Drive Goods

SSCNET Conversion Unit

Model
DG2GWY13

User's Manual (Detailed)

● SAFETY PRECAUTIONS ●

(Please read the instructions carefully before using this equipment.)

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 described in this manual are concerned with this product only. For Motion controller system safety precautions, refer to the user's manual of the CPU module used.
In this manual, the safety precautions are ranked as "DANGER" and "CAUTION".

⚠ DANGER	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 physical 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]

⚠ DANGER

- Configure safety circuits external to the conversion unit to ensure that the entire system operates safely even when a fault occurs in the external power supply or the conversion unit. Failure to do so may result in an accident due to a malfunction or incorrect output.
  (1) Configure external safety circuits, such as an emergency stop circuit, protection circuit, and protective interlock circuit for forward/reverse operation or upper/lower limit positioning.
  (2) When the conversion unit detects an error such as a watchdog timer error by the self-diagnostic function, all outputs are turned off. Also, output controls may not work when an error occurs in a part, such as I/O control part, where the conversion unit cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or external circuit.
  (3) Outputs may remain on or off due to a failure of an output module relay, transistor, or triac. To ensure safety operation, configure an external circuit to monitor output signals that could cause a serious accident.

⚠ CAUTION

- Noise interference can cause erroneous data to be written to the conversion unit, resulting in an incorrect operation of the conversion unit which may cause an accident, or damage the machine. Always ensure the following items are observed.
  (1) Do not bundle main circuit lines or high-voltage lines with load lines.
  Do not keep these lines close to each other as they are easily affected by noise and surge induction.
  When wiring, keep the above lines at least 100 mm apart.
  (2) The shield of shielded cords and shielded cables must be grounded to a point on the programmable controller side. However, do not use a common ground with strong electrical equipment.
  (3) Input, power supply, and optical fiber connectors should be used without any force applied on them.
  Excessive force will cause cables to disconnect and fail.
- Provide appropriate circuits external to the conversion unit to prevent cases where danger may result from abnormal operation of the overall system in the event of an external power supply fault or conversion unit failure.
- If a fault occurs in the conversion unit or servo amplifier, shut off the power at the control power source of the servo amplifier.
- Do not apply a voltage other than that specified in the instruction manual on any terminal. Doing so may cause destruction or damage.
- Do not reverse the polarity (+/-). Doing so can cause an explosion or damage.

[Installation Precautions]

⚠ DANGER

- Shut off the external power supply (all phases) used in the system before mounting or removing the conversion unit. Not doing so could result in an electric shock or damage to the unit.

⚠ CAUTION

- Never try to disassemble or modify the conversion unit. It may cause a product failure, operation failure, injury, or fire.
- Do not drop or apply strong impact on the conversion unit. Doing so will damage the unit.
- Use the conversion unit in an environment that meets the general specifications contained in this manual. Using the conversion unit in an environment outside the range of the general specifications could result in an electric shock, fire, operation failure, and damage to or deterioration of the unit.
- When using the conversion unit in places subject to vibration, fix the unit with screws. Tighten the screws within the specified torque range. Undertightening may cause a drop, short circuit or malfunction. Overtightening may cause a drop, short circuit, or malfunction due to damage to the screws or conversion unit.
- Do not directly touch the conductive parts and electronic components of the conversion unit. Doing so may cause malfunction or failure of the unit.
- Lock the control panel and prevent access to those who are not certified to handle or install electric equipment.
- Mount the conversion unit, servo amplifier, servo motor, and regenerative resistor on incombustible material. Mounting them directly or close to combustibles will lead to fire.

[Wiring Precautions]

⚠ DANGER

- Shut off the external power supply (all phases) used in the system before installation or wiring. Not doing so could result in an electric shock or damage to the product.

⚠ CAUTION

- Be sure to ground the earth terminal FG and LG. (Ground resistance: 100 Ω or less) Not doing so could result in an electric shock or malfunction.
- Do not connect the FG terminal to the 24 V DC side of an external power supply. Doing so may cause a malfunction.
- Check the product's rated voltage and the terminal layout. Make sure to wire the conversion unit correctly. Connecting a power supply that differs from the rating or incorrectly wiring the product could result in fire or failure.
- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. Imperfect connections could result in a short circuit, fire, or malfunction.
- Tighten the terminal screws within the specified torque range. Undertightening may cause a drop, short circuit, fire, or malfunction. Overtightening may cause a drop, short circuit, or malfunction due to damage to the screws or conversion unit.
- Make sure that no foreign matter such as sawdust or wiring debris enters the conversion unit. Such debris could cause fire, damage, or malfunction.
- Do not reverse the polarity (+/-). Doing so can cause an explosion or damage.

[Startup and Maintenance Precautions]

⚠ DANGER

- .Do not touch any terminal while power is on. Doing so will cause electric shock.
- Shut off the external power supply (all phases) used in the system before cleaning the conversion unit or retightening the terminal or unit mounting screws. Not doing so could result in an electric shock. Undertightening may cause a drop or malfunction. Overtightening may cause a drop, short circuit, or malfunction due to damage to the screws or conversion unit.

⚠ CAUTION

- Never try to disassemble or modify the conversion unit. It may cause a product failure, operation failure, injury, or fire.
- Use any radio communication device such as a cellular phone or a PHS phone more than 25 cm away from the conversion unit in all directions. Not doing so may cause a malfunction.
- Shut off the external power supply (all phases) used in the system before installing or removing the conversion unit. Not doing so may cause the unit to fail or malfunction.
- Before handling the conversion unit, always touch grounded metal, etc. to discharge static electricity from human body. Not doing so may cause the unit to fail or malfunction.
- Do not directly touch the conductive parts and electronic components of the conversion unit. Doing so could cause the unit to malfunction or fail.

[Disposal Precautions]

⚠ DANGER

- A capacitor is mounted into the conversion unit. Do not incinerate the conversion unit, or the capacitor may burst. For disposal of the conversion unit, request for the specialized industrial waste disposal service who has incineration facilities.

Dispose of this product according to your local laws and regulations.

⚠ CAUTION

- This product is not designed or manufactured to be used in equipment or systems in situations that can affect or endanger human life.
- When considering this product for operation in special applications such as machinery or systems used in passenger transportation, atomic power, electric power, aerospace, medical or submarine repeating applications, please contact your nearest Mitsubishi sales representative.
- Although this product was manufactured under conditions of strict quality control, you are strongly advised to install safety devices to forestall serious accidents when it is used in facilities where a breakdown in the product is likely to cause a serious accident.

[Transportation Precautions]

⚠ CAUTION

- When not using the product for a long time, disconnect the power line from the unit or servo amplifier.
- Place the conversion unit and servo amplifier in anti-static vinyl bags to store.

REVISIONS

*The manual number is noted on the lower left of the back cover.

Print Date	*Manual Number	Revision
June 2015	50GR-041197-A	First edition
Feb 2016	50GR-041197-B	[Addition of compatible models] A273UHCPU(-S3)/Q172CPU(N)/Q173CPU(N) [Additions & corrections] Restrictions
Apr 2016	50GR-041197-C	[Additions & corrections] Restrictions
Dec 2016	50GR-041197-D	[Addition of compatible models] Communication type: SSCNET III compatible [Addition of compatible operating system software] SV43 [Additions & corrections] CONTENTS, OVERVIEW, Generic terms and abbreviations, Overview of the Procedure before Starting Operations, Steps before Starting Operations, settings for conversion unit, Restrictions and precautions due to differences in encoder resolution
Feb 2017	50GR-041197-E	[Additions & corrections] Setting the servo amplifier switch
Aug 2018	50GR-041197-F	[Addition of compliance to global standard] KC [Additions & corrections] Servo parameter capture function
Aug 2020	50GR-041197-G	[Additions & corrections] Safety precautions, connectable devices, functions supported by each firmware version, specifications, connecting the devices

INTRODUCTION

Thank you for choosing our SSCNET conversion unit.
Before using this product, read this manual carefully and understand the functions and performance of the product thoroughly to ensure correct use.

CONTENTS

About the manuals

Order the following manuals that are related to this product when necessary.

Detailed manual

Manual name	Manual No.
DG2GWY13 SSCNET Conversion Unit User's Manual (Detailed)	50GR-041197

Relevant manuals of the products manufactured by Mitsubishi Electric Corporation

Manual name	Manual No.
MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)	SH(NA)030109
MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual	SH(NA)030106
MR-J4W2-_B, MR-J4W3-_B, MR-J4W2-0303B6 Servo Amplifier Instruction Manual	SH(NA)030105
MR-J3-_B Servo Amplifier Instruction Manual	SH(NA)030051
MR-J3W-0303BN6, MR-J3W-_B Servo Amplifier Instruction Manual	SH(NA)030073
A173UHCPU/A172SHCPUN/A171SHCPUN User's Manual	IB(NA)67395
A273UHCPU User's Manual	IB(NA)67262
Q173CPU(N)/Q172CPU(N) User's Manual	IB(NA)0300040

Generic terms and abbreviations

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

Generic terms/abbreviations	Description
Conversion unit	DG2GWY13 SSCNET conversion unit
MELSOFT MT Works2	Motion controller engineering software package
MT Developer2	Programming software included in MELSOFT MT Works2
MR Configurator2	Servo setup software MR Configurator2 (version 1.00A or later)
A series Motion controller	A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU(-S3) Motion controller
Q series Motion controller	Q172CPU(N)/Q173CPU(N) Motion controller
HG motor	MR-J4 compatible HG series servo motor
SSCNET	Communication network between the A/QN series Motion controller and the conversion unit
SSCNET III/H	Communication network between the conversion unit and the SSCNET III/H compatible servo amplifier
SSCNET III	Communication network between the conversion unit and the SSCNET III compatible servo amplifier
SV13	Operating system software for conveyor assembly use
SV22	Operating system software for automatic machinery use
SV43	Operating system software for the areas around machine tools
SW3RNC-GSVE	Integrated startup support software for the A series Motion controller
A270CDCBL03M cable	Cable for the SSC I/F card
J3 compatibility mode	MR-J4-B series operation mode compatible with the MR-J3-B series
SSCNET III/H compatible servo amplifier	MR-J4-B/MR-J4W2-B/MR-J4W3-B servo amplifiers
SSCNET III compatible servo amplifier	MR-J4-B (J3 compatibility mode)/MR-J4W2-B (J3 compatibility mode)/MR-J4W3-B (J3 compatibility mode)/MR-J3-B/MR-J3W-B servo amplifiers
MR-J4-B servo parameters	Servo parameters used with SSCNET III/H compatible servo amplifiers
MR-J3-B servo parameters	Servo parameters used with SSCNET III compatible servo amplifiers

POINT

Apart from the conversion unit (DG2GWY13) and the 24 V DC power supply input connector (DG8PW3CN), the software package, modules, and cables of Mitsubishi Electric Corporation are used to configure the systems described in this manual.

1. OVERVIEW

1. OVERVIEW

- The communication type for the conversion unit (model: DG2GWY13) can be set to "SSCNET III/H" or "SSCNET III"
- By setting the communication type to "SSCNET III/H", the drive section of a system can be upgraded from SSCNET compatible servo amplifiers (MR-J2S-B/MR-J2M-B/MR-J2-B/MR-H-B/ MR-J4-B-RJ020+MR-J4-T20) to SSCNET III/H compatible servo amplifier (MR-J4-B). The SSCNET compatible controller section (A series or Q series Motion controller) does not need to be upgraded simultaneously.
- By setting the communication type to "SSCNET III", the drive section of a system can be upgraded from SSCNET compatible servo amplifiers to SSCNET III compatible servo amplifiers (MR-J4-B [J3 compatibility mode] and MR-J3-B). The SSCNET compatible controller section does not need to be upgraded simultaneously.
- Since the controller and drive sections can be upgraded independently, the potential risks at upgrading can be reduced and the machine halt time can be shortened.
- The range of upgrading is flexible since the drive section can be upgraded by SSCNET line (max. 16 axes).
- Existing design assets can be used.

Important

(1) Precautions due to differences in encoder resolution

When replacing existing SSCNET compatible servo amplifiers with SSCNET III/H compatible servo amplifiers, the following items must be checked, and each setting must be changed in applicable cases because of differences in encoder resolution (SSCNET compatible servo amplifiers: 8192 pulses/rev, 16384 pulses/rev or 131072 pulses/rev, SSCNET III/H compatible servo amplifiers: 4194304 pulses/rev, SSCNET IIIcompatible servo amplifiers: 262144 pulses/rev).

- Electronic gear settings (position accuracy error)
- Stroke limit upper/lower limit range setting (reduction in the stroke limit upper/lower limit range)
- Settings for the amount of backlash compensation (reduction in the setting range)
- Command in-position settings (reduction in the setting range)
- Mechanical system program settings (set-up and operation)

Refer to Section 5.4 for details.

(2) The speed control (II) VVF command and VVR command for the A series Motion controllers

When the speed control (II) VVF command or VVR command is executed for an A series Motion controller, the encoder resolution for the servo amplifier will affect the internal calculations of the A series Motion controller. This may cause overflow to occur, and thus the commands cannot be used.
If controlling speed with an A series Motion controller, use the speed control (I) VF or VR command.
(If controlling speed with a Q series Motion controller, use the speed control (I) VF or VR command and the speed control (II) VVF or VVR command.)

For the operating specifications for the speed control (I) VF or VR command and the speed control (II) VVF or VVR command, refer to the Motion controller manual.

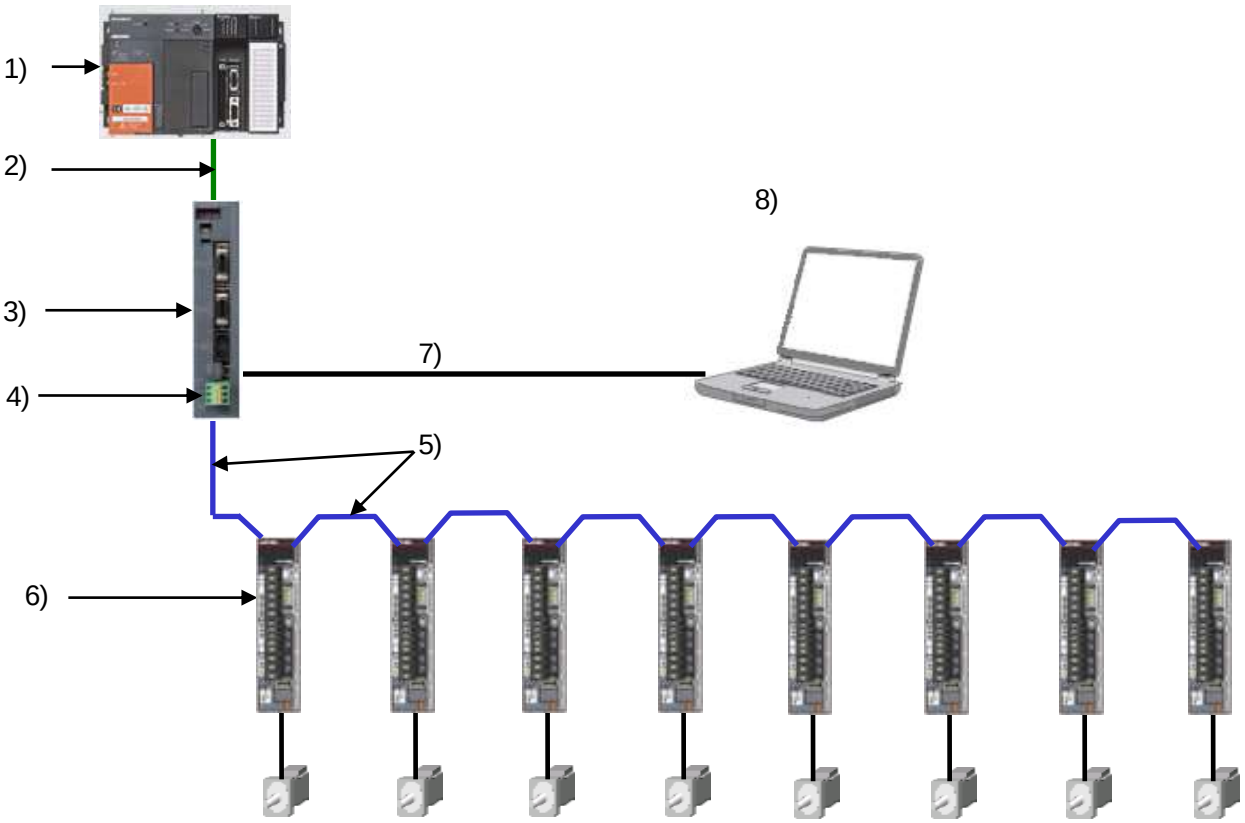
- A172SHCPUN/A171SHCPUN Motion Controller (SV13/SV22) Programming Manual (REAL MODE) [IB (NA) 67396]
- A173UHCPUN/A273UHCPUN Motion Controller (SV13/SV22) Programming Manual (REAL MODE) [IB (NA) 0300028]
- Q173CPU(N)/Q172CPU(N) Motion Controller (SV13/SV22) Programming Manual (REAL MODE) [IB (NA) 0300043]

2. SYSTEM CONFIGURATION

2. SYSTEM CONFIGURATION

(1) Overall configuration of the system (product model, related product model)

The following shows the overall configuration of the system when the conversion unit is used.



No.	Item	Model	Description
1)	A series Motion controller	A171SHCPU(N) A172SHCPU(N) A173UHCPU A273UHCPU(-S3)	SSCNET compatible controller
	Q series Motion controller	Q172CPU(N) Q173CPU(N)	SSCNET compatible controller
2)	SSCNET cable	MR-J2HBUS_M-A	A series Motion controller ⇔ conversion unit
		Q172J2BCBL_M	Q172CPU(N) ⇔ conversion unit
		Q173J2B_CBL_M	Q173CPU(N) ⇔ conversion unit
		Q173DVCBL_M	Q173CPU(N) ⇔ dividing unit (Q173DV)
		MR-J2HBUS_M	Dividing unit (Q173DV) ⇔ conversion unit
3)	Conversion unit	DG2GWY13	SSCNET (max. 8 axes × 2 lines) → SSCNET III/H (max. 16 axes)
4)	24 V DC power supply input connector	DG8PW3CON	24 V DC power supply input connector
5)	SSCNET III cable*	MR-J3BUS_M MR-J3BUS_M-A MR-J3BUS_M-B	Conversion unit ⇔ servo amplifier Servo amplifier ⇔ servo amplifier
6)	Servo amplifier	MR-J4-B MR-J4W2-B MR-J4W3-B	SSCNET III/H compatible servo amplifier SSCNET III compatible servo amplifier
		MR-J3-B MR-J3W-B	SSCNET III compatible servo amplifier
7)	USB cable	MR-J3USBCBL3M	Conversion unit ⇔ personal computer
8)	Parameter conversion tool software	MELSOFT MT Works2	Software for writing parameters to the conversion unit

* The SSCNET III/H line and SSCNET III line use the same SSCNET III cable.

2. SYSTEM CONFIGURATION

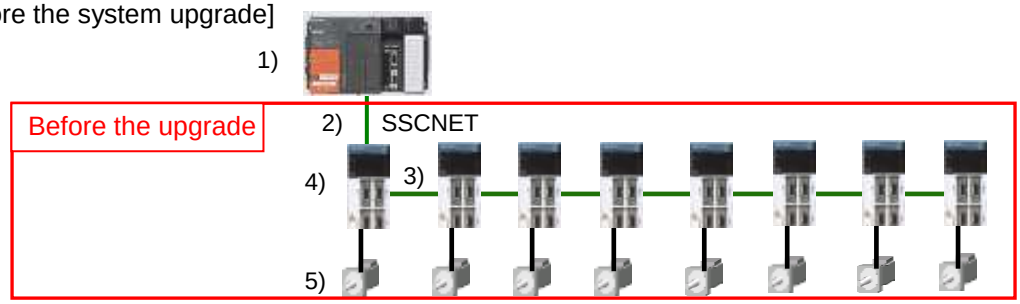
(2) Configuration of the upgraded system for the conversion unit

The following shows the system configurations before and after the upgrade.

By using this conversion unit, SSCNET on the Motion controller side can connect to SSCNET III/H or SSCNET III on the servo amplifier side. This enables the drive section to be upgraded independently.

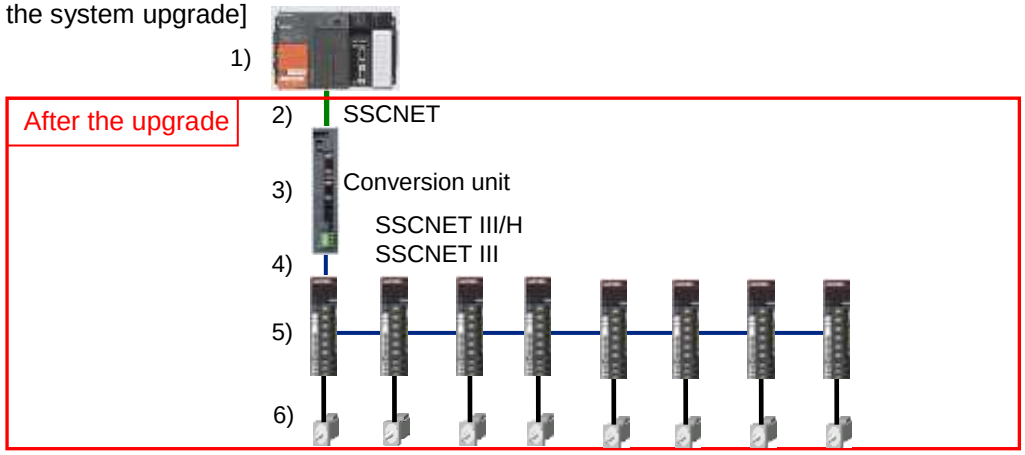
There are cases where the SSCNET cable between the A series Motion controller/Q series Motion controller and the servo amplifier before the upgrade can not be used as the SSCNET cable between the A series Motion controller/Q series Motion controller and the conversion unit after the upgrade. Check the explanatory note (*1). on the next page.

[Before the system upgrade]



No	Item	Description
1)	A series Motion controller	A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU(-S3)
	Q series Motion controller	Q172CPU(N)/Q172CPU(N) Motion controller
2)	SSCNET cable	Cable between the A series Motion controller/Q series Motion controller and the servo amplifier
3)	SSCNET cable	Cable between servo amplifiers
4)	Servo amplifier (SSCNET compatible)	MR-J2S-BCMR-J2M-BVMR-J2-B/MR-H-B/MR-J4-B-RJ020+MR-J4-T20 servo amplifiers
5)	Servo motor	• MR-J2S-B compatible motor : HC-KFS/HC-MFS/HC-SFS/HC-RFS/HC-UFS/HC-LFS/HA-LFS • MR-J2M-B compatible motor : HC-KFS/HC-MFS/HC-UFS • MR-J2-B compatible motor : HC-MF/HC-SF/HC-RF/HC-UF/HA-FF • MR-H-B compatible motor : HA-MH/HA-FH/HA-SH/HA-UH/HA-LH • MR-J4-B-RJ020+MR-J4-T20 compatible motor : HG-KR/HG-MR/HG-SR/HG-UR/HG-RR/HG-JR

[After the system upgrade]



No	Item	Description	
1)	A series Motion controller	A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU(-S3)	Diversion possible
	Q series Motion controller	Q172CPU(N)/Q172CPU(N) Motion controller	
2)	SSCNET cable	Cable between the A series Motion controller/Q series Motion controller and the servo amplifier (*1)	New procurement/ Diversion possible (*1)
3)	Conversion unit	SSCNET → SSCNET III/H conversion unit (*2)	This product
	24 VDC power supply input connector	24 VDC power supply input connector	
4)	SSCNET III cable	Cable between the conversion unit and servo amplifier, and cable between servo amplifiers	New procurement
5)	Servo amplifier	MR-J4-B/MR-J4W2-B/MR-J4W3-B servo amplifier (SSCNET III/H compatible) MR-J4-B/MR-J4W2-B/MR-J4W3-B/MR-J3-B/MR-J3W-B servo amplifier (SSCNET III compatible)	New procurement/ Diversion possible (*3)
6)	Servo motor	• MR-J4-B compatible motor : HG-KR/HG-MR/HG-SR/HG-UR/HG-RR/HG-JR • MR-J3-B compatible motor : HF-KP/HF-MP/HF-SP/HF-JP/HC-LP/HC-UP/HC-RP/HA-LP	New procurement/ possible (*4)

2. SYSTEM CONFIGURATION

(*1) The SSCNET cables connecting the Motion controller and servo amplifier before the system upgrade, and the SSCNET cables connecting the Motion controller and conversion unit after the system upgrade are described below.
If the SSCNET cables used before and after the system upgrade are different, procure the new cable.

