer to the following. ☞ Page 745 System Error
57H	Exceeding of Valid Width of Tandem Drive Deviation Compensation Error	01H	The deviation between the master axis and the slave axis exceeded the valid width when home position return was performed while in tandem drive mode.	• Adjust the mechanical deviation between the master axis and the slave axis so that it is within the valid width. • Set "Tandem drive home position signal offset (parameter No.026C, 026D)" to a correct value.
58H	Tandem Drive Synchronous Alignment Error	01H	When a stop command is input during calculation error correction performed for turning on the servo, while in tandem drive synchronous mode.	To correct the error between the master axis and the slave axis, turn the servo off and then on to perform synchronization again.
		02H	In tandem drive synchronous mode, the start operation is performed without completion of synchronization.	To correct the error between the master axis and the slave axis, turn the servo off and then on to perform synchronization again.
5BH	Using Other Axes Start Data	01H	Other axes start data is being used (the other axes start notice signal (OSOP□) is ON).	Check the other axes start data is not being used (the other axes start notice signal (OSOP□) is OFF).

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
5CH	Pass Position Interrupt Error	01H	The setting to the start number of the pass interrupt condition is out of range.	Check the start number setting of the pass interrupt condition.
		02H	The setting to the end number of the pass interrupt condition is out of range.	Check the end number setting of the pass interrupt condition.
		03H	The start number of the pass interrupt condition exceeds the end number.	Check the start number setting and the end number setting of the pass interrupt condition.
		04H	The setting of the pass interrupt condition is out of range.	Check the pass interrupt condition setting.
		05H	The specified pass interrupt condition is used for other axes.	Do not overlap the pass interrupt condition numbers for each axis.
		06H	The operation is started during the pass position output interrupt.	Do not start the operation until the pass position output interruption is completed.
		07H	During the pass position interrupt cancel signal (PPISTP) is ON, the operation is started with setting valid to the pass position specification for auxiliary command of point table.	• Start the operation after turning OFF the pass position interrupt cancel signal (PPISTP). • Check the setting of the cancel condition of the pass position option.
5DH	Continuous Operation to Torque Control Error	01H	Continuous operation to torque control valid was specified to a tandem drive axis.	Specify continuous operation to torque control invalid to the tandem drive axis.
		02H	When operating at a continuous operation to torque control point, the operation was completed without conducting a switch to continuous operation to torque control.	• For automatic switch, reexamine the setting of the continuous operation to torque control switching position. • For manual switch, conduct a switch to continuous operation to torque control mode before position control mode operation is completed.
		03H	The press limit position was reached.	Reexamine the positions of the pressing position in continuous operation to torque control and the press limit position.
		04H	Interlock signal (ITL) turned ON during the operation of a point set to continuous operation to torque control valid.	Do not input an interlock command during the operation of a continuous operation to torque control point.
		05H	The travel direction and press limit position were incorrect.	• Reexamine the set values of the point table. • Travel in the opposite direction, and start operation before the press limit position.
		06H	A continuous operation to torque control point was specified for a connected module that does not support continuous operation to torque control.	• Reexamine the set values of the point table. • Use a servo amplifier that supports continuous operation to torque control mode.
		07H	The control mode switch command signal (CTLMC) turned ON during movement in continuous operation to torque control mode (before reaching target torque).	Turn ON control mode switch command after completion of continuous operation to torque control. (Switch to position control mode)
		08H	The press limit position was set to a position before the position data of the point table.	Set the press limit position to a position after the position data of the point table.
		09H	The software limit was set to a position before the press limit position.	Set the press limit position to a position before the software limit.
		0AH	Continuous operation to torque control valid was specified to a linear interpolation axis or circular interpolation axis [MC300].	Specify continuous operation to torque control invalid to a linear interpolation axis or circular interpolation axis [MC300].
		0BH	Continuous operation to torque control was specified as valid for a point where travel amount is 0.	Set the required travel amount in order to conduct continuous operation to torque control.
5EH	Continuous Operation to Torque Control Setting Error	01H	Continuous operation to torque control speed limit value is outside of range.	Reexamine the setting of the continuous operation to torque control speed limit value.
		02H	Target torque is outside of range.	Reexamine the setting of the target torque.
		03H	Continuous operation to torque control acceleration time constant is outside of range.	Reexamine the setting of continuous operation to torque control acceleration time constant.
		04H	Continuous operation to torque control deceleration time constant is outside of range.	Reexamine the setting of continuous operation to torque control deceleration time constant.
		05H	Continuous operation to torque control operating conditions is out of range.	Reexamine the setting of continuous operation to torque control operating conditions.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
5FH	Point Table Loop Error	01H	The loop start point is specified but the latest command point No. is 0.	After updating the point table, set the latest command point No.
		02H	The loop start point is specified but the number of points used is 1.	When specifying the point table loop, set more than one point.
		03H	A value smaller than the start point No. or a value larger than the end point No. was input to the latest command point No.	Input a number within the range of start point No. and end point No. to the latest command point No.
		04H	The next point for a point that specifies continuous operation has not been updated.	• Increase the number of points to be used in loop method so that update is complete at the time of operation start for the next point. • Increase the updating speed so that update is complete at the time of operation start for the next point. • After updating the point table, set the latest command point No.
		05H	Loop end point was specified while not in point table loop.	Specify loop end point while using point table loop method.
		06H	Before point switching is specified in the speed switching point specification but the next point is not updated in time.	Update the next point before the start of the operation of the specified point.
90H	Home Position Return Not Complete	01H	Automatic operation, linear interpolation operation [MC200]/interpolation operation [MC300], or home position reset were performed without executing return to home position.	Execute home position return. Or set "1: Valid" for "No home position" of "Control option 1 (parameter No.0200)".
91H	Z-phase Not Passed	01H	The Z-phase has not been passed.	Turn the motor more than 1 revolution in the + / - direction and then perform home position return.
92H	The Proximity Dog is Short	01H	When using dog method home position return, after the dog turned ON and decelerating to a stop, the position is not above the dog.	Lengthen the proximity dog. Or in order to stop on top of the dog, reduce the home position return speed.
94H	Home Position Return Direction Error	01H	The home position return direction and stopper method direction are opposite when using a stopper method for return to home position.	Set the home position return direction to be the same as the push direction.
95H	Not Limiting Torque	01H	Torque limit effective signal (TLC) has not been turned ON when stopper method is being used for return to home position.	Perform push, and after torque limitation effective state, perform start operation for home position return.
96H	Home Position Setting Error	01H	Home position setting was performed prior to motor being stabilized.	Adjust the servo so that it stabilizes quickly upon stopping at the home position.
97H	Home Position Stop Error	01H	Upon stopping at home position, even after 1800ms passed, in-position was not achieved.	• Reduce home position return speed and creep speed. • Lengthen the home position return time constant. • Broaden the in-position boundaries. • Confirm that it is not contacting the machine when return to home position is being performed.
98H	Home Position Search Limit Error	02H	The movement amount moved to detect the home position signal or dog signal while performing return to home position exceeded "Home position search limit (parameter No.024A, 024B)"	Confirm the input status of the dog signal etc.
9CH	Z-phase Mask Amount Setting Error	01H	• The value calculated by Z-phase mask amount × electronic gear numerator (CMX) ÷ electronic gear denominator (CDV) exceeds 32bit. • The Z-phase mask amount + the travel distance to the Z-phase exceeds 32bit.	Reexamine the setting value of the Z-phase mask amount.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
9DH	Home Position Return Parameter Setting Error	01H	For a home position return method that requires the Z-phase being passed, "Not need to pass motor Z phase after the power supply is switched on" is set.	Reexamine "Home position return method" of "Home position return option 1 (parameter No.0240)" or "Home position setting condition selection" of "Function selection C-4 (MR-J4(W_)-_B: parameter No.1190, MR-J5(W_)-_B: parameter No.20A3 [MC300])".
		02H	In the Z-phase detection method home position return, "Search again" is set in the setting of the home position signal re-search.	Set "0: Do not search again" to "Home position signal re-search" of "Home position return option 1 (parameter No.0240)".
		03H	In the home position return using other than a Z-phase detection method, a shortcut direction is set as the home position return direction.	Set "0: - direction" or "1: + direction" to "Home position return direction" of "Home position return option 1 (parameter No.0240)".
		04H	The setting for "Home position return method" of "Home position return option 1 (parameter No.0240)" is incorrect.	Reexamine the setting of "Home position return method" of "Home position return option 1 (parameter No.0240)".
A0H	Limit Switch	01H	The upper limit switch (LSP) turned OFF while moving in the + direction.	Using JOG operation etc. move in the opposite direction to return to within the limit switch boundaries.
		02H	The lower limit switch (LSN) turned OFF while moving in the - direction.	Using JOG operation etc. move in the opposite direction to return to within the limit switch boundaries.
A1H	Out of Software Limit Boundaries	01H	Position outside of software limit boundaries is being designated.	Set the movement command to within the software limit boundaries.
A2H	Reached Software Limit	01H	The software limit has been reached.	Using JOG operation etc. move in the opposite direction to return to within the software limit boundaries.
A4H	Software Limit Parameter Error	01H	The parameter settings for the software limits has the upper limit < lower limit.	Set the parameter settings for the software limits such that the upper limit > lower limit.
A5H	Position Switch Parameter Error	01H	The parameter settings for the position switch has the upper limit < lower limit.	Set the parameter settings for the position switch such that the upper limit > lower limit.
A6H	Mark Detection Write/Read Error	01H	During mark detection, it is not possible to write to the target buffer.	The reading speed of the host personal computer for a mark detection occurrence is too slow. Perform the following. • Increase "Number of continuous latch data storages" of "Mark detection option (parameter No.02B0, 02B2)" for the applicable mark sensor. • Increase the reading speed.
		02H	After the input of a value to the read complete buffer number that exceeds the mark detection count, a mark sensor was detected.	Reexamine the input value for the read complete buffer number.
A7H	Command Data Error	01H	A value outside of range was input to the speed command buffer.	Reexamine the speed command data.
		02H	A value outside of range was input to the torque command buffer.	Reexamine the torque command data.
		03H	Position command data that exceeds the allowable difference between the position command data of the previous command data update cycle was input.	Reexamine the position command data.
B0H	Servo Is Not Controllable	01H	Axis is not a control axis.	Set "1: Controlled" for "Control axis" of "Control option 1 (parameter No.0200)".
		02H	A communication error or a power outage on the servo amplifier occurred.	Confirm that the connection to the servo amplifier is intact. For further details concerning communication errors, refer to the following. ☞ Page 745 System Error
		03H	• A servo alarm was set and servo ready off mode was entered. • The main circuit is in off status.	• Cancel the servo alarm. For details, refer to the servo amplifier instruction manual or the manual on your servo amplifier. • Turn ON the main circuit.
B1H	Servo Alarm Occurrence	01H	A servo alarm occurs (including servo warnings [AL. E6_Servo forced stop warning], [AL. E7_Controller forced stop warning], [AL. E9_Main circuit off warning]*5).	Cancel the servo alarm. For details, refer to the servo amplifier instruction manual or the manual on your servo amplifier.

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
B2H	Servo Is Off	01H	Servo is in off status.	Turn on the servo.
B3H	Servo Off Command	01H	Servo on signal (SON) was turned OFF during operation.	Turn on the servo.

*1 Depending on parameter settings, a setting of 1 or more may be treated as 0 by internal calculations.

*2 This occurs when the command speed is treated as 0 by the internal operation of the jerk ratio acceleration/deceleration.

*3 Only when "1: Before point switching" is set in the speed switching point specification.

*4 The operation alarm cannot be reset.

*5 For MR-J5(W_)-_B, the servo warning [AL. 0E6_Servo forced stop warning], [AL. 0E7_Controller forced stop warning], and [AL. 0E9_Main circuit off warning], [MC300]

13.5 RIO control alarm

Alarm No.	Content	Detail No.	Cause of occurrence	Procedure
37H	Parameter Error*1	01H	Parameter setting is erroneous.	Set the setting to correct value within the parameter limits.
38H	System Setting Error*1	01H	The setting for the control station exceeds the maximum number of control stations.	Reexamine the structure of the system.
		02H	When station No. assignment is valid, "Remote I/O station No." of "Station No. assignment (parameter No.0202)" is set to 0.	Set the station No. to "Remote I/O station No." of "Station No. assignment (parameter No.0202)".
		03H	When station No. assignment is valid, the setting value of "Remote I/O station No." of "Station No. assignment (parameter No.0202)" is out of range of the valid station No.	Set the station No. within the valid range to "Remote I/O station No." of "Station No. assignment (parameter No.0202)".
		04H	When station No. assignment is valid, the setting value of "Remote I/O station No." of "Station No. assignment (parameter No.0202)" is the same as other stations.	Reexamine the setting of "Remote I/O station No." of "Station No. assignment (parameter No.0202)".
		05H	The used points were set to an input table that is not being used.	Review the settings for "I/O table selection" of "I/O table (parameter No.004A)", "Input bit device points (parameter No.0210)" and "Input word device points (parameter No.0212)" for remote I/O module
		06H	The used points were set to an output table that is not being used.	Review the settings for "I/O table selection" of "I/O table (parameter No.004A)", "Output bit device points (parameter No.0214)" and "Output word device points (parameter No.0216)" for remote I/O module
39H	I/O No. Assignment Setting Error*1	01H	The number assigned to the digital input table or input device table is the same as the setting for other servo amplifiers/remote I/O modules. Or, the assignment exceeds its allowable range.	Reexamine "input bit device start No. (parameter No.0211)", and "Input word device start No. (parameter No.0213)" for the remote I/O module.
		02H	The number assigned to the digital output table or output device table is the same as the setting for other servo amplifiers/remote I/O modules. Or, the assignment exceeds its allowable range.	Reexamine "Output bit device start No. (parameter No.0215)", and "Output word device start No. (parameter No.0217)" for the remote I/O module.

*1 The RIO control alarm cannot be reset.

13.6 System Error

The error code for system errors can be confirmed using system status codes (address 01D0). When the status code is "E□□□h", this corresponds to a system error.

Error code	Content	Cause of occurrence	Procedure
E001H	ROM Error 1	Component failure inside position board.	Replace the position board.
E002H	RAM Error 1		
E003H	Dual Port Memory Error	Component (dual port memory) failure inside position board[*1].	If the conditions described in[*1] are not applicable, replace the position board.
E004H	RAM Error 2	Component error inside position board.	Replace the position board.
E006H	SSCNET Communication IC Error 1		
E007H	SSCNET Communication IC Error 2		
E008H	Board Error		
E009H	ROM error 2		
E00AH	ROM error 3		
E1□□H	CPU Error		
E200H	Interrupt Error		
E301H	Watchdog Error[*2]		
E302H	DC FAIL	The + 5VDC being supplied to the position board was reduced.	Check the + 5VDC of the bus connected to the position board.
E310H	PCIe Bus Connection Error [MC300]	PCIe communication with the host personal computer was disconnected.	Check the connection status of the PCIe bus connecting the position board.
E400H	An Axis That Has Not Been Mounted Exists	"Control axis" of "Control option 1 (parameter No.0200)" setting and the servo amplifier connection status are different.	Check the following details. • "Control option 1 (parameter No.0200)" setting, servo amplifier connection status, and station No. setting (rotary switch) match. • Power supply status to servo amplifier. • SSCNETⅢ cable connection status. • For disconnection of SSCNETⅢ cable.
		Communication was cut off by power outage of servo amplifier etc.	Check the following details. • Power supply status to servo amplifier. • SSCNETⅢ cable connection status. • For disconnection of SSCNETⅢ cable. Turn ON the control power supplies for the communication route servo amplifiers.
		The disconnection command is sent to the second or later axis in the module of the multi-axis amplifier.	Make sure the all axes in the module of the multi-axis amplifier are simultaneously disconnected.
E401H	CRC Error	SSCNET communication error	Check the following details. • SSCNETⅢ cable connection status. • For disconnection of SSCNETⅢ cable.
E403H	Data ID Error		
E405H	Driver Type Code Error	"Type code (parameter No.021E)" is different from actual drivers.	Check the respective parameters.
		"Vendor ID (parameter No.021D)" is different from the actual driver.	Check the respective parameters.
E407H	SSCNET Time Out	No response from the servo amplifier and a communication time out occurred.	An error occurred in communication processing between the position board and the servo amplifier. Make contact with and explain the failure symptoms to an agency or branch office.
E40BH	Uncontrollable Driver	The position board failed to shift to the status where the driver is controllable since an error occurred in initial communication between the position board and the servo amplifier.	Check the following details. • The setting value of "Control option 1 (parameter No.0200)" should correspond to the servo amplifier connection status. • The setting of multi-axis amplifier and "Control option 1 (parameter No.0200)" or axis/station No. assignment should correspond.
E40EH	Communication Cycle Error	A servo amplifier that does not support the set communication cycle is connected.	Check that all servo amplifiers support the set control cycle (communication cycle.)

Error code	Content	Cause of occurrence	Procedure
E500H	Electronic Gear Setting Error	A value out of the setting range was input.	Check the following details. • The settings of the electronic gear numerator (CMX) and the electronic gear denominator (CDV) are within the setting range. • The settings of the electronic gears (CMX/CDV) are within the setting range.
E503H	Exclusive Control Error	The invalid value is set to the exclusive control data area.	Reexamine the setting process for the exclusive control data.
E504H	CPU Temperature Error [MC300]	The CPU temperature exceeded the error temperature.	Turn OFF the power supply of the host personal computer. Check the conditions in the general specifications.
E510H	I/O No. Assignment Error	The digital I/O table or I/O table assignment is erroneous.	Check the axis or station in which "I/O No. Assignment Setting Error (operation alarm 39H, RIO control alarm 39H)" is occurring and reexamine the setting.
E511H	I/O Table Select Error	The used points were set to an I/O table that is not being used.	Check the station in which "System Setting Error (RIO control alarm 38H)" is occurring and reexamine the setting.
E5E0H	SSCNET Communication System Error	An error occurred in initial communication with the servo amplifier.	An error occurred in initial communication between the position board and the servo amplifier. Make contact with and explain the failure symptoms to an agency or branch office.
E5E1H	SSCNET Communication System Error 2		
E5E2H	SSCNET Communication System Error 3		
EF01H	System Command Code Error	An erroneous system command code was set.	Do not set any values other than those listed in the following. ☞ Page 564 System Command/status

*1 There are cases where this occurs when data is written to the dual port memory from the host personal computer prior to system status code becoming system preparation completion after turning on the power for the position board (or after reboot).

*2 Not user watchdog. Watchdog error on the position board side.

14 EMC AND LOW VOLTAGE DIRECTIVES

In each country, laws and regulations concerning electromagnetic compatibility (EMC) and electrical safety are enacted.
For the products sold in the European countries, compliance with the EU's EMC Directive has been a legal obligation as EMC regulation since 1996, as well as the EU's Low Voltage Directive as electrical safety regulation since 1997.
Manufacturers who recognize their products are compliant with the EMC and Low Voltage Directives are required to perform a Declaration of Conformity and attach "CE marking" on their products in European countries.
In some other countries and regions, manufacturers are required to make their products compliant with applicable laws or regulations and attach a certification mark on the products as well (such as UK Conformity Assessed (UKCA) marking in the UK, and Korea Certification (KC) marking in South Korea).
Each country works to make their regulatory requirements consistent across countries based on international standards. When the requirements are consistent, measures to comply with the EMC and electrical safety regulations become common across countries.
The UK and South Korea have enacted EMC regulations whose requirements are consistent with those of the EMC Directive. The UK has also enacted electrical safety regulations whose requirements are consistent with those of the Low Voltage Directive.

Authorized representative in Europe

The sales representative in EU member states is:
Company: Mitsubishi Electric Europe B.V.
Address: Gothaer strase 8, 40880 Ratingen, Germany

14.1 Requirements for Compliance with the EMC Directive

The EMC Directive specifies that "products placed on the market must be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)". This section summarizes the precautions on compliance with the EMC Directive of the machinery constructed with the position board.
These precautions are based on the requirements and the standards of the regulation, however, it does not guarantee that the entire machinery constructed according to the descriptions is not complied with above-mentioned directives. The method and judgment for complying with the EMC Directive must be determined by the person who constructs the entire machinery.

Standards relevant to the EMC directive

For all test items, the test has been done with a position board installed in a computer that is compatible to CE mark.
The test does not cover USB because only the test tool "MRZJW3-MC2-UTL" (sold separately) uses it.
The standards relevant to the EMC Directive are listed below.

Standards relevant to the EMC directive that apply when using MR-MC2_ _

Certification	Test item	Test details	Standard value
EN61000-6-4:2007+A1:2011	CISPR16-2-3 Radiated emission*1	Radio waves from the product are measured.	• 30M to 230MHz QP: 40dBμV/m (10m (32.81ft.) in measurement range)*2 • 230M to 1000MHz QP: 47dBμV/m (10m (32.81ft.) in measurement range)*2 • 1GHz to 2GHz QP: 76dBμV/m (3m (9.84ft.) in measurement range)*2, AV: 56dBμV/m (3m (9.84ft.) in measurement range)*3
	CISPR16-2-1 Conducted emission	Noise from the product to the power line is measured.	AC power line • 0.15M to 0.5MHz QP: 79dBμV*2, AV: 66dBμV*3 • 0.5M to 30MHz QP: 73dBμV*2, AV: 60dBμV*3
EN61000-6-2:2005	EN61000-4-2 Electrostatic discharge immunity	Immunity test in which electrostatic discharge is applied to the product.	• 8kV: 10 times at 1 second interval, Air discharge • 4kV: 10 times at 1 second interval, Contact discharge
	EN61000-4-3 Radiated immunity*1	Immunity test in which electric fields are radiated to the product.	80%AM modulation @1kHz • 80 to 1000MHz: 10V/m • 1400M to 2000MHz: 3V/m • 2000M to 2700MHz: 1V/m
	EN61000-4-4 Electrical fast transient/burst (EFT/B) immunity	Immunity test in which burst noise is applied to the power cable and signal line.	• AC power line: ±2kV/5kHz • DC power line: ±2kV/5kHz • I/O, communication line: ±1kV/5kHz
	EN61000-4-5 Surge immunity	Immunity test in which surge is applied to the power line and signal line.	• AC power line Common mode: ±2.0kV Differential mode: ±1.0kV • DC power line Common mode: ±0.5kV Differential mode: ±0.5kV • I/O, communication line Common mode: ±1kV
	EN61000-4-6 Conducted immunity	Immunity test in which high frequency noise is applied to the power line and signal line.	0.15 to 80MHz, 80%AM modulation @1kHz, 10Vrms
	EN61000-4-11 Voltage dip and short interruptions immunity	Immunity test in which short interruptions are applied to the power supply voltage.	• 0% of rated voltage, 1cycle • 0% of rated voltage, 250/300cycle (50Hz/60Hz) • 40% of rated voltage, 10/12cycle (50Hz/60Hz) • 70% of rated voltage, 25/30cycle (50Hz/60Hz)

*1 This product is an open type device (a device designed to be housed inside other equipment) and must be installed inside a conductive control panel.
*2 QP: Quasi-peak value
*3 AV: Average value

Standards relevant to the EMC directive that apply when using MR-MC3_ _

Certification	Test item	Test details	Standard value
EN61131-2:2007	CISPR16-2-3 Radiated emission[*1]	Radio waves from the product are measured.	• 30M to 230MHz QP: 40dBμV/m (10m (32.81ft.) in measurement range)[*2] • 230M to 1000MHz QP: 47dBμV/m (10m (32.81ft.) in measurement range)[*2] • 1GHz to 2GHz QP: 76dBμV/m (3m (9.84ft.) in measurement range)[*2], AV: 56dBμV/m (3m (9.84ft.) in measurement range)[*3]
	CISPR16-2-1 Conducted emission	Noise from the product to the power line is measured.	AC power line • 0.15M to 0.5MHz QP: 79dBμV[*2], AV: 66dBμV[*3] • 0.5M to 30MHz QP: 73dBμV[*2], AV: 60dBμV[*3]
	EN61000-4-2 Electrostatic discharge immunity	Immunity test in which electrostatic discharge is applied to the product.	• 8kV: 10 times at 1 second interval, Air discharge • 4kV: 10 times at 1 second interval, Contact discharge
	EN61000-4-3 Radiated immunity[*1]	Immunity test in which electric fields are radiated to the product.	80%AM modulation @1kHz • 80 to 1000MHz: 10V/m • 1400M to 2000MHz: 3V/m • 2000M to 2700MHz: 1V/m
	EN61000-4-4 Electrical fast transient/burst (EFT/B) immunity	Immunity test in which burst noise is applied to the power cable and signal line.	• AC power line: ±2kV/5kHz • DC power line: ±2kV/5kHz • I/O, communication line: ±1kV/5kHz
	EN61000-4-5 Surge immunity	Immunity test in which surge is applied to the power line and signal line.	• AC power line Common mode: ±2.0kV Differential mode: ±1.0kV • DC power line Common mode: ±0.5kV Differential mode: ±0.5kV • I/O, communication line Common mode: ±1kV
	EN61000-4-6 Conducted immunity	Immunity test in which high frequency noise is applied to the power line and signal line.	0.15 to 80MHz, 80%AM modulation @1kHz, 10Vrms
	EN61000-4-11 Voltage dip and short interruptions immunity	Immunity test in which short interruptions are applied to the power supply voltage.	• 0% of rated voltage, 0.5cycle • 0% of rated voltage, 250/300cycle (50Hz/60Hz) • 40% of rated voltage, 10/12cycle (50Hz/60Hz) • 70% of rated voltage, 25/30cycle (50Hz/60Hz)

*1 This product is an open type device (a device designed to be housed inside other equipment) and must be installed inside a conductive control panel.
*2 QP: Quasi-peak value
*3 AV: Average value

Installation instructions for EMC directive

Installation

Installing inside a control panel not only ensures safety but also ensures effective shielding of position board-generated electromagnetic noise.

■Control panel

- Use a conductive control panel.
- When attaching the control panel's top plate or base plate, expose bare metal surface and weld so that good surface contact can be made between the panel and plate.
- To ensure good electrical contact with the control panel, mask the paint on the installation bolts of the inner plate in the control panel so that contact between surfaces can be ensured over the widest possible area.
- Ground the control panel with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies.
- Holes made in the control panel must be 10cm (3.94inch) diameter or less. If the holes are 10cm (3.94 inch) or larger, radio frequency noise may be emitted. In addition, because radio waves leak through a clearance between the control panel door and the main unit, reduce the clearance as much as practicable. The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.

■Connection of power line and ground wire

Ground wire and power supply cable for the host personal computer must be connected as described below.

- Provide a grounding point near the FG terminal. Ground the FG terminals (Frame Ground) with the thickest and shortest wire possible. (The wire length must be 30cm (11.81inch) or shorter.) The FG terminals function is to pass the noise generated in the position board to the ground, so the ground wire ensures a low impedance as possible. Because the wire does the role to transfer the noise, the wire itself carries a large noise content and thus short wiring means that the wire is prevented from acting as an antenna.
- Twist the ground wire drawn out from grounding point with the power line. By twisting the power line with ground wire, it can transfer the noise more from power line to the ground. However, if the noise filter is attached to the power line, it might be unnecessary to twist with the ground wire.

■Forced stop input cable

The forced stop input cable length must be within 30m (98.43ft.).

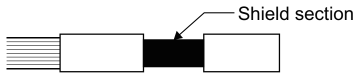
■Cable

The cables extracted from the control panel contain a high frequency noise component. On the outside of the control panel, therefore, they serve as antennas to emit noise. To prevent noise emission, use shielded cables for the cables extracted to the outside of the control panel.

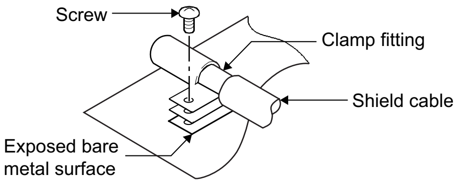
The use of a shielded cable also increases noise resistance.

<Grounding of shield section of shield cable>

- When the grounded cables and the not yet grounded cables are bundled in grounding point of shielded cable back, the cables might be induced to electromagnetic and generated high frequency noise outside of the control panel.
- Ground the exposed shield section to spacious area on the control panel.

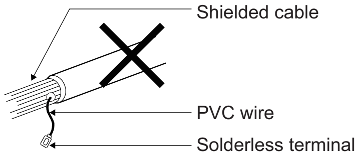


- A clamp can be used as shown below. In this case, mask the inner wall surface when coating the control panel, and contact the exposed shield section with the clamp at the exposed bare metal surface.



Point

The method of grounding with a vinyl-coated wire soldered onto the shielded section of the shielded cable is not recommended. Doing so may raise the high frequency impedance, resulting in loss of the shielding effect.



■Precautions relevant to the electrostatic discharge

Before handling the position board, always touch a grounded metal, etc. to discharge static electricity from a human body. Failure to do so may cause failure or malfunction of the position board.

Do not directly touch the conductive parts of position board and electronic components. Touching them could cause an operation failure or damage the position board.

Parts of measure against noise

■Ferrite core

A ferrite core is effective for reducing radiated noise in the 30MHz to 100MHz frequency band.

Installing a ferrite core to the cable is not essential, however, it is recommended to install a ferrite core if a shield cable extended out of the control panel does not provide sufficient shielding effects.

Install a ferrite core to the cable in the position just before the cable is extended out of the control panel. If the installation position is not appropriate, the ferrite core does not produce any effect.

- Recommended ferrite core

Manufacturer	Model name
TDK Corporation	ZCAT3035-1330

■Noise filter (power supply line filter)

A noise filter is effective for reducing conducted noise.

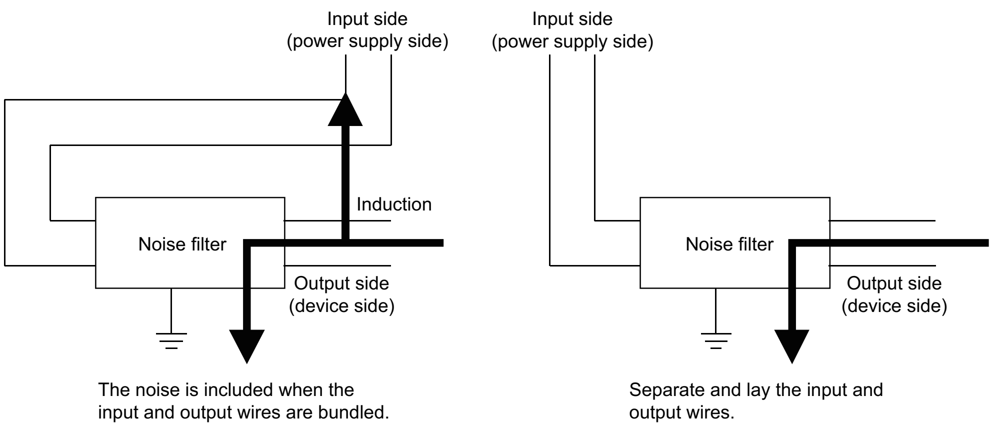
The attachment of the noise filter to the power supply line of the servo amplifier and system's power supply is effective for the reducing noise. (The noise filter has the effect of reducing conducted noise of 10MHz or less.)

- Recommended noise filter

Manufacturer	Model name	Rated current (A)	Rated voltage (V)
SCHAFFNER	FN343-3/01	3	250
	FN660-6/06	6	
TDK Corporation	ZHC2203-11	3	

Precautions

- Do not bundle the wires on the input side and output side of the noise filter. When bundled, the output side noise is induced into the input side wires from which the noise was filtered.



- Ground the noise filter grounding terminal to the control panel with the shortest wire possible (approx. 10cm (3.94 inch)).

14.2 Measures to Comply with the Low Voltage Directive

This board does not use the power supply of 50VAC to 1000VAC and 75VDC to 1500VDC, so it is a product outside the object range of Low Voltage Directive.

APPENDIX

Appendix 1 Supplementary Explanation for the Use of Linear Servo System

Position board

There are no restrictions in the software versions of the position board that can set up the linear servo system.

Position board utility software

There are no restrictions in the Position Board Utility2 versions supporting position board.

Servo amplifier

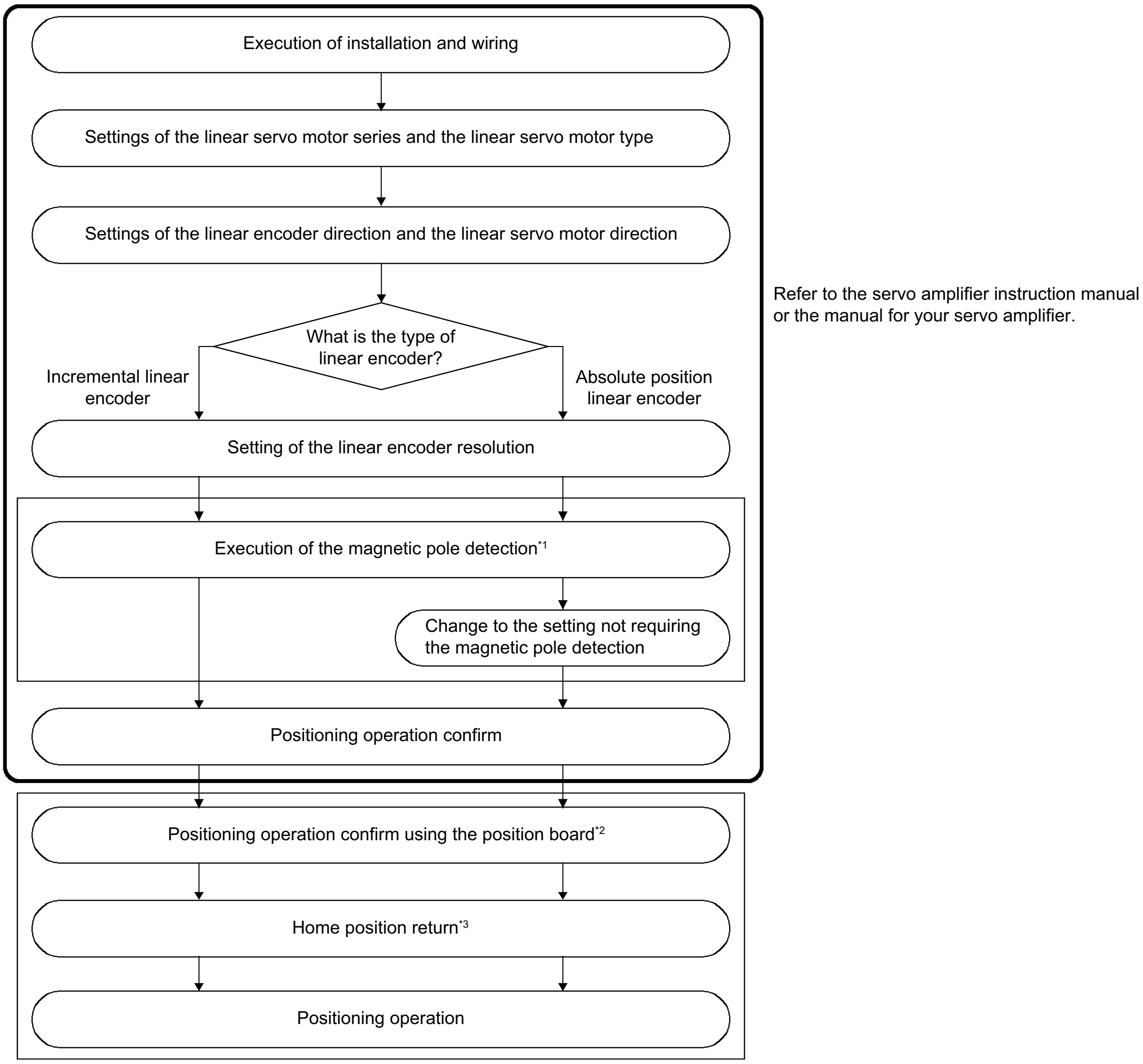
The servo amplifier MR-J4(W_)-_B and MR-J5(W_)-_B*1 can set linear servo system with the position board. For detailed specifications of the servo amplifier, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

*1 For MR-J5(W_)-_B, only be used in MR-MC3_ _

Operations and functions of the linear servo system

Startup procedure

Linear servo system startup procedures are as follows.



*1 ☞ Page 756 Magnetic pole detection

*2 ☞ Page 758 Operation from the position board

*3 ☞ Page 760 Home position return operation

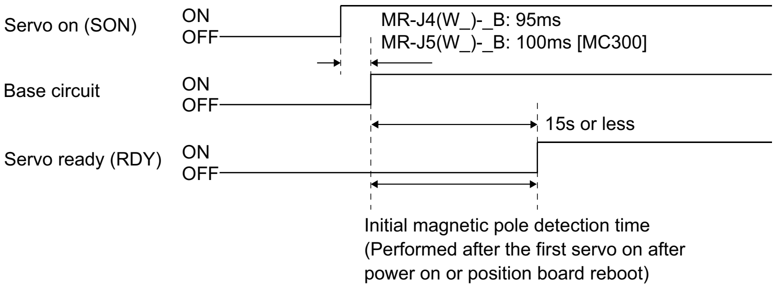
Magnetic pole detection

For the magnetic pole detection methods, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

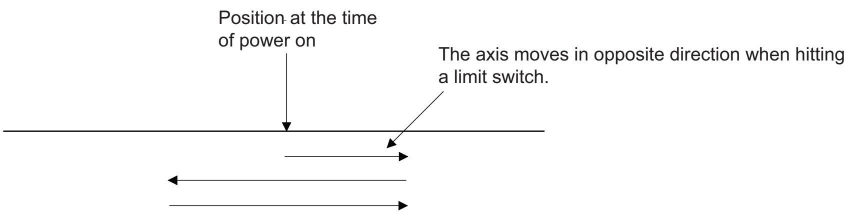
When an incremental scale is used, magnetic pole detection is performed at every power on. The magnetic pole detection is started when the first servo on command following power on is received. Completion of the magnetic pole detection turns the servo on.

■For a single axis

- Timing char

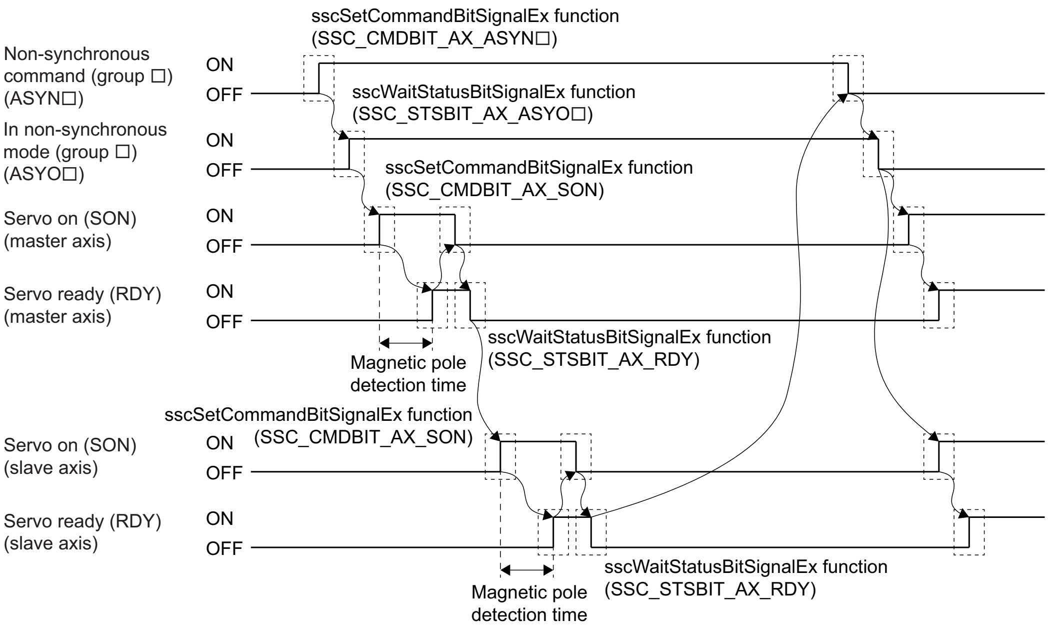


- Axis movement in magnetic pole detection



■For tandem drive axes

For tandem drive axes, perform magnetic pole detection for the master axis, and then for the slave axis in the non-synchronous micro-adjustment mode. Make sure the axis where magnetic pole detection is not performed is servo off (free).



- As shown on the timing chart above, during magnetic pole detection operation, it takes up to 15s from the servo on signal (SON) turning ON to the servo ready signal (RDY) turning ON. Before using the API library, set 15s or more to the time-out period in sscWaitStatusBitSignalEx function, and wait until the servo on.
- Establish the machine configuration using a limit switch. Collision may be caused between components without a limit switch.
- In initial magnetic pole adjustment, a controlled object may move in the forward direction or reverse direction.
- For tandem drive axes, do not turn servo on simultaneously for both the master and slave axes.
- Magnetic pole detection time is the operating time when the stroke limit signal (FLS/RLS) is ON.
- When switching between non-synchronous mode/synchronous mode, confirm that all of the following conditions are satisfied.
  - The in-position signal (INP) is ON for both the master axis and slave axis.
  - No operation alarm has occurred for both the master axis and slave axis.

A

Operation from the position board

Positioning operation using the position board is basically the same as operation for using a rotary servo motor.
However, some parameters, home position return operation, and monitor No. vary from when using a rotary servo motor.
Details are as follows.

■Parameter

When using the linear servo system, set the parameters shown on the table below.
For other servo parameters, control parameters, and system parameters, set them as equivalent to using standard control mode (operation mode).

- Servo parameters

  For details about each parameter, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

[MR-J4(W_)-_B]

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol*1	Name
1100	PA01	**STY	Operation mode
1110	PA17	**MSR	Servo motor series setting
1111	PA18	**MTY	Servo motor type setting
1180	PC01	ERZ	Error excessive alarm level
1182	PC03	*ENRS	Encoder output pulse selection
119A	PC27	**COP9	Function selection C-9
1300	PL01	**LIT1	Linear servo motor/DD motor function selection 1
1301	PL02	**LIM	Linear encoder resolution setting Numerator
1302	PL03	**LID	Linear encoder resolution setting Denominator
1303	PL04	*LIT2	Linear servo motor/DD motor function selection 2
1304	PL05	LB1	Position deviation error detection level
1305	PL06	LB2	Speed deviation error detection level
1306	PL07	LB3	Torque/thrust deviation error detection level
1307	PL08	*LIT3	Linear servo motor/DD motor function selection 3
1308	PL09	LPWM	Magnetic pole detection voltage level
1310	PL17	LTSTS	Magnetic pole detection - Minute position detection method - Function selection
1311	PL18	IDLV	Magnetic pole detection - Minute position detection method - Identification signal amplitude

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

[MR-J5(W_)-_B] [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol*1	Name
2000	PA01	**STY	Operation mode
2010	PA17	**MSR	Servo motor series setting
2011	PA18	**MTY	Servo motor type setting
2093	PC01	ERZ	Excessive error alarm trigger level
2095	PC03	*ENRS	Encoder output pulses selection
20AD	PC27	**COP9	Function selection C-9
22E5	PL01	**LIT1	Function selection L-1
22E6	PL02	**LIM	Linear encoder resolution setting - Numerator
22E7	PL03	**LID	Linear encoder resolution setting - Denominator
22E8	PL04	*LIT2	Function selection L-2
22E9	PL05	LB1	Position deviation error detection level
22EA	PL06	LB2	Speed deviation error detection level
22EB	PL07	LB3	Torque deviation error detection level
22EC	PL08	*LIT3	Function selection L-3

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol*1	Name
22ED	PL09	LPWM	Magnetic pole detection - Voltage level
22F5	PL17	LTSTS	Magnetic pole detection - Minute position detection method - Function selection
22F6	PL18	IDLV	Magnetic pole detection - Minute position detection method - Identification signal amplitude

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Point

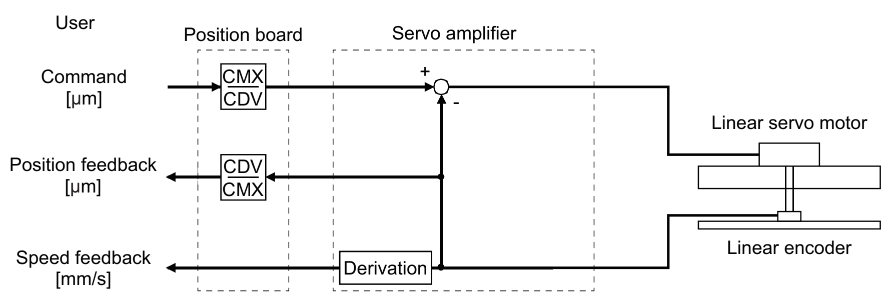
[MC300]
For MR-J5(W_)-_B, the fully closed loop system cannot be used in combination with the linear servo system.

• Control parameters

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 2111h	□■■■ (Speed unit) Set the speed command unit. • 0: Position command unit/min • 1: Position command unit/s When using a linear servo amplifier, select [0: position command unit/min] or [1: position command unit/s] as the speed command unit. [2: r/min] cannot be used as the speed command unit.
020A	*CMXL	Electronic gear numerator (lower)	0001h	—	1 to 5242879*2 (32bit)	Set the numerator of the electronic gear. For setting methods, refer to the following. ☞ Page 759 Setting example of electronic gears
020B	*CMXH	Electronic gear numerator (upper)	0000h			
020C	*CDVL	Electronic gear denominator (lower)	0001h	—	1 to 589823*2 (32bit)	Set the denominator of the electronic gear. For setting methods, refer to the following. ☞ Page 759 Setting example of electronic gears
020D	*CDVH	Electronic gear denominator (upper)	0000h			
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. • 0000h: Mitsubishi Electric
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Set the type code. • 1000h: MR-J4(W_)-_B • 1400h: MR-J5(W_)-_B [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 For details on the setting range, refer to the following.
☞ Page 148 Position command unit - electronic gear

• Setting example of electronic gears



Conditions

Command unit: μm
Linear encoder resolution: 0.05 μm

$$\frac{\text{Number of pulses (CMX) [pulse]}}{\text{Movement amount (CDV) [μm]}} = \frac{1}{0.05} = \frac{20}{1}$$

■Home position return operation

The home position return operation from the position board is basically the same as operation for using a rotary servo motor. However, note the following.

- When using the absolute position type linear scale, the home position return using a scale home position signal detection method or the home position return using a scale home position signal detection method 2 cannot be used. The other home position return methods are available and a home position return is performed to the reference home position created based on stop interval settings for the home position return.
- When using the incremental linear scale, it is recommended to use the home position return using a scale home position signal detection method or the home position return using a scale home position signal detection method 2. In this case, the home position return is performed based on the home position signal (Z-phase). The reference home position which is created based on stop interval settings for the home position return is not used.
- When using the incremental scale, the home position return using a Z-phase detection method cannot be used.
- With the incremental scale, when using a home position return method other than the home position return using a scale home position signal detection method or the home position return using a scale home position signal detection method 2, "1: Search again" must be set for "Home position signal re-search" of "Home position return option 1 (parameter No.0240)". In this case, the home position return is performed based on the home position return reference position which is created based on stop interval settings for the home position return and the home position signal (Z-phase).

[Control parameter]

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0240	*OPZ1	Home position return option 1	0000h	—	0000h to 112Dh	■■■□ (Home position return method) Set the method for home position return. • 0: Dog method • 2: Data set method • 3: Stopper method • 4: Dog cradle method • 5: Limit switch combined method • 6: Scale home position signal detection method • 7: Limit switch front end method • 8: Dog front end method • C: Z-phase detection method • D: Scale home position signal detection method 2 □■■■ (Home position signal re-search) Set "1: Search again" when using an incremental encoder or incremental linear scale. • 0: Do not search again • 1: Search again

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

[Servo parameter (MR-J4(W_)-_B)]

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
1300	PL01	**LIT1	Linear servo motor/ direct drive motor function selection 1	0301h	—	0000h to 0605h	■□■■ (Stop interval setting for home position return) • 0: 8192pulse • 1: 131072pulse • 2: 262144pulse • 3: 1048576pulse • 4: 4194304pulse • 5: 16777216pulse • 6: 67108864pulse

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following condition.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

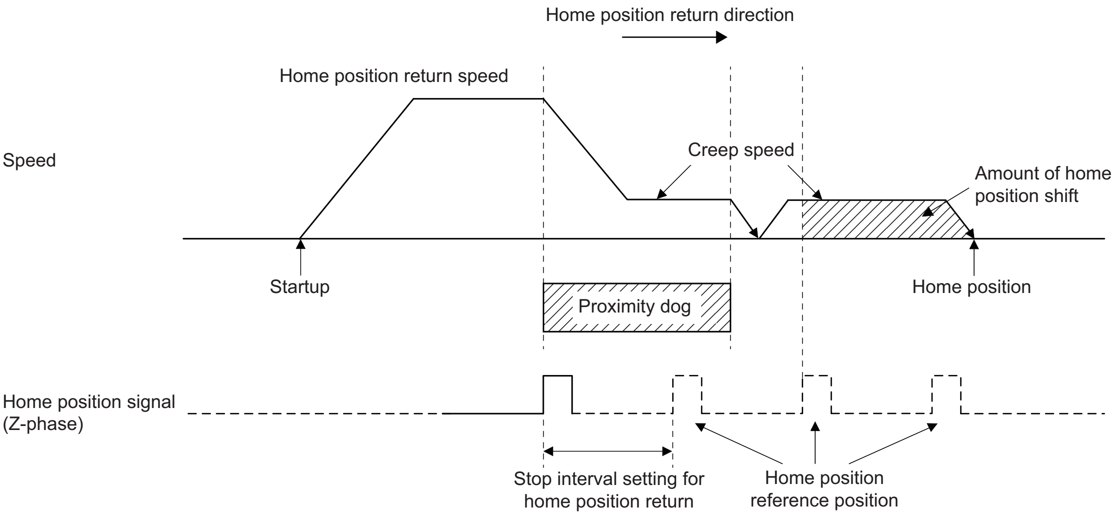
[Servo parameter (MR-J5(W_)-_B)] [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
22E5	PL01	**LIT1	Function selection 1	0301h	—	00000000h to 00000605h	■■■■■□■■ (Stop interval setting for home position return) • 0: 8192pulse • 1: 131072pulse • 2: 262144pulse • 3: 1048576pulse • 4: 4194304pulse • 5: 16777216pulse • 6: 67108864pulse

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following condition.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Ex.

Home position reference position for home position return using a dog method



Point

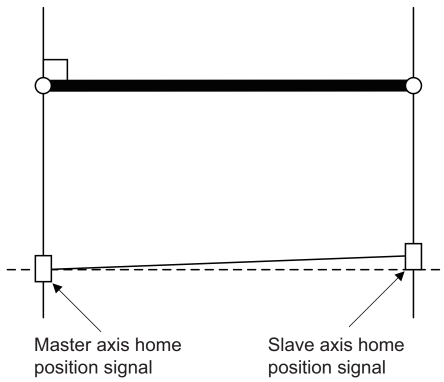
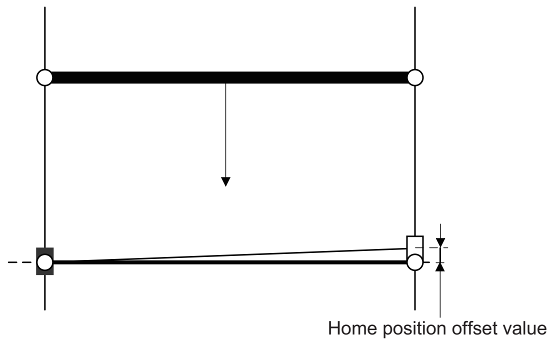
- Adjust the position of the proximity dog sensor so that a stop position following the passed proximity dog is not near the reference home position. The reference home position may differ due to dispersion in the proximity dog signal detection, etc., which may prevent normal completion of the home position return.
- When the reference home position is passed during deceleration after the proximity dog is passed, the reference home position that is the closest to the home position direction is defined as the home position.
- For the other precautions, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

■Home position return process for tandem drive axes

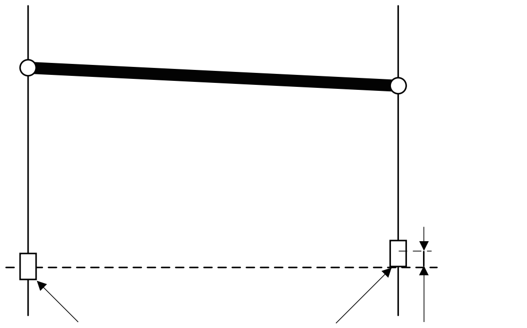
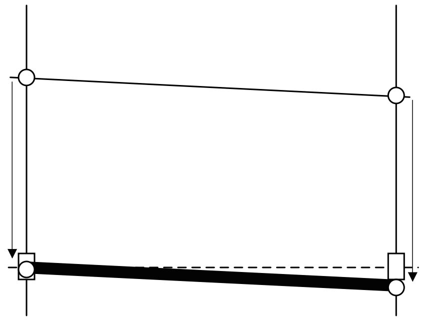
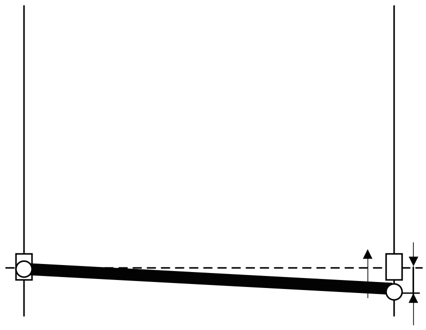
The following shows an example of the home position return for the tandem drive axes. In this example, "Scale home position signal detection method" is used as a home position method. "Scale home position signal detection method" has "Adjustment mode" and "Normal mode", which can be selected in "Tandem drive options (parameter No.0265)".