Before the system upgrade			After the system upgrade			
Motion controller	Servo amplifier	SSCNET cable	Motion controller	Conversion unit	SSCNET cable	
A171SHCPU(N) A172SHCPU(N) A173UHCPU A273UHCPU(-S3)	MR-H-B	MR-HBUS_M	A171SHCPU(N) A172SHCPU(N) A173UHCPU A273UHCPU(-S3)	DG2GWY13	MR-J2HBUS_M-A	New procurement
	MR-J2S-B MR-J2M-B MR-J2-B MR-J4-B-RJ020 +MR-J4-T20	MR-J2HBUS_M-A			MR-J2HBUS_M-A	Diversion possible
Q172CPU(N)	MR-H-B	Q172HBCBL_M(-B)	Q172CPU(N)	DG2GWY13	Q172J2BCBL_M(-B)	New procurement
	MR-J2S-B MR-J2M-B MR-J2-B MR-J4-B-RJ020 +MR-J4-T20	Q172J2BCBL_M(-B)			Q172J2BCBL_M(-B)	Diversion possible
Q173CPU(N) [Q173DV not used]	MR-H-B	Q173HB_CBL_M	Q173CPU(N) [Q173DV not used]	DG2GWY13	Q173J2B_CBL_M	New procurement
	MR-J2S-B MR-J2M-B MR-J2-B MR-J4-B-RJ020 +MR-J4-T20	Q173J2B_CBL_M			Q173J2B_CBL_M	Diversion possible
Q173CPU(N) [Q173DV used]	MR-H-B	Q173DVCBL_M(*1-1) MR-J2HBUS_M-A(*1-2)	Q173CPU(N) [Q173DV used]	DG2GWY13	Q173DVCBL_M(*1-1)	Diversion possible
					MR-J2HBUS_M(*1-3)	New procurement
	MR-J2S-B MR-J2M-B MR-J2-B MR-J4-B-RJ020 +MR-J4-T20	Q173DVCBL_M(*1-1) MR-J2HBUS_M(*1-4)			Q173DVCBL_M(*1-1) MR-J2HBUS_M(*1-3)	Diversion possible

(*1-1) Cable between Q173CPU(N) and Q173DV (dividing unit)
(*1-2) Cable between Q173DV (dividing unit) and MR-H-B servo amplifier
(*1-3) Cable between Q173DV (dividing unit) and the conversion unit
(*1-4) Cable between Q173DV (dividing unit) and MR-J2S-B/MR-J2M-B/MR-J2-B/ MR-J4-B-RJ020+MR-J4-T20 servo amplifiers

(*2) MELSOFT MT Works2 is required to write. projects to the conversion unit and to read projects from the conversion unit.
If not installed on the personal computer, make a new procurement of MELSOFT MT Works2.
(*3) If the servo amplifier (SSCNET compatible) before the system upgrade is "MR-J4-B-RJ020+MR-J4-T20", it can be diverted for usability as "MR-J4-B-RJ020" for the servo amplifier after the system upgrade.
(*4) If the servo amplifier (SSCNET compatible) before the system upgrade is "MR-J4-B-RJ020+MR-J4-T20", the servo motor "HG-KR/HG-MR/HG-SR/HG-UR/HG-RR/HG-JR" can be diverted to this.

(3) Connectible devices

The following table lists devices that can be connected to the conversion unit.

Item	Product model	Supported firmware version
SSCNET compatible Motion controller (OS: SV13/SV22)	A171SHCPU(N) / A172SHCPU(N) / A173UHCPU	A or later
	A273UHCPU(-S3) Q172CPU(N) / Q173CPU(N)	B or later
SSCNET compatible Motion controller (OS: SV43) .	A171SHCPU(N) / A172SHCPU(N) / A173UHCPU A273UHCPU Q172CPU(N) / Q173CPU(N)	D or later
SSCNET III/H compatible servo amplifier	MR-J4-B / MR-J4W2-B / MR-J4W3-B	A or later
SSCNET III compatible servo amplifier	MR-J4-B / MR-J4W2-B / MR-J4W3-B (J3 compatibility mode) MR-J3-B / MR-J3W-B	D or later

(4) Functions supported by each firmware version

Whether functions are available depends on the firmware version of the conversion unit.
The following table lists firmware versions and supported functions.

Function	Description	Firmware version (*1)	Reference
SSCNET compatible controllers added (OS: SV13/SV22) ・A273UHCPU(-S3) ・Q172CPU(N) ・Q173CPU(N)	Currently, the controllers shown on the left can be connected.	B or later	(3) in Chapter 2
SSCNET compatible controllers added (OS: SV43) ・A171SHCPU(N) ・A172SHCPU(N) ・A173UHCPU ・A273UHCPU ・Q172CPU(N) ・Q173CPU(N)	Currently, the controllers shown on the left can be connected.	D or later	
SSCNET III/H compatible servo amplifiers added ・MR-J4-B (J3 compatibility mode) ・MR-J4W2-B (J3 compatibility mode) ・MR-J4W3-B (J3 compatibility mode) ・MR-J3-B ・MR-J3W-B	Currently, the servo amplifiers shown on the left can be connected.		
Auto tuning function improved	The auto tuning function adjusts servo parameters of the servo amplifier. Currently, the tuning results can be automatically stored in the storage of the conversion unit. Therefore, even soon after the power of the conversion unit and servo amplifier has been cycled, the gain servo parameters adjusted just before power off can still be used.	F or later	Sectious 5.1.3, 5.2.3 (*3), (*4), (*5), (*6)
Servo parameter adjustment function using servo setup software improved (*2)	Currently, the servo parameters adjusted using the servo setup software can be automatically stored in the storage of the conversion unit. Therefore, the "applying the servo gain adjustment result setting" procedure in sections 5.1.4 or 5.2.4. can be skipped.		

(*1) The firmware version can be checked on the LED display at power-on of the conversion unit. (Refer to (4) in Chapter 3.)
(*2) Servo parameter adjustment function corresponds to “Adjustment” in the MR Configurator 2 menu or “Advanced-function” in the MRZJW3-SETUP221 menu.
(*3) Refer to "MR-J4-_B_(-RJ) Servo Amplifer Instruction Manual" (SH(NA)030106).
(*4) Refer to "MR-J4W2-_B, MR-J4W3-_B, MR-J4W2-0303B6 Servo Amplifer Instruction Manual" (SH(NA)030105).
(*5) Refer to "MR-J3-_B Servo Amplifer Instruction Manual" (SH(NA)030051).
(*6) Refer to "MR-J3W-0303BN6, MR-J3W-_B Servo Amplifer Instruction Manual" (SH(NA)030073).

3. SPECIFICATIONS

3. SPECIFICATIONS

(1) General specifications

<table>
<tr><th colspan="2">Item</th><th colspan="6">Specifications</th></tr>
<tr><td colspan="2">Operating ambient temperature</td><td colspan="6">0 to 55°C</td></tr>
<tr><td colspan="2">Storage ambient temperature</td><td colspan="6">-25 to 75°C</td></tr>
<tr><td colspan="2">Operating ambient humidity</td><td colspan="6">5 to 95%RH, no condensation</td></tr>
<tr><td colspan="2">Storage ambient humidity</td><td colspan="6">5 to 95%RH, no condensation</td></tr>
<tr><td colspan="2" rowspan="5">Vibration resistance</td><td rowspan="5">Compliant with JIS B 3502 and IEC 61131-2</td><td></td><td>Frequency</td><td>Constant acceleration</td><td>Half amplitude</td><td>Number of sweeps</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>5 to 9 Hz</td><td>-</td><td>3.5 mm</td><td rowspan="2">10 times in each of X, Y and Z directions (for 80 minutes)</td></tr>
<tr><td>9 to 150 Hz</td><td>9.8 m/s^2</td><td>-</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>5 to 9 Hz</td><td>-</td><td>1.75 mm</td><td rowspan="2">-</td></tr>
<tr><td>9 to 150 Hz</td><td>4.9 m/s^2</td><td>-</td></tr>
<tr><td colspan="2">Impact resistance</td><td colspan="6">Compliant with JIS B 3502 and IEC 61131-2 (147 m/s^2, 3 times in each of X, Y and Z directions)</td></tr>
<tr><td colspan="2">Operating atmosphere</td><td colspan="6">No corrosive gas</td></tr>
<tr><td colspan="2">Operating altitude</td><td colspan="6">2000 m or less</td></tr>
<tr><td colspan="2">Installation location</td><td colspan="6">Inside the control panel</td></tr>
<tr><td colspan="2">Overvoltage category (*1)</td><td colspan="6">II or lower</td></tr>
<tr><td colspan="2">Pollution degree (*2)</td><td colspan="6">2 or less</td></tr>
</table>

(*1) Indicates the power distribution section to which the device is assumed to be connected, between the public power grid and the machinery within the premises. Category II applies to the devices that are supplied with power from fixed facilities. The surge withstand voltage is 500 V for devices with ratings up to 50 V.

(*2) Indicates the extent to which conductive substances are found in the device operating environment. Pollution degree 2 indicates an environment in which normally only nonconductive pollution occurs and the temporary conductivity caused by condensation is to be expected.

(2) SSCNET conversion function, performance specifications

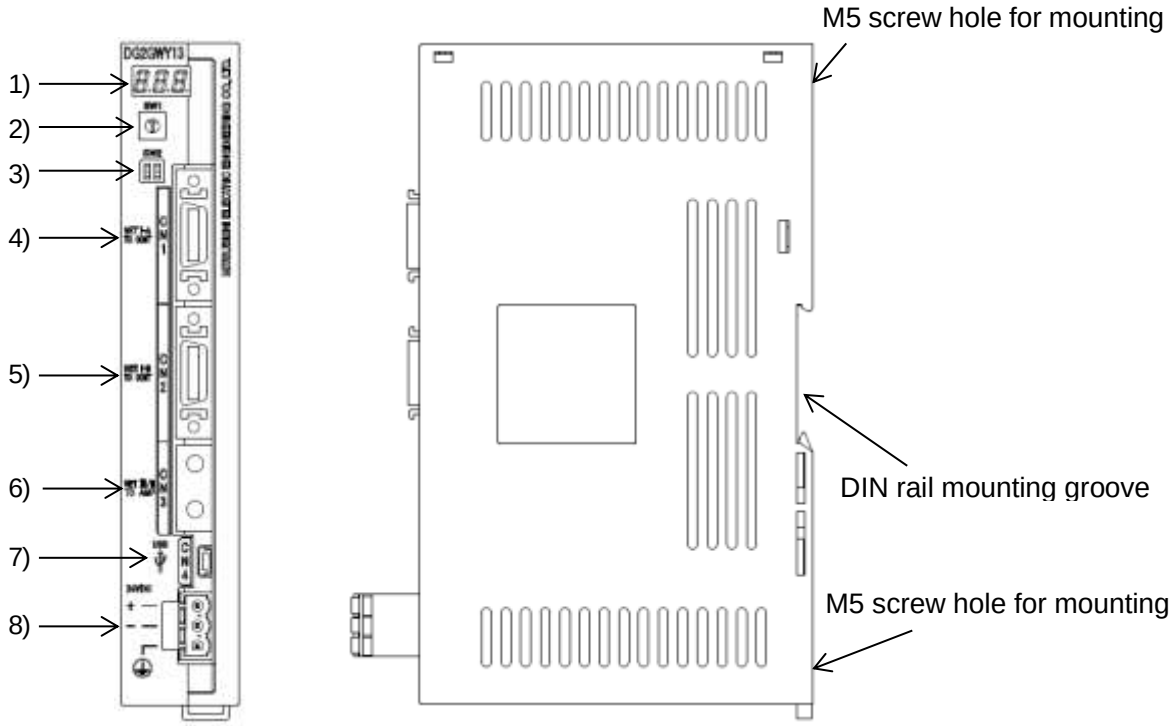
Item		Performance and specifications of the conversion unit
Number of control axes		16 axes (16 axes per line)
Communication cycle	Input	SSCNET 3.555 ms to 14.222 ms (A series Motion controller/Q series Motion controller compatible)
	Output	SSCNET III/H (SSCNET III) 3.555 ms (A series Motion controller/Q series Motion controller compatible)
Power supply		20.4 to 26.4 V DC (ripple factor within 5%)
Consumption current		24 V DC (Class 2), 0.2 A
24 V DC power supply (recommended)		PS5R-SB24 (manufactured by IDEC CORPORATION)
Inrush current		20 A in 2 ms (24 V DC)
Communication function		USB: communication with a personal computer
Compliance to global standards		CE, UL/cUL,KC
Structure		Self-cooling, open (IP20)
Mounting	Mounting screw	M5 × 10 mm or more, tightening torque range: 78 to 118 N·cm
	DIN rail	Applicable DIN rail: TH35-7.5Fe, TH35-7.5Al (JIS C2812 compatible)
External dimensions (mm)		168 (H) × 30 (W) × 100 (D)
Weight (g)		260

3. SPECIFICATIONS

POINT
(1) Input power 1) This conversion unit must be supplied with 24 V DC. An input voltage of 28 V DC or above can cause the unit to fail. 2) Perform voltage measurements at the input connector of the conversion unit, and select the DC power supply and wire with voltages ranging from 20.4 to 26.4 V DC (including the ripple voltage and spike voltage). (2) Power on Turn on or off the power at the primary side (AC side) of the DC power supply. (3) Permissible instantaneous power failure time Select a DC power supply with a permissible instantaneous power failure time of 20 ms or more.

(3) Names of each section

The following shows the names of each section of the conversion unit.



No.	Name	Function
1)	7-segment LED display	Alarm display, status display
2)	Rotary switch (SW1)	"0": For parameter read/write "1", "3": For operation / parameter read "2", "4": For manufacturer setting
3)	Adjustment switch (SW2)	Switch for manufacturer setting (Always set this switch to OFF.)
4)	SSCNET connector (CN1)	Connector to connect the SSCNET CN1 line
5)	SSCNET connector (CN2)	Connector to connect the SSCNET CN2 line
6)	SSCNET III connector (CN3)	Connector to connect the SSCNET III CN3 line
7)	USB communication connector (CN4)	USB port to connect a personal computer
8)	24 VDC power supply input connector (24 VDC)	24 V DC power supply input connector

Notation	Signal name	Description
+	24 V(+)	+ 24 V power supply
-	24G	GND
⏚	FG	Grounding terminal

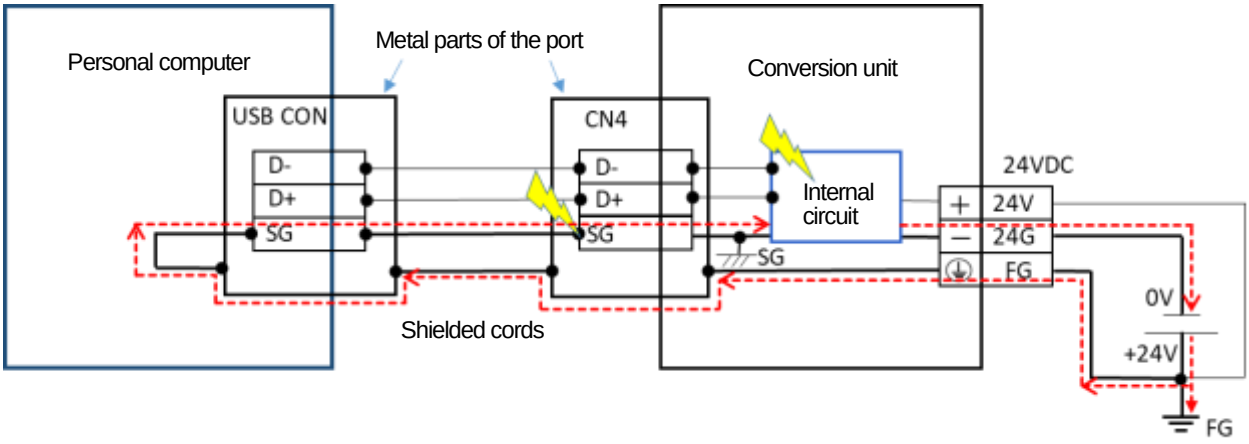
⚠ Do not connect the FG terminal to the 24 V DC side of an external power supply. This will cause a short circuit malfunction.

3. SPECIFICATIONS

Precaution

Wiring the FG terminal of the 24 V DC power supply input connector (24VDC):
Do not connect the FG terminal to the 24 V DC side of an external power supply. This will cause a short circuit malfunction.

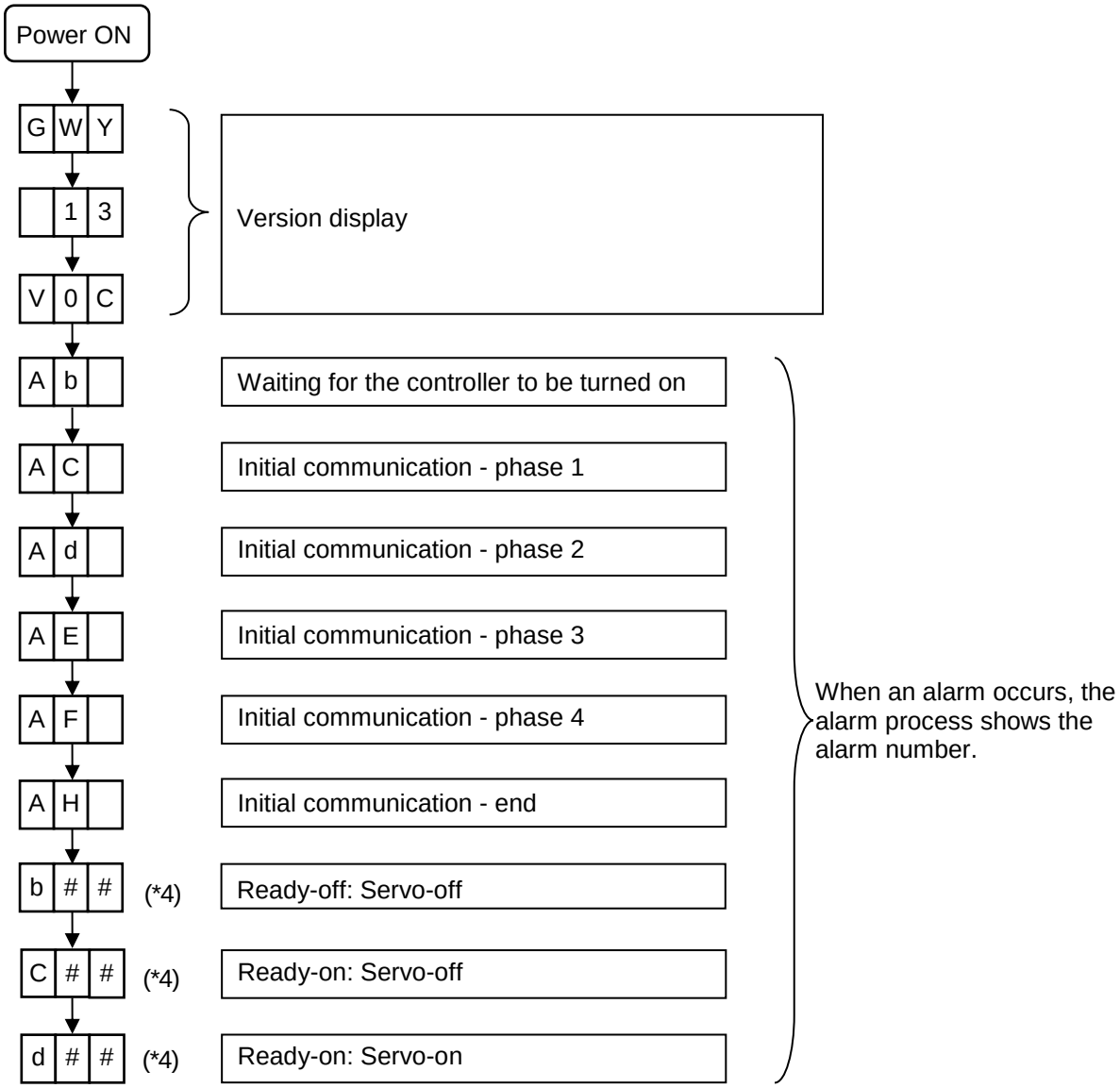
The metal part of the USB port on the conversion unit is wired to FG of the internal circuit.
Additionally, SG and the metal part of the USB port are wired inside the computer. Therefore, connecting the conversion unit and computer via a USB connection will cause a current to flow as indicated by the dotted lines in the figure below. This may lead to a problem such as conversion unit, computer, or external power supply malfunctioning.



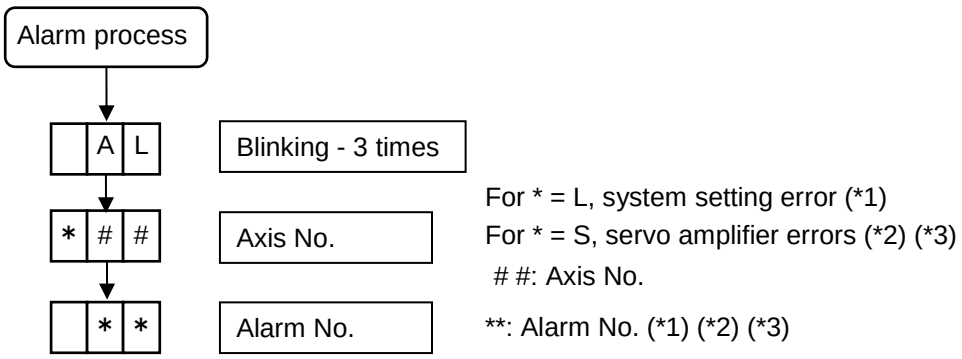
(4) 7-segment LED display

The following shows the state transition after the conversion unit is powered on.

For conversion unit system setting errors and servo amplifier troubleshooting, refer to Chapter 6.



POINT
If an SSCNET communication error occurs, "Ab" is shown on the 7-segment LED display.



(*1) List of system setting errors

LED display		Error description
0	4	Axis setting missing error
1	3	System setting not registered
2	6	Servo parameter not registered

(*2) List of alarm codes

LED display		Error description	LED display		Error description
1	0	Undervoltage	3	4	SSCNET receive error 1
1	2	Memory error 1	3	5	Command frequency error
1	3	Clock error	3	6	SSCNET receive error 2
1	4	Control process error	3	7	Parameter error
1	5	Memory error 2	3	A	Inrush current suppression circuit error
1	6	Encoder initial communication error 1	3	D	Parameter setting error for driver communication
1	7	Board error	3	E	Operation mode error
1	9	Memory error 3	4	2	Servo control error
1	A	Servo motor combination error	4	5	Main circuit device overheat
1	E	Encoder initial communication error 2	4	6	Servo motor overheat
1	F	Encoder initial communication error 3	4	7	Cooling fan error
2	0	Encoder normal communication error 1	5	0	Overload 1
2	1	Encoder normal communication error 2	5	1	Overload 2
2	4	Main circuit error	5	2	Error excessive
2	5	Absolute position erased	5	4	Oscillation detection
2	7	Initial magnetic pole detection error	5	6	Forced stop error
2	8	Linear encoder error 2	6	3	STO timing error
2	A	Linear encoder error 1	7	0	Load-side encoder initial communication error 1
2	B	Encoder counter error	7	1	Load-side encoder normal communication error 1
3	0	Regenerative error	7	2	Load-side encoder normal communication error 2
3	1	Overspeed	8	2	Master-slave operation error 1
3	2	Overcurrent	8	A	USB communication time-out error
3	3	Overvoltage	8	E	USB communication error

(*3) List of warning codes

LED display		Error description	LED display		Error description
9	1	Servo amplifier overheat warning	E	4	Parameter warning
9	2	Battery cable disconnection warning	E	6	Servo forced stop warning
9	5	STO warning	E	7	Controller forced stop warning
9	6	Home position setting warning	E	8	Cooling fan speed reduction warning
9	B	Error excessive warning	E	9	Main circuit off warning
9	F	Battery warning	E	C	Overload warning 2
E	0	Excessive regeneration warning	E	D	Output watt excess warning
E	1	Overload warning 1	F	0	Tough drive warning
E	2	Servo motor overheat warning	F	2	Drive recorder miswriting warning
E	3	Absolute position counter warning	F	3	Oscillation detection warning

(*4) When the rotary switch is set to "1" or "3", the 7-segment LED display shows information as below.
In the hundreds place of the 7-segment LED display, "b" indicates ready-off and servo-off status, "C" indicates ready-on and servo-off status, and "d" indicates ready-on and servo-on status.
When the rotary switch is set to "2" or "4", the switch is used for manufacturer settings

.

Rotary switch setting	LED display
"1"	b01, C01, or d01
"3"	b02, C02, or d02

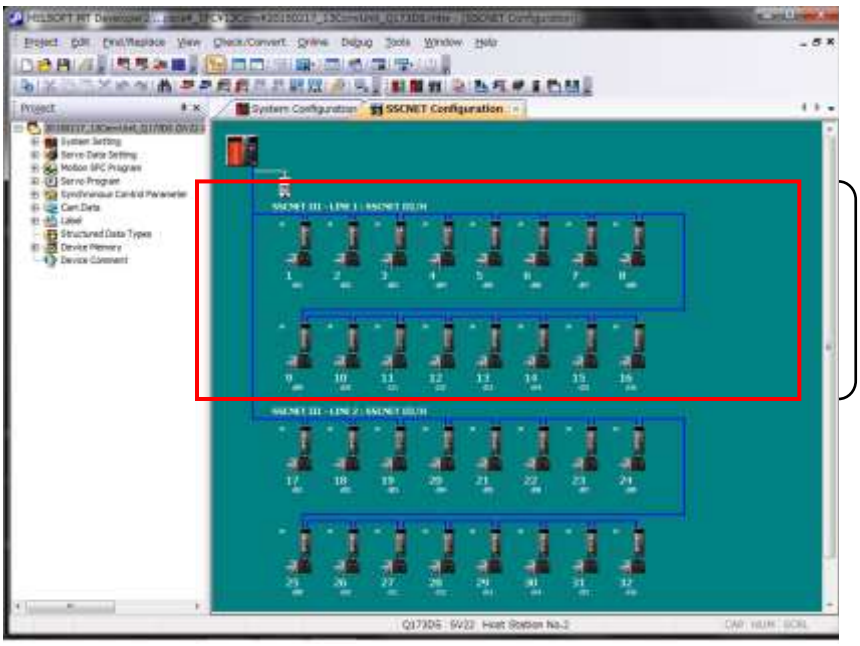
(5) Setting the rotary switch

For information about how to set the rotary switch of the conversion unit, refer to 1) to 3).

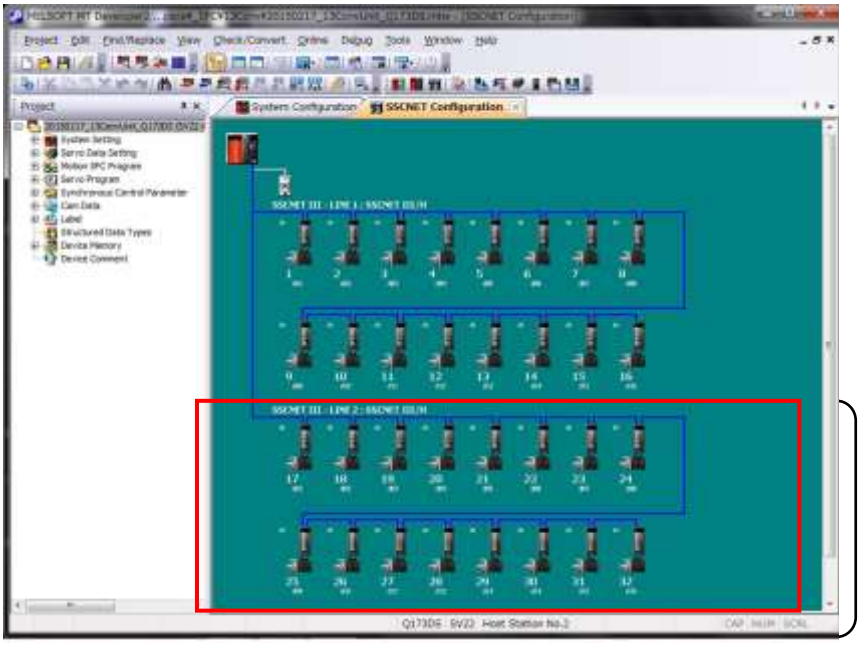
To check the SSCNET III/H or SSCNET III lines, click [System Setting] - [SSCNET Configuration] of a MELSOFT MT Works2 project.

1) To read or write parameters by USB communication, set the rotary switch to "0".
This setting disables SSCNET communication.

2) To use SSCNET III/H, SSCNET III line 1, set the rotary switch to "1".
Parameters can be read even when the rotary switch is set to "1".



3) To use SSCNET III/H, SSCNET III line 2, set the rotary switch to "3".
Parameters can be read even when the rotary switch is set to "3".

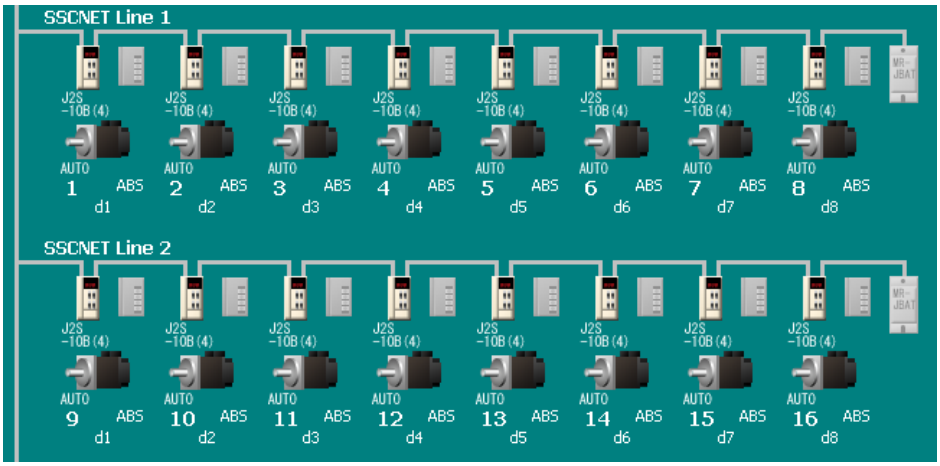


(6) Compatibility with SSCNET, SSCNET III/H and SSCNET III

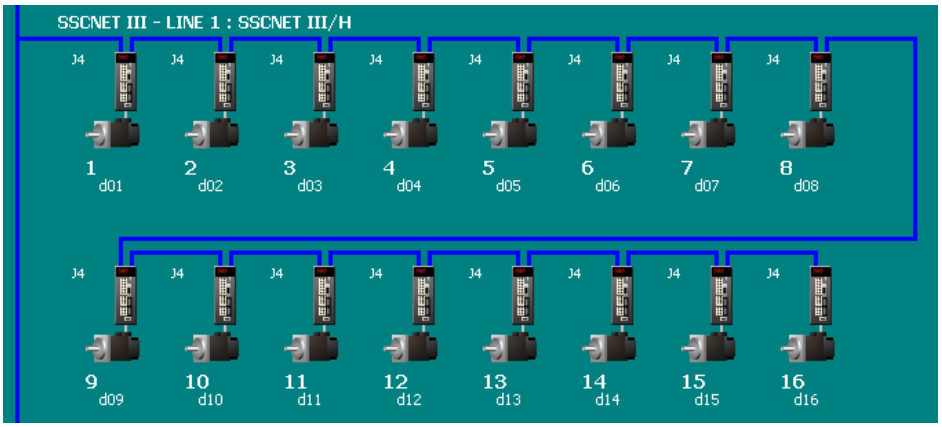
The following shows the compatibility of the A series Motion controller/Q series Motion controller (SSCNET) and the conversion unit (SSCNET III/H, SSCNET III) with each other.

No.	A series Motion controller Q series Motion controller		Conversion unit		Remarks
	Line	Station No.	Line	Station No.	
1	CN1	d1	CN3	d01	Set the same axis number for d1 of the SSCNET CN2 line and d09 of the SSCNET III/H, SSCNET III. In addition, set the same axis numbers for d2 to d8 of the SSCNET CN2 line as for d10 to d16 of the SSCNET III/H, SSCNET III.
2		d2		d02	
3		d3		d03	
4		d4		d04	
5		d5		d05	
6		d6		d06	
7		d7		d07	
8		d8		d08	
9	CN2	d1		d09	
10		d2		d10	
11		d3		d11	
12		d4		d12	
13		d5		d13	
14		d6		d14	
15		d7		d15	
16		d8		d16	

Setting the A series Motion controller/Q series Motion controller (SSCNET)

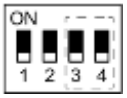
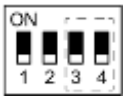


Setting the conversion unit (SSCNET III/H, SSCNET III)



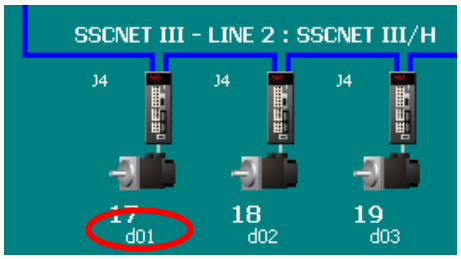
(7) Auxiliary axis number setting switch and axis selection rotary switch for SSCNET III/H compatible servo amplifiers

The station numbers "d01-d16" of the conversion unit correspond to "All OFF" for the auxiliary axis number setting switches of SSCNET III/H compatible servo amplifiers and correspond to 0-9 and A-F for the axis selection rotary switches of SSCNET III/H compatible servo amplifiers. Refer to (5) in this chapter for setting the rotary switch of the conversion unit.

Conversion unit		SSCNET III/H compatible servo amplifiers	
Rotary switch	Station No.	Auxiliary axis number setting switch	Axis selection rotary switch
1 (SSCNET III line 1)	d01	All OFF  (Example of MR-J4-B)	0
	d02		1
	d03		2
	d04		3
	d05		4
	d06		5
	d07		6
	d08		7
	d09		8
	d10		9
	d11		A
	d12		B
	d13		C
	d14		D
	d15		E
	d16		F
3 (SSCNET III line 2)	d01	All OFF  (Example of MR-J4-B)	0
	d02		1
	d03		2
	d04		3
	d05		4
	d06		5
	d07		6
	d08		7
	d09		8
	d10		9
	d11		A
	d12		B
	d13		C
	d14		D
	d15		E
	d16		F

Example: If the rotary switch of the conversion unit is "3", the station number "d01" of the conversion unit corresponds to "All OFF" for the auxiliary axis number setting switches of SSCNET III/H compatible servo amplifiers and corresponds to "0" for the axis selection rotary switch of SSCNET III/H compatible servo amplifiers.

Station number of the conversion unit "d01"



Axis number for the SSCNET III/H compatible servo amplifier

Auxiliary setting switches are "All OFF"

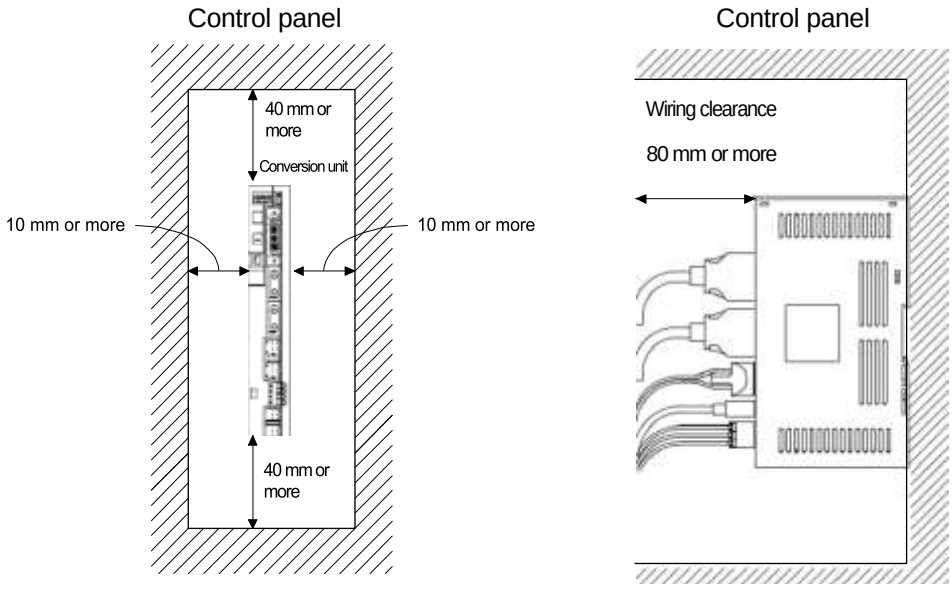
Axis selection for the SSCNET III/H compatible servo amplifier

Rotary switch is "0"

4. INSTALLATION AND WIRING

(1) Mounting the conversion unit

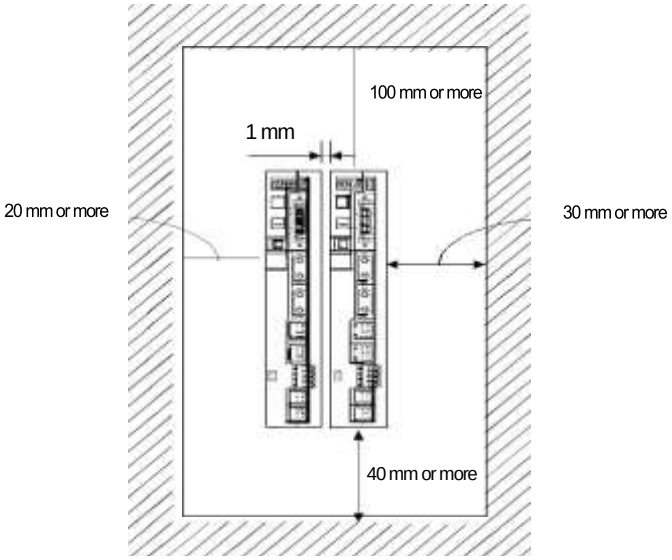
1) Installation of one conversion unit



2) Installation of two conversion units

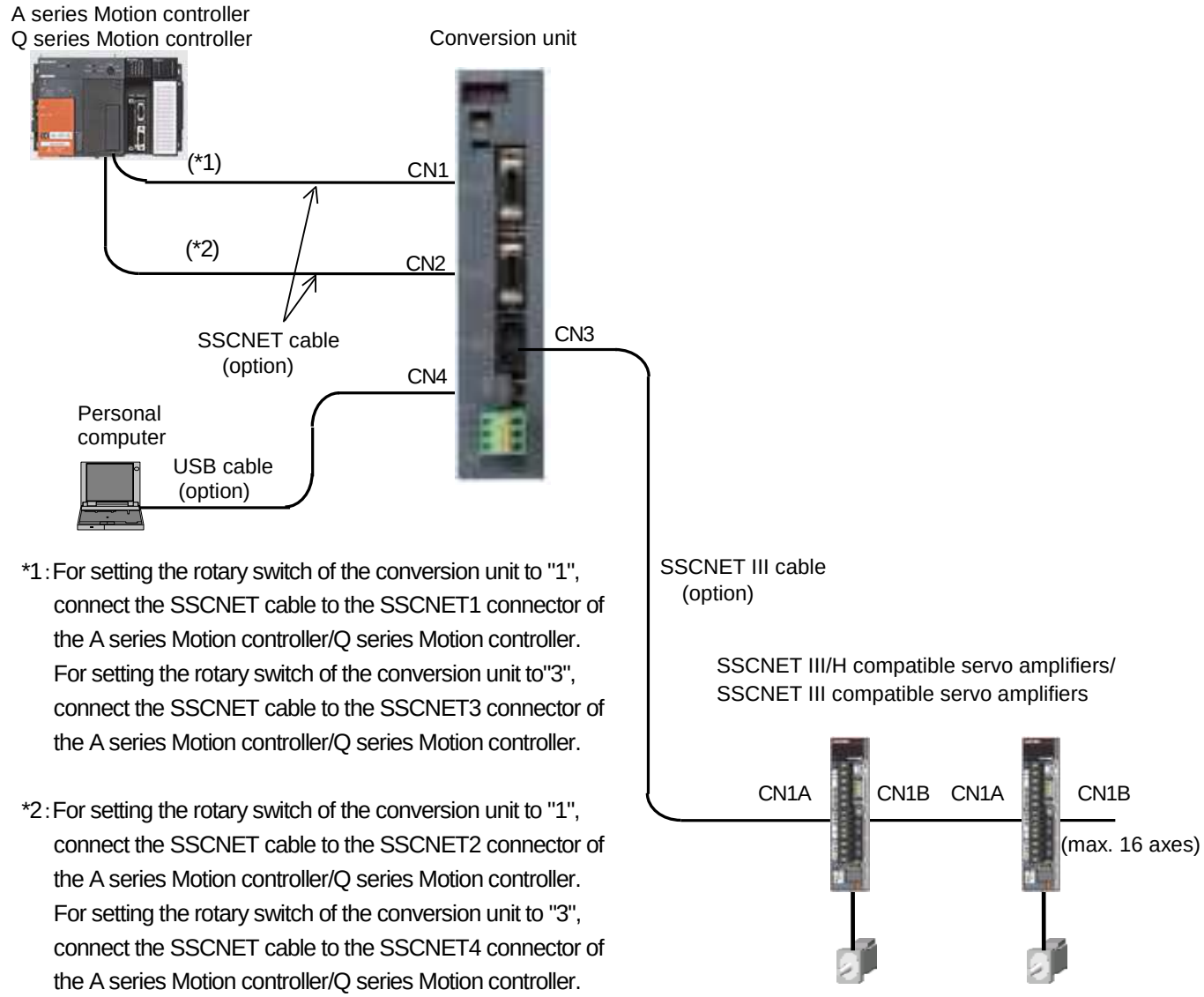
Leave a large clearance between the inner surface of the control panel and the conversion units to circulate air above and below the conversion units.

When mounting the conversion units, leave a clearance of 1 mm between the conversion units in consideration of mounting tolerances.



POINT
● When mounting the two conversion units closely, keep the ambient temperature within 0˚C to 45˚C.

(2) Connecting the devices



*1: For setting the rotary switch of the conversion unit to "1", connect the SSCNET cable to the SSCNET1 connector of the A series Motion controller/Q series Motion controller. For setting the rotary switch of the conversion unit to"3", connect the SSCNET cable to the SSCNET3 connector of the A series Motion controller/Q series Motion controller.

*2: For setting the rotary switch of the conversion unit to "1", connect the SSCNET cable to the SSCNET2 connector of the A series Motion controller/Q series Motion controller. For setting the rotary switch of the conversion unit to "3", connect the SSCNET cable to the SSCNET4 connector of the A series Motion controller/Q series Motion controller.

Use optional cables listed in the following tables.

○SSCNET III cable (The SSCNET III/H line and SSCNET III line use the same SSCNET III cable.)

Cable	Cable model	Cable length
Standard cord inside cabinet	MR-J3BUS_M	0.15/0.3/0.5/1/3 m
Standard cable outside cabinet	MR-J3BUS_M-A	5/10/20 m
Long-distance cable	MR-J3BUS_M-B	30/40/50 m

○SSCNET cable (Refer to (1) in Chapter 2 for cable selection)

Cable	Cable model	Cable length
Bus cable	MR-J2HBUS_M	0.5/1/5 m
	MR-J2HBUS_M-A	
	Q172J2BCBL_M	
	Q173J2B_CBL_M	
	Q173DVCBL_M	0.5/1 m

○ USB cable

Cable	Cable model	Cable length
USB cable	MR-J3USBCBL3M	3 m

4. INSTALLATION AND WIRING

Precaution

Precautions for using the USB communication function

To prevent an electric shock, or conversion unit or computer malfunction, connect the computer power supply using the following steps:

(a) When using a computer with an AC power supply

1) When using a computer with a three-pin power plug or a power plug with a grounding wire, use a three-pin socket or ground the grounding wire.
2) When using a computer with a two-pin power plug without a grounding wire, connect the conversion unit to the computer using the following steps:
   a) Unplug the computer power plug from the AC power socket.
   b) Connect the conversion unit to the device after unplugging the computer power plug from the AC power socket.
   c) Plug the computer power plug into the AC power socket.

(b) When running the computer on its battery

The computer can be used as it is.

(3) Wiring the power supply connector

A spring connection plug connector is used for 24 V DC power supply input. No dedicated tools are required.

1) Applicable wire size and wire fabrication

(a) Applicable wire size

The table below shows the wire size and type applicable to the 24 V DC power supply input connector.

Connector	Model	Applicable wire size and type
24 V DC power supply input connector	FKC-2.5/3-ST-5.08	0.3 to 2.5 mm^2 (AWG12 to AWG22) Use copper wire only

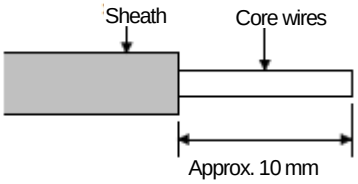
(b) Wire fabrication

The stripped length of the wire is as shown below.

Use the wire after stripping the sheath without twisting the core.

At this time, take care to avoid a short caused by the loose wires of the core and the adjacent pole.

Do not solder the core, as it may cause a contact fault.



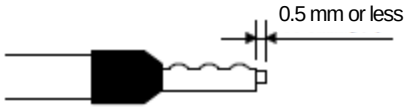
* When using a ferrule

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

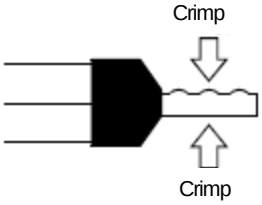
Use the ferrules in the table below for the 24 V DC power supply connector.

Connector	Wire size	Ferrule model		Crimping tool	Manufacturer
		For 1 wire	For 2 wires		
24 V DC power supply input connector	AWG16	AI1.5-10 BK	AI-TWIN2×1.5-10 BK	CRIMPFOX-ZA3	Phoenix Contact
	AWG14	AI2.5-10 BU	–		

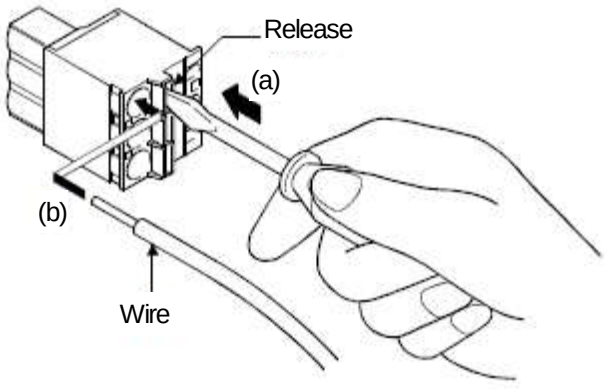
- Cut the wire sticking out from the end of the ferrule to 0.5 mm or less.



- When using a twin ferrule, be sure to insert the wire in a manner that will keep the insulation sleeve from interfering with the neighboring poles. Be sure to crimp the ferrule.

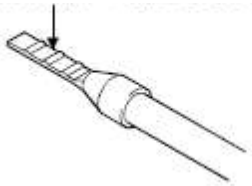


2) Inserting the wire
(a) Press the connector release with a tool such as a flathead screwdriver.
(b) While holding the release down, insert the wire all the way in.
(c) Confirm the connection status.



* When using a ferrule, make sure its bumpy side is facing toward the release.
To insert two wires into one terminal, use a twin ferrule.

Make sure the bumpy side is facing toward the release.