Scale home position signal detection method	Description
Adjustment mode	This mode is used, for example, during adjustment at factory shipment, and is used to calculate the home position signal offset (amount of deviation in the position of the home position signal for the master axis and slave axis) on a linear scale.
Normal mode	In this mode, the amount of deviation between the master axis and slave axis is detected and tweaking (compensation of deviation between master axis and slave axis) is performed. This movement sets the axis linking the master axis and slave axis mechanically at a right angle to the movement direction.

- In adjustment mode

Home position return procedure	Remarks
1. Micro-adjustment of position of slave axis.	Set the axes and the joint part mechanically at a right angle.(It is not guaranteed that the line between both home position signals and the both axes are crossed at a right angle.) 
2. Execution of home position return using a home position signal detection method (adjustment mode). "Tandem drive home position signal offset (parameter No.026C, 026D)" is saved on the user program side after home position return complete.	By home position return processing, the axis moves to the home position signal position of the master axis. At this time, the offset amount of the master axis and the slave axis is output to "tandem drive home position signal offset (parameter No.026C, 026D)". 

• In normal mode

Home position return procedure	Remarks
1. Setting of "Tandem drive home position signal offset (parameter No.026C, 026D)" which has been set in the adjustment mode.	It is not guaranteed that the axes and the joint part are connected at a right angle when the power is turned ON. 
2. Execution of home position return using a home position signal detection method (normal mode).	By home position return processing, the axis moves to the home position signal position of the master axis.  By home position return processing, the deviation amount of the slave axis is compensated. 
3. Calculation of deviation amount from the target home position (compensation value) by camera, etc.	—
4. Compensation of home position coordinate by home position reset function. (Resetting of home position coordinate)	—

A

■Monitor

The following monitor Nos. are added.

- Servo information (2)

Monitor No. (hexadecimal)	Description	Unit	Description
0246	Load side encoder information data 1 (lower)	pulse	For incremental type linear encoder, displays the counter from power on. For absolute position type linear encoder, displays the absolute position data.
0247	Load side encoder information data 1 (upper)		
0248	Load side encoder information data 2 (lower)	—	For incremental type linear encoder, displays the distance (number of pulses) from reference mark (Z-phase). For absolute position type linear encoder, displays "00000000".
0249	Load side encoder information data 2 (upper)		
024A	Speed feedback (lower)	0.01mm/s	Display motor speed in units of 0.01mm/s.
024B	Speed feedback (upper)		

For the following monitor Nos., the monitor data details vary from those of a rotary servo motor.

- Servo information (1)

Monitor No. (hexadecimal)	Description	Unit	Description
0112	Motor rated revolution speed	r/min	Display the value calculated in the equations shown below. Motor rated speed [m/s] × 1000 × 1000 × 60/Scale resolution [μm/pulse]/Stop interval at home position return [pulse]
0114	Motor maximum revolution speed	r/min	Display the value calculated in the equations shown below. Motor rated speed [m/s] ×1000 × 1000 × 60/Scale resolution [μm/pulse]/Stop interval at home position return [pulse]
0116	Number of encoder pulses per revolution (lower)	pulse	For MR-J4(W_)-_B, display the stop interval during home position return set in "Linear servo motor/DD motor function selection 1 (parameter No.1300)". For MR-J5(W_)-_B, display the stop interval during home position return set in "Function selection L-1 (parameter No.22E5)". [MC300]
0117	Number of encoder pulses per revolution (upper)		
0119	Initial within 1 revolution position (lower)	pulse	Display the within 1 revolution position at the time of power-on.*1
011A	Initial within 1 revolution position (upper)		
011B	Initial multiple revolution data	rev	Display the multiple revolution data at the time of power-on.*2

- Servo information (2)

Monitor No. (hexadecimal)	Description	Unit	Description
0208	Speed feedback (lower)	0.01mm/s	Display motor speed in units of 0.01mm/s.
0209	Speed feedback (upper)		
020E	Detector within 1 revolution position (lower)	pulse	Display the current position within 1 revolution.*1
020F	Detector within 1 revolution position (upper)		
0210	Home position within 1 revolution position (lower)	pulse	Display the home position within 1 revolution.*1
0211	Home position within 1 revolution position (upper)		
0214	Multiple revolution counter	rev	Display the current multiple revolution counter.*2
0215	Home position multiple revolution data	rev	Display the home position multiple revolution data.*2

*1 Incremental linear encoder: Setting the position at the time of power on as 0, the position normalized by the stop interval during home position.
Absolute position linear encoder: Setting the linear encoder home position (absolute position data 0), the position normalized by the stop interval during home position.

*2 Incremental linear encoder: Setting the position at the time of power on as 0, the counter that counts up or down by the stop interval during home position return.
Absolute position linear encoder: Setting the linear encoder home position (absolute position data 0), the counter that counts up or down by the stop interval during home position return.

■Command units

When using speed control mode in interface mode, the conversion of data in units of 0.01r/min is required. The formula for conversion is as follows.

$$\text{Speed command [0.01r/min]} = \frac{\text{Speed command [m/s]} \times 1000 \times 1000 \times 60 \times 100}{\text{Linear encoder resolution [μm/pulse]} \times \text{Stop interval setting for home position return [pulse]}}$$

$$\text{Linear encoder resolution [μm/pulse]} = \frac{\begin{array}{c}\text{Linear encoder resolution setting Numerator} \\ \text{(MR-J4(W\_)-\_B: parameter No.1301, MR-J5(W\_)-\_B: parameter No.22E6 [MC300])}\end{array}}{\begin{array}{c}\text{Linear encoder resolution setting Denominator} \\ \text{(MR-J4(W\_)-\_B: parameter No.1302, MR-J5(W\_)-\_B: parameter No.22E7 [MC300])}\end{array}}$$

Appendix 2 Supplementary Explanation for the Use of Fully Closed Loop System

Position board

There are no restrictions in the software versions of the position board that can set up the fully closed loop system.

Position board utility software

There are no restrictions in the Position Board Utility2 versions supporting position board.

Servo amplifier

The software versions of the servo amplifier that can set up the fully closed loop system with the position board are as follows.

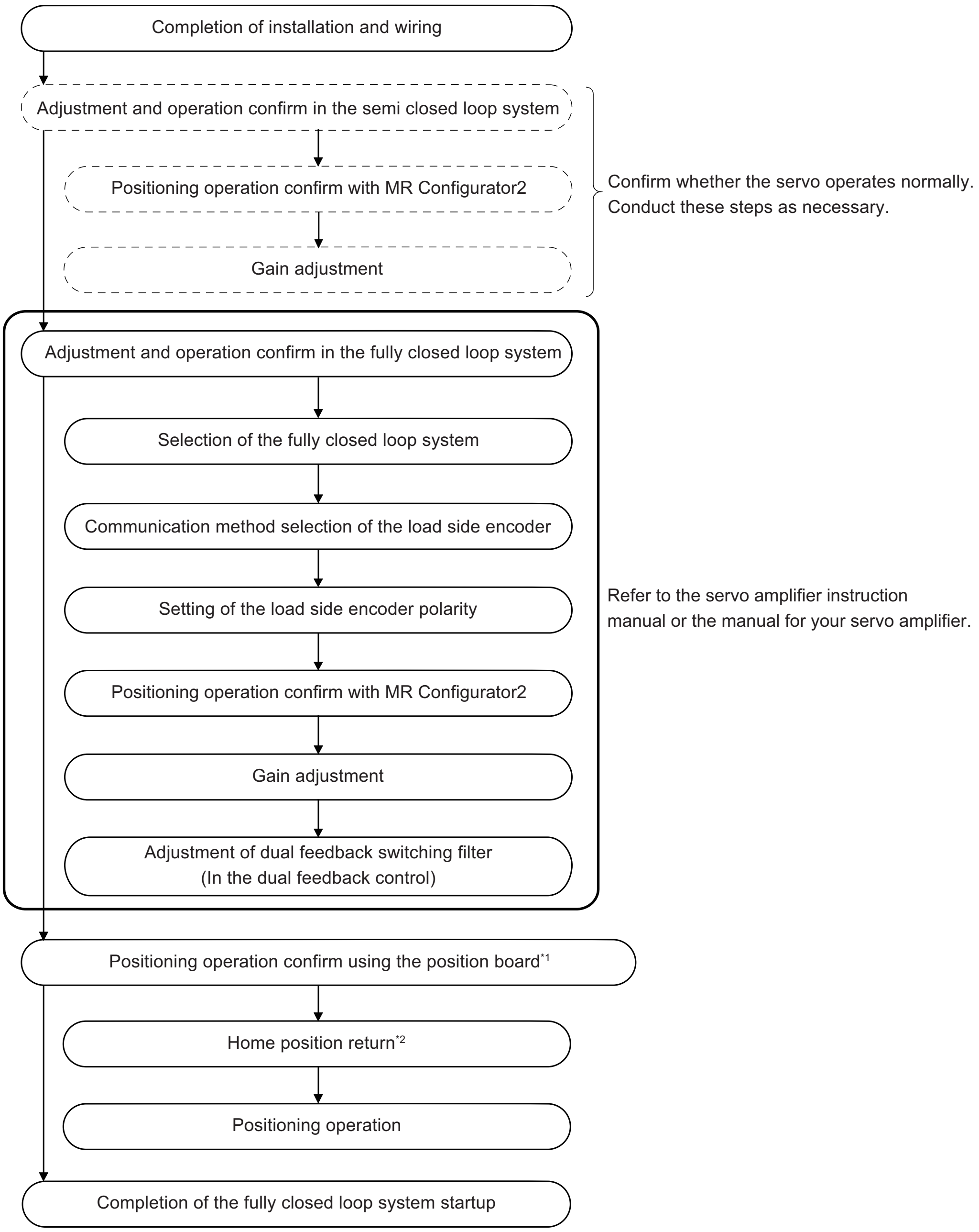
Servo amplifier	Software version
MR-J4(W_)-_B	A3 or later
MR-J5(W_)-_B [MC300]	C4 or later

For detailed specifications of the servo amplifier, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

Operations and functions of the fully closed loop control

Startup procedure

The fully closed loop system startup procedures are as follows.



*1 ☞ Page 768 Operation from the position board
*2 ☞ Page 770 Home position return operation

Operation from the position board

Positioning operation using the position board is basically the same as operation for using a rotary servo motor.
However, some parameters, home position return operation, command/status bit, and monitor No. vary from when using a rotary servo motor. Details are as follows.

■Parameters

When using the fully closed loop system, set the parameters shown on the table below.
For other servo parameters, control parameters, and system parameters, set them as equivalent to using a rotary servo motor.

- Servo parameters

  For details about each parameter, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

[MR-J4(W_)-_B]

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol*1	Name
1100	PA01	**STY	Operation mode
1190	PC17	**COP4	Function selection C-4
119A	PC27	**COP9	Function selection C-9
1200	PE01	**FCT1	Fully closed loop function selection 1
1202	PE03	*FCT2	Fully closed loop function selection 2
1203	PE04	**FBN	Fully closed loop control feedback pulse electronic gear numerator 1
1204	PE05	**FBD	Fully closed loop control feedback pulse electronic gear denominator 1
1205	PE06	BC1	Fully closed loop control speed deviation error detection level
1206	PE07	BC2	Fully closed loop control position deviation error detection level
1207	PE08	DUF	Fully closed loop dual feedback filter
1209	PE10	FCT3	Fully closed loop function selection 3
1221	PE34	**FBN2	Fully closed loop control feedback pulse electronic gear numerator 2
1222	PE35	**FBD2	Fully closed loop control feedback pulse electronic gear denominator 2

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

[MR-J5(W_)-_B] [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol*1	Name
2000	PA01	**STY	Operation mode
20A3	PC17	**COP4	Function selection C-4
20AD	PC27	**COP9	Function selection C-9
2159	PE01	**FCT1	Fully closed loop function selection 1
215B	PE03	*FCT2	Fully closed loop function selection 2
215C	PE04	**FBN	Fully closed loop control feedback pulse electronic gear numerator 1
215D	PE05	**FBD	Fully closed loop control feedback pulse electronic gear denominator 1
215E	PE06	BC1	Fully closed loop control speed deviation error detection level
215F	PE07	BC2	Fully closed loop control position deviation error detection level
2160	PE08	DUF	Fully closed loop dual feedback filter
2162	PE10	FCT3	Fully closed loop function selection 3

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Point

[MC300]

- The setting of "Operation mode (MR-J4(W_)-_B: parameter No.1100, MR-J5(W_)-_B: parameter No.2000)" differs between MR-J4(W_)-_B and MR-J5(W_)-_B. Set "Fully closed loop operation mode selection" of "Operation mode (parameter No.2000)" to "1: Enabled (fully closed loop control mode)"when validating the fully closed loop system with MR-J5(W_)-_B.
- For MR-J5(W_)-_B, the fully closed loop system cannot be used in combination with the linear servo system or the direct drive servo system.

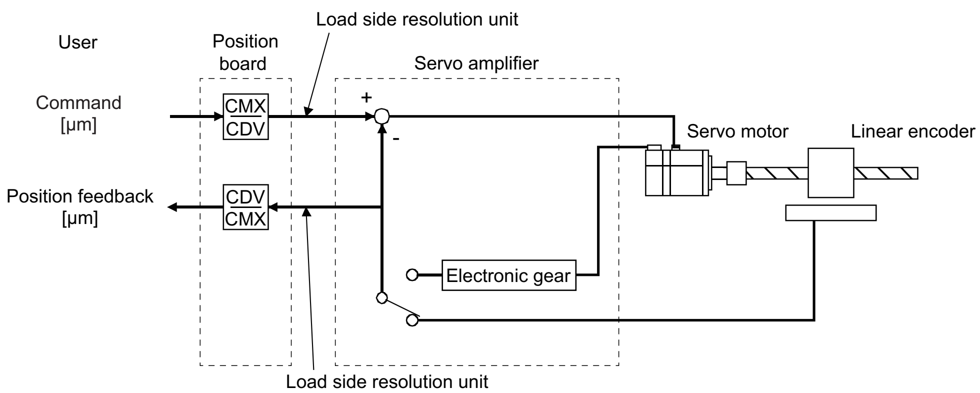
- Control parameters

Parameter No.	Symbol *1	Name	Initial value	Unit	Setting range	Description
020A	*CMXL	Electronic gear numerator (lower)	0001h	—	1 to 5242879*2 (32bit)	Set the numerator of the electronic gear. For setting methods, refer to the following. ☞ Setting example of electronic gears
020B	*CMXH	Electronic gear numerator (upper)	0000h			
020C	*CDVL	Electronic gear denominator (lower)	0001h	—	1 to 589823*2 (32bit)	Set the denominator of the electronic gear. For setting methods, refer to the following. ☞ Setting example of electronic gears
020D	*CDVH	Electronic gear denominator (upper)	0000h			
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. • 0000h: Mitsubishi Electric
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Set the type code. • 1000h: MR-J4(W_)-_B • 1400h: MR-J5(W_)-_B [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 The setting range differs depending on the setting of "Speed unit" in "Control option 1 (parameter No.0200)". For details on the setting range, refer to the following.
☞ Page 148 Position command unit - electronic gear

- Setting example of electronic gears

For the electronic gear numerator (CMX), set the number of linear encoder pulses (= load side resolution unit) per revolution of the servo motor, not the number of pulses per revolution of the servo motor.



Conditions

- Command unit: μm
- Ball screw lead: 20mm
- Linear encoder resolution: 0.05μm

Ball screw lead / Linear encoder resolution = 20mm / 0.05μm = 400000pulses

$$\frac{\text{Number of pulses per revolution [pulse] (CMX)}}{\text{Movement amount per revolution [μm] (CDV)}} = \frac{\text{400000pulses}}{\text{20mm}} = \frac{400000}{20000} = \frac{20}{1}$$

■Home position return operation

The home position return operation from the position board is basically the same as operation for using a rotary servo motor. However, note the following.

- When using the incremental linear scale, it is recommended to use the home position return using a scale home position signal detection method or the home position return using a scale home position signal detection method 2. In this case, the home position return is performed based on the home position signal (Z-phase). The reference home position which is created based on the number of encoder pulses per revolution of the servo motor is not used.
- The home position return using a Z-phase detection method cannot be used.
- When using a home position return method other than the scale home position signal detection method or the scale home position signal detection method 2, "1: Search again" must be set for "Home position signal re-search" of "Home position return option 1 (parameter No.0240)".

[Control parameter]

Parameter No.	Symbol[*1]	Name	Initial value	Unit	Setting range	Description
0240	*OPZ1	Home position return option 1	0000h	—	0000h to 112Dh	■■■□ (Home position return method) Set the method for home position return. • 0: Dog method • 2: Data set method • 3: Stopper method • 4: Dog cradle method • 5: Limit switch combined method • 6: Scale home position signal detection method • 7: Limit switch front end method • 8: Dog front end method • C: Z-phase detection method • D: Scale home position signal detection method 2 □■■■ (Home position signal re-search) Set "1: Search again" when using an incremental encoder or incremental linear scale. • 0: Do not search again • 1: Search again

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

- For the other precautions, refer to the servo amplifier instruction manual for your servo amplifier.

■Bit information

The following the fully closed loop control change command signal (FCLS) and the fully closed loop control changing signal (FCLSO) shown in the table below used to switch between the semi closed loop control and fully closed loop control.

The switching between the semi closed loop control and fully closed loop control is set with "Fully closed loop function selection 1 (MR-J4(W_)-_B: parameter No.1200, MR-J5(W_)-_B: parameter No.2159 [MC300])".

[Command bit]

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive	Description
MR-MC2_ _	MR-MC3_ _					
1008	005008	0	GAIN	Gain switching command	Each axis	—
		1	FCLS	Fully closed loop control change command	Each axis	• 0: Semi closed loop control • 1: Dual feedback control (Fully closed loop control)
		2	—	For manufacturer setting	—	—
		3	CPC	PID control command	Each axis	—
		4	—	For manufacturer setting	—	—
		5				
		6				
		7				

[Status bit]

Address (hexadecimal)		Bit	Symbol	Signal name	When in tandem drive	Description
MR-MC2_ _	MR-MC3_ _					
1068	0050A8	0	GAINO	During gain switching	Each axis	—
		1	FCLSO	Fully closed loop control changing	Each axis	• 0: During semi closed loop control • 1: During dual feedback control (During fully closed loop control)
		2	TLSO	Selecting torque limit	Each axis	—
		3	SPC	During PID control	Each axis	—
		4	—	For manufacturer setting	—	—
		5				
		6				
		7				

■Monitor

The following monitor Nos. are added.

- Servo information (2)

Monitor No. (hexadecimal)	Description	Unit	Description
0240	Selected droop pulse (lower)	pulse	The data set to the second digit from the upper of "Fully closed loop function selection 3 (MR-J4(W_)-_B: parameter No.1209, MRJ5(W_)-_B: parameter No.2162 [MC300])" is output.
0241	Selected droop pulse (upper)		
0244	Selected cumulative feed pulses (lower)	pulse	The data set to the first digit from the upper of "Fully closed loop function selection 3 (MR-J4(W_)-_B: parameter No.1209, MRJ5(W_)-_B: parameter No.2162 [MC300])" is output.
0245	Selected cumulative feed pulses (upper)		
0246	Load side encoder information data 1 (lower)	pulse	For incremental type linear encoder, displays the counter from power on. For absolute position type linear encoder, displays the absolute position data.
0247	Load side encoder information data 1 (upper)		
0248	Load side encoder information data 2 (lower)	—	For incremental type linear encoder, displays the distance (number of pulses) from reference mark (Z-phase). For absolute position type linear encoder, displays "00000000".
0249	Load side encoder information data 2 (upper)		

For the following monitor Nos., the monitor data details vary from those of a rotary servo motor.

- Servo information (1)

Monitor No. (hexadecimal)	Description	Unit	Description (upper: data, lower: unit)*1		
			Semi closed loop system*2	Fully closed loop system*2	
				Semi closed loop control*2	Fully closed loop control*2
0112	Motor rated revolution speed	r/min	Motor side Motor unit	Motor side Motor unit	Motor side Motor unit
0114	Motor maximum revolution speed	r/min	Motor side Motor unit	Motor side Motor unit	Motor side Motor unit
0116	Number of encoder pulses per revolution (lower)	pulse	Motor side Motor unit	Load side Machine unit	Load side Machine unit
0117	Number of encoder pulses per revolution (upper)				
0119	Initial within 1 revolution position (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
011A	Initial within 1 revolution position (upper)				
011B	Initial multiple revolution data	rev	Motor side Motor unit	Motor side Machine unit	Load side Machine unit

*1 Data : Motor side → Data from the servo motor encoder, Load side → Data from the load side encoder
Unit : Motor unit → Motor side encoder resolution unit, Machine unit → Load side encoder resolution unit

*2 For the definitions of the semi closed loop system, the fully closed loop system, the semi closed loop control, and the fully closed loop control, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

A

• Servo information (2)

Monitor No. (hexadecimal)	Description	Unit	Description (upper: data, lower: unit)*1		
			Semi closed loop system*2	Fully closed loop system*2	
				Semi closed loop control*2	Fully closed loop control*2
0200	Position feedback (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0201	Position feedback (upper)				
0204	Position droop (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0205	Position droop (upper)				
0208	Speed feedback (lower)	0.01r/min	Motor side Motor unit	Motor side Motor unit	Motor side Motor unit
0209	Speed feedback (upper)				
020E	Detector within 1 revolution position (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
020F	Detector within 1 revolution position (upper)				
0210	Home position within 1 revolution position (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0211	Home position within 1 revolution position (upper)				
0212	ZCT (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0213	ZCT (upper)				
0214	Multiple revolution counter	rev	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0215	Home position multiple revolution data	rev	Motor side Motor unit	Motor side Machine unit	Load side Machine unit

*1 Data: Motor side → Data from the servo motor encoder, Load side → Data from the load side encoder
Unit: Motor unit → Motor side encoder resolution unit, Machine unit → Load side encoder resolution unit

*2 For the definitions of the semi closed loop system, the fully closed loop system, the semi closed loop control, and the fully closed loop control, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

• Operation information

The contents of the following table are also applied to the corresponding monitor No. of operation information (double word).

Monitor No. (hexadecimal)	Description	Unit	Description (upper: data, lower: unit)*1		
			Semi closed loop system*2	Fully closed loop system*2	
				Semi closed loop control*2	Fully closed loop control*2
0308	Grid size (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0309	Grid size (upper)				
0310	Current command position (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0311	Current command position (upper)				
0312	Current feedback position (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0313	Current feedback position (upper)				
0314	FΔT (lower)	pulse	Motor side Motor unit	Motor side Machine unit	Load side Machine unit
0315	FΔT (upper)				

*1 Data: Motor side → Data from the servo motor encoder, Load side → Data from the load side encoder
Unit: Motor unit → Motor side encoder resolution unit, Machine unit → Load side encoder resolution unit

*2 For the definitions of the semi closed loop system, the fully closed loop system, the semi closed loop control, and the fully closed loop control, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

Appendix 3 Supplementary Explanation for the Use of Direct Drive Servo System

Position board

There are no restrictions in the software versions of the position board that can set up the direct drive servo system.

Position board utility software

There are no restrictions in the Position Board Utility2 versions supporting position board.

Servo amplifier

The servo amplifier MR-J4(W_)-_B and MR-J5(W_)-_B*1 can set the direct drive servo system with the position board. For detailed specifications of the servo amplifier, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

*1 For MR-J5(W_)-_B, only be used in MR-MC3_ _

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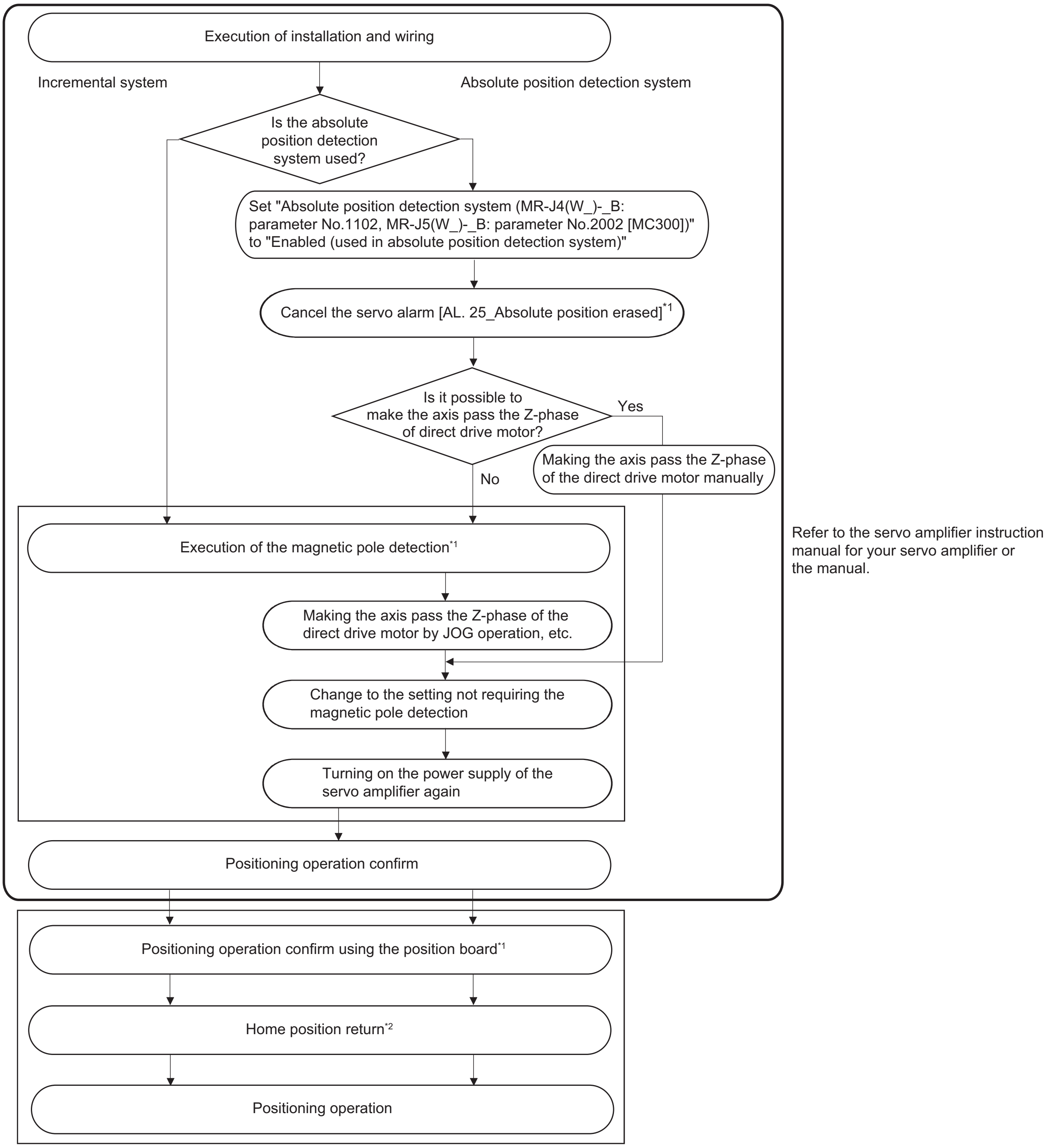
Operations and functions of the direct drive servo system

Startup procedure

The direct drive servo system startup procedures are as follows.