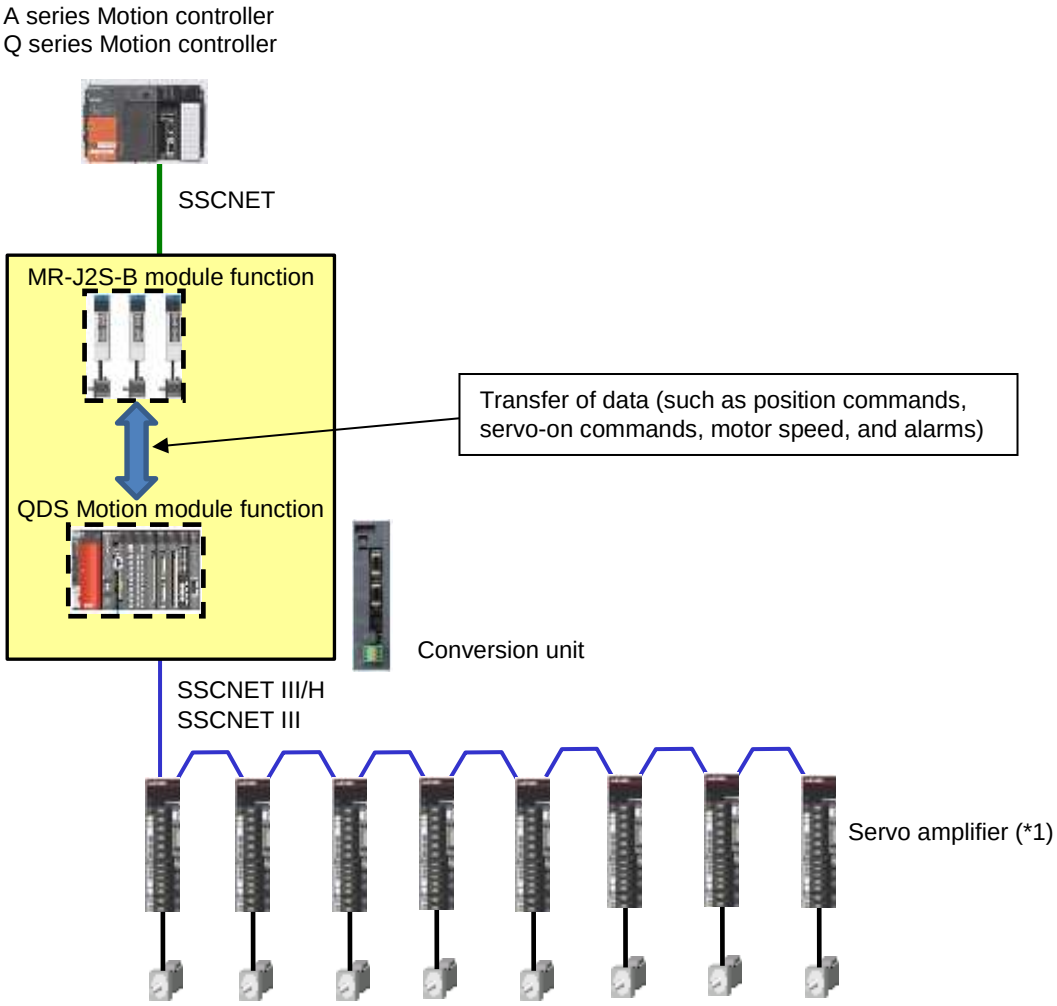


5. SETTING AND PROCEDURE BEFORE STARTING OPERATIONS

5. SETTING AND PROCEDURE BEFORE STARTING OPERATIONS

The conversion unit firmware has the MR-J2S-B module function and the QDS Motion module function.
By setting the communication type to "SSCNET III/H", the MR-J2S-B module function receives position commands, etc. from the A series Motion controller/Q series Motion controller. Then, the QDS Motion module function sends the commands to the actual MR-J4-B servo amplifiers. The QDS Motion module function also manages the system settings (axis configuration information) and the MR-J4-B servo parameters.
By setting the communication type to "SSCNET III", the MR-J2S-B module function receives position commands, etc. from the A series Motion controller/Q series Motion controller. Then, the QDS Motion module function sends the commands to the actual MR-J4-B servo amplifiers (J3 compatibility mode)/MR-J3-B servo amplifiers. The QDS Motion module function also manages the system settings (axis configuration information) and the MR-J3-B servo parameters in the conversion unit.

Refer to Section 5.1 when motion controller operating system: SV13 or SV22 is used, and refer to Section 5.2 when motion controller operating system: SV43 is used.



*1 : The SSCNET III/H compatible servo amplifiers are MR-J4-B/MR-J4W2-B/MR-J4W3-B, and the SSCNET III compatible servo amplifiers are MR-J4-B (J3 compatibility mode)/MR-J4W2-B (J3 compatibility mode)/MR-J4W3-B (J3 compatibility mode)/MR-J3-B/MR-J3W-B.

5. SETTING AND PROCEDURE BEFORE STARTING OPERATIONS

With the A/Q Motion controllers and the conversion unit, edit projects using the following peripheral software packages.

[Peripheral software packages for the motion controller and conversion unit]

	A series Motion controller	Q series Motion controller	Conversion unit
Peripheral software package	SW3RNC-GSV	MELSOFT MT Works2	MELSOFT MT Works2

In a project for the A/Q Motion controllers, set up system settings, servo data settings and various programs, as shown in the following table. For the servo parameters for servo data settings in the system using the conversion unit, no A/Q Motion controller settings other than servo parameters No.1 (amplifier settings) and No.7 (rotation direction selection) are used. The reason for this is because servo parameters for MR-J2S-B/MR-J2-B/MR-H-B are handled with the A/Q Motion controllers, not servo parameters for MR-J4-B/MR-J3-B.
Only set the system settings (system setting data, basic setting data) and servo data settings (servo parameter) in a conversion unit project, as shown in the following table. Set the servo parameters on the conversion unit side since the QDS Motion module in the conversion unit manages the MR-J4-B/MR-J3-B servo parameters.

[Table of project settings for Motion controller and conversion unit]

Project settings			A series Motion controller			Q series Motion controller			Conversion unit
			SV13	SV22	SV43	SV13	SV22	SV43	
System settings	System setting data		○	○	○	○	○	○	Δ **(*1)**
	Data with high read speed		○	○	○	○	○	○	
	Basic setting data					○	○	○	Δ **(*2)**
Servo data settings	Axis data	Fixed parameters	○	○	○	○	○	○	×
		Home position return data	○	○	○	○	○	○	×
		JOG operation data	○	○	○	○	○	○	×
		Servo parameters	Δ **(*3)**	Δ **(*3)**	Δ **(*3)**	Δ **(*3)**	Δ **(*3)**	Δ **(*3)**	○
		Workpiece coordinate data			○			○	
	Parameter block		○	○	○	○	○	○	×
	Limit output data		○	○	○	○	○	○	×
Motion SFC program			○	○		○	○		×
Servo program			○	○		○	○		×
Mechanical system program				○			○		
Cam data				○			○		
Motion program					○			○	

○ : Setting data is used
Δ : Only a portion of the setting data is used
× : Setting data is not used

*1: With the conversion unit, only "SSCNET Configuration" are used as system setting data.
*2: With the conversion unit, only "Basic System Settings (operation cycle)" and "SSCNET Settings (communication type)" are used as basic setting data.
*3: With the A/Q Motion controllers, only "No.1 (amplifier settings)" and "No.7 (rotation direction selection)" are used as servo parameters.
The settings for "No.1 (amplifier settings)" and "No.7 (rotation direction selection)" must also be matched to the settings for the servo parameters for the conversion unit.

Source A/Q series Motion controller MR-H-B/MR-J2-B/MR-J2S-B Servo parameters			Conversion unit MR-J4-B/MR-J3-B Servo parameters		
No.	Name	Initial value	No.	Name	Initial value
1	Amplifier setting	0000 (Absolute position: detection: Disabled, INC)	PA03	Absolute position detection system	0000 (Absolute position detection: Disabled, INC)
7	Rotation direction selection	0 (Counterclockwise in positioning address increments)	PA14	Rotation direction selection	0 (Counterclockwise in positioning address increments)

5. SETTING AND PROCEDURE BEFORE STARTING OPERATIONS

5.1 Setting and Procedure before Starting Operation When Motion Controller Operating System: SV13 or SV22 Is Used

Before starting operations, follow the procedure from [Step 1] to [Step 5] to configure the settings.

[Step 1] Set the conversion unit (Section 5.1.1) and write the parameters to the conversion unit (Section 5.1.5).

- Using MELSOFT MT Works2, convert the source Motion controller project to write the parameters to the conversion unit.

[Step 2] Set the Motion controller (Section 5.1.2).

<A series Motion controller>

- Using SW3RNC-GSV, change the fixed parameters of the A series Motion controller (electronic gear setting, etc.) so that they match the servo motor, and write the settings to the A series Motion controller.

<Q series Motion controller>

- Using MELSOFT MT Works2, change the fixed parameters of the Q series Motion controller (electronic gear setting, etc.) so that they match the servo motor, and write the settings to the Q series Motion controller.

[Step 3] Adjust the servo gain. (Section 5.1.3).

- Using MR Configurator2, adjust the servo gain.

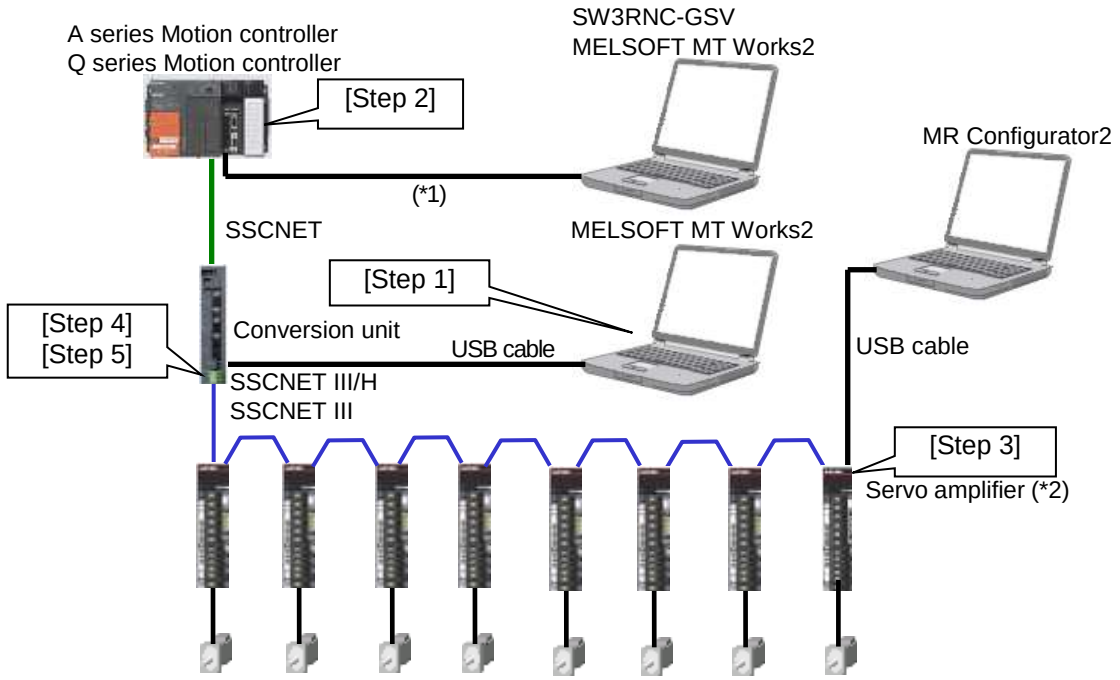
[Step 4] Apply the servo gain adjustment result setting (Section 5.1.4).

- Apply the servo gain adjustment result setting to the project in [Step 1].

[Step 5] Write the parameters to the conversion unit (Section 5.1.5).

- Write the parameters to the conversion unit.

After completing [Step 1] to [Step 5], turn on the control circuit power supply for the Motion controller, conversion unit, and servo amplifiers simultaneously to start the system.



*1: Refer to the manual for the A series Motion controller/Q series Motion controller for the cables used.

Manual name	Manual number
A173UHCPU/A172SHCPUN/A171SHCPUN User's Manual	IB(NA)67395
A273UHCPU User's Manual	IB(NA)67262
Q173CPU(N)/Q172CPU(N) User's Manual	IB(NA)0300040

*2: The SSCNET III/H compatible servo amplifiers are MR-J4-B/MR-J4W2-B/MR-J4W3-B, and the SSCNET IIIcompatible servo amplifiers are MR-J4-B (J3 compatibility mode)/MR-J4W2-B (J3 compatibility mode)/ MR-J4W3-B (J3 compatibility mode)/MR-J3-B/MR-J3W-B.

5. SETTING AND PROCEDURE BEFORE STARTING OPERATIONS

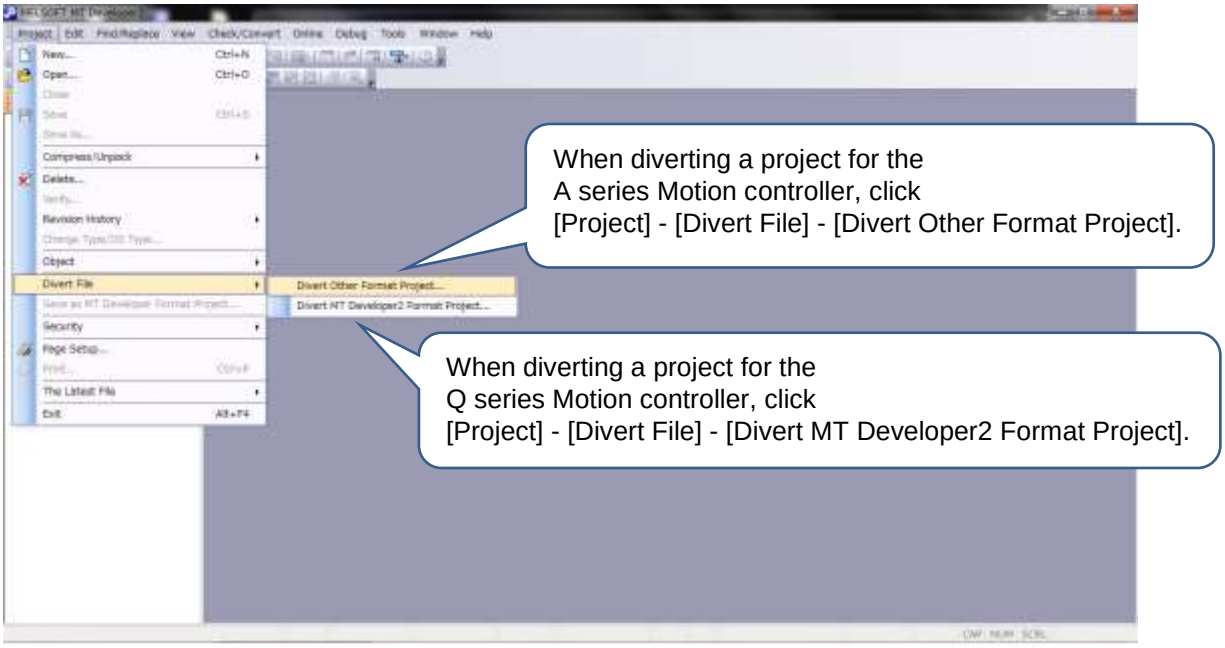
5.1.1 Setting the conversion unit

If there is no project for the A series Motion controller/Q series Motion controller, read and save a project.

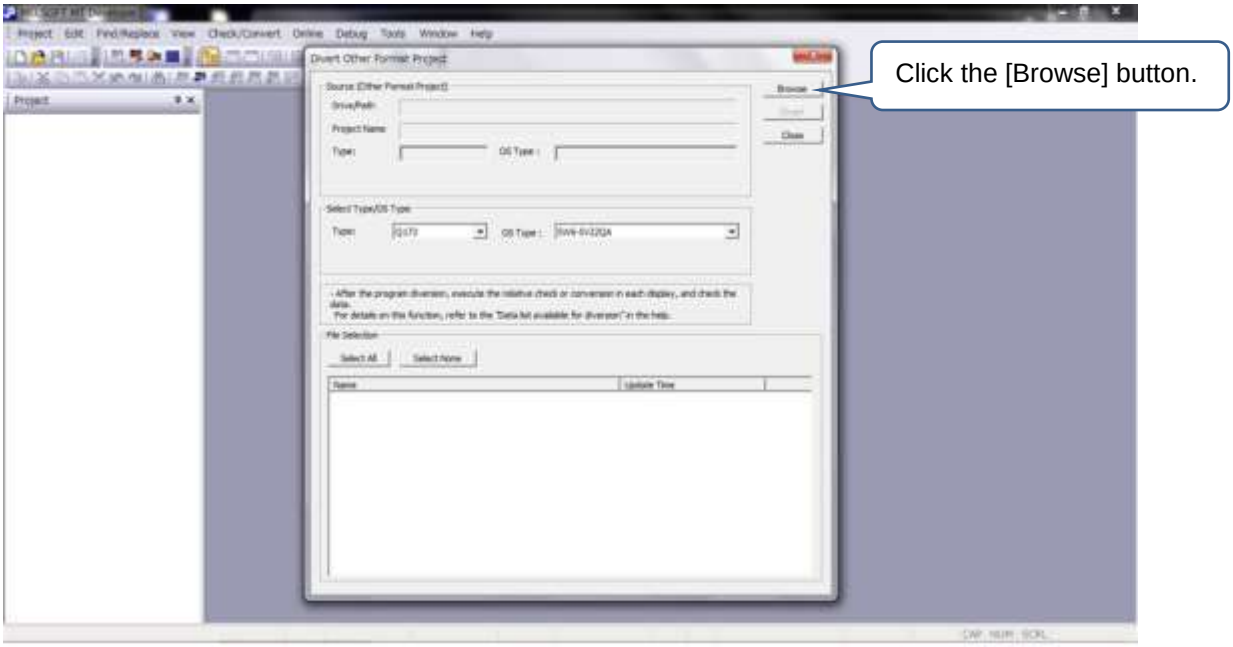
1) Start MT Developer2

When diverting a project for the A series Motion controller, click Menu: [Project] - [Divert File] - [Divert Other Format Project].

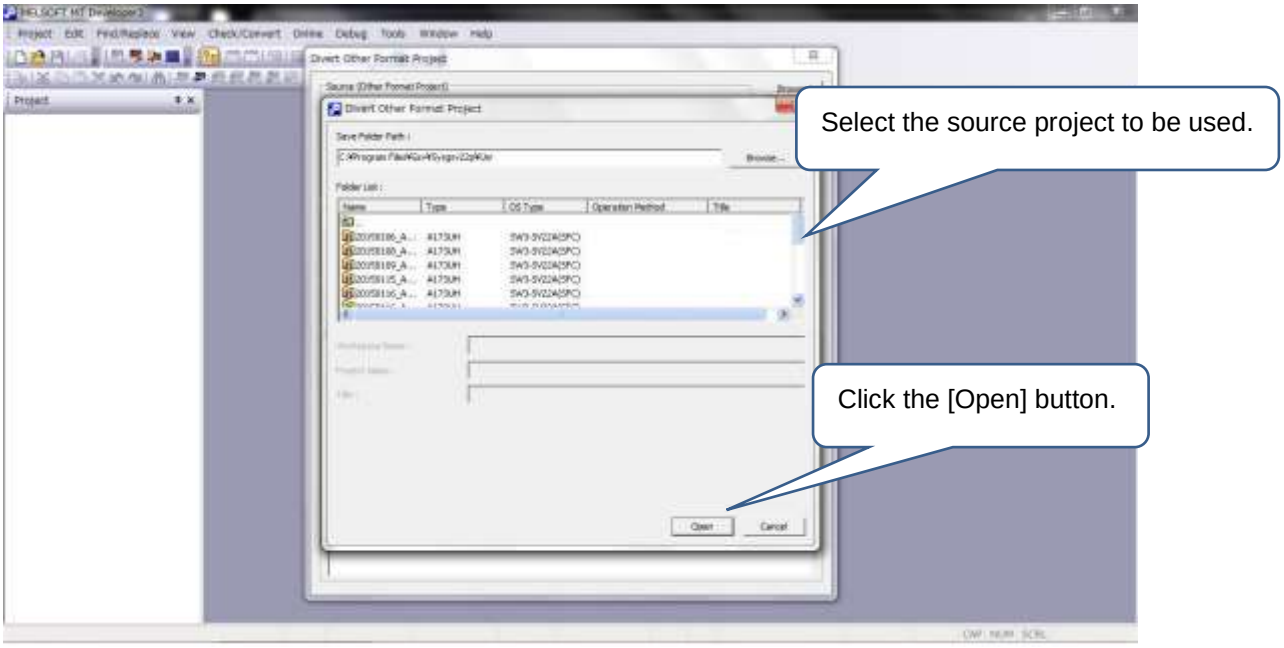
When diverting a project for the Q series Motion controller, click Menu: [Project] - [Divert File] - [Divert MT Developer2 Format Project].



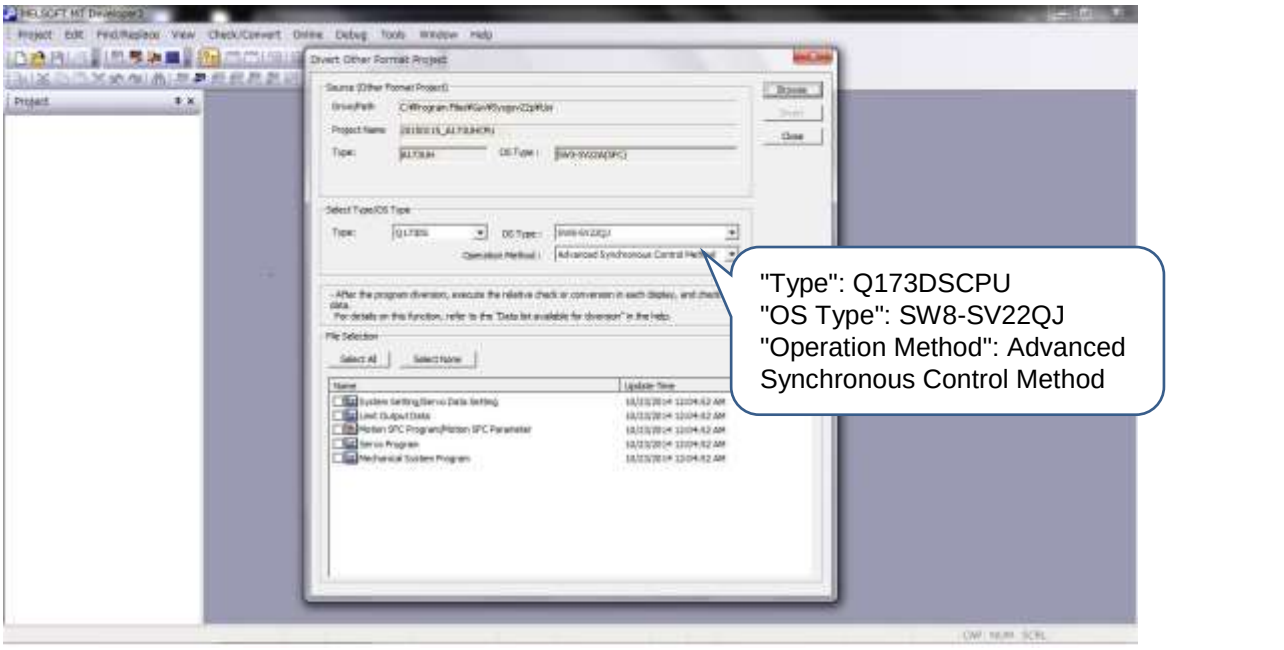
2) Click the [Browse] button.



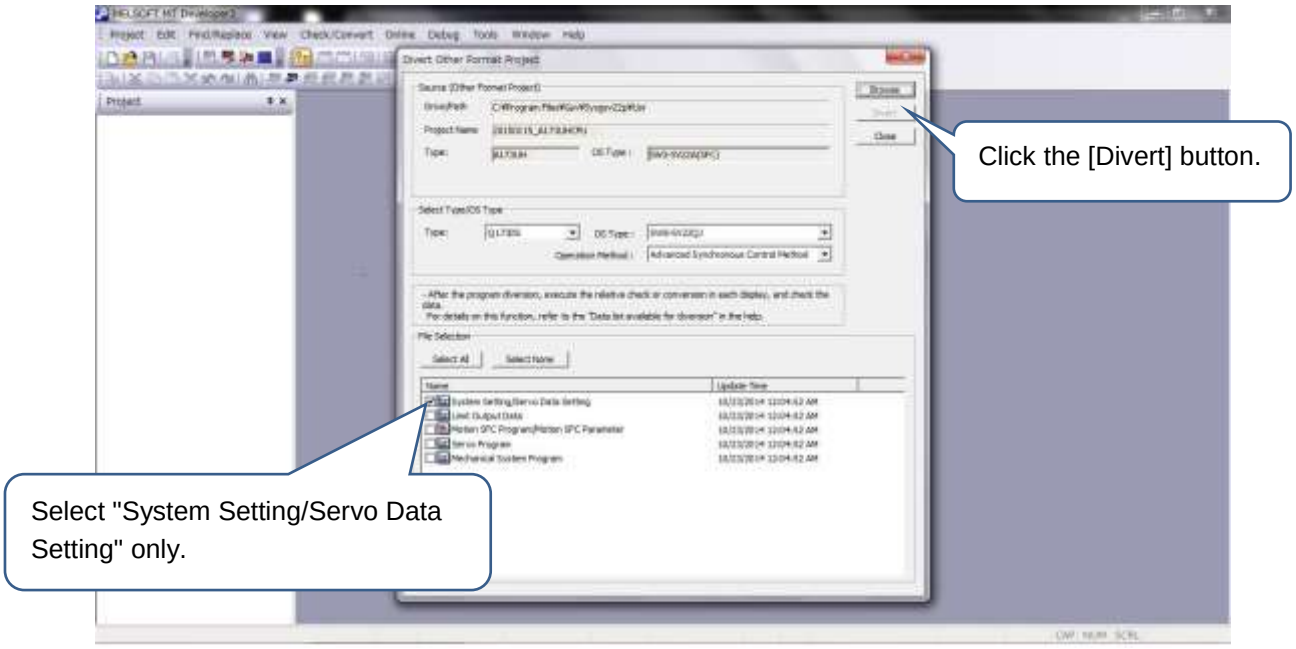
3) Select the source project to be used, and click the [Open] button.



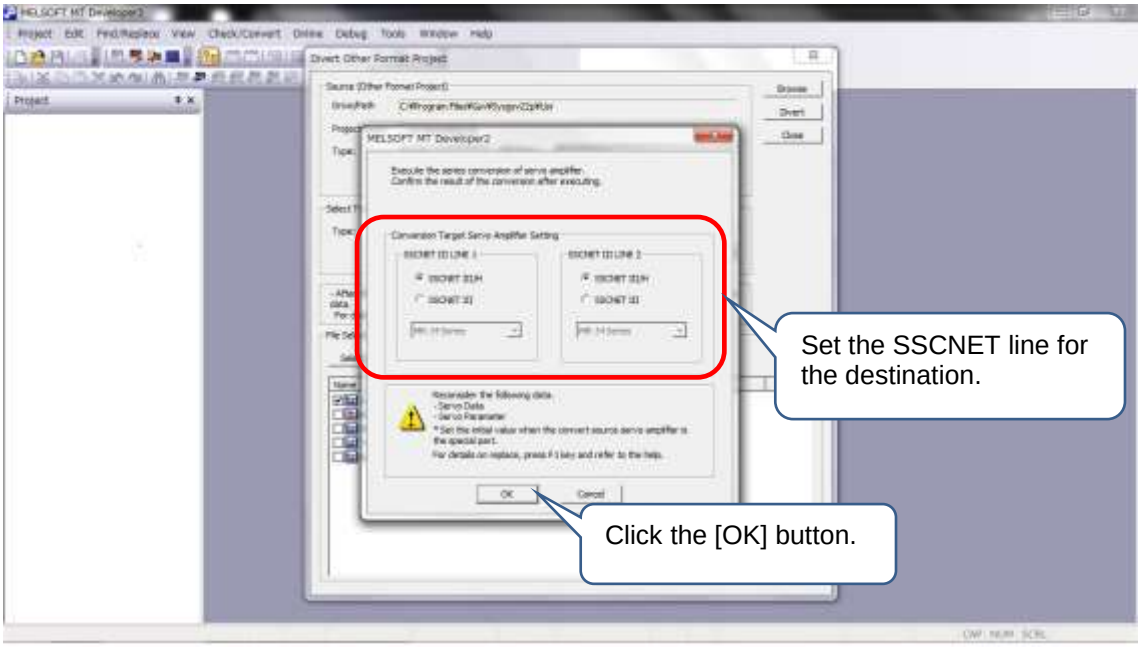
4) In "Select Type/OS Type", select Q173DSCPU for "Type", select SW8-SV22QJ for "OS Type", and select Advanced Synchronous Control Method for "Operation Method".



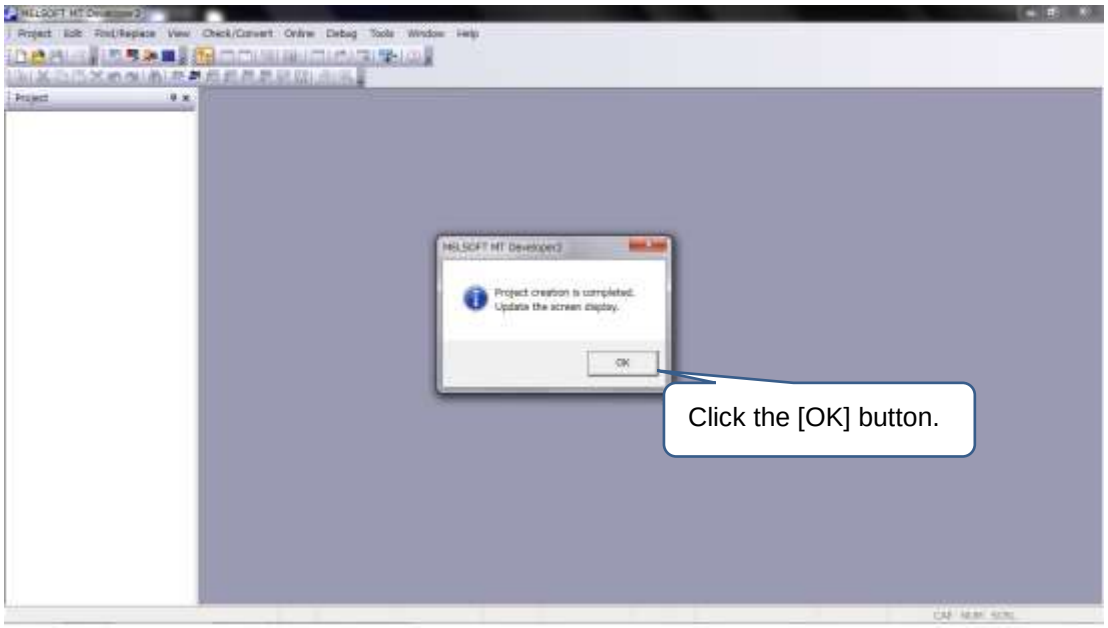
5) Select the file to be converted.
For the conversion unit, select "System Setting/Servo Data Setting" only and click the [Divert] button.



6) When using an SSCNET III/H compatible servo amplifier, select "SSCNET III/H".
When using an SSCNET III compatible servo amplifier, select "SSCNET III".
After making the selection, click the [OK] button.

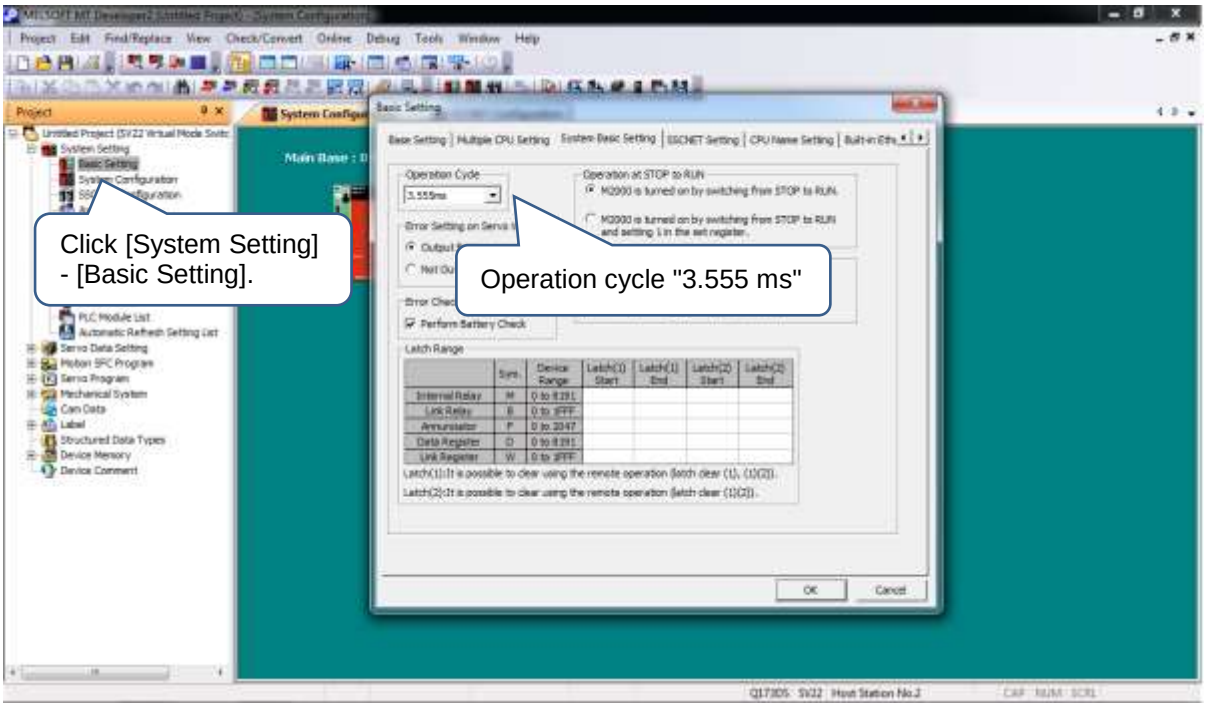


7) "Project creation is completed. Update the screen display." appears.
Click the [OK] button.

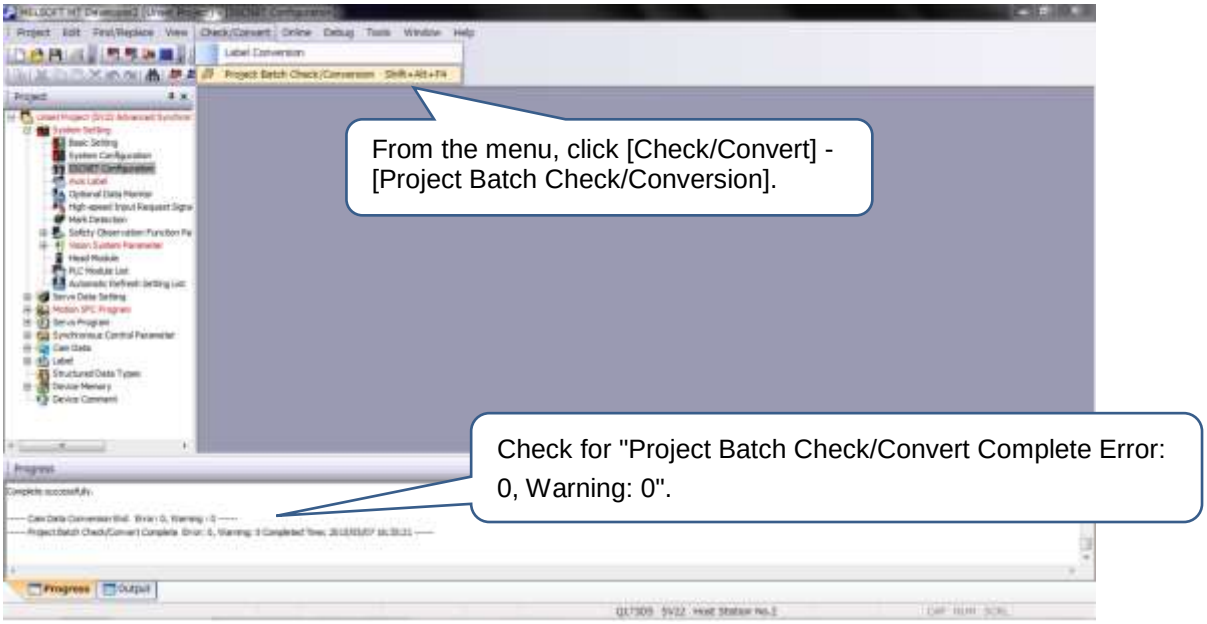


Cautions
The servo parameters are initialized when the servo amplifier setting is changed from MR-H-B/MR-J2-B to MR-J4-B/MR-J3-B by conversion of a project from an A series Motion controller/Q series Motion controller project to a conversion unit project, so the servo parameters written to the conversion unit must be reviewed. Note that when the servo amplifier setting is changed from MR-J2S-B/MR-J2M-B to MR-J4-B/MR-J3-B, the servo parameters is retained. Refer to [Appendix-3] for comparisons of the MR-H-B/MR-J2-B/MR-J2S-B and the MR-J4-B/MR-J3-B servo parameters.

8) In the project window, click [System Setting] - [Basic Setting].
Set the operation cycle to "3.555 ms" on the [Basic System Settings] tab in the window that appears.



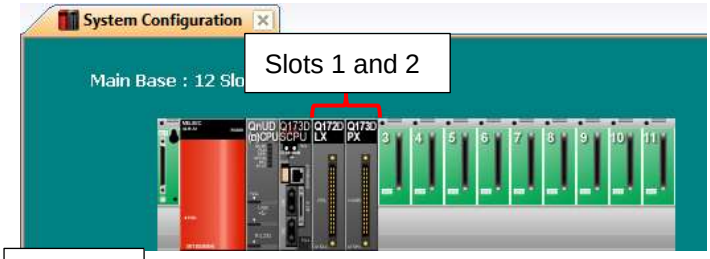
9) From the menu, click [Check/Convert] - [Project Batch Check/Conversion].
Check that the message: "Project Batch Check/Convert Complete Error: 0, Warning: 0" is in the output window.



Now the setting up of the conversion unit is completed.

Cautions

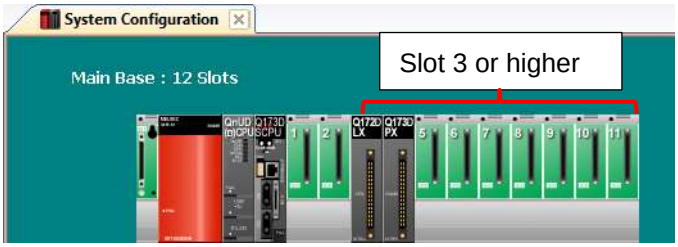
The conversion unit uses "Basic Setting", "SSCNET Configuration" and "Servo Parameter", and does not use any other setting data.
When the Motion module setting (servo external signals interface module (Q172DLX), synchronous encoder interface module (Q172DEX) and manual pulse generator interface module (Q173DPX)) is set to slots 1 and 2 in the system configuration after the project conversion, the error shown below will occur. Correct the error with either (Correction Method 1) or (Correction Method 2).



Error

No.	Parameter/Program	Content
1	System Setting	System Configuration Main Base - Slot 1 Motion Slot Setting - Motion module cannot be set in the CPU slot of main base or I/O slot 0 to 2.
2	System Setting	System Configuration Main Base - Slot 2 Motion Slot Setting - Motion module cannot be set in the CPU slot of main base or I/O slot 0 to 2.

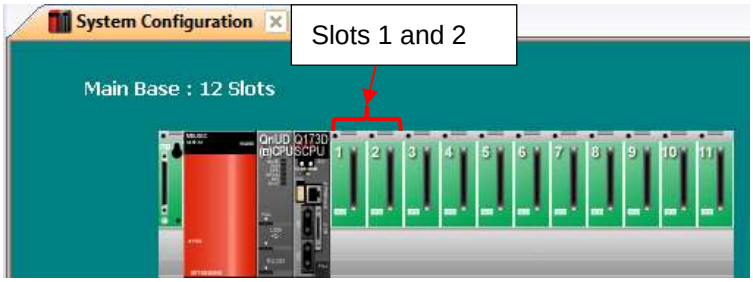
(Correction Method 1) Change Motion module setting
Change the setting for slot 3 or higher of the Motion module as shown below. From the menu, click [Check/Convert] - [Project Batch Check/Conversion] after the setting change(s) to check whether there is an error.



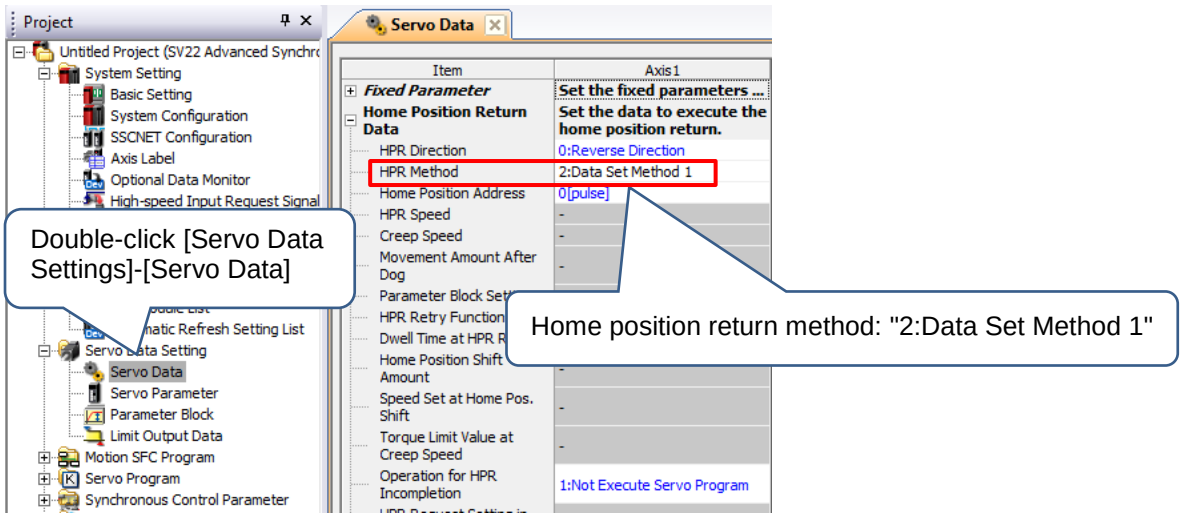
Cautions

(Correction Method 2) Clear Motion slot setting

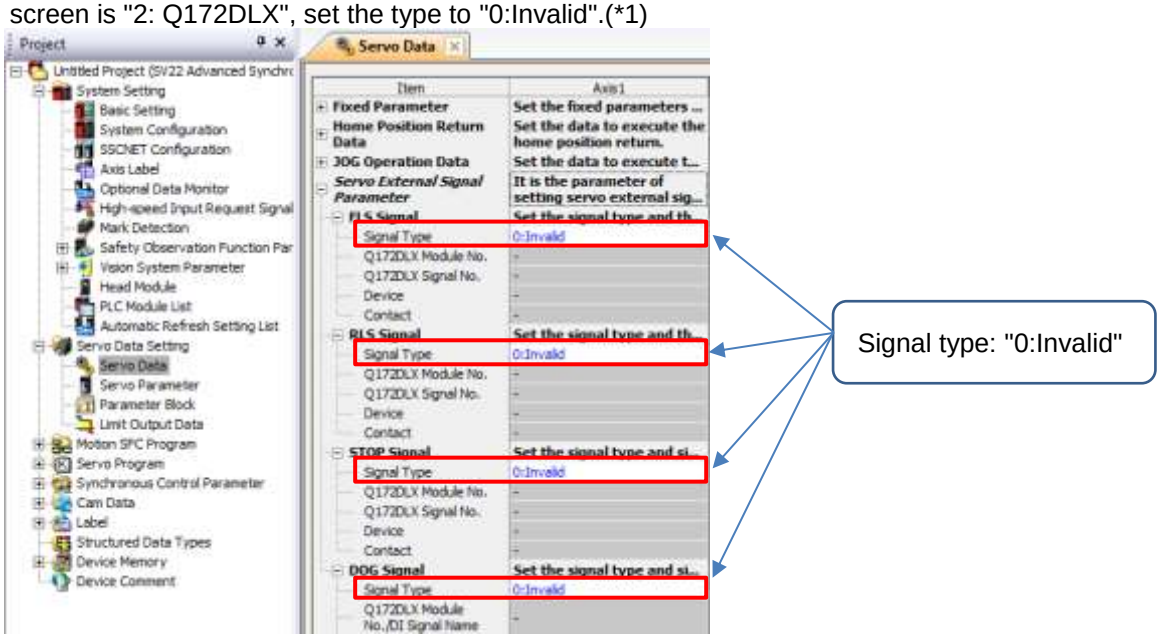
(1) Clear the Motion slot setting for slots 1 and 2 as shown below.



(2) For any home position return method other than the "data set method" on a servo data screen, which appears by double-clicking [Servo Data Settings]-[Servo Data] in the project window, set the method to "2:Data Set Method 1".(*1)



(3) When the signal type for the FLS signal, RLS signal, STOP signal or DOG signal on a servo data screen is "2: Q172DLX", set the type to "0:Invalid".(*1)



From the menu, click [Check/Convert] - [Project Batch Check/Conversion] after the setting change(s) to check whether there is an error.

(*1) Set the type to "0:Invalid" for all applicable axes.

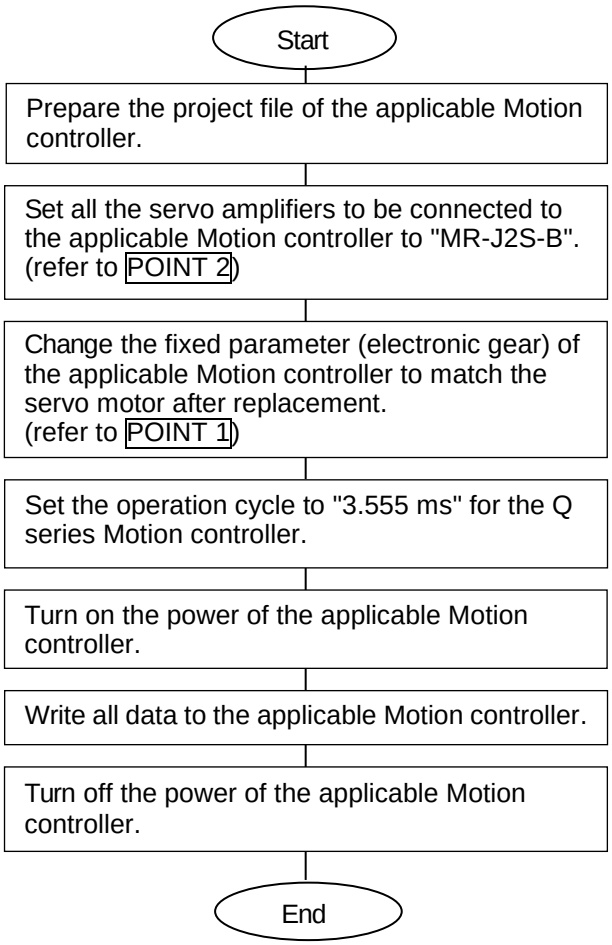
5.1.2 Setting the Motion controller

■ Applicable Motion controller
A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU(-S3)/Q172CPU(N)/Q173CPU(N)

■ Applicable software
SW3RNC-GSV(A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU(-S3))
MELSOFT MT Works2(Q172CPU(N)/Q173CPU(N))

(1) Setting procedure for the Motion controller

(a) Prepare the project file of the applicable Motion controller.
(b) Set all the servo amplifiers to be connected to the applicable Motion controller to "MR-J2S-B".
(c) Change the fixed parameter (electronic gear) of the applicable Motion controller to match the servo motor after replacement.
(d) Set the operation cycle to "3.555 ms" for the Q series Motion controller.
(e) Turn on the power of the applicable Motion controller.
(f) Write all data to the applicable Motion controller.
(g) Turn off the power of the applicable Motion controller.



■ When there is no project file, read the project from the Motion controller.

■ For axes assigned to MR-J2-B and MR-H-B, change to MR-J2S-B in the system setting.
When changing the system setting to "MR-J2S-B", the servo parameters are initialized, so set the parameters by referring to POINT 2.