*1 For MR-J5(W_)-_B, the servo alarm [AL. 025_Absolute position erased] [MC300]

*2 ☞ Page 775 Operation from the position board

*3 ☞ Page 776 Home position return operation

Operation from the position board

Positioning operation using the position board is basically the same as operation for using a rotary servo motor.
However, some parameters, home position return operation, command/status bit, and monitor No. vary from when using a rotary servo motor. Details are as follows.

■Parameters

When using the direct drive system, set the parameters shown on the table below.
For other servo parameters, control parameters, and system parameters, set them as equivalent to using a rotary servo motor.

- Servo parameters

  For details about each parameter, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

[MR-J4(W_)-_B]

Parameter No.	MR-J4(W_)-_B parameter No.	Symbol*1	Name
1100	PA01	**STY	Operation mode
1180	PC01	ERZ	Error excessive alarm level
1182	PC03	*ENRS	Encoder output pulse selection
1300	PL01	**LIT1	Linear servo motor/DD motor function selection 1
1303	PL04	*LIT2	Linear servo motor/DD motor function selection 2
1304	PL05	LB1	Position deviation error detection level
1305	PL06	LB2	Speed deviation error detection level
1306	PL07	LB3	Torque/thrust deviation error detection level
1307	PL08	*LIT3	Linear servo motor/DD motor function selection 3
1308	PL09	LPWM	Magnetic pole detection voltage level
1310	PL17	LTSTS	Magnetic pole detection - Minute position detection method - Function selection
1311	PL18	IDLV	Magnetic pole detection - Minute position detection method - Identification signal amplitude

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

[MR-J5(W_)-_B] [MC300]

Parameter No.	MR-J5(W_)-_B parameter No.	Symbol*1	Name
2000	PA01	**STY	Operation mode
2093	PC01	ERZ	Error excessive alarm level
2095	PC03	*ENRS	Encoder output pulse selection
22E5	PL01	**LIT1	Linear servo motor/DD motor
22E8	PL04	*LIT2	Linear servo motor/DD motor
22E9	PL05	LB1	Position deviation error detection level
22EA	PL06	LB2	Speed deviation error detection level
22EB	PL07	LB3	Torque/thrust deviation error detection level
22EC	PL08	*LIT3	Linear servo motor/DD motor
22ED	PL09	LPWM	Magnetic pole detection voltage level
22EE	PL17	LTSTS	Magnetic pole detection - Minute position detection method - Function selection
22EF	PL18	IDLV	Magnetic pole detection - Minute position detection method - Identification signal amplitude

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
**: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Point

[MC300]
For MR-J5(W_)-_B, the fully closed loop system cannot be used in combination with the direct drive servo system.

• Control parameters

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
020A	*CMXL	Electronic gear numerator (lower)	0001h	—	1 to 5242879*2 (32bit)	Set the numerator of the electronic gear. For setting methods, refer to the following. ☞ Page 777 Position command unit
020B	*CMXH	Electronic gear numerator (upper)	0000h			
020C	*CDVL	Electronic gear denominator (lower)	0001h	—	1 to 589823*2 (32bit)	Set the denominator of the electronic gear. For setting methods, refer to the following. ☞ Page 777 Position command unit
020D	*CDVH	Electronic gear denominator (upper)	0000h			
021D	*VEND	Vendor ID	0000h	—	0000h to FFFFh	Set the vendor ID. • 0000h: Mitsubishi Electric
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Set the type code. • 1000h: MR-J4(W_)-_B • 1400h: MR-J5(W_)-_B [MC300]

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 The setting range differs depending on the setting of "Speed unit" in "Control option 1(parameter No.0200)".For the setting range, refer to the following.
☞ Page 148 Position command unit - electronic gear

■Home position return operation

The home position return operation from the position board is basically the same as operation for using a rotary servo motor. However, note the following.

- When the home position return is performed using the position board, it is recommended to use the home position return using a scale home position signal detection method 2. In this case, the home position return is performed based on the first home position signal (Z-phase) following start operation.
- The home position return using a Z-phase detection method cannot be used.
- When using a home position return method other than the home position return using a scale home position signal detection method or the home position return using a scale home position signal detection method 2, "1: Search again" must be set for "Home position signal re-search" of "Home position return option 1 (parameter No.0240)".

[Control parameter]

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0240	*OPZ1	Home position return option 1	0000h	—	0000h to 112Dh	■■■□ (Home position return method) Set the method for home position return. • 0: Dog method • 2: Data set method • 3: Stopper method • 4: Dog cradle method • 5: Limit switch combined method • 6: Scale home position signal detection method • 7: Limit switch front end method • 8: Dog front end method • C: Z-phase detection method • D: Scale home position signal detection method 2 □■■■ (Home position signal re-search) Set "1: Search again" when using an incremental encoder or incremental linear scale. • 0: Do not search again • 1: Search again

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

- For the other precautions, refer to the servo amplifier instruction manual or the manual for your servo amplifier.

■Position command unit

As "degree" cannot be used as a position command unit, note the following when using the axis as a degree axis.

Point

- For positioning the automatic operation, etc., set "Relative position command" to the auxiliary command of the point table, and set the difference of the movement amount to the target position in the position data. Also, the rotating direction is determined by the code of the position data. Use the user program for shortcut control of a degree axis.
- The function to judge based on the current command position or the current feedback position such as the position switch, software limit, other axes start cannot be used.

[When the movement range is limited (-2147483648 to 2147483647)]

For the electronic gear setting, set values so that conversion from movement amount per motor revolution to the number of encoder pulses per revolution does not produce a round value for electronic gear processing. In this case, the movement amount per motor revolution can be converted to the number of encoder pulses per revolution by the following formula.

<Example> When the position command unit is 0.001° and the movement amount per motor revolution is 360000 [0.001°]

$$\frac{\text{Electronic gear numerator}}{\text{Electronic gear denominator}} = \frac{\text{Number of encoder pulses per revolution [pulse]}}{\text{Movement amount per motor revolution [position command unit]}} = \frac{\text{Number of encoder pulses per revolution [pulse]}}{360000}$$

$$\text{Movement amount per motor revolution [position command unit]} \times \frac{\text{Electronic gear numerator}}{\text{Electronic gear denominator}} = \text{Number of encoder pulses per revolution [pulse]}$$

[When using the unlimited length feed such as an unidirectional feed]

When the movement amount per motor revolution is a power of two, the unlimited length feed can be used.

As the monitor of a current command position is 4bytes in size, unidirectional feed causes the overflow of current command position. Even though overflowed high-byte data is lost, the range of 4bytes normally continues to be updated. And positioning control is not affected. (Position mismatch does not occur.)

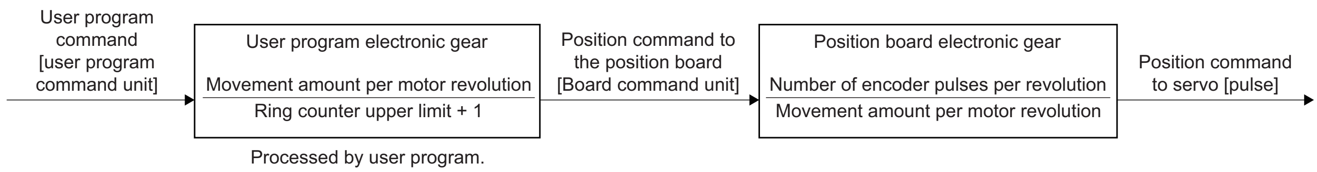
To control the axis as a degree axis, use the user program process to convert the current command position to the ring counter. As necessary, perform the same process for the current feedback position. The conversion process of the ring counter is as follows.

<Example> When the command unit of the user program (user program command unit) is 0.001° and the range of the ring counter is 0 to 359999 [0.001°]

In this example, the movement amount per motor revolution is a power of two (2^{20}), and the unit is the position command unit of the position board (board command unit).

The user program uses the user program electronic gear for converting the user program command unit to the board command unit when the position command (position data, parameter, etc.) is set in the position board (hereinafter: board). Also, when the board current command position is referred, the user program uses the user program electronic gear for converting the board command unit to the user program command unit (ring counter) inversely.

The relationship of each command unit is as follows.



■Conversion from the user program position command [user program command unit] to the position command to the board (position data) [board command unit]

$$\text{Position data} = \text{User program position command} \times \frac{\text{Movement amount per motor revolution}}{\text{Ring counter upper limit + 1}}$$

$$= \text{User program position command} \times \frac{2^{20}}{360000}$$

■Inverse conversion from current command position [board command unit] to ring counter [user program command unit]

$$\text{Ring counter} = \{\text{Current command position \& (Movement amount per motor revolution - 1)}\} \times \frac{\text{Ring counter upper limit + 1}}{\text{Movement amount per motor revolution}}$$

$$= \text{(Current command position \& 0x000FFFFF)} \times \frac{360000}{2^{20}}$$

■Absolute position detection system

When the movement amount from the home position exceeds the value calculated from "32767 × number of encoder pulses per revolution" due to a unidirectional feed, etc., the absolute position cannot be restored. To restore the absolute position, when turning OFF the power supply at a position out of the range where the absolute position is restorable, establish the home position again by the home position reset function or the home position return, and store the home position information (home position multiple revolution data and home position within 1 revolution position) to the user program side.

Appendix 4 Supplementary Explanation for the Use of Multiple-axis Servo Amplifier (MR-J4W_-_B/MR-J5W_-_B)

Position board

There are no restrictions in the software versions of the position board that can be connected with a multiple-axis servo amplifier (MR-J4W_-_B/MR-J5W_-_B).

Position board utility software

There are no restrictions in the Position Board Utility2 versions supporting position board.

Servo amplifier

For detailed specifications of the multiple-axis servo amplifier (MR-J4W_-_B/MR-J5W_-_B), refer to the servo amplifier instruction manual or the manual for your servo amplifier.

Point

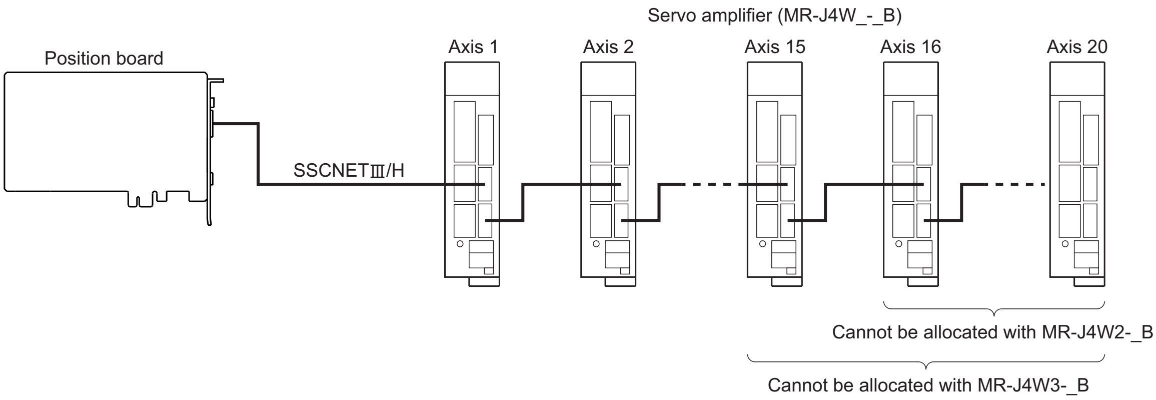
- When the control cycle is 0.22ms, MR-J4W3-_B can be used with software version A3 or later.
- The fully closed loop system can be used for the servo amplifier MR-J4W_-_B whose software version is A3 or later, or the servo amplifier MR-J5W_-_B whose software version is C4 or later.

SSCNETIII/H connection restrictions for multiple-axis servo amplifier (MR-J4W_-_B)

The multiple-axis servo amplifier (MR-J4W2-_B) cannot allocate axis 16 onwards from the start of the SSCNETⅢ/H connection.

The multiple-axis servo amplifier (MR-J4W3-_B) cannot allocate axis 15 onwards from the start of the SSCNETⅢ/H connection.

The remote I/O module is also counted as one axis.



A

Operations and functions of the servo amplifier

Startup procedure

With one multiple-axis servo amplifier (MR-J4W_-_B/MR-J5W_-_B), a rotary servo motor, linear servo motor, fully closed loop system, and direct drive motor can be used in combination.

combination	Reference
For the use of a rotary servo motor	Page 65 Startup Procedures
For the use of a linear servo motor	Page 754 Supplementary Explanation for the Use of Linear Servo System
For the use of the fully closed loop system	Page 766 Supplementary Explanation for the Use of Fully Closed Loop System
For the use of the direct drive motor	Page 773 Supplementary Explanation for the Use of Direct Drive Servo System

Point

- For the all axes used with the multiple-axis servo amplifier (MR-J4W_-_B/MR-J5W_-_B), always set "1: Controlled" to "Control axis" of "Control option 1 (parameter No.0200)". When "0: Not controlled" is set, the system cannot start properly.
- For a multiple-axis servo amplifier (MR-J4W_-_B/MR-J5W_-_B), the number of axis used can be changed using the control axis invalid switch (SW2). Deactivate unused axes.

Operation from the position board

Positioning operation using the position board is basically the same as operation for using a rotary servo motor.

For the use of a linear servo motor, refer to the following.

☞ Page 754 Supplementary Explanation for the Use of Linear Servo System

For the use of the direct drive motor, refer to the following.

☞ Page 773 Supplementary Explanation for the Use of Direct Drive Servo System

■Parameters

For servo parameters, control parameters, and system parameters, set them in the same way as the operation mode to be used (rotary motor, linear, fully closed loop system, and direct drive).

Appendix 5 Supplementary Explanation for the Use of Servo Amplifier (MR-JE-_B(F))

Position board

The software versions of the position board that can use servo amplifier (MR-JE-_B(F)) are as follows.

Position board	Software version
MR-MC2_ _	A7 or later
MR-MC3_ _	No restrictions

Position board utility software

The Position Board Utility2 versions supporting above position board are as follows.

Position board	Software version (MRZJW3-MC2-UTL)
MR-MC2_ _	1.70 or later
MR-MC3_ _	3.00 or later

Servo amplifier

For detailed specifications of the servo amplifier (MR-JE-_B(F)), refer to the servo amplifier instruction manual for your servo amplifier.

Point

- Servo amplifier (MR-JE-_B(F)) does not support SSCNETⅢ communication. Use the servo amplifier in a SSCNETⅢ/H system.
- Control cycle 0.22ms is not supported. When the system is start with the control cycle as 0.22ms and a servo amplifier (MR-JE-_B(F)) connected, the system is on standby for start and "Communication Cycle Error (system error E40EH)" occurs.
- Servo amplifier (MR-JE-_B(F)) can connect up to 16 axes on 1 line with SSCNETⅢ/H. When using 17 axes or more, up to 20 axes can be controlled on 1 line by using MR-JE-_B(F) together with MR-J4(W_)-_B.

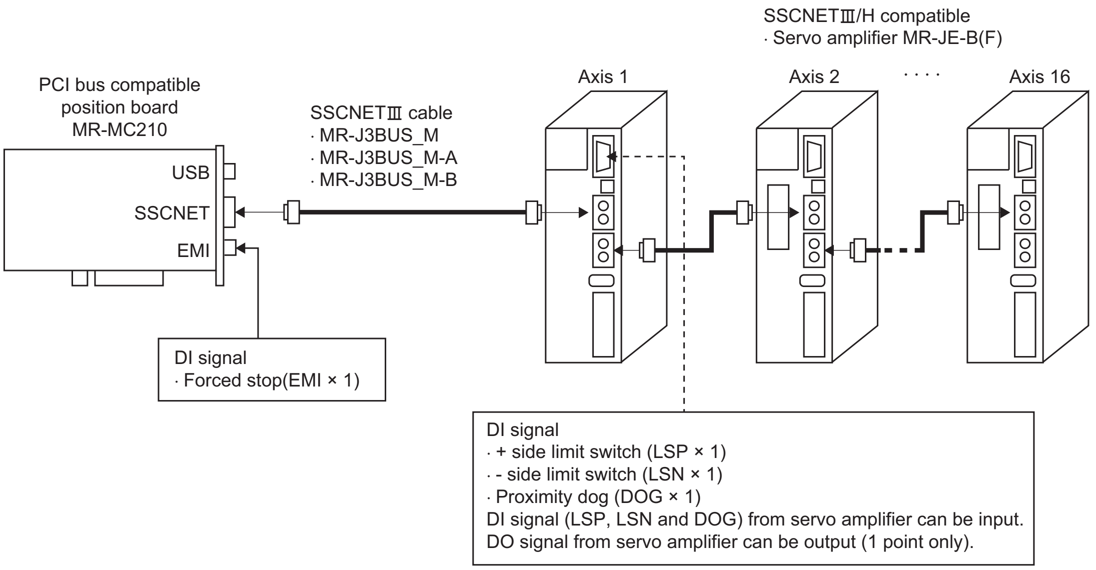
A

System configuration

System configuration diagram

Ex.

For PCI bus compatible position board MR-MC210



Point

- The input of DI signals (LSP/LSN/DOG) from servo amplifier (MR-JE-_B) is available with servo amplifiers with software version C5 or later, and manufactured from May, 2016 onwards. For servo amplifiers manufactured in China, the input of DI signals is available with servo amplifiers manufactured June, 2016 onwards.
- For servo amplifiers (MR-JE-_B(F)) manufactured before the dates above, DI signals (LSP/LSN/DOG) cannot be input to servo amplifier (MR-JE-_B(F)). When using sensor input, set a value other than "1: Driver input" to "Sensor input system" of "Sensor input options (parameter No.0219)". When inputting the sensor input from dual port (setting "4: Dual port memory input" to "Sensor input system" of "Sensor input options (parameter No.0219)"), periodically updating the input status is necessary. Also, to take into consideration when the host personal computer is hang up, use together with the user watchdog function. For details, refer to the following.

☞ Page 243 Servo Amplifier General I/O
☞ Page 386 User Watchdog Function

Axis No. setting

Servo amplifier setting

Axis No. of MR-JE-_B(F) is set by the axis selection rotary switch (SW1) on the servo amplifier. Servo amplifier axis No. and rotary switch setting are correlated as shown on the table below. Set the axis No. of the servo amplifier so that it is not duplicate in the same line. If it is duplicated, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).

Servo amplifier axis No.	Axis selection rotary switch	Servo amplifier display (3-digit, 7-segment indicator)
d1	0	01
d2	1	02
d3	2	03
d4	3	04
d5	4	05
d6	5	06
d7	6	07
d8	7	08
d9	8	09
d10	9	10
d11	A	11
d12	B	12
d13	C	13
d14	D	14
d15	E	15
d16	F	16

Parameter setting

System option 1 setting

SSCNET communication method and control cycle are set by "System option 1 (parameter No.0001)".
SSCNET communication method is used for communication between a position board and connected units such as servo amplifiers and SSCNETⅢ/H method and SSCNETⅢ method are available. When using MR-JE-_B(F) servo amplifiers, make sure to select the SSCNETⅢ/H method.
Control cycle is a cycle in which the position board conducts command import, position control, status output, and communication with servo amplifier. To set this cycle, use "Control cycle setting" of "System option 1 (parameter No.0001)".
Servo amplifier (MR-JE-_B(F)) does not support control cycle 0.22ms. When using servo amplifier (MR-JE-_B(F)), make sure to select a control cycle other than 0.22ms.
The following shows the number of controllable axes according to the control cycle.

- For MR-MC210/MR-MC220U3/MR-MC220U6/MR-MC240

Control cycle	Maximum number of axes connected		Maximum number of axes connected for each line	Controllable axis No.
	Using MR-JE-_B(F) only	Using together with MR-J4(W)-_B		
0.88ms	16 axes	20 axes	20 axes*1	Axis 1 to 20
0.44ms	16 axes	16 axes	16 axes	Axis 1 to 16

*1 When using 17 axes or more for each line, use MR-JE-_B(F) together with MR-J4(W_)-_B.

- For MR-MC211/MR-MC241

Control cycle	Maximum number of axes connected		Maximum number of axes connected for each line	Controllable axis No.
	Using MR-JE-_B(F) only	Using together with MR-J4(W)-_B		
0.88ms	32 axes	32 axes	20 axes*1	Axis 1 to 32
0.44ms	16 axes	16 axes	16 axes	Axis 1 to 16

*1 When using 17 axes or more for each line, use MR-JE-_B(F) together with MR-J4(W_)-_B.

Control cycle settings are imported during system startup (system command code: 000Ah), and cannot be changed during system running (system command code: 000Ah).

■System parameters

Parameter No.	Symbol*1	Name	Description
0001	*SYSOP1	System option1	■■■□ (Control cycle setting)*2 Set the control cycle. • 0: 0.88ms • 1: 0.44ms • 2: 0.22ms (Not use) ■□■■ (SSCNET communication method)*3 Set the SSCNET communication method. SSCNET communication method is shared in lines 1 and 2. • 0: SSCNETⅢ/H • 1: SSCNETⅢ (Not use)

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 Make sure to set a value other than "2: 0.22ms".
*3 Make sure to set "0: SSCNETⅢ/H".

■SSCNET communication method

Address (hexadecimal)	Name	Description
0008	SSCNET communication method	• 1: SSCNETⅢ • 2: SSCNETⅢ/H
0009		

Axis No. assignment

With Axis No. assignment, the axis No. (on the position board) can be assigned by the axis No. on the servo amplifier. When using only servo amplifier (MR-JE-_B(F)) and connecting 17 axes or more, the axis No. assignment function must be used to assign axes to line 2.

For details on axis No. assignment, refer to the following.

☞ Page 75 Axis No. assignment

Point

When using servo amplifier (MR-JE-_B(F)), the 17th servo amplifier axis No. and after cannot be set on 1 line.

Sensor input option setting

External signal (sensor) is connected by setting "Sensor input options (parameter No.0219)". When using a version of servo amplifier (MR-JE-_B) that does not support DI signal input, set a value other than "1: Driver input" to "Sensor input system" of "Sensor input options (parameter No.0219)".

For details on sensor input options setting, refer to the following.

☞ Page 78 Sensor input option setting

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0219	*SOP	Sensor input options	0000h	—	0000h to 0304h	■■■□ (Sensor input system) Set the input system of the sensor (LSP, LSN, DOG). Make sure to set a value other than "1: Driver input". • 0: Not use • 1: Driver input • 2: Digital or input device input • 3: Not connected (does not detect LSP, LSN, DOG) • 4: Dual port memory input ■□■■ (Limit switch signal selection) Set valid/invalid of limit switch. • 0: LSP/LSN are valid • 1: LSP is valid, LSN is invalid • 2: LSP is invalid, LSN is valid • 3: LSP/LSN are invalid

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

When "1: Driver input" is set in "Sensor input system" of "Sensor input options (parameter No.0219)", "Parameter error (servo alarm 37H)" occurs for "Input device selection (parameter No.11C2 to 11C4)".

Vendor ID and type code setting

When using servo amplifier (MR-JE-_B(F)) set 1200h to the type code.

Control parameters

Parameter No.	Symbol*1	Name	Description
021D	*VEND	Vendor ID	Set the vendor ID. • 0000h: Mitsubishi Electric
021E	*CODE	Type code	Set the type code. • 1200h: MR-JE-_B(F)

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Supported functions

Some functions and operation of the servo amplifier (MR-JE-_B(F)) differ from those of the servo amplifier MR-J4(W_)-_B. This section mainly describes functions and operations different from those of the servo amplifier MR-J4(W_)-_B. For the specification items not described in this section, refer to the specifications of servo amplifier MR-J4(W_)-_B.

Supported function list

○: Supported, △: With restrictions, ×: Unsupported

Classification	Function		Supported	Remarks
Operational function	JOG operation		○	
	Incremental feed		○	
	Automatic operation		○	
	Linear interpolation		○	
	Home position return		○	
	Home position reset function (data set function)		○	
Application function	Command unit	Electronic gear	○	
	Speed unit	Speed unit	○	
		Speed units multiplication factor	○	
		Speed limit	○	
	Acceleration/deceleration	Linear acceleration/deceleration	○	
		Smoothing filter	○	
		Start up speed enable	○	
		S-pattern acceleration/deceleration (Sine acceleration/deceleration)	○	
	Servo off		○	
	Forced stop		○	
	Stop operation		○	
	Rapid stop		○	
	Limit switch (stroke end)		○	
	Software limit		○	
	Interlock		○	
	Rough match output		○	
	Torque limit		○	
	Command change	Speed change	○	
		Change of time constants	○	
		Position change	○	
	Backlash		○	
	Position switch		○	
	Completion of operation signal		○	
	Interference check function		○	
	Home position search limit		○	
	Gain changing		○	
	PI-PID switching		○	
	Absolute position detection system		○	
	Home position return request		○	
	Other axes start		○	
	High response I/F		○	
	In-position signal		○	
	Digital I/O		○	
	I/O device		○	

Classification	Function	Supported	Remarks
Application function	Servo amplifier general I/O	△	Confirm the servo amplifier MR-JE-_B being used to confirm if general input is available or not. One point only can be used for general output.
	Dual port memory exclusive control	○	
	Pass position interrupt	○	
	Mark detection	×	
	Continuous operation to torque control	○	
	SSCNETⅢ/H head module connection	○	
	Sensing module connection	○	
Auxiliary function	Reading/writing parameters	○	
	Changing parameters at the servo	○	
	Alarm and system error	○	
	Monitor function	○	
	High speed monitor function	○	
	Interrupt	○	
	User watchdog function	○	
	Software reboot function	○	
	Parameter backup	○	
	Test mode	○	
	Reconnect/disconnect function	○	If MR-JE-_B is reconnected in a system with a 0.22ms control cycle, the reconnection error signal (RCE) turns ON, and reconnection/disconnection error code 0006h (communication cycle error) occurs.
	Sampling	○	
	Log	○	
	Operation cycle monitor function	○	
	Servo amplifier disconnect	○	Operate with the following motor specifications. • Number of encoder pulses per revolution: 131072 [pulse] • Motor maximum revolution speed: 6000 [r/min]
	Alarm history function	○	
	External forced stop disable	○	
	Transient transmit	○	
	Hot line forced stop	○	Not required when MR-JE-_BF is used.
Tandem drive	Tandem drive	○	
Interface mode	Position control mode	○	
	Speed control mode	○	
	Torque control mode	○	

A

Application functions

■Servo amplifier general I/O

For the specification of the servo amplifier general I/O, refer to the following table.