■ When the communication type is SSCNET III/H, the servo motor will be changed to a motor with resolution of 4194304 pulses/rev, so the fixed parameter (electronic gear) must be changed.
When the communication type is SSCNET III, the servo motor will be changed to a motor with resolution of 262144 pulses/rev, so the fixed parameter (electronic gear) must be changed.

POINT 1

Example of the electronic gear setting (Example of SV13/SV22・MR-J4-B)

<A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU(-S3)>

"Example of electronic gear setting from before motor replacement (Resolution: 131072 pulses/rev) and at the time of HG motor replacement (Resolution: 4194304 pulses/rev)"

For the electronic gear before motor replacement (number of pulses per revolution: 32768 pulses; moveme a mount per revolution: 1600.0 μm; unit scaling factor: 10), the following shows the electronic gear settings at the time of HG motor replacement.

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution} \times \text{unit scaling factor}} = \frac{32768 \text{ pulse} \times (4194304 \text{ pulse/rev} \div 131072 \text{ pulse/rev})}{1600.0 \text{ μm} \times 10} = \frac{32768 \text{ pulse}}{50.0 \text{ μm} \times 10}$$

The number of pulses per revolution and the movement amount per revolution are settable only within 1 to 65535. Set the reduced fraction.

In the electronic gear example, the number of pulses per revolution is set to 32768 pulses, the movement amount per revolution is set to 50.0 μm, and the unit scaling factor is set to 10.

*Position accuracy errors occur in cases that are not reducible. Refer to Section 5.4 (1) for details.

<Q172CPU(N)/Q173CPU(N)>

"Example of electronic gear setting from before motor replacement (Resolution: 131072 pulses/rev) and at the time of HG motor replacement (Resolution: 4194304 pulses/rev)"

For the electronic gear before motor replacement (number of pulses per revolution: 32768 pulses; movement amount per revolution: 1600.0 μm), the following shows the electronic gear settings at the time of HG motor replacement.

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution}} = \frac{32768 \text{ pulse} \times (4194304 \text{ pulse/rev} \div 131072 \text{ pulse/rev})}{16000.0 \text{ μm}} = \frac{1048576 \text{ pulse}}{16000.0 \text{ μm}}$$

In the electronic gear example, the number of pulses per revolution is set to 1048576 pulses and the movement amount per revolution is set to 16000.0 μm.

POINT 2

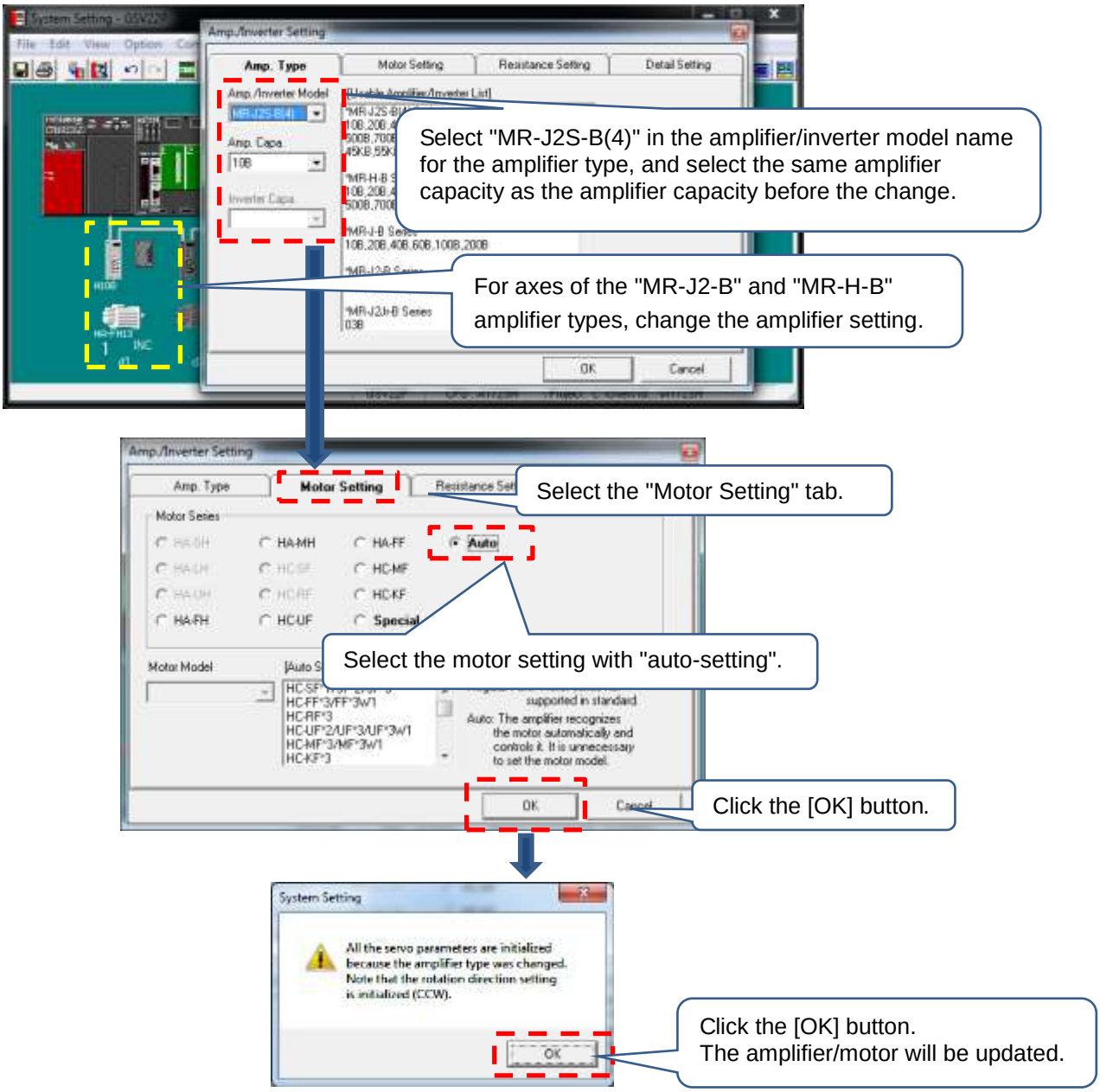
How to change "MR-J2-B" and "MR-H-B" to "MR-J2S-B"

Step 1: The servo parameters are initialized when changing amplifier settings in the system settings, so the following servo parameters are recorded for the "MR-J2-B" axis and "MR-H-B" axis.

MR-H-B/MR-J2-B servo parameters		Checking method
No.	Name	
1	Amplifier setting	Check either one of "INC/ABS" in "Detailed Settings" on an amplifier setting screen in the system setting screens.
7	Rotation direction selection	Set either "forward rotation (CCW)/reverse rotation (CW)" in the servo parameter setting screen.

Step 2: For the axes with the amplifier type set to "MR-J2-B" and "MR-H-B" in the system settings for the applicable Motion controller, change the amplifier type to "MR-J2S-B" and select "auto-setting" for the motor setting.

["System Setting" screen for SW3RNC-GSV]



Step 3: Set the amplifier setting and rotation direction selection again that were recorded in Step 1.

5.1.3 Adjusting the servo gain

■ Applicable servo amplifier

<Communication type: SSCNET III/H>

MR-J4-B/MR-J4W2-B/MR-J4W3-B

<Communication type: SSCNET III>

MR-J4-B (J3 compatibility mode)/MR-J4W2-B (J3 compatibility mode)/MR-J4W3-B (J3 compatibility mode)/MR-J3-B/MR-J3W-B

■ Applicable programming software

MELSOFT MT Works2

(1) Adjusting procedure for the servo gain

(a) Connect the personal computer and servo amplifier with a USB cable.

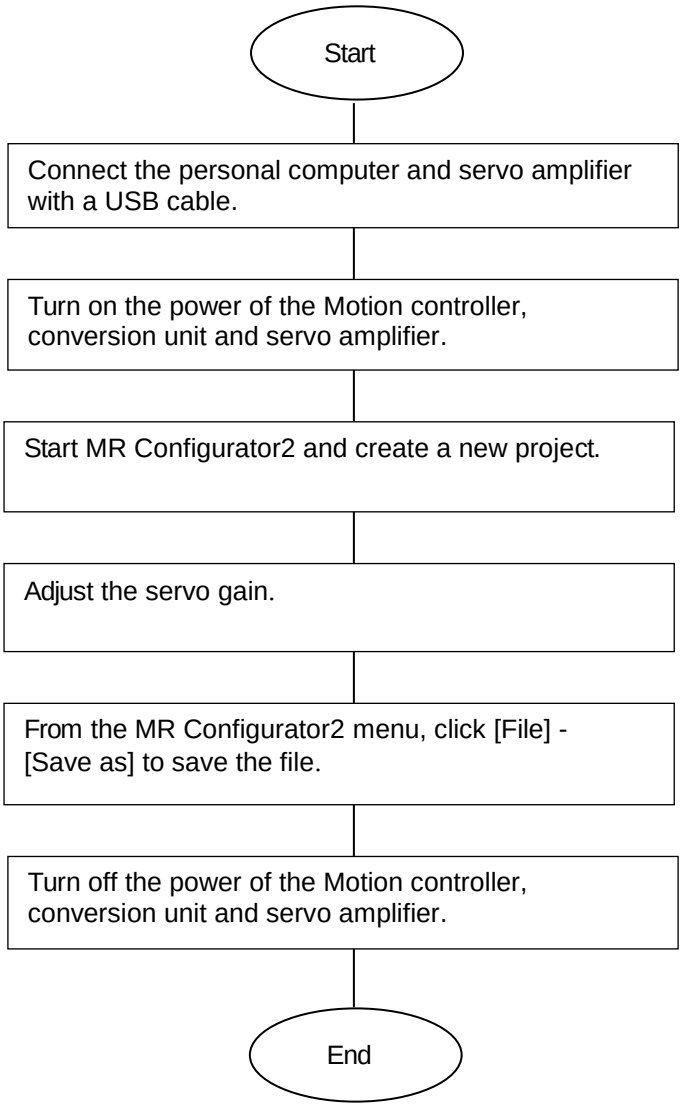
(b) Turn on the power of the Motion controller, conversion unit and servo amplifier.

(c) Start MR Configurator2 and create a new project.

(d) Adjust the servo gain.

(e) From the MR Configurator2 menu, click [File] - [Save as] to save the file.

(f) Turn off the power of the Motion controller, conversion unit and servo amplifier.



5.1.4 Applying the servo gain adjustment result setting

* This procedure is required only for Version E or earlier.

■ Applicable software

MELSOFT MT Works2、MR Configurator2

(1) Process for applying the servo gain adjustment result setting

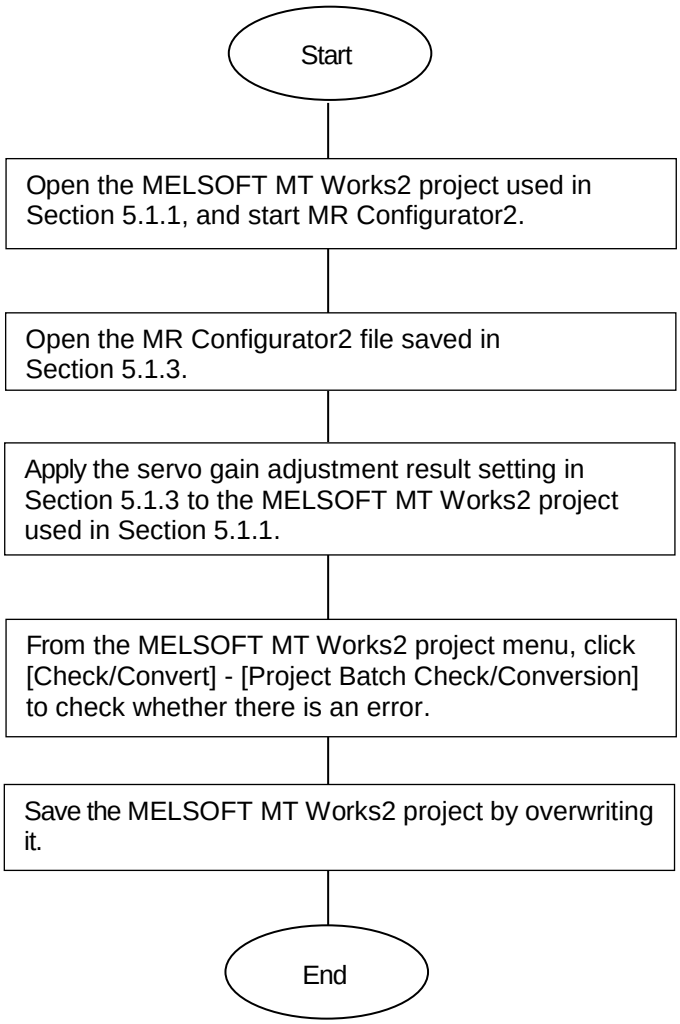
(a) Open the MELSOFT MT Works2 project used in Section 5.1.1, and start MR Configurator2.

(b) Open the MR Configurator2 file saved in Section 5.1.3.

(c) Apply the servo gain adjustment result setting in Section 5.1.3 to the MELSOFT MT Works2 project used in Section 5.1.1.

(d) From the MELSOFT MT Works2 project menu, click [Check/Convert] - [Project Batch Check/Conversion] to check whether there is an error.

(e) Save the MELSOFT MT Works2 project by overwriting it.

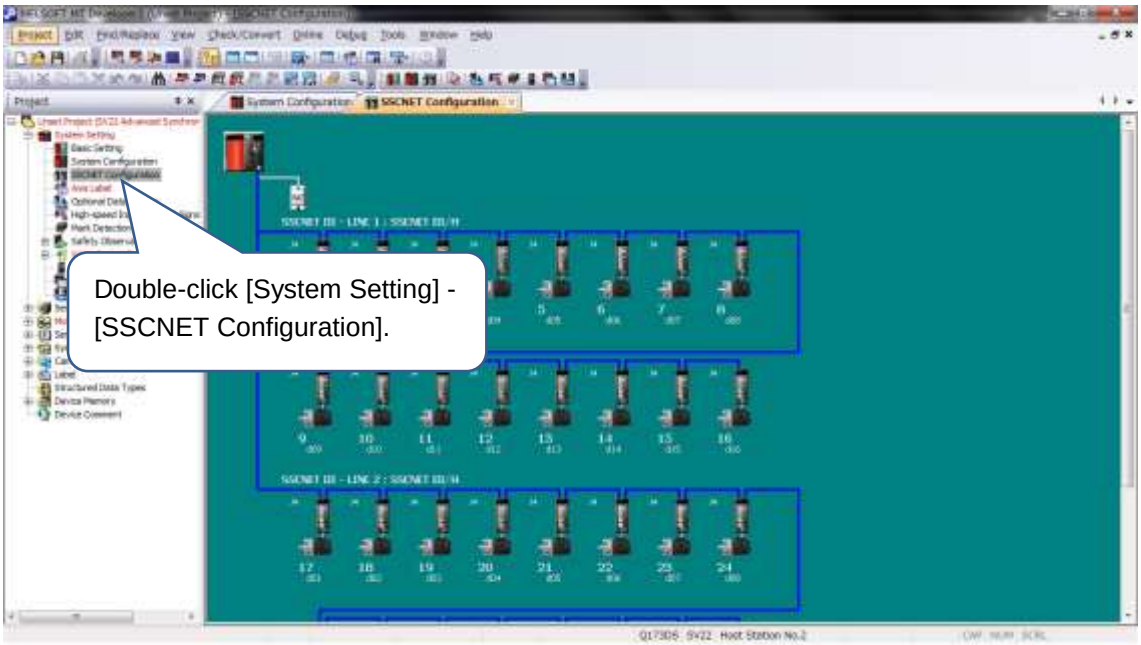


5.1.5 Writing parameters to the conversion unit

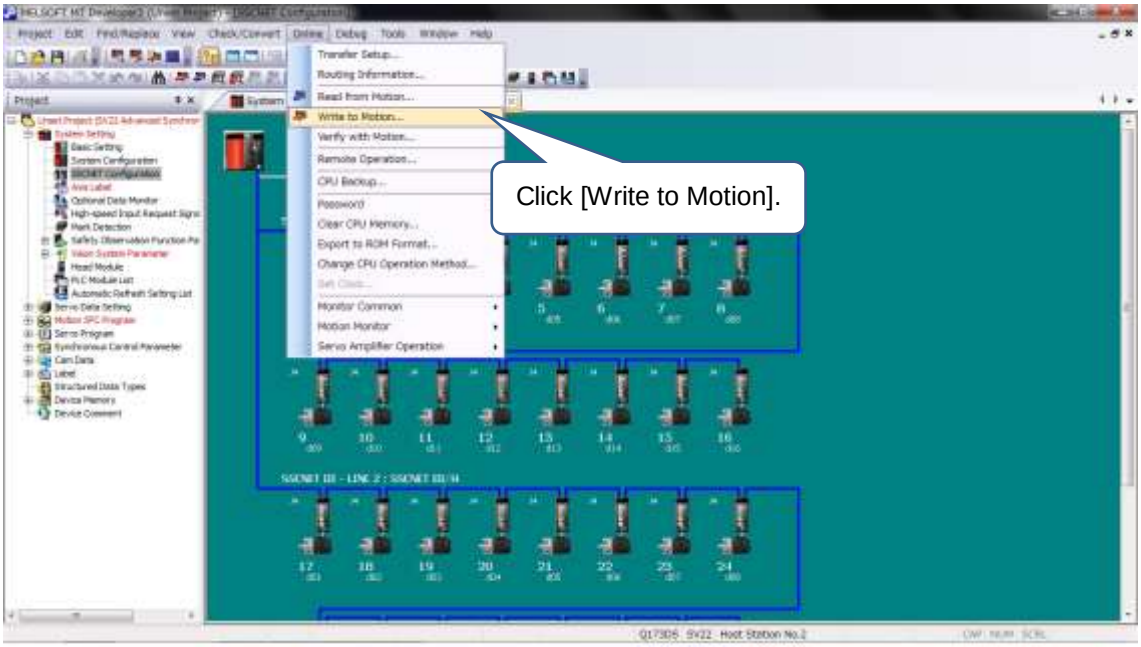
Perform the following procedures with the power supply of the conversion unit turned off, then turn on the power supply of the conversion unit.

- Connect the personal computer and the conversion unit with a USB cable.
- Set the rotary switch of the conversion unit to "0".

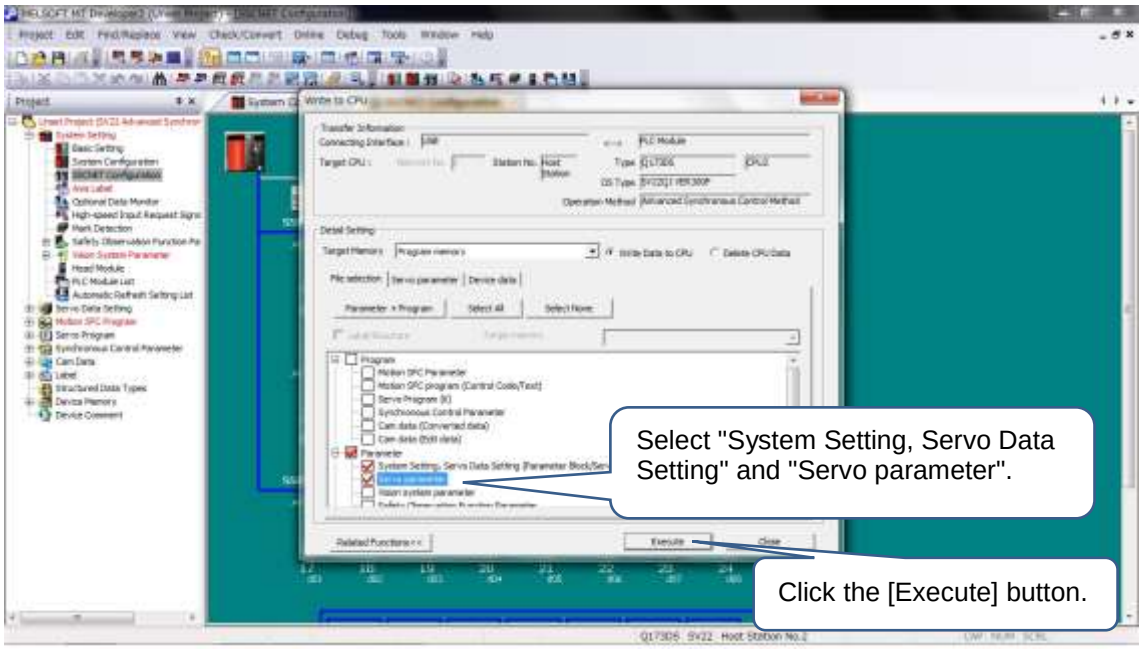
1) Open a MELSOFT MT Works2 project, and double-click [System Setting] - [SSCNET Configuration] in the window.



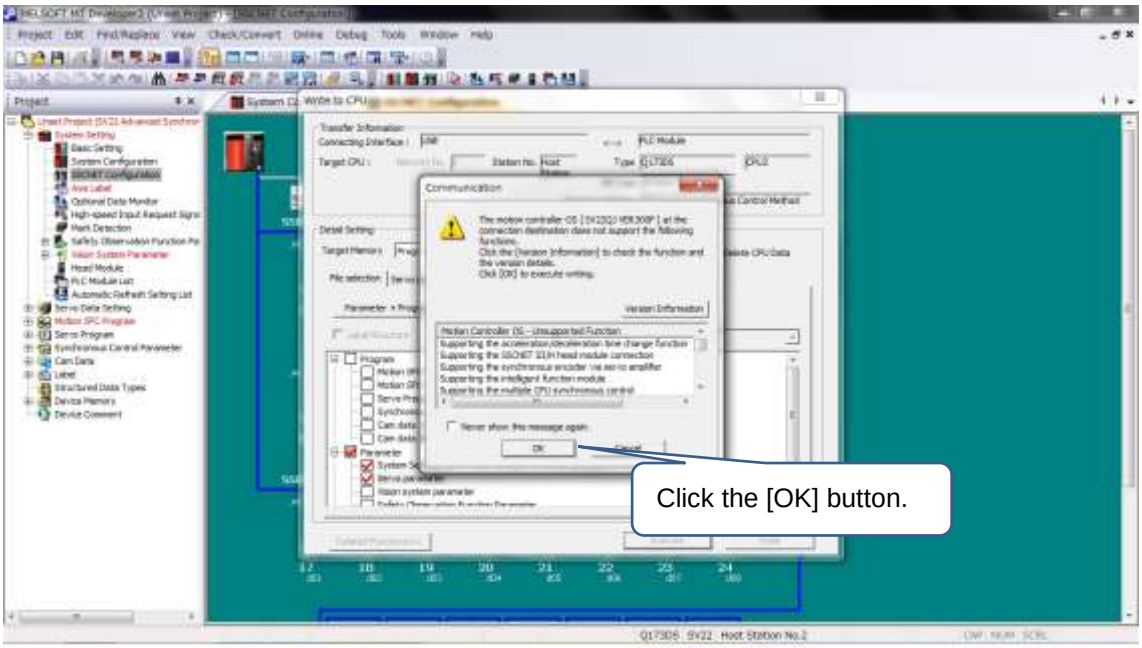
2) From the menu, click [Online] - [Write to Motion].