Point

The input of DI signals (LSP/LSN/DOG) from servo amplifier (MR-JE-_B) is available with servo amplifiers with software version C5 or later, and manufactured from May, 2016 onwards. For servo amplifiers manufactured in China, the input of DI signals is available with servo amplifiers manufactured June, 2016 onwards.

• Compatible servo amplifier

Model	Remarks
Servo amplifier MR-JE-_B(F)	Input: 3 points/axis Output: 1 point/axis

- Destination connector

General I/O	Signal name	Destination connector pin No.	Symbol
General input	LSP	CN3-2	DI1
	LSN	CN3-12	DI2
	DOG	CN3-19	DI3
General output	DO_□□0	CN3-13	MBR
	DO_□□1	—	—
	DO_□□2	—	—

- Servo parameters

[When using the servo amplifier general input function, set the input device selection parameters as follows.]

Parameter No.	MR-JE-B(F) Parameter No.	Symbol*1	Name	Setting value
11C2	PD03	*DI1	Input device selection 1	0028h
11C3	PD04	*DI2	Input device selection 2	0029h
11C4	PD05	*DI3	Input device selection 3	002Ah

[When using the servo amplifier general output function, set the output device selection parameters as follows.]

Parameter No.	MR-JE-B(F) Parameter No.	Symbol*1	Name	Setting value
11C6	PD07	*DO1	Output device selection 1	0021h

*1 The parameters with a * mark at the front of the symbol are validated according to the following conditions.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

Auxiliary function

■Hot line forced stop function

For the hot line forced stop function, refer to the following.

☞Page 487 Hot Line Forced Stop Function

Table map

For the table map, refer to the table map of when servo amplifier (MR-J4(W_)-_B) is used.

Parameters

Concerning the parameters for which the parameter name shows that it is set by manufacturer, do not use other than the default values. If erroneous values are set, unexpected operation can occur. For the specification items not described in this section, refer to the specifications of servo amplifier MR-J4(W_)-_B.

Classification	Parameter No.*1	Remarks
System parameters	No.0001 to 007F	—
Servo parameters	No.0100 to 01FF	Each axis
Control parameters	No.0200 to 02FF	Each axis

*1 Parameter Nos. are given in hexadecimal.

System parameters

For system parameters, only the additions and changes are listed.

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0001	*SYSOP1	System option 1	0000h	—	0000h to 0102h	■■■□ (Control cycle setting)*2 Set the control cycle. • 0: 0.88ms • 1: 0.44ms • 2: 0.22ms (Not use) ■□■■ (SSCNET communication method)*3 Set the SSCNET communication method. SSCNET communication method is shared in lines 1 and 2. • 0: SSCNETⅢ/H • 1: SSCNETⅢ (Not use)

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 Make sure to set a value other than "2: 0.22ms".
*3 Make sure to set "0: SSCNETⅢ/H".

Servo parameters

When using servo amplifier MR-JE-_B(F), initial values for the following parameters are different from MRJ4(W_)-_B(F). Set the initial value to each parameter when using it. For details, refer to the servo amplifier instruction manual for your servo amplifier.

Point

The parameters with a * mark in front of the parameter symbol are validated according to the following conditions.

- *: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
- **: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

Control parameters

For control parameters, only the additions and changes are listed.

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description	When in tandem drive
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Set the type code. • 1200h: MR-JE-_B(F)	Same value

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Monitor

For the monitor, refer to the monitor list of when MR-J4(W_)-_B is used.

System alarm

For the alarm No., only the additions and changes are listed.

Servo alarm

The servo alarms of MR-JE-_B(F) are shown in the following table. For details, refer to the servo amplifier instruction manual.

Point

For the specific servo alarm No., refer to the specifications of MR-JE-_B(F).

■Alarm

Alarm No.	Name
10H	Undervoltage
12H	Memory error 1 (RAM)
13H	Clock error
14H	Control process error
15H	Memory error 2 (EEP-ROM)
16H	Encoder initial communication error 1
17H	Board error
19H	Memory error 3 (FLASH-ROM)
1AH	Servo motor combination error
1EH	Encoder initial communication error 2
1FH	Encoder initial communication error 3
20H	Encoder normal communication error 1
21H	Encoder normal communication error 2
24H	Main circuit error
25H	Absolute position erased
30H	Regenerative error
31H	Overspeed
32H	Overcurrent
33H	Overvoltage
34H	SSCNET receive error 1
35H	Command frequency error
36H	SSCNET receive error 2
37H	Parameter error
39H	Program error
3EH	Operation mode error
45H	Main circuit device overheat
46H	Servo motor overheat
47H	Cooling fan error
50H	Overload 1
51H	Overload 2
52H	Error excessive
54H	Oscillation detection
56H	Forced stop error
61H	Operation error
8AH	USB communication time-out error/serial communication time-out error/Modbus-RTU communication time-out error
8EH	USB communication error/serial communication error/Modbus-RTU communication error
888H/88888H	Watchdog

■Warning

Alarm No.	Name
90H	Home position return incomplete warning
91H	Servo amplifier overheat warning
92H	Battery cable disconnection warning
96H	Home position setting warning
97H	Program operation disabled/next station position warning
98H	Software limit warning
99H	Stroke limit warning
9BH	Error excessive warning
9FH	Battery warning
E0H	Excessive regeneration warning
E1H	Overload warning 1
E3H	Absolute position counter warning
E4H	Parameter warning
E6H	Servo forced stop warning
E7H	Controller forced stop warning
E8H	Cooling fan speed reduction warning
E9H	Main circuit off warning
ECH	Overload warning 2
EDH	Output watt excess warning
F0H	Tough drive warning
F2H	Drive recorder . Miswriting warning
F3H	Oscillation detection warning
F5H	Simple cam function - Cam data miswriting warning
F6H	Simple cam function - Cam control warning

Appendix 6 Supplementary Explanation for the Use of SSCNETIII Compatible Servo Amplifier (MR-J3(W)-_B) [MC200]

The SSCNETⅢ/H compatible position board (MR-MC2_ _) can perform the positioning control with connecting our servo amplifier (MR-J3(W)-_B) when the SSCNET communication method is SSCNETⅢ.
In this section, the different point, comparing SSCNETⅢ/H with the servo amplifier MR-J4(W_)-_B, are mainly described.

Position board

There are no restrictions in the software versions of the position board that can be used with the SSCNETⅢ compatible servo amplifier (MR-J3(W)-_B).

Position board utility software

There are no restrictions in the Position Board Utility2 versions supporting position board.

Connectable units

The connectable units with the position board when the SSCNET communication method is SSCNETⅢ are shown below.

Item		Remarks
SSCNETⅢ compatible unit	Servo amplifier MR-J3-_B(S)	For how to use the unit, refer to this section.
	Linear servo amplifier MR-J3-_B-RJ004	For how to use the units, refer to the following. ☞ Page 754 Supplementary Explanation for the Use of Linear Servo System ☞ Page 766 Supplementary Explanation for the Use of Fully Closed Loop System ☞ Page 773 Supplementary Explanation for the Use of Direct Drive Servo System ☞ Page 779 Supplementary Explanation for the Use of Multiple-axis Servo Amplifier (MR-J4W_-_B/MR-J5W_-_B) For the servo parameters, refer to the servo amplifier instruction manual for your servo amplifier.
	Fully closed control-compatible servo amplifier MR-J3-_B-RJ006	
	2-axis servo amplifier MR-J3W-_B	
	Direct drive servo amplifier MR-J3-_B-RJ080W	
SSCNETⅢ(/H) compatible unit	MR-J4(W_)-_B	Communication by SSCNETⅢ can only be used in J3 compatibility mode. This is supported in the MR-J4(W_)-_B software version A5 or later. Also refer to the following. ☞ Page 799 Restrictions when using J3 compatibility mode For how to use the unit, refer to the explanation of MR-J3 series.

System setting

When the SSCNET communication method is SSCNETⅢ, servo amplifiers of up to 32 axes can be controlled per SSCNET control channel (CH).

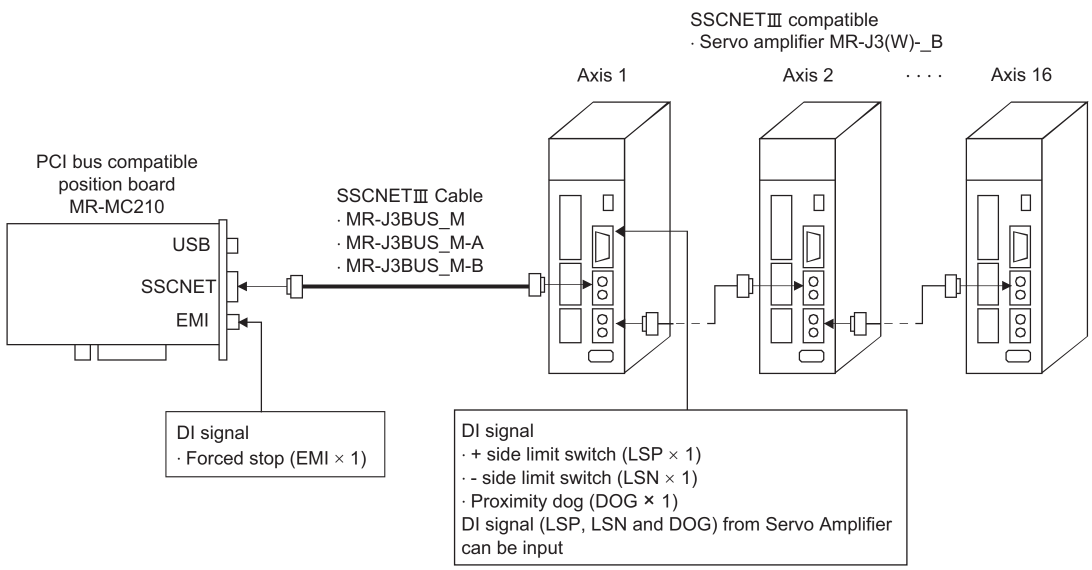
Model	Number of control axes	Remarks
MR-MC210	Up to 16 axes	Up to 16 axes can be controlled per SSCNET line.
MR-MC211	Up to 32 axes	
MR-MC220U3	Up to 16 axes	
MR-MC220U6	Up to 16 axes	
MR-MC240	Up to 16 axes	
MR-MC241	Up to 32 axes	

System configuration

System configuration diagram

Ex.

For PCI bus compatible position board MR-MC210 (when using SSCNETⅢ)



A

Axis No. setting

Axis No. is set by the axis selection rotary switch*1. The axis No. and rotary switch No. are correlated as shown on the table below. Set the axis No. of the servo amplifier so that it is not duplicate in the same SSCNET line. If it is duplicated, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).

*1 The name and setting method of the axis selection rotary switch vary depending on the unit device to be used. For details, refer to the unit device instruction manual for your unit.

Servo amplifier setting

■MR-J3(W)-_B

Axis No. of MR-J3(W)-_B is set by the axis selection rotary switch (SW1) on the servo amplifier. Servo amplifier axis No. and rotary switch setting are correlated as shown on the table below. Set the axis No. of the servo amplifier so that it is not duplicate in the same line. If it is duplicated, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).

Servo amplifier axis No.	Axis selection rotary switch	Servo amplifier display (3-digit, 7-segment indicator)
d1	0	01
d2	1	02
d3	2	03
d4	3	04
d5	4	05
d6	5	06
d7	6	07
d8	7	08
d9	8	09
d10	9	10
d11	A	11
d12	B	12
d13	C	13
d14	D	14
d15	E	15
d16	F	16

Point

- For each switch setting, refer to the servo amplifier instruction manual for your servo amplifier.
- If "An Axis That Has Not Been Mounted Exists" (system error E400H) occurred, the axis with wrong axis No. set can be confirmed with Information concerning axis that is not mounted (monitor No.0480H, 0481H) in the system information.
- The servo amplifier axis No. and the axis No. to be managed on the position board are different. For details, refer to the following.

☞ Page 797 Axis No. assignment

Parameter setting

System option 1 setting

SSCNET communication method and control cycle are set by "System option 1 (parameter No.0001)".
SSCNET communication method is used for communication between a position board and connected units such as servo amplifiers and SSCNETⅢ/H method and SSCNETⅢ method are available. When using MR-J3(W)-_B servo amplifiers, make sure to select the SSCNETⅢ method.
Control cycle is a cycle in which the position board controls command import, position control, status output, and communication with servo amplifier. To set this cycle, use "Control cycle setting" of "System option 1 (parameter No.0001)".
The number of controllable axes differs depending on the control cycle.

Position board	Control cycle	Maximum number of axes connected*1	Maximum number of axes connected for each line	Controllable axis No.
MR-MC210/MR-MC220U3/ MR-MC220U6/MR-MC240	0.88ms	16 axes	16 axes	Axis 1 to 16
	0.44ms	8 axes	8 axes	Axis 1 to 8
MR-MC211/MR-MC241	0.88ms	32 axes	16 axes	Axis 1 to 32
	0.44ms	16 axes	8 axes	Axis 1 to 16

*1 Do not connect more servo amplifiers than the maximum number of axes connected. When more servo amplifiers are connected than the maximum No. of axes connected, "System Setting Error (operation alarm 38H, detail 01H)" occurs.

Control cycle settings are imported during system startup (system command code: 000Ah), and cannot be changed during system running (system command code: 000Ah).

- System parameters

Parameter No.	Symbol*1	Name	Description
0001	*SYSOP1	System option1	■■■□ (Control cycle setting)*2 Set the control cycle. • 0: 0.88ms • 1: 0.44ms ■□■■ (SSCNET communication method)*3 Set the SSCNET communication method. SSCNET communication method is shared in lines 1 and 2. • 0: SSCNETⅢ/H (Not use) • 1: SSCNETⅢ

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.
*2 When "SSCNET communication method" is "1: SSCNETⅢ"
*3 Make sure to set "1: SSCNETⅢ"

- SSCNET communication method

Address (hexadecimal)	Name	Description
0008	SSCNET communication method	• 1: SSCNETⅢ • 2: SSCNETⅢ/H
0009		

Control option 1 setting

When controlling servo amplifier, set "1: control" for "Control axis" of "Control option 1 (parameter No.0200)". When the axis No. is set out of the controllable range, the corresponding axis is "System Setting Error (operation alarm 38H)" and cannot be controlled. If the servo amplifier set is in a state where communication cannot be made, such as not connected or control circuit power is off, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs at the time of system startup (system command code: 000Ah).

If "An Axis That Has Not Been Mounted Exists (system error E400H)" occurred, the axis with wrong No. set can be confirmed with information concerning axis that is not mounted (monitor No.0480H, 0481H) in the system information.

Control axis settings are imported during system startup (system command code: 000Ah), and cannot be changed during system running (system status code: 000Ah).

Control parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0200	*OPC1	Control option 1	0000h	—	0000h to 2111h	■■■□ (Control axis) Set "1: Controlled" when controlling the servo amplifier. • 0: Not controlled • 1: Controlled ■■□■ (Amplifier-less axis function) Set "1: Valid" when not communicating with the servo amplifier. When setting "1" with "Control axis", the operation without the servo amplifier (simulation) is available. • 0: Invalid • 1: Valid ■□■■ (No home position) Set "1: Valid" when setting the position at the time of power on as the home position. After returning to the home position, the home position becomes the position where the home position return is performed. • 0: Invalid • 1: Valid □■■■ (Speed unit) Set the speed command unit. • 0: Position command unit/min • 1: Position command unit/s • 2: r/min

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

When "Amplifier-less axis function" is "1: Valid", the position board simulates the operations of servo amplifier and operates as if it is connected. Operation can be confirmed without connecting the servo amplifier. When the setting is "1: Valid",, the position board do not communicate with the servo amplifier.

Axis No. assignment

With Axis No. assignment, the axis No. (on the position board) can be assigned by the axis No. on the servo amplifier.
When Axis No. assignment is invalid, correspondence between the axis No. on a position board and the axis No. on a servo amplifier is shown in the following table.

When SSCNET communication method is SSCNETIII/H

Servo amplifier axis No.		Line 1																			
		d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	d15	d16	d17	d18	d19	d20
Axis No.	0.88ms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	—	—	—	—
	0.44ms	1	2	3	4	5	6	7	8	—	—	—	—	—	—	—	—	—	—	—	—

Servo amplifier axis No.		Line 2																			
		d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	d15	d16	d17	d18	d19	d20
Axis No.	0.88ms	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	—	—	—	—
	0.44ms	9	10	11	12	13	14	15	16	—	—	—	—	—	—	—	—	—	—	—	—

When Axis No. assignment is valid, the axis Nos. 1 to 32 (on the position board) can be assigned by the servo amplifier axis Nos. d1 to d16 arbitrarily.
To assign the axis Nos., set the following parameters.

Point

To set servo amplifier axis Nos., use "Axis No. assignment (parameter No.0203)". Valid servo amplifier axis Nos. differ depending on the control cycle. Up to 16 axes can be set.
- Control cycle 0.88ms: 1 to 16
- Control cycle 0.44ms: 1 to 8

- System parameter

Parameter No.	Symbol*1	Name	Description
0002	*SYSOP2	System option 2	■■■□ (Axis No. assignment) Set "1: Valid" when validating axis No. assignment. When axis No. assignment is "0: Invalid", axis No. is automatically assigned. • 0: Invalid • 1: Valid

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

- Control parameter

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0203	*AXALC	Axis No. assignment	0000h	—	0000h to 011Fh	■■□□ (Servo amplifier axis No.) Set the servo amplifier axis No. to be assigned to the axis Nos. on the position board. • 00h: No axis No. assignment • 01h to 14h: Axis No. <Example> 0Ah Axis No.10 ■□■■ (Servo amplifier line No.) Set the servo amplifier line No. to be assigned to the axis Nos. on the position board. • 0 to 1: Line No. -1

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Point

- An axis No. out of the valid range causes "System Setting Error (operation alarm 38H, detail 03H)".
- Regardless of whether "Control axis" of "Control option 1 (parameter No.0200)" is "1: Controlled" or "0: Not controlled", set the axis No. so that the axis No. assignment is not duplicated. (Except for 00: No axis No. assignment) Duplicated axis Nos. cause "System Setting Error (operation alarm 38H, detail 04H)".
- When "1: Controlled" is set in "Control axis" of "Control option 1 (parameter No.0200)", always set the axis Nos. (1 to 16). When 0 is set, "System Setting Error (operation alarm 38H, detail 02H)" occurs.

Sensor input option setting

External signal (sensor) is connected by setting "Sensor input options (parameter No.0219)". The following is for when "1: Driver input" is set in "Sensor input system". For details on other sensor input option settings, refer to the following.

☞ Page 78 Sensor input option setting

When selecting the driver input

When "1: Driver input" is selected as the sensor destination in "Sensor input system" of "Sensor input options (parameter No.0219)", the sensor (LSP, LSN, DOG) status connected to the driver is imported via SSCNET.

- MR-J3-_B is used as a servo amplifier

Signal name	Destination connector pin No.	Symbol
LSP	CN3-2	DI1
LSN	CN3-12	DI2
DOG	CN3-19	DI3

- MR-J3W-_B is used as a servo amplifier

Signal name	Destination connector pin No.		Symbol*1
	A-axis	B-axis	
LSP	CN3-7	CN3-20	DI1-□
LSN	CN3-8	CN3-21	DI2-□
DOG	CN3-9	CN3-22	DI3-□

*1 □: A, B

Point

- For the sensor connection to the driver, refer to the instruction manual of the driver.
- If the communication error (system error E401H to E407H) occurs, the sensor (LSP, LSN, DOG) input status turns OFF.
- If the communication error (system error E400H) occurs, the input status of the corresponding axis turns OFF.

Vendor ID and type code setting

Available functions, parameter settings and ranges vary by servo amplifier type. At the time the communication with the servo amplifier has started, the position board performs consistency check between type code of the servo amplifier connected and the parameter set. If a consistency check error occurs, "Driver Type Code Error (system error E405H)" is output, therefore set correct type code.

Point

- If "Driver Type Code Error (system error E405H)" occurred, the axis that has set an incorrect type code can be confirmed with "Type code erroneous axis information (monitor No.0484H, 0485H)".
- When the communication method is SSCNETⅢ, "Driver Type Code Error (system error E405H)" due to the inconsistency of vendor IDs.

- Control parameters

Parameter No.	Symbol[*1]	Name	Description
021D	*VEND	Vendor ID	Set the vendor ID. (Not used in SSCNETⅢ communication.) • 0000h: Mitsubishi Electric
021E	*CODE	Type code	Set the type code. • 0100: MR-J3-B, MR-J3W-B (for rotary servo motor) • 0101: MR-J3-BS, MR-J3-B-RJ006 • 0102: MR-J3-B-RJ004, MR-J3W-B (for linear servo motor) • 0107: MR-J3-B-RJ080W • 0180: MR-J3W-0303BN6

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

System startup processing

The parameter settings and the system startup processing is the same as those of when the SSCNET communication method is SSCNETⅢ/H.

Restrictions when using J3 compatibility mode

The restrictions when connecting SSCNETⅢ for position board and servo amplifier MR-J4(W_)-_B are shown in the following table.

Position board SSCNET communication method	MR-J4(W_)-_B mode	Controller reset necessity [*1]	Details
SSCNETⅢ	Factory default	Necessary	The servo amplifier LED displays "rST". The system status code is not system running (000Ah). After system start up, if the system status code is not system running (000Ah) after 10 seconds, or a system error occurs, perform system startup procedure again after controller reset.
	J3 compatibility mode	Not necessary	The system status code becomes system running (000Ah) when all axes are connected normally.
	J4 mode	— (Cannot connect)	The system status code is not system running (000Ah). Review the settings of the servo amplifier or position board.
SSCNETⅢ/H	Factory default	Not necessary	The system status code becomes system running (000Ah) when all axes are connected normally.
	J3 compatibility mode	— (Cannot connect)	The system status code is not system running (000Ah). Review the settings of the servo amplifier or position board.
	J4 mode	Not necessary	The system status code becomes system running (000Ah) when all axes are connected normally.

*1 To perform a controller reset, execute a software reboot of the position board, or turn the power supply of the position board OFF and ON again.

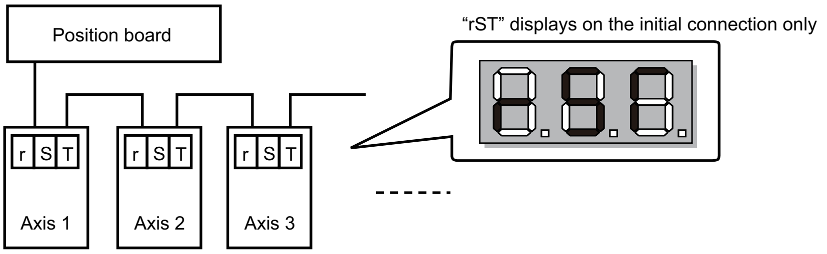
When position board SSCNET communication method is SSCNETⅢ and a factory default MR-J4(W_)-_B servo amplifier is connected by SSCNET, the servo amplifier switches to J3 compatibility mode and the LED displays "rST". In this state, executing a controller reset (software reboot, or turning the power supply of position board OFF and ON again) and performing system startup procedure again enables all axes to be connected.
When connecting by SSCNETⅢ from the next time onwards, a controller reset is not necessary. When a controller reset cannot be executed, use "MR-J4(W)-B mode selection" attached to MR Configurator2 to manually switch the servo amplifier to J3 compatibility mode in advance.
For details about J3 compatibility mode, also refer to the MR-J4(W_)-_B instruction manual.

Point

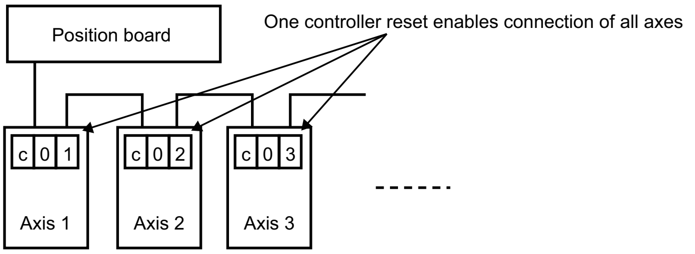
Do not connect a factory default MR-J4(W_)-_B servo amplifier by SSCNET reconnect afterwards. If SSCNET is disconnected once, system error E4□□H occurs and all axes go into a forced stop state.

When connecting factory default MR-J4(W_)-_B servo amplifier from the position board.

■Connecting the first time



■After performing system startup procedure again after controller reset.



Supported functions

Some functions and operation of the servo amplifier MR-J3(W)-_B differ from those of the servo amplifier MR-J4(W_)-_B. This section mainly describes functions and operations different from those of the servo amplifier MR-J4(W_)-_B. For the specification items not described in this manual, refer to the specifications of servo amplifier MR-J4(W_)-_B.

Supported function list

○: Supported, △: With restrictions, ×: Unsupported

Classification	Function		Supported	Remarks
Operational functions	JOG operation		○	
	Incremental feed		○	
	Automatic operation		○	
	Linear interpolation		○	
	Home position return		○	
	Home position reset function (data set function)		○	
Application functions	Command unit	Electronic gear	○	
	Speed unit	Speed unit	○	
		Speed units multiplication factor	○	
		Speed limit	○	
	Acceleration/ deceleration	Linear acceleration/ deceleration	○	
		Smoothing filter	○	
		Start up speed enable	○	
		S-pattern acceleration/ deceleration (Sine acceleration/deceleration)	○	
	Servo off		○	
	Forced stop		○	
	Stop operation		○	
	Rapid stop operation		○	
	Limit switch (stroke end)		○	
	Software limit		○	
	Interlock		○	
	Rough match output		○	
	Torque limit		○	
	Command change	Speed change	○	
		Change of time constants	○	
		Position change	○	
	Backlash		○	
	Position switch		○	
	Completion of operation signal		○	
	Interference check function		○	
	Home position search limit		○	
	Gain switching		○	The parameter No. to be used differs from those of MR-J4(W_)-_B. For details, refer to the following. ☞ Page 803 Gain changing
	PI-PID switching		○	The parameter No. to be used differs from those of MR-J4(W_)-_B. For details, refer to the following. ☞ Page 803 PI-PID switching
	Absolute position detection system		○	The parameter No. to be used differs from those of MR-J4(W_)-_B. For details, refer to the following. ☞ Page 804 Absolute position detection system

Classification	Function	Supported	Remarks
Application functions	Home position return request	○	
	Other axes start	○	
	High response I/F	○	
	In-position signal	○	
	Digital I/O	○	
	I/O device	○	
	Servo amplifier general I/O	○	
	Dual port memory exclusive control	○	
	Pass position interrupt	○	
	Mark detection	×	
	Continuous operation to torque control	○	For the servo amplifier, use a software version that supports continuous operation to torque control. • MR-J3-_B: C7 or later • MR-J3-_BS: C7or later • MR-J3W-_B: Not supported.
	SSCNETⅢ/H head module connection	×	
	Sensing module connection	×	
Auxiliary function	Reading/writing parameters	○	Parameters No.0100 to 01FF are used as servo parameters.
	Changing parameters at the servo	○	Parameters No.0100 to 01FF are used as servo parameters.
	Alarm and system error	△	The specific servo alarm No. is always 0.
	Monitor function	△	For MR-J3(W)-_B, some data cannot be monitored. For details, refer to the following. ☞ Page 817 Monitor
	High speed monitor function	○	
	Interrupt	○	
	Interrupt output cycle	△	Can only be used during interface mode.
	Command data update cycle	△	Can only be used during interface mode.
	User watchdog function	○	
	Software reboot function	○	
	Parameter backup	○	
	Test mode	○	Even when SSCNETⅢ is used, servo amplifier can be adjusted using test operation function (JOG, test positioning, machine analyzer etc.) of the MR Configurator2 attached to the position board using a USB connection.
	Reconnect/disconnect function	○	When using the SSCNET disconnect function for the axes of a multiple-axis unit, make sure that all the axes in the unit are simultaneously disconnected. When the disconnection command is sent to the second axis or later in the same unit, "An Axis That Has Not Been Mounted Exists (system error E400H)" occurs.
	Sampling	○	
	Log	○	
	Operation cycle monitor function	○	For software version A4 or later, when the operation cycle alarm signal (OCME) is turned ON, "Operation Cycle Alarm (system alarm 35H, detail 01H)" occurs.
	Amplifier-less axis function	○	Operates in the following motor specifications. • Number of encoder pulses per revolution: 262144 [pulse] • Maximum motor speed: 6000 [r/min]
	Alarm history function	○	Supported by software version A3 or later
	External forced stop disabled	○	Supported by software version A5 or later
	Transient transmit	○	
Tandem drive	Tandem drive	○	Set the same values for the servo parameters of the tandem drive axes. However, "Rotation direction selection (parameter No.110D)" can be different values depending on mechanical specifications.
Interface mode	Position control mode	○	Supported by software version A3 or later
	Speed control mode	○	Supported by software version A4 or later
	Torque control mode	○	Supported by software version A4 or later

Application functions

■Gain changing

For the usage of gain changing, which is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 199 Gain Changing/Gain Changing 2

However, for the servo parameters to be used, refer to the following table.

- Servo parameters (MR-J3(W)-_B)

Parameter No.	MR-J3(W)-_B parameter No.	Symbol*1	Name	Setting
0139	PB26	*CDP	Gain changing selection	0001 (valid when command received from controller and when the input signal (CDP) is ON)
013A	PB27	CDL	Gain changing condition	0
013B	PB28	CDT	Gain changing time constant	Arbitrary within setting range
013C	PB29	GD2B	Gain changing ratio of load inertia moment to servo motor inertia moment	Arbitrary within setting range
013D	PB30	PG2B	Gain changing position loop gain	Arbitrary within setting range
013E	PB31	VG2B	Gain changing speed loop gain	Arbitrary within setting range
013F	PB32	VICB	Gain changing speed integral compensation	Arbitrary within setting range
0140	PB33	VRF1B	Gain changing vibration suppression control vibration frequency setting	Arbitrary within setting range
0141	PB34	VRF2B	Gain changing vibration suppression control resonance frequency setting	Arbitrary within setting range

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following condition.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

Point

- For details about the servo parameters, refer to the servo amplifier instruction manual for your servo amplifier.
- To use the gain switching function, first set the gain adjustment mode to a manual mode by changing "Auto-tuning mode (parameter No.0107)" to "3: Manual mode". If the gain adjustment mode is in an auto-tuning mode, the gain changing function cannot be used.

■PI-PID switching

For the usage of PI-PID switching, which is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 202 PI-PID Switching

However, for the servo parameters to be used, refer to the following table.

- Servo parameters (MR-J3(W)-_B)

Parameter No.	MR-J3(W)-_B parameter No.	Symbol*1	Name	Setting value
0137	PB24	*MVS	Slight vibration suppression control selection	■■□■ (PI-PID control switch over selection) • 0: PI control is valid. (Switching to PID control is possible with instructions of controller.)

*1 The settings for the parameters with a * mark at the front of the symbol validated according to the following condition.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

Point

- For details about the servo parameters, refer to the servo amplifier instruction manual for your servo amplifier.
- To use the PI-PID switching function, first set the gain adjustment mode to a manual mode by changing "Auto-tuning mode (parameter No.0107)" to "3: Manual mode". If the gain adjustment mode is in an auto-tuning mode, the PI-PID switching function cannot be used.

A

■Absolute position detection system

For the usage of the absolute position detection system, which is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 203 Absolute Position Detection System

However, for the servo parameters to be used, refer to the following table.

- Servo parameters (MR-J3(W)-_B)

Parameter No.	MR-J3(W)-_B parameter No.	Symbol[*1]	Name	Setting value
0102	PA03	*ABS	Absolute position detection system	■■■□ (Absolute position detection system) • 1: Used in absolute position detection system

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following condition.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

Point

- For details about the servo parameters, refer to the servo amplifier instruction manual for your servo amplifier.
- When "Rotation direction selection (parameter No.010D)" is changed, the absolute position erased signal (ABSE) is turned ON and "Absolute position data" of "Home position return option 2 (parameter No.0241)" is changed to "0: Invalid".

■In-position signal

For the specification of the in-position signal, which is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 234 In-position Signal

However, for the servo parameters to be used, refer to the following table.

- Servo parameter (MR-J3(W)-_B)

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
0109	PA10	INP	In-position range	100	pulse

■Servo amplifier general I/O

For the specification of the servo amplifier general I/O, which is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 243 Servo Amplifier General I/O

However, for the compatible servo amplifiers, refer to the following table.

- Compatible servo amplifier

Model	Remarks
Servo amplifier MR-J3-_B	Input: 3 points/axis Output: 3 points/axis
Servo amplifier MR-J3W-_B	Input: 3 points/axis Output: 2 points/axis

- Destination connector

[Servo amplifier MR-J3-_B is used]

General I/O	Signal name	Destination connector pin No.	Symbol
General input	DI_□□0	CN3-2	DI1
	DI_□□1	CN3-12	DI2
	DI_□□2	CN3-19	DI3
General output	DO_□□0	CN3-13	MBR
	DO_□□1	CN3-9	INP
	DO_□□2	CN3-15	ALM

[Servo amplifier MR-J3W-_B is used]

General I/O	Signal name	Destination connector pin No.		Symbol[*1]
		A-axis	B-axis	
General input	DI_□□0	CN3-7	CN3-20	DI1-□
	DI_□□1	CN3-8	CN3-21	DI2-□
	DI_□□2	CN3-9	CN3-22	DI3-□
General output	DO_□□0	CN3-12	CN3-25	MBR-□
	DO_□□1	—	—	—
	DO_□□2	CN3-11	CN3-24	ALM-□

*1 □: A, B

- Servo parameters

[Servo amplifier MR-J3-_B is used]

Parameter No.	MR-J3-_B parameter No.	Symbol[*1]	Name	Setting value
0176	PD07	*DO1	Output device selection 1	0021h
0177	PD08	*DO2	Output device selection 2	0022h
0178	PD09	*DO3	Output device selection 3	0023h

[Servo amplifier MR-J3W-_B is used]

Parameter No.	MR-J3W-_B parameter No.	Symbol[*1]	Name	Setting value
0176	PD07	*DO1	Output device selection 1	0021h
0178	PD09	*DO3	Output device selection 3	0023h

*1 The settings for the parameters with a * mark at the front of the symbol are validated according to the following condition.
*: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.

A

Auxiliary function

■Reading/writing parameters

For the usage of the parameter read/write, which is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 363 Reading/Writing Parameters

However, servo parameters No.0100 to 01FF are used.

When the servo alarm [AL. 37_Parameter error] has occurred at system startup, confirm the parameter No. on which the error has occurred in "Servo parameter error No. (monitor No.0500H to 050FH)". Then reboot software, set correct parameters, and restart the system.

Point

- When SSCNET communication method is SSCNETⅢ, servo parameters No.1100 to 137F of MR-J4(W_)-_B cannot be written while system is running. Parameter No. error (PWEN□ (□ = 1 to 2)) turns ON
- When SSCNET communication method is SSCNETⅢ/H, servo parameters No.0100 to 01FF of MR-J3(W)-_B cannot be written while system is running. Parameter No. error (PWEN□ (□ = 1 to 2)) turns ON.
- When SSCNET communication method is SSCNETⅢ, servo parameters No.1100 to 137F of MR-J4(W_)-_B cannot be read while system is running. Parameter No. error (PREN□ (□ = 1 to 2)) turns ON.
- When SSCNET communication method is SSCNETⅢ/H, servo parameters No.0100 to 01FF of MR-J3(W)-_B cannot be read while system is running. Parameter No. error (PREN□ (□ = 1 to 2)) turns ON.

■Changing parameters at the servo

For how to confirm parameter changes at the servo, which is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 370 Changing Parameters at the Servo

However, to confirm changed servo parameter Nos., use "Servo parameter change No. (monitor No.0580H to 058FH)" corresponding to the servo parameter change No.01 (PSN01) of the servo parameter change No. table.

Point

- The reasons that parameters are re-written on the servo amplifier are as follows.
  · When parameters are changed using MR Configurator2 (This includes execution of the machine analyzer and the gain search function.)
  · The parameter was automatically changed such as by the real time auto tuning function.
- For the servo parameters that are automatically changed, refer to the servo amplifier instruction manual for your servo amplifier.

■Transient transmit

The interface is the same as that of the servo amplifier MR-J4(W_)-_B, refer to the following.

☞ Page 477 Transient Transmit

- Compatible transient command list

Data type	Transient command	Unit	Number of valid words*1	Remarks
Servo motor ID (SSCNETⅢ)/Encoder ID	0304	—	3	*2
Encoder resolution	0305	[pulse]	2	
Servo amplifier recognition information (First 8 characters)	0310	[characters]	4	
Servo amplifier recognition information (Last 8 characters)	0311	[characters]	4	
Servo amplifier software No. (First 8 characters)	0312	[characters]	4	
Servo amplifier software No. (Last 8 characters)	0313	[characters]	4	
Power ON cumulative time	0319	[h]	2	
Inrush relay ON/OFF number	031A	[times]	2	Return the contactor ON count.
Read alarm history number	0323	[times]	1	
Alarm history/Detail #1, #2	0324	—	4	*2
Alarm history/Detail #3, #4	0325	—	4	
Alarm history/Detail #5, #6	0326	—	4	
Alarm history/Detail/Occurrence time	0328	—/[h]	4	*2
Alarm occurrence time #1, #2	0329	[h]	4	
Alarm occurrence time #3, #4	032A	[h]	4	
Alarm occurrence time #5, #6	032B	[h]	4	
Alarm history clear command	0382	—	0	*2
Home position [command unit]	0408	[pulse]/[rev]	3	*2
Main circuit bus voltage	040A	[V]	1	
Regenerative load ratio	040B	[%]	1	
Effective load ratio	040C	[%]	1	
Peak load ratio	040D	[%]	1	
Estimate inertia moment ratio	040E	[× 0.1]	1	
Model loop gain	040F	[rad/s]	1	
LED display	0410	[characters]	2	*2
Load-side encoder information 1	0416	[pulse]	2	Fully closed control or synchronous encoder via servo amplifier use
Load-side encoder information 2	0417	[pulse]	2	
Speed feedback	0418	[0.01mm/s]	2	Linear servo use
Servo motor thermistor temperature	0419	[℃]	1	Linear servo use
Optional transient command	—	—	4	Used when using an optional transient command.

*1 Number of valid words for response data 1 to 4.

*2 For details, refer to the following.

☞ Page 479 Transient commands for servo amplifier

Table map

For the table map, only the additions and changes are listed. For items not described in this section, refer to the following.

☞ Page 554 TABLE MAP

Table list

Point

- Do not write to manufacturer setting areas.
- The first No. in the point table for each axis can be designated using point No. offset.

- Dual port memory

<table>
<tr><th>Address
(hexadecimal)</th><th colspan="3">Table area content</th></tr>
<tr><td>0000h
⋮</td><td colspan="3">System information table
(992bytes)</td></tr>
<tr><td>03E0h
⋮</td><td colspan="3">System command/status table
(224bytes)</td></tr>
<tr><td>04C0h
⋮</td><td colspan="3">Outputting information table with factor of interrupt
(16bytes)</td></tr>
<tr><td>04D0h
⋮</td><td colspan="3">Interrupt factor table for each axis
(192bytes)</td></tr>
<tr><td>0590h
⋮</td><td colspan="3">System interrupt table
(32bytes)</td></tr>
<tr><td>05B0h
⋮</td><td colspan="3">For manufacturer setting
(288bytes)</td></tr>
<tr><td>06D0h
⋮</td><td colspan="3">System configuration table
(176bytes)</td></tr>
<tr><td>0780h
⋮</td><td colspan="3">For manufacturer setting
(1888bytes)</td></tr>
<tr><td>0EE0h
⋮</td><td colspan="3">Factor of event table
(192bytes)</td></tr>
<tr><td>0FA0h
⋮</td><td colspan="3">Details on factor of pass position interrupt
(64bytes)</td></tr>
<tr><td>0FE0h
⋮</td><td colspan="3">Details on factor of other axes start interrupt
(32bytes)</td></tr>
<tr><td rowspan="2">1000h
⋮</td><td rowspan="11">Command/status table for each axis
(7680bytes)</td><td rowspan="2">Axis 1
(192bytes)</td><td>Command</td></tr>
<tr><td>Status</td></tr>
<tr><td rowspan="2">10C0h
⋮</td><td rowspan="2">Axis 2
(192bytes)</td><td>Command</td></tr>
<tr><td>Status</td></tr>
<tr><td rowspan="2">1180h
⋮</td><td rowspan="2">Axis 3
(192bytes)</td><td>Command</td></tr>
<tr><td>Status</td></tr>
<tr><td rowspan="2">⋮</td><td rowspan="2">⋮</td><td>Command</td></tr>
<tr><td>Status</td></tr>
<tr><td rowspan="2">2740h
⋮</td><td rowspan="2">Axis 32
(192bytes)</td><td>Command</td></tr>
<tr><td>Status</td></tr>
<tr><td>2800h
⋮</td><td colspan="2">For manufacturer setting
(1536bytes)</td></tr>
<tr><td>2E00h
⋮</td><td colspan="3">For manufacturer setting
(2672bytes)</td></tr>
<tr><td>3800h
⋮</td><td colspan="3">Servo parameter change No. table (J3)
(96bytes)</td></tr>
<tr><td>3860h
⋮</td><td colspan="3">For manufacturer setting
(5952bytes)</td></tr>
<tr><td>4FA0h
⋮</td><td colspan="3">Point No. offset table
(80bytes)</td></tr>
<tr><td>4FF0h
⋮</td><td colspan="3">For manufacturer setting
(16bytes)</td></tr>
</table>

Address (hexadecimal)	Table area content	
5000h(0000h)[*1] ⋮	Point table/position command buffer (10240bytes)	Axis 1 (256bytes)
5100h(0008h)[*1] ⋮		Axis 2 (256bytes)
5200h(0010h)[*1] ⋮		Axis 3 (256bytes)
⋮		⋮
6F00h(00F8h)[*1] ⋮		Axis 32 (256bytes)
7000h(0100h)[*1] ⋮		For manufacturer setting (2048bytes)
7800h ⋮	Speed command buffer (5120bytes)	
8C00h ⋮	Torque command buffer (5120bytes)	
A000h ⋮	High speed monitor table (1280bytes)	
A500h ⋮	For manufacturer setting (320bytes)	
A640h ⋮	Pass position interrupt table (512bytes)	
A840h ⋮	Continuous operation to torque control data table (1536bytes)	
AE40h ⋮	For manufacturer setting (448bytes)	
B000h ⋮	Digital I/O table (256bytes)	
B100h ⋮	For manufacturer setting (2864bytes)	
BC30h ⋮	Alarm history data table (256bytes)	
BD30h ⋮	For manufacturer setting (112bytes)	
BDA0h ⋮	Sampling data table (96bytes)	
BE00h ⋮	Sampling data read table (4224bytes)	
CE80h ⋮	For manufacturer setting (1408bytes)	
D400h ⋮	Transient transmit command/status table (1792bytes)	
DB00h ⋮	I/O device table (1024bytes)	
DF00h ⋮	Log data table (256bytes)	
E000h ⋮	For manufacturer setting (64bytes)	
E040h ⋮	Interpolation group No. being executed table (64bytes)	
E080h ⋮	Other axes start command/status table (128bytes)	
E100h ⋮	Other axes start data table (3328bytes)	
EE00h ⋮	For manufacturer setting (384bytes)	
EF80h ⋮	Exclusive control table (16bytes)	
EF90h ⋮ EFFFh	For manufacturer setting (4208bytes)	

Address (hexadecimal)	Table area content	Reference
20000h ⋮ 2000Fh	Board information (16bytes)	Page 45 Board information

*1 "( )" in the address refers to the point No. offset.

System information

Address (hexadecimal)	Description	
0000	CH No.	
0001		
0002	Number of lines	
0003		
0004	Control cycle status	0001h: 0.88ms 0002h: 0.44ms 0003h: 0.22ms
0005		
0006	For manufacturer setting	
0007		
0008	SSCNET communication method	1: SSCNETⅢ 2: SSCNETⅢ/H
0009		
000A	For manufacturer setting	
⋮		
0013		
0014	Operation cycle current time	
0015		
0016	Operation cycle maximum time	
0017		
0018	Operation cycle over time	
0019		
001A	For manufacturer setting	
⋮		
002F		
0030	System program Software version	
0031		
0032		
0033		
0034		
0035		
0036		
0037		
0038		
0039		
003A		
003B		
003C		
003D		
003E		
003F		
0040	For manufacturer setting	
⋮		
005F		

Servo parameter change No.

When parameter settings within the servo amplifier are changed using the auto tuning function or parameter changes using MR Configurator2 (set up software), the bit corresponding to the servo parameter No. that was changed is turned ON to notify concerning which parameter No. was changed (in units of 16). To identify the changed parameter, confirm "Servo parameter change No. (monitor No.0580H to 058FH)" corresponding to the bit which is turned ON. For details, refer to the following.

☞ Page 370 Changing Parameters at the Servo

■Servo parameter change No. (SSCNETⅢ)

Address (hexadecimal)	Description
3800	Servo parameter change No.01□□ Axis 1
3801	
3802	Servo parameter change No.01□□ Axis 2
3803	
3804	Servo parameter change No.01□□ Axis 3
3805	
3806	Servo parameter change No.01□□ Axis 4
3807	
3808	Servo parameter change No.01□□ Axis 5
3809	
380A	Servo parameter change No.01□□ Axis 6
380B	
380C	Servo parameter change No.01□□ Axis 7
380D	
380E	Servo parameter change No.01□□ Axis 8
380F	
3810	Servo parameter change No.01□□ Axis 9
3811	
3812	Servo parameter change No.01□□ Axis 10
3813	
3814	Servo parameter change No.01□□ Axis 11
3815	
3816	Servo parameter change No.01□□ Axis 12
3817	
3818	Servo parameter change No.01□□ Axis 13
3819	
381A	Servo parameter change No.01□□ Axis 14
381B	
381C	Servo parameter change No.01□□ Axis 15
381D	
381E	Servo parameter change No.01□□ Axis 16
381F	
3820	Servo parameter change No.01□□ Axis 17
3821	
3822	Servo parameter change No.01□□ Axis 18
3823	
3824	Servo parameter change No.01□□ Axis 19
3825	
3826	⋮
⋮	
383D	
383E	Servo parameter change No.01□□ Axis 32
383F	

Address (hexadecimal)	Description
3840	For manufacturer setting
⋮	
385F	

■Details on servo amplifier change No. on axis n (SSCNETⅢ)
The addresses in the table are the addresses for the first axis. For the second axis and after, add "+2h" for each axis.

Address (hexadecimal)	Name	Symbol	Remarks
3800	Servo parameter change No.01□□	PSN01	BIt0 (parameter No.0100 to 010F) to bit15 (parameter No.01F0 to 01FF)
3801			

Parameters

Concerning the parameters for which the parameter name shows that it is set by manufacturer, do not use other than the default values. If erroneous values are set, unexpected movement can occur.

The parameters are classified as is shown below.

When using the servo amplifier MR-J3(W)-_B, use parameter Nos. 0100 to 01FF as servo parameters.

For control parameters, refer to the following.

☞ Page 677 Control Parameters

Classification	Parameter No.*1	Remarks
System parameters	No.0001 to 007F	—
Servo parameters	No.0100 to 01FF	Each axis
Control parameters	No.0200 to 02FF	Each axis

*1 Parameter Nos. are given in hexadecimal.

System parameters

For system parameters, only the additions and changes are listed.

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description
0001	*SYSOP1	System option 1	0000h	—	0000h to 0102h	■■■□ (Control cycle setting)*2 Set the control cycle. • 0: 0.88ms • 1: 0.44ms ■□■■ (SSCNET communication method)*3 Set the SSCNET communication method. SSCNET communication method is shared in lines 1and 2. • 0: SSCNETⅢ/H(Not use) • 1: SSCNETⅢ

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

*2 When SSCNET communication method is "1: SSCNETⅢ".

*3 Make sure to set "1: SSCNETⅢ".

Servo parameters

The parameters described in this section are for using the servo amplifier MR-J3(W)-_B. For details, refer to the servo amplifier instruction manual for your servo amplifier.

Point

The parameters with a * mark in front of the parameter symbol are validated according to the following conditions.

- *: The setting value for the system startup or the SSCNET reconnection is valid. The parameter change after the system startup is invalid.
- **: The setting value for the system startup or the SSCNET reconnection is valid. However, after the system startup, turn OFF the power supply of the servo amplifier once, and it is necessary to turn it on again. The parameter change after the system startup is invalid.