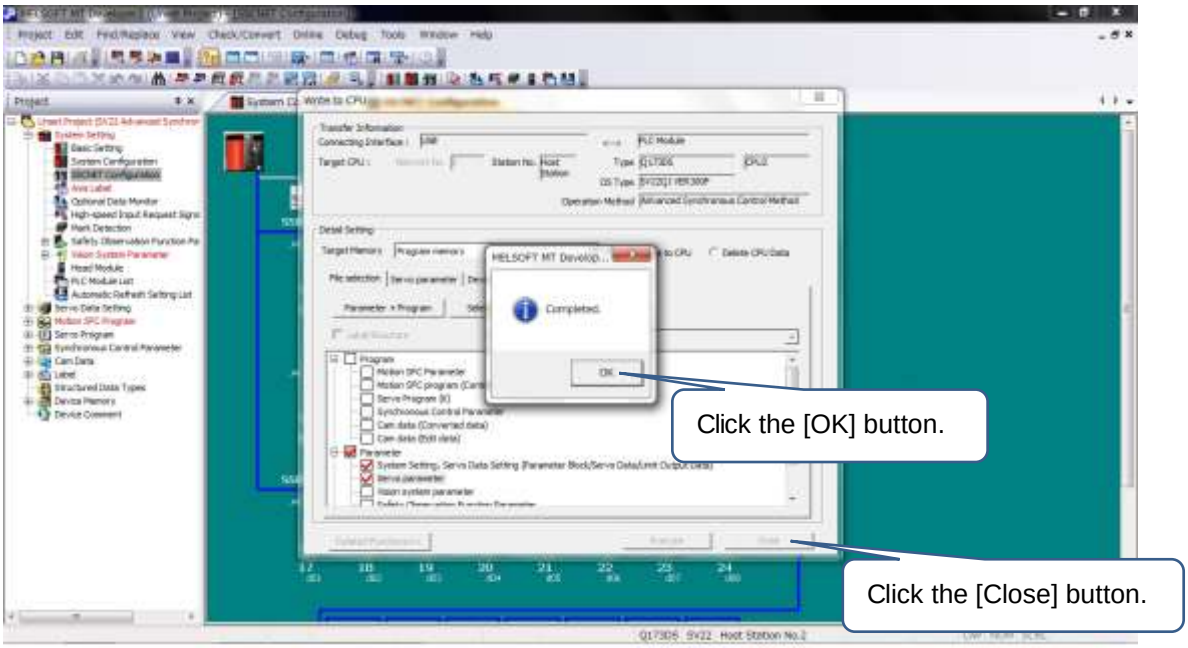
3) Write the setting to the Motion controller.
Select "System Setting, Servo Data Setting" and "Servo parameter" and click the [Execute] button.
<Cautions>
* Do not select items other than the above ones.



4) A confirmation message appears: "The motion controller OS [SV22QJ VER300F] at the connection destination does not support the following functions."
Click the [OK] button.



5) When the writing is completed, the message: "Completed." appears.
Click the [OK] button. In the "Write to CPU" screen, click the [Close] button.



Now the parameter writing to the conversion unit is completed.
From the menu, select [Project] - [Save] to save the converted project.
Turn off the power of the conversion unit.

6) Set the rotary switch of the conversion unit according to the SSCNET III/H (SSCNET III) line.
For details on the setting method, refer to Chapter 3 (5).

<Cautions>
For selecting anything other than [System Setting, Servo Data Settings] and [Servo Parameter], rewrite parameters to the conversion unit starting from the first step.

5. SETTING AND PROCEDURE BEFORE STARTING OPERATIONS

5.2 Setting and Procedure before Starting Operation When Motion Controller Operating System: SV43 Is Used

Before starting operations, follow the procedure from [Step 1] to [Step 5] to configure the settings.

[Step 1] Set the conversion unit (Section 5.2.1) and write the parameters to the conversion unit (Section 5.2.5).

- Write the parameters to the conversion unit by creating a project using MELSOFT MT Works2, referring to the source Motion controller project.

[Step 2] Set the Motion controller (Section 5.2.2).

<A series Motion controller>

- Using SW3RNC-GSV, change the fixed parameters of the A series Motion controller (electronic gear setting, etc.) so that they match the servo motor, and write the settings to the A series Motion controller.

<Q series Motion controller>

- Using MELSOFT MT Works2, change the fixed parameters of the Q series Motion controller (electronic gear setting, etc.) so that they match the servo motor, and write the settings to the Q series Motion controller.

[Step 3] Adjust servo gain (Section 5.2.3).

- Use MR Configurator2 to adjust the servo gain.

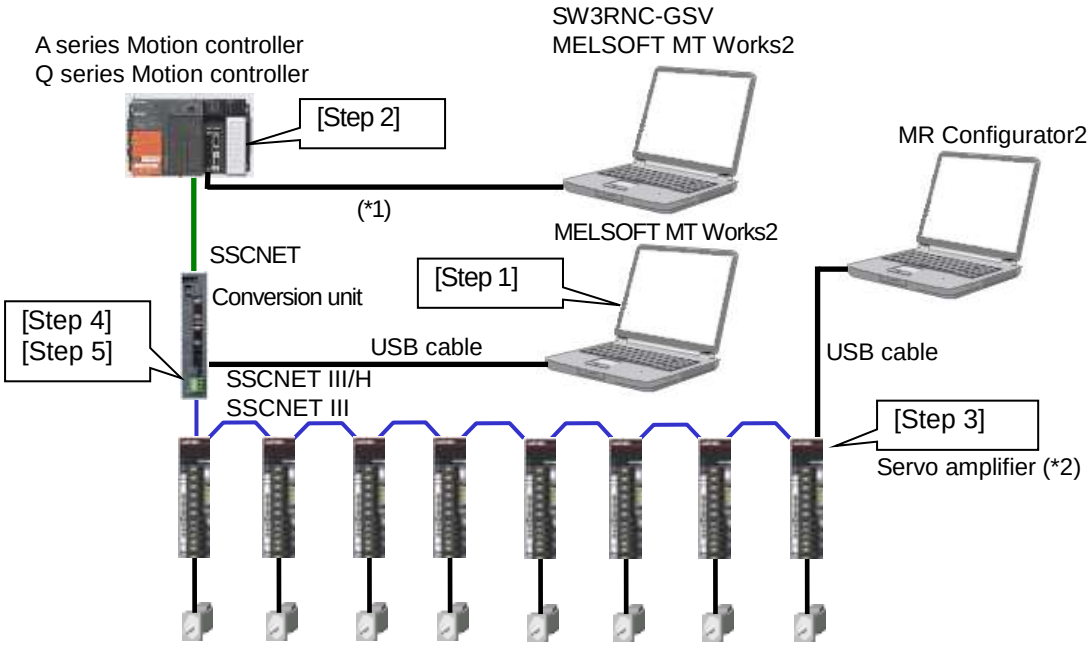
[Step 4] Apply the servo gain adjustment result setting (Section 5.2.4).

- Apply the servo gain adjustment result setting to the project in [Step 1].

[Step 5] Write the parameters to the conversion unit (Section 5.2.5).

- Write the parameters to the conversion unit.

After completing [Step 1] to [Step 5], turn on the control circuit power supply for the Motion controller, conversion unit, and servo amplifiers simultaneously to start the system.



*1 : Refer to the manual for the A series Motion controller/Q series Motion controller for the cables used.

Manual name	Manual number
A173UHCPU/A172SHCPUN/A171SHCPUN User's Manual	IB(NA)67395
A273UHCPU User's Manual	IB(NA)67262
Q173CPU(N)/Q172CPU(N) User's Manual	IB(NA)0300040

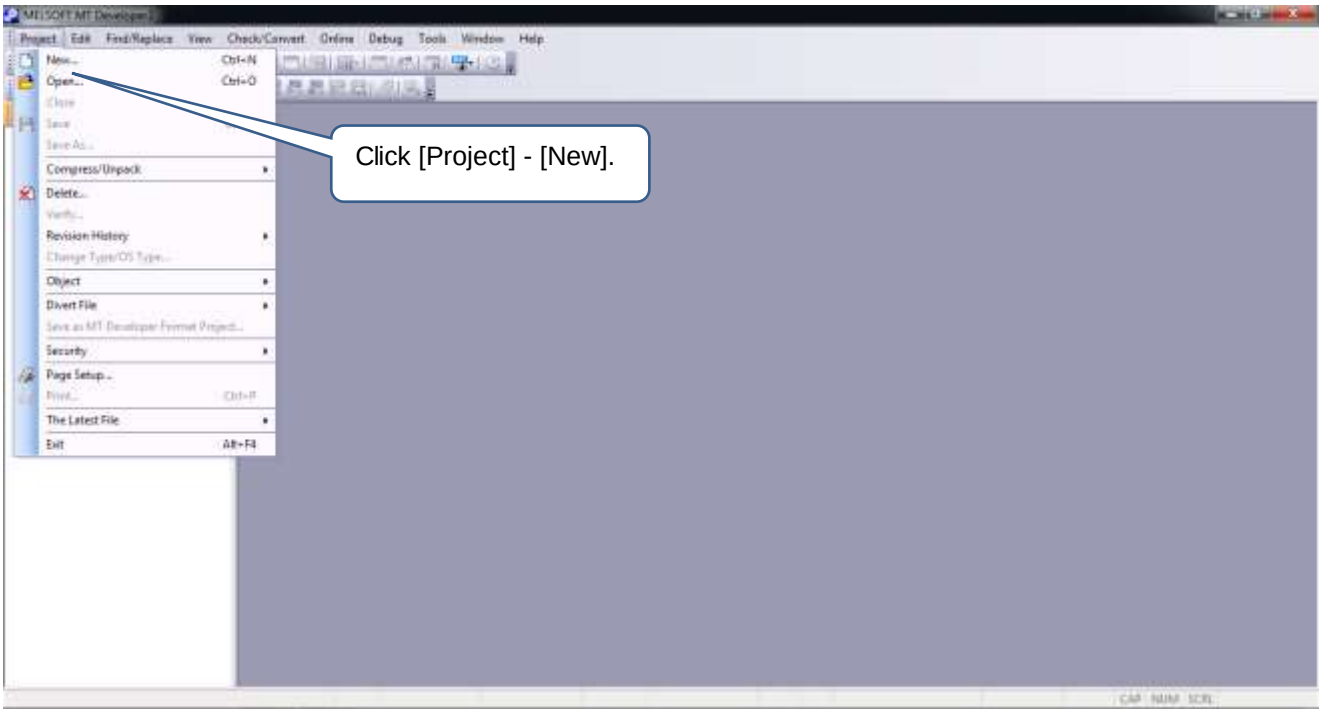
*2 : The SSCNET III/H compatible servo amplifiers are MR-J4-B/MR-J4W2-B/MR-J4W3-B, and the SSCNET III compatible servo amplifiers are MR-J4-B (J3 compatibility mode)/MR-J4W2-B (J3 compatibility mode)/ MR-J4W3-B (J3 compatibility mode)/MR-J3-B/MR-J3W-B.

5.2.1 Setting the conversion unit

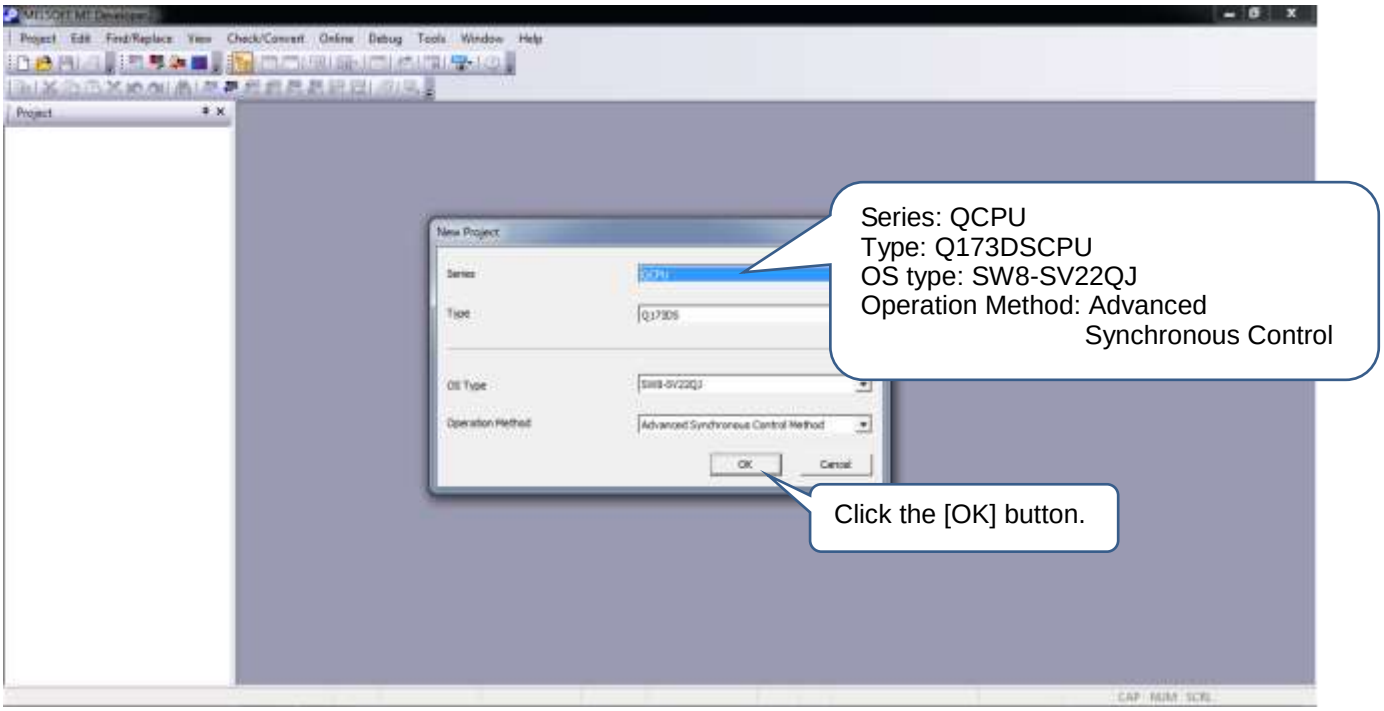
Projects for the conversion unit cannot be diverted/converted from the SV43 Motion controller project, so create projects with the following steps.

1) Start MT Developer2.

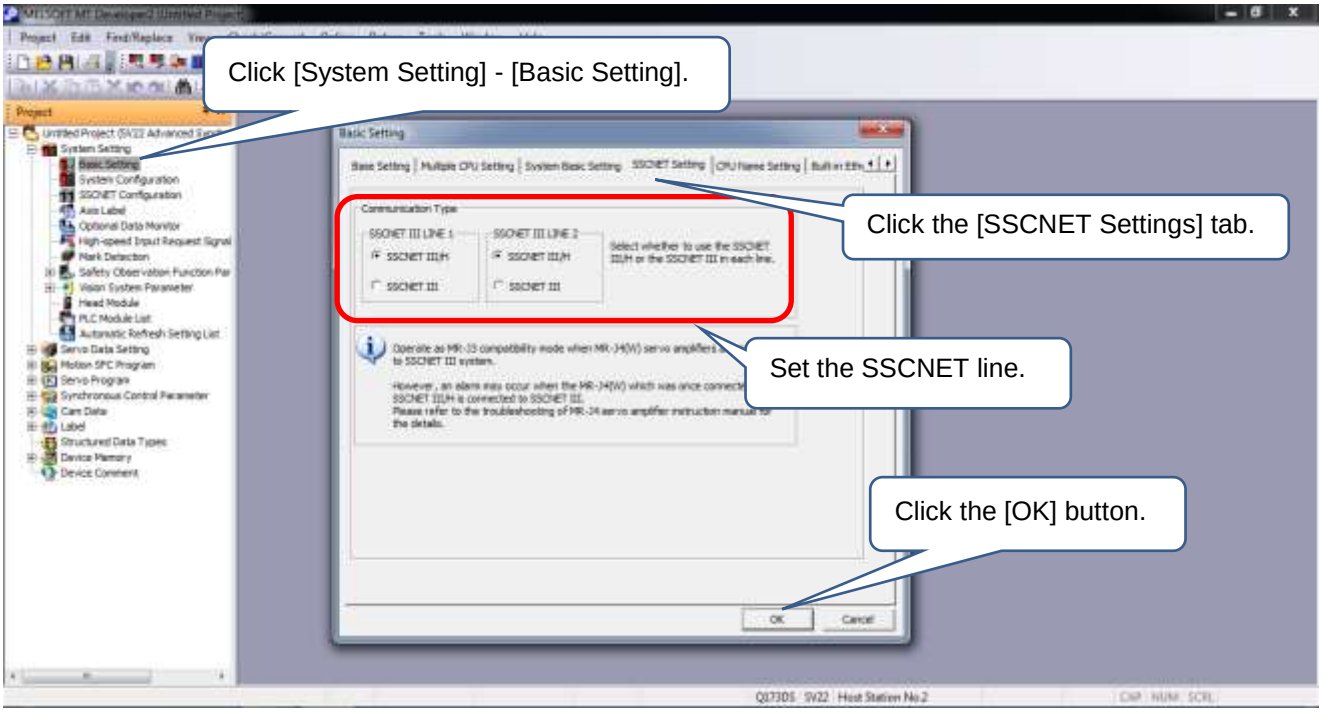
From the menu, click [Project]-[New].



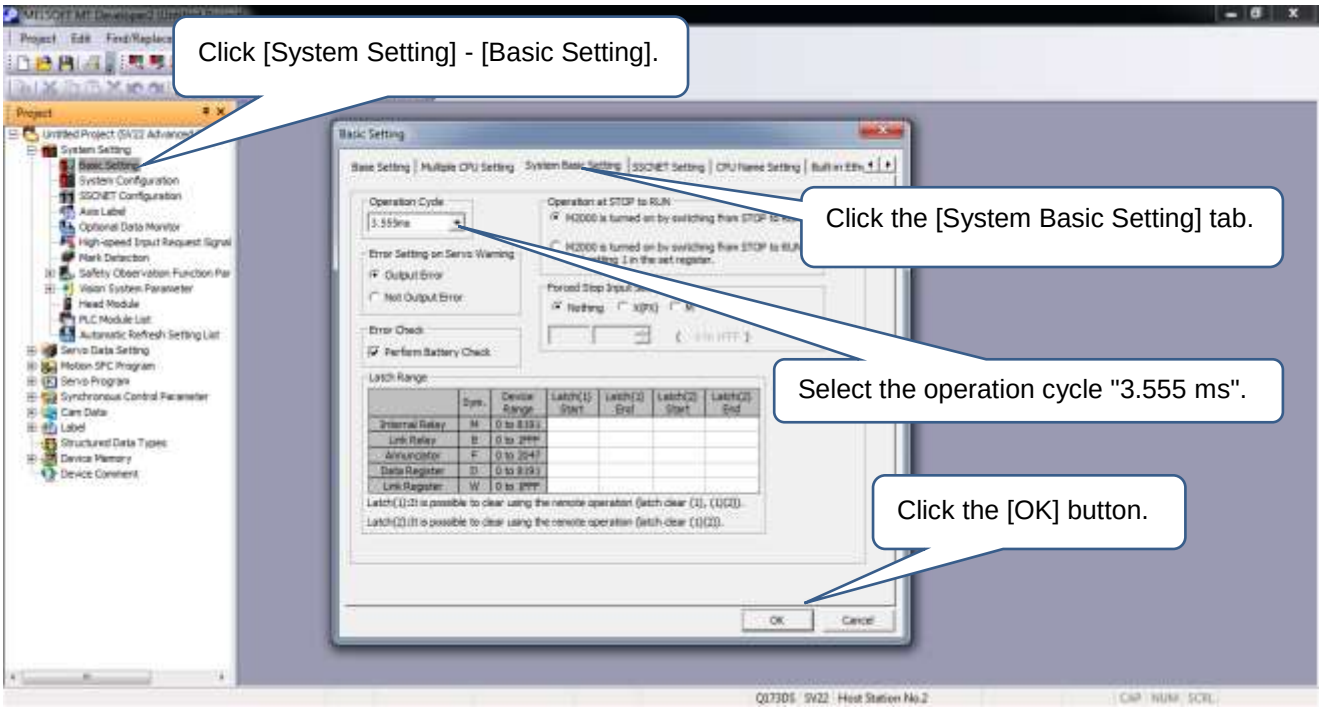
2) Select the Series: QCPU; Type: Q173DS, OS type: SW8-SV22QJ and Operation Method: Advanced Synchronous Control Method, and click the [OK] button.



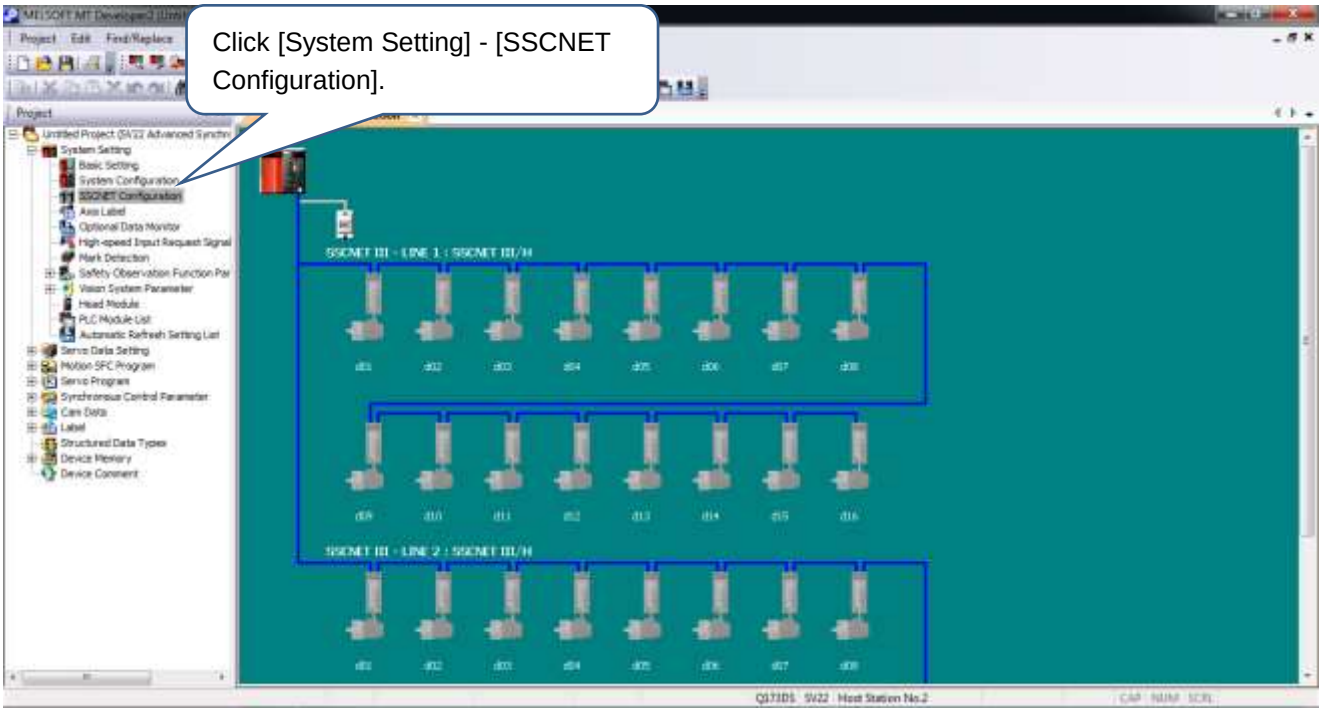
3) In the project window, click [System Setting] - [Basic Setting].
Click the [SSCNET Settings] tab in the window that appears.
When using an SSCNET III/H compatible servo amplifier, select the "SSCNET III/H" communication type.
When using an SSCNET III compatible servo amplifier, select the "SSCNET III" communication type.
After making the selection, click the [OK] button.