■Menu A) Basic settings

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
0100	PA01	**STY	Control mode	0000h	—
0101	PA02	**REG	Regenerative option	0000h	—
0102	PA03	*ABS	Absolute position detection system	0000h	—
0103	PA04	*AOP1	Function selection A-1	0000h	—
0104	PA05	—	For manufacturer setting	0	—
0105	PA06			1	—
0106	PA07			1	—
0107	PA08	ATU	Auto tuning	0001h	—
0108	PA09	RSP	Auto tuning response	12	—
0109	PA10	INP	In-position range	100	pulse
010A	PA11	—	For manufacturer setting	10000	—
010B	PA12			10000	—
010C	PA13			0	—
010D	PA14	*POL	Rotation direction selection	0	—
010E	PA15	*ENR	Encoder output pulses	4000	pulse/rev
010F	PA16	—	For manufacturer setting	0	—
0110	PA17			0000h	—
0111	PA18			0000h	—
0112	PA19	*BLK	Parameter write inhibit	000Bh	—
0113	PA20	—	For manufacturer setting	0	—
⋮	⋮			⋮	
011F	PA32			0	

■Menu B) Gain filter

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
0120	PB01	FILT	Adaptive tuning mode (adaptive filter II)	0000h	—
0121	PB02	VRFT	Vibration suppression control filter turning mode (advanced vibration suppression control)	0000h	—
0122	PB03	—	For manufacturer setting	0	—
0123	PB04	FFC	Feed forward gain	0	%
0124	PB05	—	For manufacturer setting	500	—
0125	PB06	GD2	Ratio of load inertia moment to servo motor inertia moment	70	0.1times
0126	PB07	PG1	Model loop gain	24	rad/s
0127	PB08	PG2	Position loop gain	37	rad/s
0128	PB09	VG2	Speed loop gain	823	rad/s
0129	PB10	VIC	Speed integral compensation	337	0.1ms
012A	PB11	VDC	Speed differential compensation	980	—

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
012B	PB12	OVA	Overshoot amount compensation	0	%
012C	PB13	NH1	Machine resonance suppression filter 1	4500	Hz
012D	PB14	NHQ1	Notch form selection 1	0000h	—
012E	PB15	NH2	Machine resonance suppression filter 2	4500	Hz
012F	PB16	NHQ2	Notch form selection 2	0000h	—
0130	PB17	—	Automatic setting parameter	0000h	—
0131	PB18	LPF	Low-pass filter	3141	rad/s
0132	PB19	VRF1	Vibration suppression control vibration frequency setting	1000	0.1Hz
0133	PB20	VRF2	Vibration suppression control resonance frequency setting	1000	0.1Hz
0134	PB21	—	For manufacturer setting	0	—
0135	PB22			0	
0136	PB23	VFBF	Low-pass filter selection	0000h	—
0137	PB24	*MVS	Slight vibration suppression control selection	0000h	—
0138	PB25	—	For manufacturer setting	0000h	—
0139	PB26	*CDP	Gain switching selection	0000h	—
013A	PB27	CDL	Gain switching condition	10	—
013B	PB28	CDT	Gain switching time constant	1	ms
013C	PB29	GD2B	Gain switching ratio of load inertia moment to servo motor inertia moment	70	0.1times
013D	PB30	PG2B	Gain switching position control gain	37	rad/s
013E	PB31	VG2B	Gain switching speed control gain	823	rad/s
013F	PB32	VICB	Gain switching speed integral compensation	337	0.1ms
0140	PB33	VRF1B	Gain switching vibration suppression control vibration frequency setting	1000	0.1Hz
0141	PB34	VRF2B	Gain switching vibration suppression control resonance frequency setting	1000	0.1Hz
0142	PB35	—	For manufacturer setting	0	—
⋮	⋮			⋮	
014B	PB44			0	
014C	PB45	CNHF	Vibration suppression control filter 2	0000h	—
014D	PB46	—	For manufacturer setting	0000h	—
014E	PB47			0000h	
014F	PB48			0000h	

■Menu C) Expansion settings

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
0150	PC01	ERZ	Error excessive alarm level	3	rev
0151	PC02	MBR	Electromagnetic brake sequence output	0	ms
0152	PC03	*ENRS	Encoder output pulses selection	0000h	—
0153	PC04	**COP1	Function selection C-1	0000h	—
0154	PC05	**COP2	Function selection C-2	0000h	—
0155	PC06	*COP3	Function selection C-3	0000h	—
0156	PC07	ZSP	Zero speed	50	r/min
0157	PC08	—	For manufacturer setting	0	—
0158	PC09	MOD1	Analog monitor output 1	0000h	—
0159	PC10	MOD2	Analog monitor output 2	0001h	—
015A	PC11	MO1	Analog monitor 1 offset	0	mV
015B	PC12	MO2	Analog monitor 2 offset	0	mV
015C	PC13	MOSDL	Analog monitor feedback position output standard data (lower)	0	pulse
015D	PC14	MOSDH	Analog monitor feedback position output standard data (upper)	0	10000pulse
015E	PC15	—	For manufacturer setting	0	—
015F	PC16			0000h	

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
0160	PC17	**COP4	Function selection C-4	0000h	—
0161	PC18	—	For manufacturer setting	1000h	—
0162	PC19			0000h	
0163	PC20	*COP7	Function selection C-7	0000h	—
0164	PC21	*BPS	Alarm history clear	0000h	—
0165	PC22	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
016F	PC32			0000h	

■Menu D) I/O settings

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
0170	PD01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
0175	PD06			0000h	
0176	PD07	*DO1	Output signal device selection 1(CN3-13)	0005h	—
0177	PD08	*DO2	Output signal device selection 2(CN3-9)	0004h	—
0178	PD09	*DO3	Output signal device selection 3(CN3-15)	0003h	—
0179	PD10	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
017C	PD13			0000h	
017D	PD14	*DOP3	Function selection D-3	0000h	—
017E	PD15	*IDCS	Driver communication setting	0000h	—
017F	PD16	*MD1	Driver communication setting Master transmit data selection 1	0000h	—
0180	PD17	*MD2	Driver communication setting Master transmit data selection 2	0000h	
0181	PD18	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
018C	PD29			0000h	
018D	PD30	TLC	Master/slave operation torque command factor on the slave	0000h	%
018E	PD31	VLC	Master/slave operation speed limit factor on the slave	0000h	%
018F	PD32	VLL	Master/slave operation speed limit factor adjustment value on the slave	0000h	r/min

■Menu E) Expansion control

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
0190	PE01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
01A0	PE17			0000h	
01A1	PE18	IIRC11	Filter factor 1-1	0000h	—
01A2	PE19	IIRC12	Filter factor 1-2	0000h	—
01A3	PE20	IIRC13	Filter factor 1-3	0000h	—
01A4	PE21	IIRC14	Filter factor 1-4	0000h	—
01A5	PE22	IIRC15	Filter factor 1-5	0000h	—
01A6	PE23	IIRC16	Filter factor 1-6	0000h	—
01A7	PE24	IIRC17	Filter factor 1-7	0000h	—
01A8	PE25	IIRC18	Filter factor 1-8	0000h	—
01A9	PE26	IIRC21	Filter factor 2-1	0000h	—
01AA	PE27	IIRC22	Filter factor 2-2	0000h	—
01AB	PE28	IIRC23	Filter factor 2-3	0000h	—
01AC	PE29	IIRC24	Filter factor 2-4	0000h	—
01AD	PE30	IIRC25	Filter factor 2-5	0000h	—
01AE	PE31	IIRC26	Filter factor 2-6	0000h	—

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
01AF	PE32	IIRC27	Filter factor 2-7	0000h	—
01B0	PE33	IIRC28	Filter factor 2-8	0000h	—
01B1	PE34	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
01BF	PE48			0000h	

■Menu S) Special settings

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
01C0	PS01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
01DF	PS32			0000h	

■Menu F) Other functions

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
01E0	PF01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
01EF	PF16			0000h	

■Menu O) Option setting

Parameter No.	MR-J3(W)-_B parameter No.	Symbol	Name	Initial value	Unit
01F0	Po01	—	For manufacturer setting	0000h	—
⋮	⋮			⋮	
01FF	Po16			0000h	

Control parameters

For control parameters, only the additions and changes are listed.

Parameter No.	Symbol*1	Name	Initial value	Unit	Setting range	Description	When in tandem drive
021E	*CODE	Type code	1000h	—	0000h to FFFFh	Set the type code. ■When SSCNET communication method is SSCNETⅢ/H • 1000: MR-J4(W_)-_B ■When SSCNET communication method is SSCNETⅢ • 0100: MR-J3-B, MR-J3W-B (for rotary servo motor) • 0101: MR-J3-BS, MR-J3-B-RJ006 • 0102: MR-J3-B-RJ004, MR-J3W-B(for linear servo motor) • 0107: MR-J3-B-RJ080W • 0180: MR-J3W-0303BN6	Same value

*1 The settings for the parameters with a * mark at the front of the symbol are validated when the system is started.

Monitor

For the monitor, only the additions and changes are listed. For the monitoring of operation information and system information, refer to the monitor list of when MR-J4(W_)-_B is used.

Servo information (1)

Monitor No. (hexadecimal)	Content	Unit	Remarks
0100 0101 0102 0103 0104 0105 0106 0107	Unit type name	—	Hexadecimal ASCII character string (2 Characters per monitor No.)
0108 0109 010A 010B 010C 010D 010E 010F	Software No.	—	Hexadecimal ASCII character string (2 Characters per monitor No.)
0110	Type code	—	• 0100: MR-J3-B, MR-J3W-B (for rotary servo motor) • 0101: MR-J3-BS, MR-J3-B-RJ006 • 0102: MR-J3-B-RJ004, MR-J3W-B (for linear servo motor) • 0107: MR-J3-B-RJ080W • 0180: MR-J3W-0303BN6
0111	Vendor ID	—	• 0000h: Mitsubishi Electric
0112	Motor rated revolution speed	r/min	—
0113	Motor rated current	0.1%	—
0114	Motor maximum revolution speed	r/min	—
0115	Motor maximum torque	0.1%	—
0116	Number of encoder pulses per revolution (lower)	pulse	—
0117	Number of encoder pulses per revolution (upper)		—
0118	For manufacturer setting	—	—
0119	Initial within 1 revolution position (lower)	pulse	—
011A	Initial within 1 revolution position (upper)		—
011B	Initial multiple revolution data	rev	—
011C ⋮ 011F	For manufacturer setting	—	—
0120	Motor permissible pulse rate (lower)	kpps	Pulse rate of operation at the motor maximum revolution speed
0121	Motor permissible pulse rate (upper)		
0122	Maximum output pulse rate (lower)	kpps	Maximum pulse rate that can be output by the position board
0123	Maximum output pulse rate (upper)		
0124 0125 0126	For manufacturer setting	—	—

A

Monitor No. (hexadecimal)	Content	Unit	Remarks
0127	Station No. in order of connection	—	■□□□ (Station No. in order of connection on line) Indicate the place where the station is connected from the position board. Axes and stations are both included in the connection order. □■■■ (Line No.) • 0: Line 1 • 1: Line 2 <Example> Monitor value for the axis connected fifth on line 2 1005h
0128	For manufacturer setting	—	—
⋮			
012F			

Servo information (2)

Monitor No. (hexadecimal)	Content	Unit	Remarks
0200	Position feedback (lower)	pulse	—
0201	Position feedback (upper)		
0202	For manufacturer setting	—	—
0203			
0204	Position droop (lower)	pulse	—
0205	Position droop (upper)		
0206	For manufacturer setting	—	—
0207			
0208	Speed feedback (lower)	0.01r/min	—
0209	Speed feedback (upper)		
020A	Current command	0.1%	—
020B	Electrical current feedback	0.1%	—
020C	For manufacturer setting	—	—
020D			
020E	Detector within 1 revolution position (lower)	pulse	—
020F	Detector within 1 revolution position (upper)		
0210	Home position within 1 revolution position (lower)	pulse	—
0211	Home position within 1 revolution position (upper)		
0212	ZCT (lower)	pulse	—
0213	ZCT (upper)		
0214	Multiple revolution counter	rev	—
0215	Home position multiple revolution data	rev	—
0216	Speed command (lower)	0.01r/min	0.01mm/s for linear servo motor
0217	Speed command (upper)		
0218	For manufacturer setting	—	—
⋮			
023F			
0240	Selected droop pulse (lower)	pulse	Select in the parameter when using the fully closed loop control (motor side/ load side/motor side - load side)
0241	Selected droop pulse (upper)		
0242	For manufacturer setting	—	—
0243			
0244	Selected cumulative feed pulses (lower)	pulse	Select in the parameter when using the fully closed loop control (motor side/ load side)
0245	Selected cumulative feed pulses (upper)		

Monitor No. (hexadecimal)	Content	Unit	Remarks
0246	Load side encoder information data 1 (lower)	pulse	When using the linear servo/fully closed loop control
0247	Load side encoder information data 1 (upper)		
0248	Load side encoder information data 2 (lower)	—	When using the linear servo/fully closed loop control
0249	Load side encoder information data 2 (upper)		
024A	Speed feedback (lower)	0.01mm/s	When using a linear servo
024B	Speed feedback (upper)		
024C	Voltage of generating line	V	—
024D	Regenerative load factor	%	—
024E	Effective load factor	%	—
024F	Peak load factor	%	—
0250	Estimated load inertial ratio	0.1 times	—
0251	Position gain (model position gain)	rad/s	—
0252	Motor thermistor temperature	℃	When using a motor with thermistor attached.
0253	For manufacturer setting	—	—
⋮			
0260			
0261	Alarm/warning No.	—	—
0262	Alarm detailed bits	—	—
0263	For manufacturer setting	—	—
0264	Alarm status AL-1□	—	□: 0 (bit0) to F (bit15) Bit corresponding to alarm No. is turned ON. Review the alarms when multiple alarms occur simultaneously etc.
0265	Alarm status AL-2□		
0266	Alarm status AL-3□		
0267	Alarm status AL-4□		
0268	Alarm status AL-5□		
0269	Alarm status AL-6□		
026A	Alarm status AL-7□		
026B	Alarm status AL-8□		
026C	Alarm status AL-9□		
026D	Alarm status AL-E□		
026E	For manufacturer setting	—	—
⋮			
02CF			

Servo parameter information

■Servo parameter error No.

Monitor No. (hexadecimal)	Content	Unit	Remarks
0500	Servo parameter error No.0100H to 010FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0100 (bit0) to 010F (bit15).
0501	Servo parameter error No.0110H to 011FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0110 (bit0) to 011F (bit15).
0502	Servo parameter error No.0120H to 012FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0120 (bit0) to 012F (bit15).
0503	Servo parameter error No.0130H to 013FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0130 (bit0) to 013F (bit15).
0504	Servo parameter error No.0140H to 014FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0140 (bit0) to 014F (bit15).
0505	Servo parameter error No.0150H to 015FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0150 (bit0) to 015F (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
0506	Servo parameter error No.0160H to 016FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0160 (bit0) to 016F (bit15).
0507	Servo parameter error No.0170H to 017FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0170 (bit0) to 017F (bit15).
0508	Servo parameter error No.0180H to 018FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0180 (bit0) to 018F (bit15).
0509	Servo parameter error No.0190H to 019FH	—	Bit corresponding to parameter No. is turned ON. Bit is No.0190 (bit0) to 019F (bit15).
050A	Servo parameter error No.01A0H to 01AFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.01A0 (bit0) to 01AF (bit15).
050B	Servo parameter error No.01B0H to 01BFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.01B0 (bit0) to 01BF (bit15).
050C	Servo parameter error No.01C0H to 01CFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.01C0 (bit0) to 01CF (bit15).
050D	Servo parameter error No.01D0H to 01DFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.01D0 (bit0) to 01DF (bit15).
050E	Servo parameter error No.01E0H to 01EFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.01E0 (bit0) to 01EF (bit15).
050F	Servo parameter error No.01F0H to 01FFH	—	Bit corresponding to parameter No. is turned ON. Bit is No.01F0 (bit0) to 01FF (bit15).

Point

Information concerning the servo alarm [AL. 37_Parameter error] that has occurred at system startup can be monitored. If the servo alarm [AL. E4_Parameter warning] occurs while system is running, it is not reflected in this information.

■Servo parameter change No.

Monitor No. (hexadecimal)	Content	Unit	Remarks
0580	Servo parameter change No.0100 to 010F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0100 (bit0) to 010F (bit15).
0581	Servo parameter change No.0110 to 011F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0110 (bit0) to 011F (bit15).
0582	Servo parameter change No.0120 to 012F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0120 (bit0) to 012F (bit15).
0583	Servo parameter change No.0130 to 013F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0130 (bit0) to 013F (bit15).
0584	Servo parameter change No.0140 to 014F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0140 (bit0) to 014F (bit15).
0585	Servo parameter change No.0150 to 015F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0150 (bit0) to 015F (bit15).
0586	Servo parameter change No.0160 to 016F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0160 (bit0) to 016F (bit15).
0587	Servo parameter change No.0170 to 017F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0170 (bit0) to 017F (bit15).
0588	Servo parameter change No.0180 to 018F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0180 (bit0) to 018F (bit15).
0589	Servo parameter change No.0190 to 019F	—	Bit corresponding to parameter No. is turned ON. Bit is No.0190 (bit0) to 019F (bit15).
058A	Servo parameter change No.01A0 to 01AF	—	Bit corresponding to parameter No. is turned ON. Bit is No.01A0 (bit0) to 01AF (bit15).
058B	Servo parameter change No.01B0 to 01BF	—	Bit corresponding to parameter No. is turned ON. Bit is No.01B0 (bit0) to 01BF (bit15).
058C	Servo parameter change No.01C0 to 01CF	—	Bit corresponding to parameter No. is turned ON. Bit is No.01C0 (bit0) to 01CF (bit15).
058D	Servo parameter change No.01D0 to 01DF	—	Bit corresponding to parameter No. is turned ON. Bit is No.01D0 (bit0) to 01DF (bit15).
058E	Servo parameter change No.01E0 to 01EF	—	Bit corresponding to parameter No. is turned ON. Bit is No.01E0 (bit0) to 01EF (bit15).

Monitor No. (hexadecimal)	Content	Unit	Remarks
058F	Servo parameter change No.01F0 to 01FF	—	Bit corresponding to parameter No. is turned ON. Bit is No.01F0 (bit0) to 01FF (bit15).

Alarm No.

For the servo alarm No./warning No., refer to the servo amplifier instruction manual for your servo amplifier.

Appendix 7 Cables

In this cable connection diagram, makers of connectors are omitted. For makers of connectors, refer to the following.

☞ Page 831 Connectors

SSCNETIII cables

Generally use the SSCNETⅢ cables available as our products.

For long distance cable up to 100 [m] (328.08 [ft.]) and ultra-long bending life cable, refer to the following.

☞ Page 825 SSCNETIII cables (SC-J3BUS_M-C) manufactured by Mitsubishi Electric System & Service

Model explanation

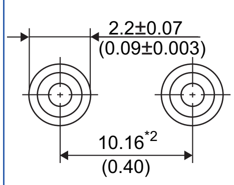
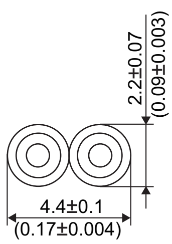
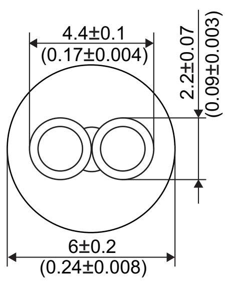
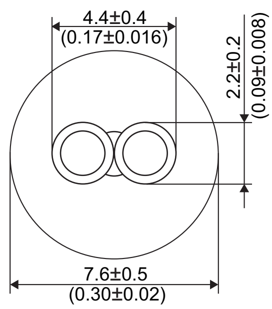
Numeral in the column of cable length on the table is a symbol put in "_" part of cable model. Cables of which symbol exists are available.

Cable model	Cable length [m(ft.)]										
	0.15 (0.49)	0.3 (0.98)	0.5 (1.64	1 (3.28)	3 (9.84)	5 (16.40)	10 (32.81)	20 (65.62)	30 (98.43)	40 (131.23)	50 (164.04)
MR-J3BUS_M	015	03	05	1	3	—	—	—	—	—	—
MR-J3BUS_M-A	—	—	—	—	—	5	10	20	—	—	—
MR-J3BUS_M-B*1	—	—	—	—	—	—	—	—	30	40	50

Cable model	Flex life	Application/ remark
MR-J3BUS_M	Standard	Standard cord for inside panel
MR-J3BUS_M-A	Standard	Standard cable for outside panel
MR-J3BUS_M-B*1	Long flex	Long distance cable

*1 For the cable of less than 30 [m] (98.43 [ft.]), contact your nearest Mitsubishi Electric sales representative.

Specifications

Item		SSCNETIII cable name			
		MR-J3BUS_M		MR-J3BUS_M-A	MR-J3BUS_M-B
SSCNETⅢ cable length [m(ft.)]		0.15 (0.49)	0.3 to 3 (0.98 to 9.84)	5 to 20 (16.40 to 65.62)	30 to 50 (98.43 to 164.04)
Optical cable (cord)	Minimum bend radius [mm(inch)]	25 (0.98)		Enforced covering cord: 50 (1.97) Cord: 25 (0.98)	Enforced covering cord: 50 (1.97) Cord: 30(1.18)
	Tension strength [N]	70	140	420 (Enforced covering cord)	980 (Enforced covering cord)
	Temperature range for use [℃ (℉)]*1	-40 to 80 (-40 to 176)			-20 to 70 (-4 to 158)
	Ambient	Indoors (no direct sunlight) No solvent or oil			
	External appearance [mm(inch)]				

*1 This temperature range for use is the value for optical cable (cord) only.

*2 Dimension of connector fiber insert location.

The distance of two cords is changed by how to bend it.

Point

- If the end face of cord tip for the SSCNETⅢ cable is dirty, optical transmission is interrupted and it may cause malfunctions. If it becomes dirty, wipe with a bonded textile, etc. Do not use solvent such as alcohol.
- Do not add impossible power to the connector of the SSCNETⅢ cable.
- When incinerating the SSCNETⅢ cable (optical fiber), hydrogen fluoride gas or hydrogen chloride gas which is corrosive and harmful may be generated. For disposal of the SSCNETⅢ cable (optical fiber), request for specialized industrial waste disposal services who has incineration facility for disposing hydrogen fluoride gas or hydrogen chloride gas.

MR-J3BUS_M

- Model explanation

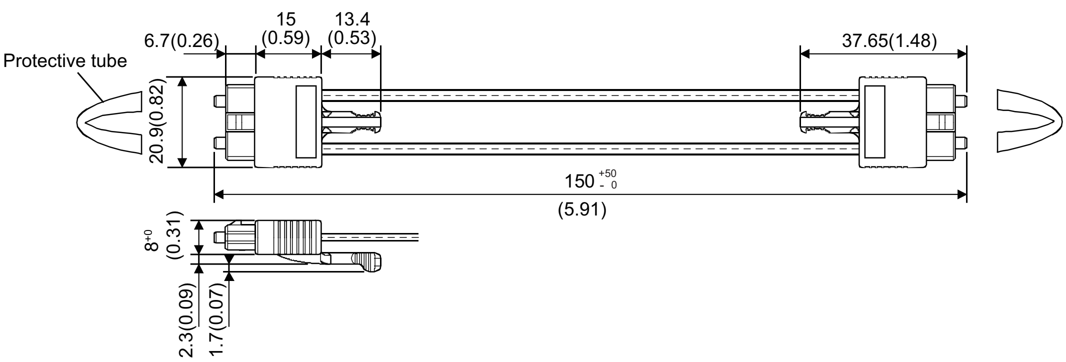
Type: MR-J3BUS_M-*

Symbol	Cable type
None	Standard cord for inside panel
A	Standard cable for outside panel
B	Long distance cable

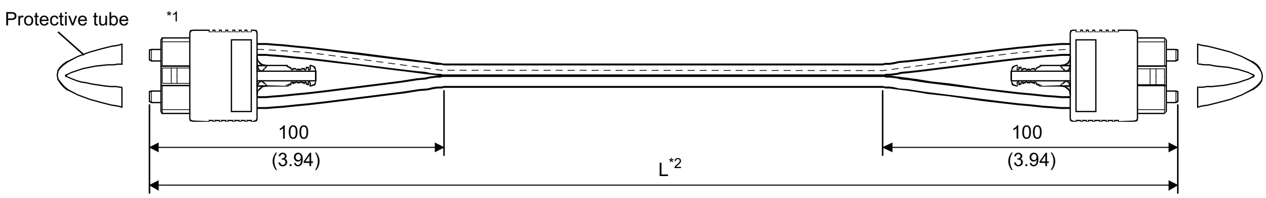
Symbol	Cable length [m(ft.)]
015	0.15 (0.49)
03	0.3 (0.98)
05	0.5 (1.64)
1	1 (3.28)
3	3 (9.84)
5	5 (16.40)
10	10 (32.81)
20	20 (65.62)
30	30 (98.43)
40	40 (131.23)
50	50 (164.04)

- Exterior dimensions (Unit: mm (inch))

[MR-J3BUS015M]

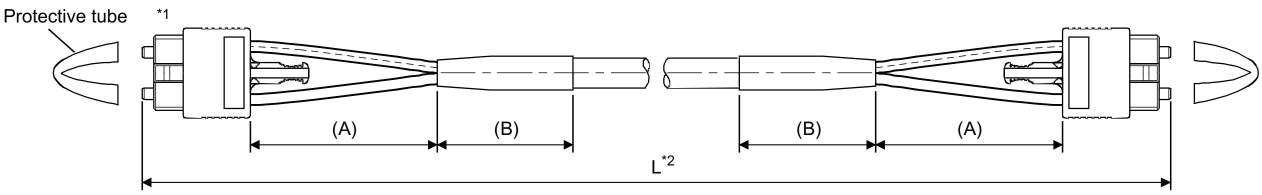


[MR-J3BUS03M to MR-J3BUS3M]



[MR-J3BUS5M-A to MR-J3BUS20M-A, MR-J3BUS30M-B to MR-J3BUS50M-B]

SSCNETIII cable	Variation [mm(inch)]	
	A	B
MR-J3BUS5M-A to MR-J3BUS20M-A	100 (3.94)	30 (1.18))
MR-J3BUS30M-B to MR-J3BUS50M-B	150 (5.91)	50 (1.97)



*1 Dimension of connector part is the same as that of MR-J3BUS015M.
*2 For cable length "L", refer to the following.
☞ Page 822 Model explanation

Point

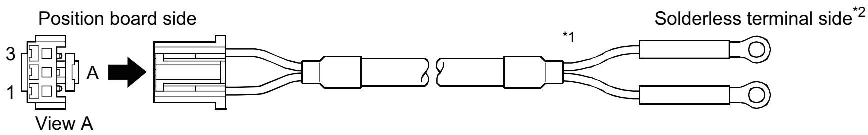
Keep the cap and the tube for protecting light cord end of SSCNETⅢ cable in a plastic bag with a zipper of SSCNETⅢ cable to prevent them from becoming dirty.

Forced stop input cable

Fabricate the forced stop input cable on the customer side.
Make the forced stop input cable within 30 [m] (98.43 [ft.]).

Forced stop input cable when using MR-MC2_ _

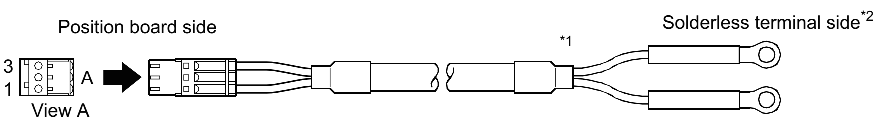
- Connection diagram

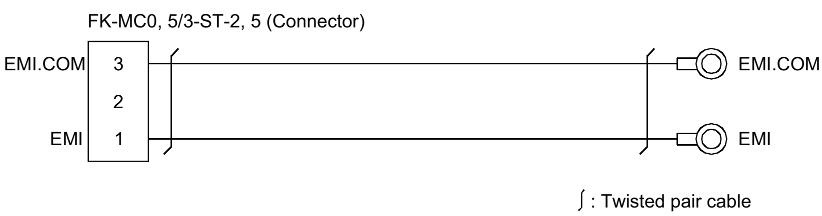


*1 Use a cable of wire size AWG28 to AWG22.
*2 Use solderless terminals that suit the size of the wire and terminals being used.

Forced stop input cable when using MR-MC3_ _

- Connection diagram





*1 Use a cable of wire size AWG28 to AWG20.
*2 Use solderless terminals that suit the size of the wire and terminals being used.

SSCNETIII cables (SC-J3BUS_M-C) manufactured by Mitsubishi Electric System & Service

Point

- For the details of the SSCNETⅢ cables, contact your local sales office.
- Do not look directly at the light generated from CN1A/CN1B connector of servo amplifier or the end of SSCNETⅢ cable. The light can be a discomfort when it enters the eye.

The cable is available per 1 [m] (3.28 [ft.]) up to 100 [m] (328.08 [ft.]). The number of the length (1 to 100) is in "_" part in the cable model.

Cable model	Cable length [m (ft.)]	Bending life	Application/remark
SC-J3BUS_M-C	1 to 100 (3.28 to 328.08)	Ultra-long bending life	Long distance cable

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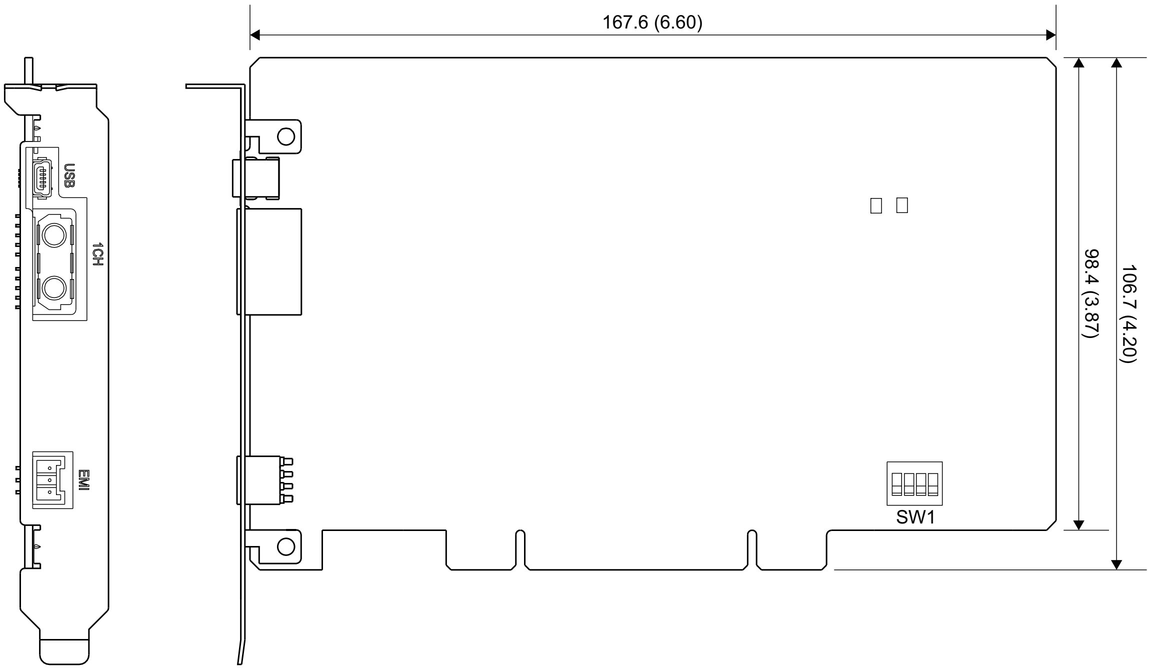
Appendix 8 Exterior Dimensions

Exterior dimensions [MC200]

MR-MC210

The MR-MC210 is a PCI short card size.

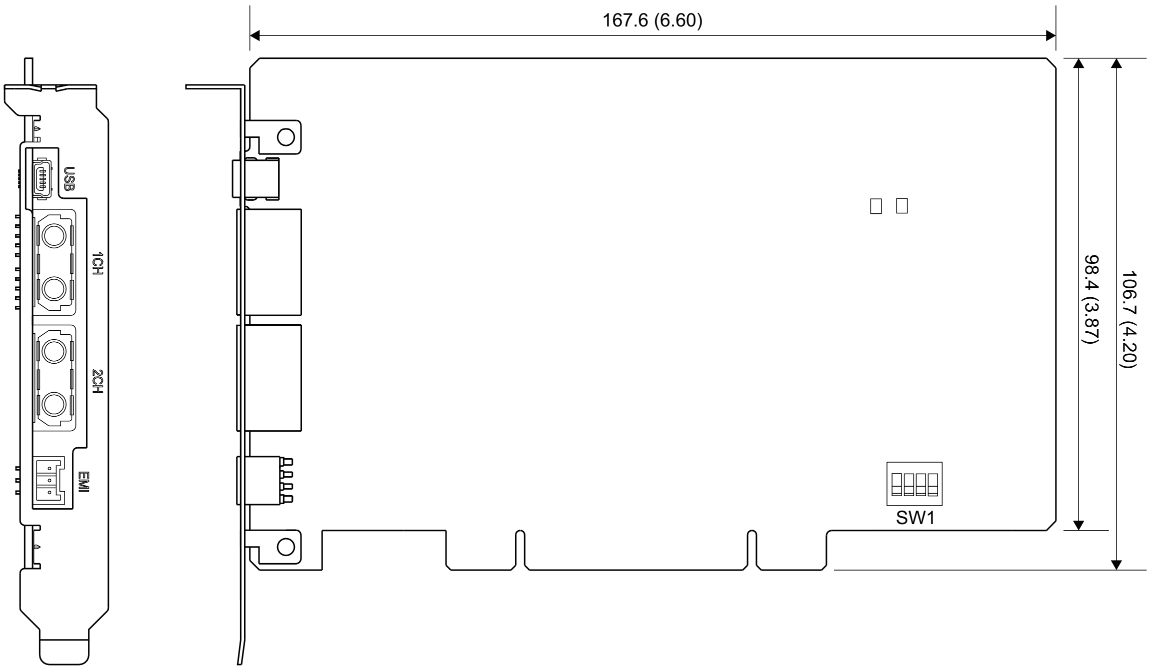
[Unit: mm (inch)]



MR-MC211

The MR-MC211 is a PCI short card size.

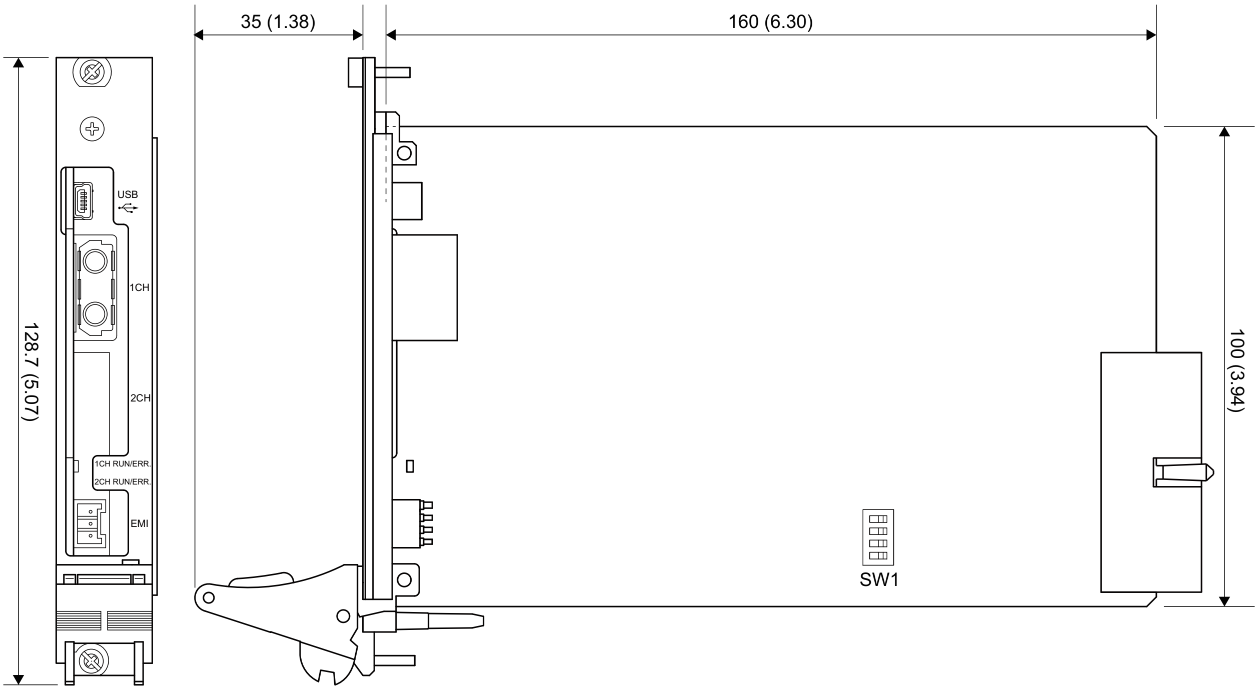
[Unit: mm (inch)]



MR-MC220U3

The MR-MC220U3 is compatible with the 3U size.

[Unit: mm (inch)]



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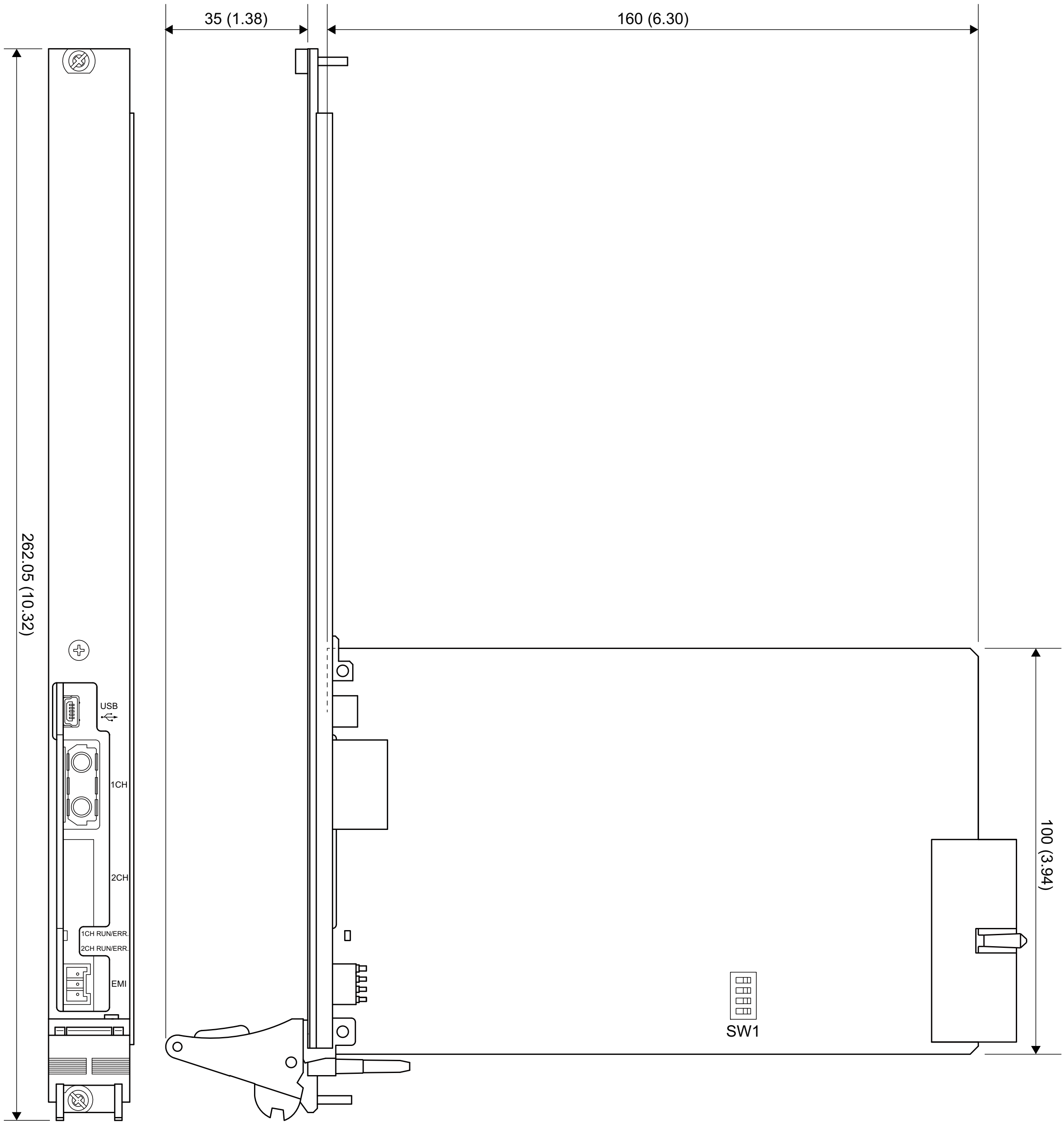
MR-MC220U6

The MR-MC220U6 is compatible with the 6U size. The circuit board is a 3U card size.

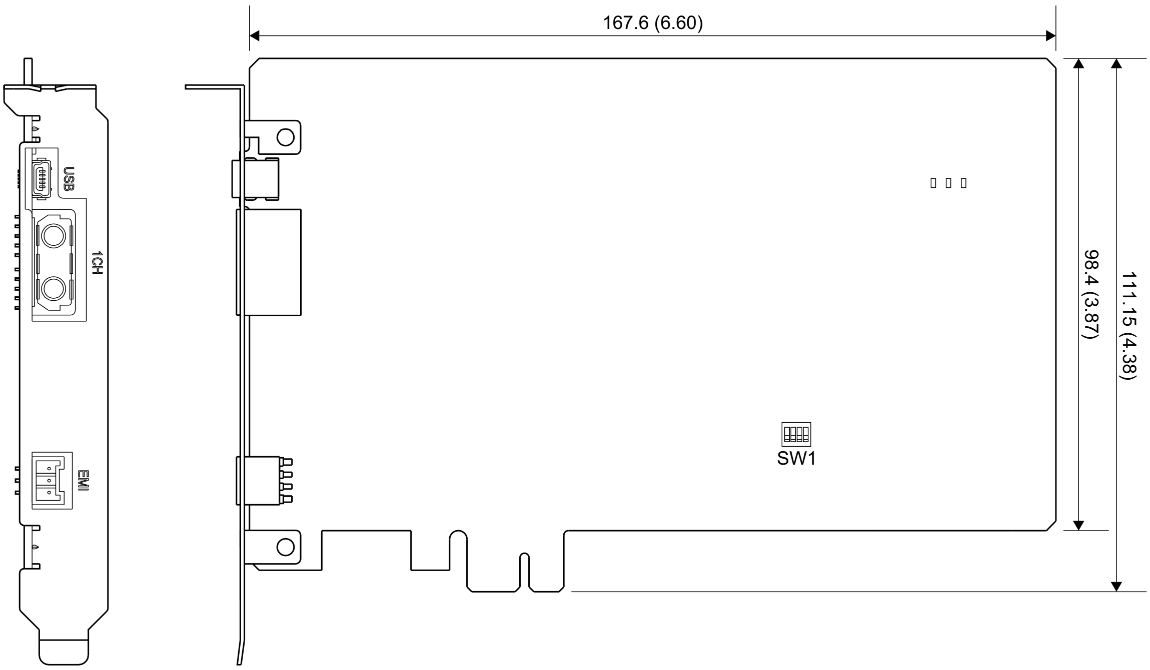
[Unit: mm (inch)]



MR-MC240

The MR-MC240 is a PCI Express short card size.

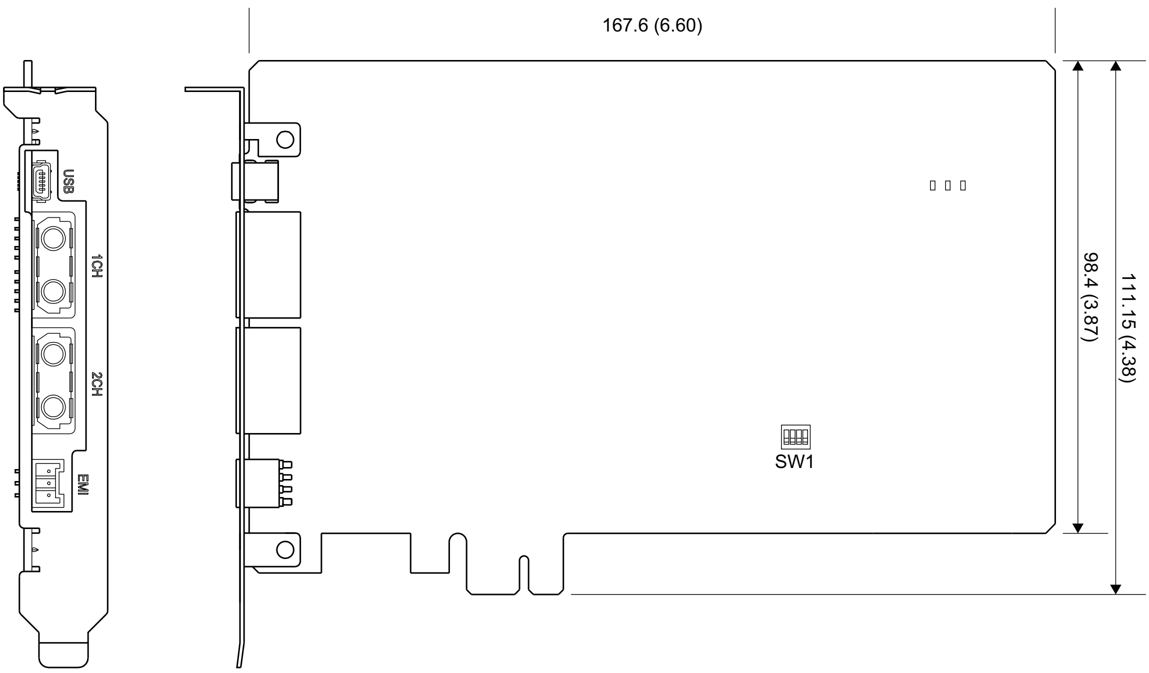
[Unit: mm (inch)]



MR-MC241

The MR-MC241 is a PCI Express short card size.

[Unit: mm (inch)]

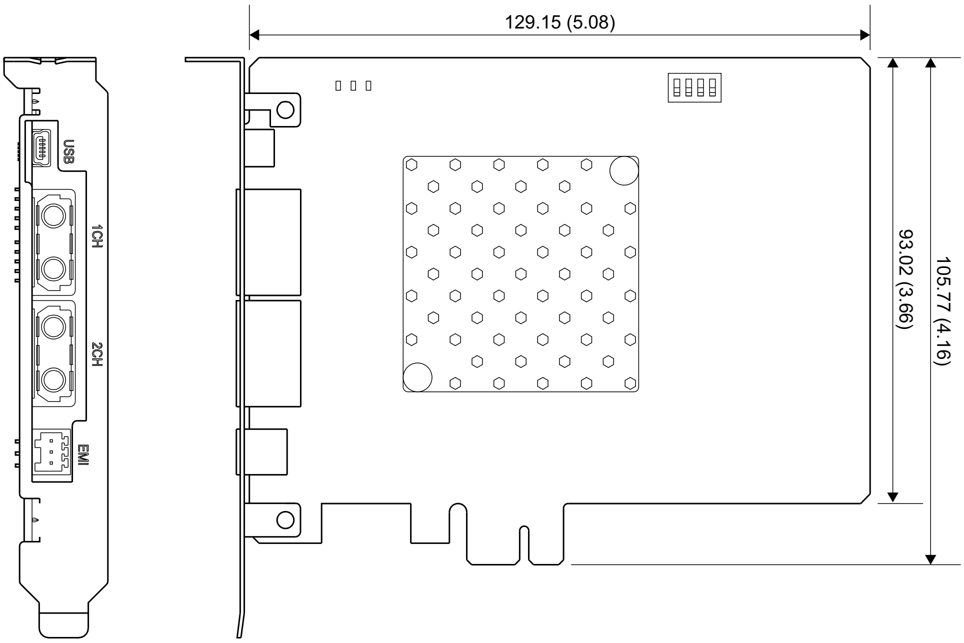


Exterior dimensions [MC300]

MR-MC341

The MR-MC341 is a PCI Express short card size.

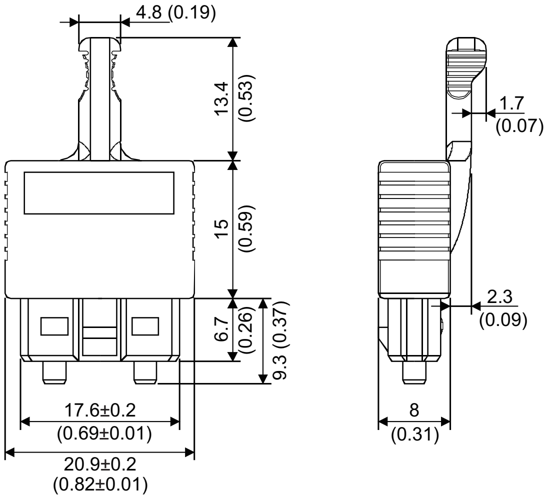
[Unit: mm (inch)]



Connectors

SSCNETIII cable connector

[Unit: mm (inch)]



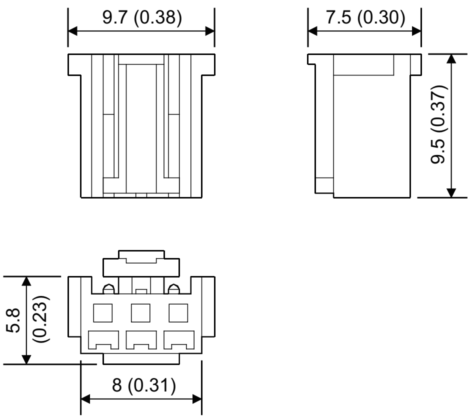
Forced stop connector

■Forced stop connector when using MR-MC2_ _ (Molex, LLC make)

Type Connector: 51103-0300

Terminal: 50351-8100

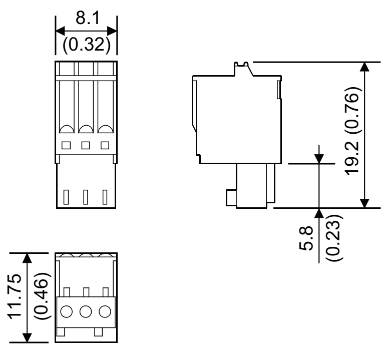
[Unit: mm (inch)]



■Forced stop connector when using MR-MC3_ _ (PHOENIX CONTACT GmbH & Co. KG make)

Type Connector: FK-MC0, 5/3-ST-2, 5

[Unit: mm (inch)]



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Appendix 9 Open Source Software

The position board (MR-MC341) uses GPL software in parts of the internal system. The GPL software source program is provided upon purchase of the position board (MR-MC341). Contact our sales representative for the GPL software source program.

In accordance with GPL/LGPL, only the open source software in the programs and drivers that make up the position board (MR-MC341), excluding parts that were created independently, are distributed. The source code is distributed 'as is', and no guarantee is provided. We are also unable to provide support on the contents of the source code. We appreciate your understanding.

Point

GPL is a GNU project that advocates free software licenses. Free software licenses grants the user the right to use, duplicate, modify, and redistribute the GPL software freely. Also, when distributing and duplicating the source program, supplying the source code is a requirement.

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REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
December 2013	IB(NA)-0300223ENG-A	First edition
December 2014	IB(NA)-0300223ENG-B	■Added models MR-MC240, MR-MC241 ■Added functions Speed-torque control, Mark detection, Continuous operation to torque control, External forced stop disabled ■Added or modified parts Section 5.8, 7.5, 7.13, 7.17, Chapter10, Section 11.2, 11.3, 12.4, 13.1, 13.4, Appendix 1, 6, 8
August 2015	IB(NA)-0300223ENG-C	■Added models MR-JE-_B ■Added functions SSCNETⅢ/H head module connection, transient transmit, hot line forced stop function, event detection function ■Added or modified parts RELEVANT MANUALS, Section 1.1, Chapter 2, Section 2.5, 4.5, 5.4, 6.27, 7.13, Chapter 10, Section 11.1, 11.2, 11.3, 11.5, 12.1, 12.3, 12.6, 12.7, 13.3, 13.4, 13.5, 13.6, Appendix 5, 6
February 2017	IB(NA)-0300223ENG-D	■Added models MR-MC220U3, MR-MC220U6 ■Added functions Sensing module connection ■Added or modified parts SAFETY PRECAUTIONS, Section 1.1, 1.3, Chapter 2, Section 2.5, 5.6, 6.13, 6.23, 6.33, 7.18, 10.19, 11.1, 11.3, 11.4, 11.5, 12.2, 12.3, 13.2, 13.3, 13.4
March 2018	IB(NA)-0300223ENG-E	■Added models MR-MC341 ■Added functions Serial number display, Jerk ratio acceleration/deceleration, Vibration suppression command filter 1, Sensing module (axis mode) connection ■Added or modified parts INTRODUCTION, Section 1.1, 1.3, Chapter 2, Section 2.4, 2.5, 3.3, 5.1, 5.5, 7.4, 10.2, 10.8, 11.1, 11.3, 11.5, 12.7, 13.1, 13.4, 13.6, Appendix 4, 5, 9
September 2018	IB(NA)-0300223ENG-F	■Added functions Circular interpolation, Proximity pass function ■Added or modified parts Section 1.2, 1.3, 1.4, 1.5, 2.5, 7.12, 10.1, 11.3, 13.4, 14.1, Appendix 8
December 2018	IB(NA)-0300223ENG-G	■Added or modified parts Section 1.3, 4.5
June 2022	IB(NA)-0300223ENG-H	■Added or modified parts Error correction
June 2024	IB(NA)-0300223ENG-J	■Added functions [MC300] MR-J5(W_)-_B connection ■Added or modified parts SAFETY PRECAUTIONS, TERMS, GENERIC TERMS AND ABBREVIATIONS, Section 1.1, 1.3, 2.2, 2.3, 2.5, 4.1, 4.4, 4.5, 4.6, 5.4, 5.6, 5.7, 5.8, 6.1, 6.3, 6.13, 6.17, 6.19, 6.20, 6.21, 6.23, 6.25, 6.28, 6.30, 6.31, 6.32, 6.33, 6.34, 6.35, 7.1, 7.2, 7.6, 7.9, 7.10, 7.12, 7.13, 7.14, 7.16, 7.17, 7.18, Chapter 8, Section 8.1, 8.4, 9.1, 9.2, 9.6, 10.1, 10.7, 10.10, 10.20, Chapter 11, Section 11.1, 11.2, 11.3, 12.1, 12.2, 12.5, 12.8, 13.2, 13.4, 13.6, Chapter 14, Appendix 1, 2, 3, 4, 6, INDEX, INFORMATION AND SERVICES, TRADEMARKS

Japanese manual number: IB-0300222-K

WARRANTY

Warranty

1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit is repaired or replaced.

[Term]

For terms of warranty, please contact your original place of purchase.

[Limitations]

(1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.
It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.

(2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.

(3) Even during the term of warranty, the repair cost will be charged on you in the following cases;

1. a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
2. a failure caused by any alteration, etc. to the Product made on your side without our approval
3. a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
4. a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
5. any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
6. a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
7. a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
8. any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

(1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.

(2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product

(1) For the use of our position board, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in the position board, and a backup or fail-safe function should operate on an external system to the position board when any failure or malfunction occurs.

(2) Our position board is designed and manufactured as a general purpose product for use at general industries.
Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.
We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

(3) Mitsubishi shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

INFORMATION AND SERVICES

For further information and services, please contact your local Mitsubishi Electric sales office or representative.
Visit our website to find our locations worldwide.

MITSUBISHI ELECTRIC Factory Automation Global Website
Locations Worldwide
www.MitsubishiElectric.com/fa/about-us/overseas/

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IB(NA)-0300223ENG-J

IB(NA)-0300223ENG-J(2406)MEE
MODEL: MRMC2-U-S-E
MODEL CODE: 1XB968

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