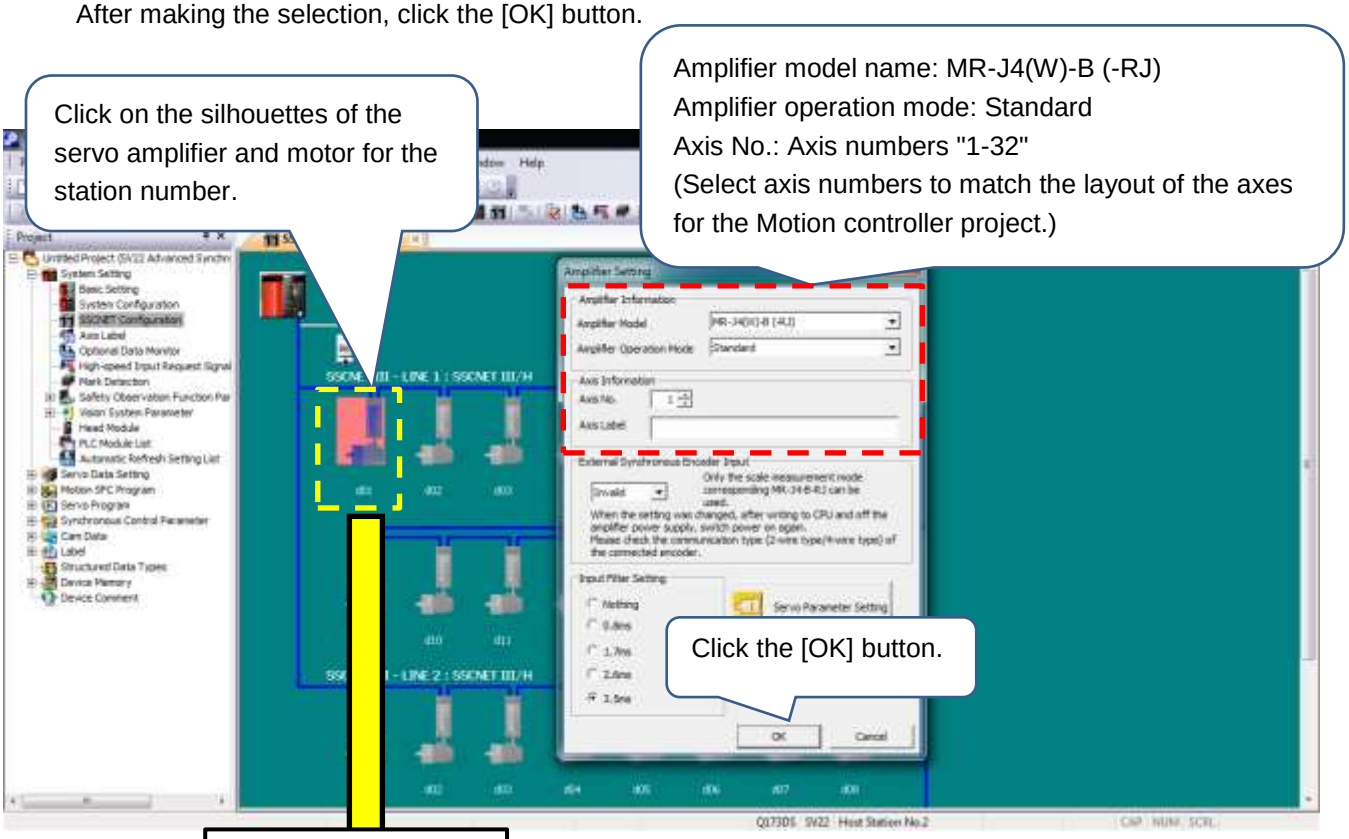
4) In the project window, click [System Setting] - [Basic Setting].
Click the [Basic System Settings] tab in the window that appears, and select the operation cycle "3.555 ms". After making the selection, click the [OK] button.



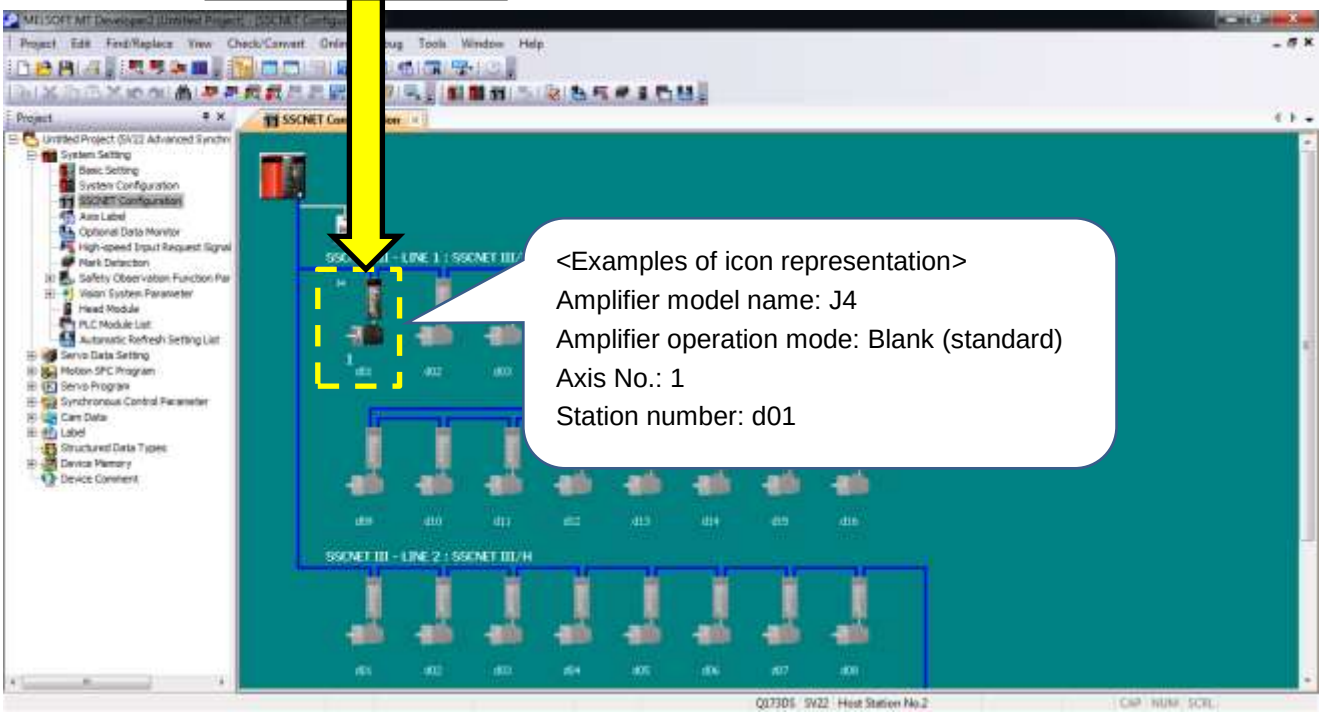
5) In the project window, click [System Setting] - [SSCNET Configuration].
Set up the SSCNET configuration for the conversion unit project to match the SSCNET configuration (axis number, layout of axes) for the Motion controller project (SV43). (Refer to "POINT" in Step 6).)



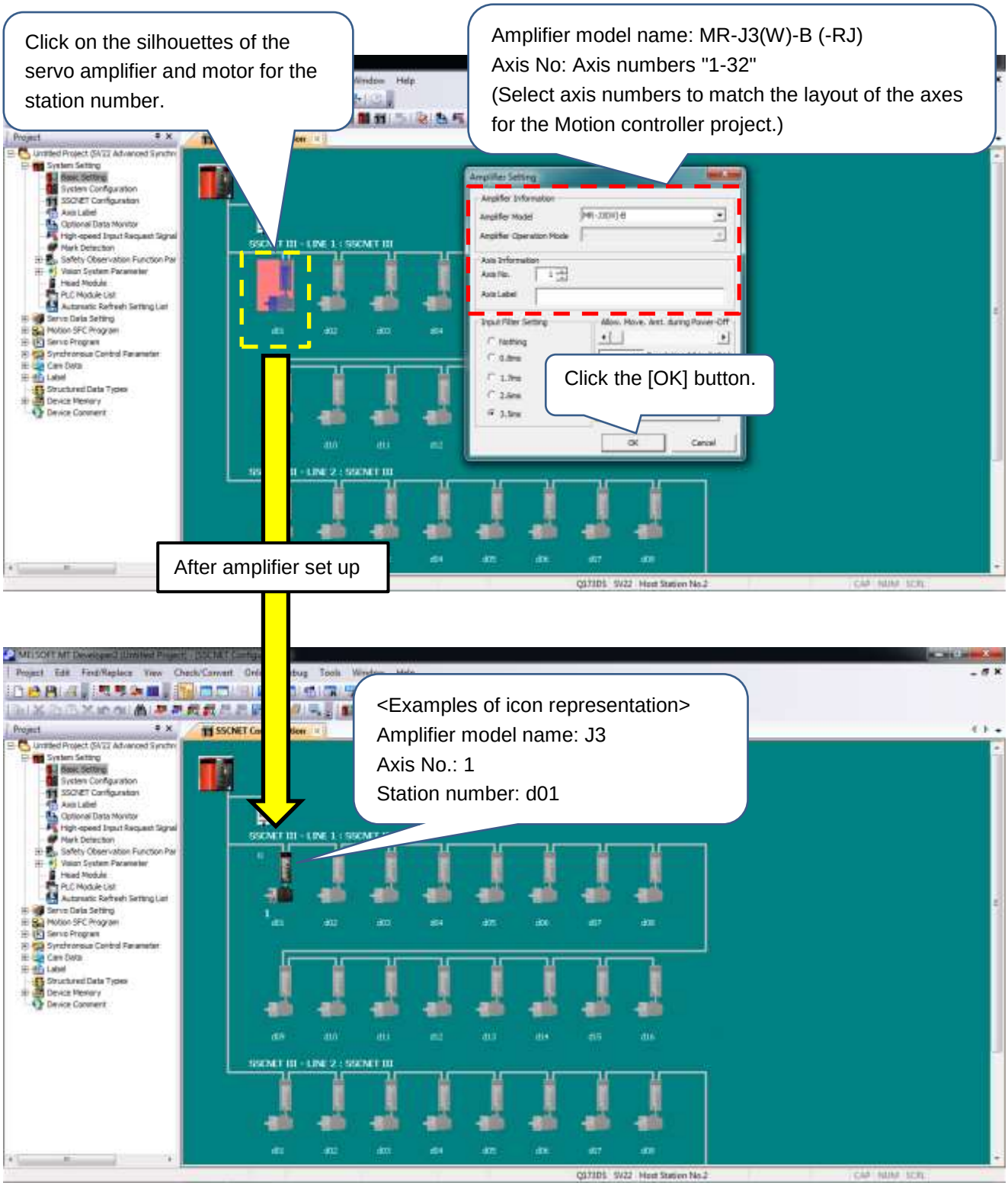
6) When selecting the communication type "SSCNET III/H" in 3), click on the silhouettes of the servo amplifier and motor for the station number in [SSCNET Configuration] to set up the amplifier.
Select the amplifier model name: MR-J4(W)-B (-RJ), amplifier operation mode: standard for the amplifier settings in the window that appears, and make selections for the axis numbers, matching the layout of the axes for the Motion controller project (refer to "POINT").
After making the selection, click the [OK] button.



After amplifier set up



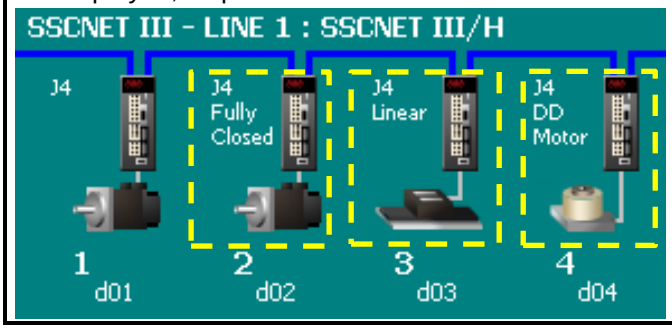
When selecting the communication type "SSCNET III" in 3), click on the silhouettes of the servo amplifier and motor for the station number in [SSCNET Configuration] to set up the amplifier.
Select the amplifier model name: MR-J3(W)-B (-RJ), amplifier operation mode: standard for the amplifier settings in the window that appears, and make selections for the axis numbers, matching the layout of the axes for the Motion controller project (refer to "POINT").
After making the selection, click the [OK] button.



Cautions

With the amplifier settings, set up the amplifier model name: "MR-J4(W)-B (-RJ)"and the amplifier operation mode: "Standard".

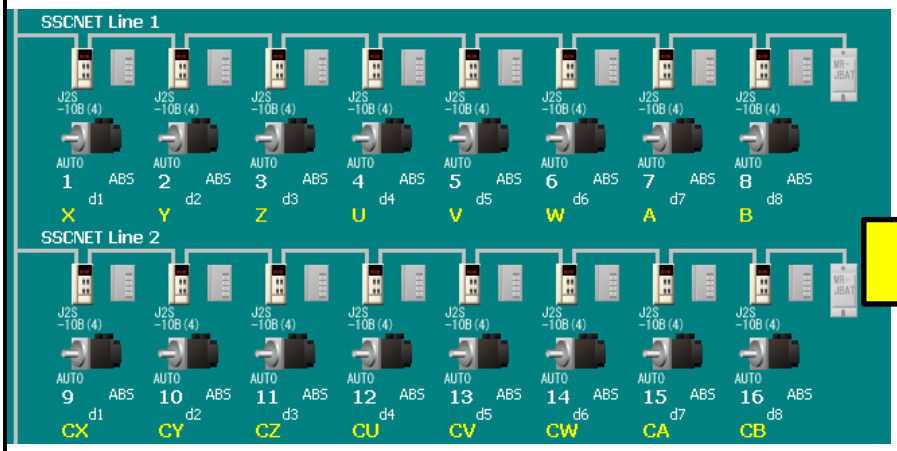
When the amplifier operation mode: "fully closed, linear, DD motor"is selected in error, the kind of icon below is displayed, so please be careful about this.



POINT

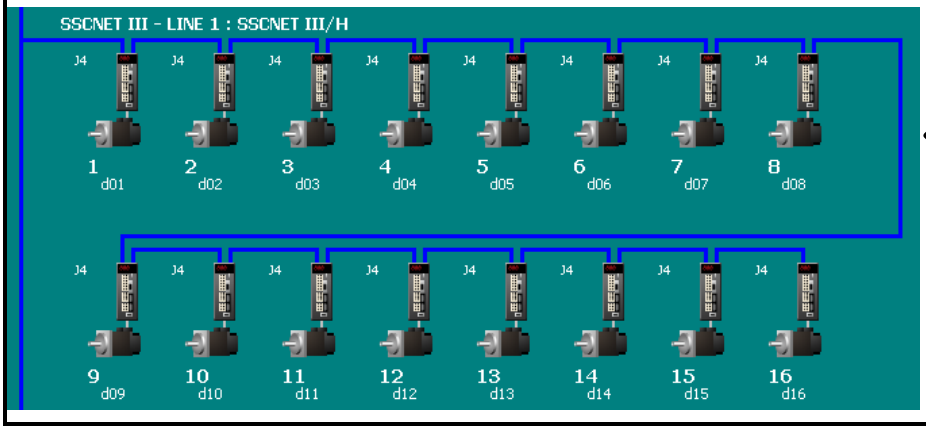
Set up the SSCNET configuration for the conversion unit project. to match the SSCNET configuration (axis number, layout of axes) for the Motion controller project (SV43) (on the conversion unit side, setting up the "axis name" is not required). The figure below shows an image of the settings for the SSCNET configuration.

• SSCNET configuration for the Motion controller project (SV43)
(SSCNET setting, amplifier type: MR-J2S-B/MR-J2-B/MR-H-B, "axis name" setting: Yes)

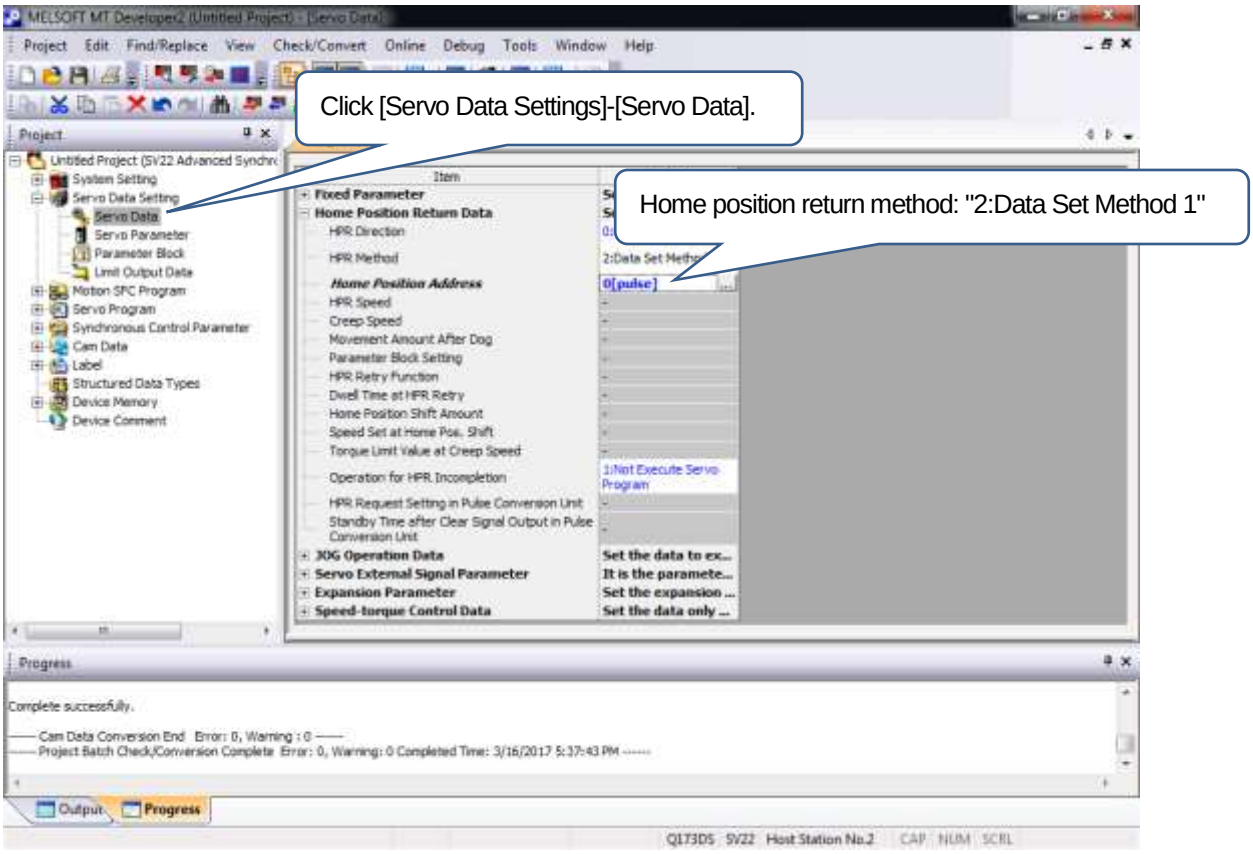


Manual setting

• SSCNET configuration for the conversion unit project
(SSCNET III/H setting, amplifier type: MR-J4(W)-B (-RJ), "axis name" setting: No)

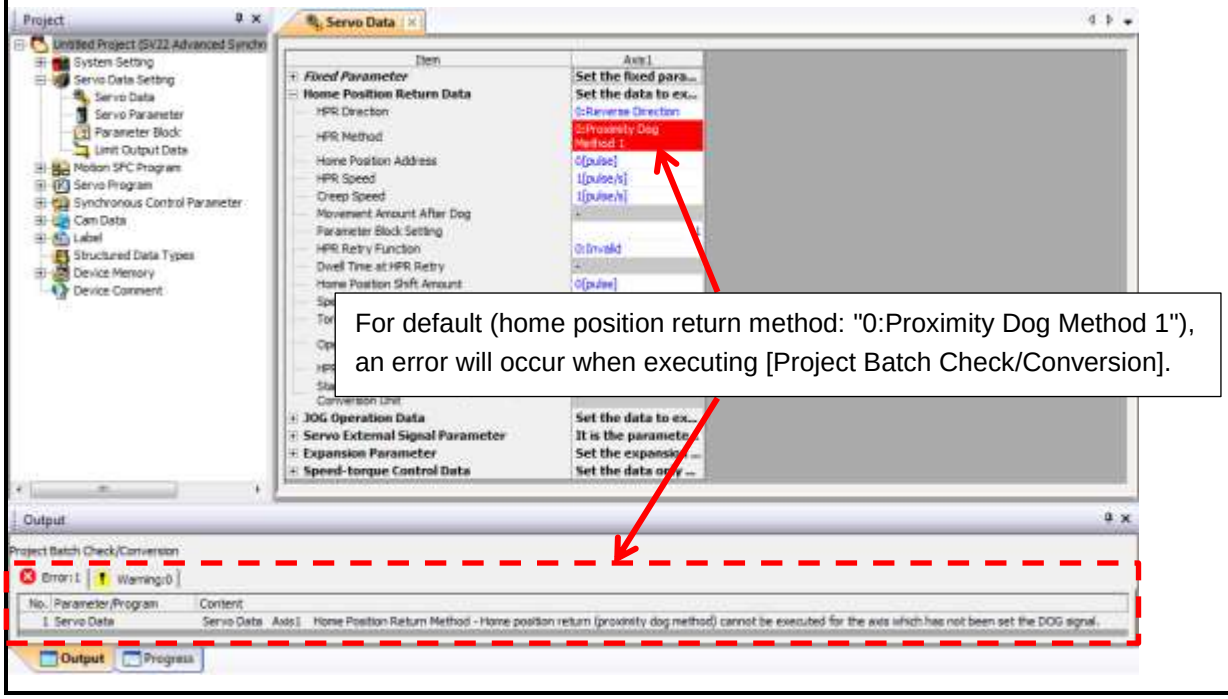


7) Click [Servo Data Settings]-[Servo Data] in the project window to set the home position return method: "2:Data Set Method 1".

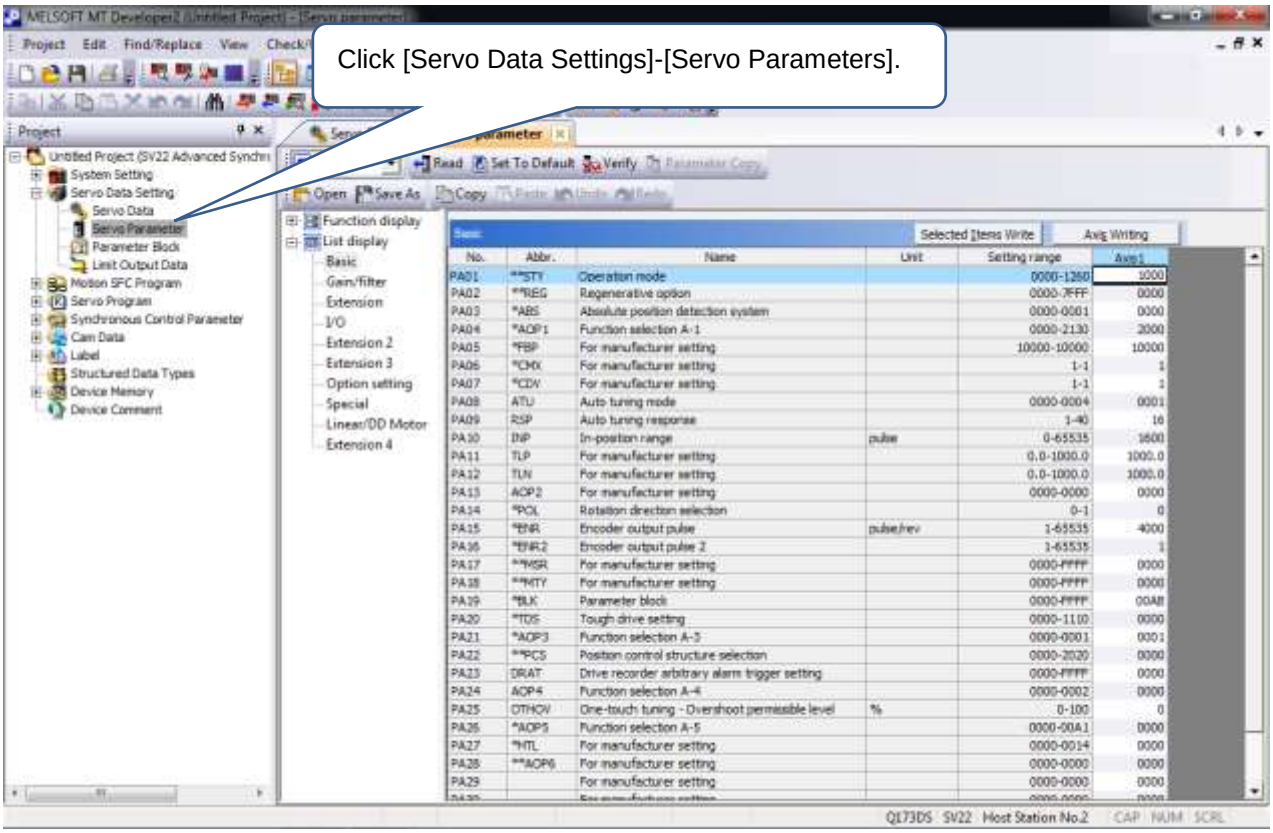


Cautions

The home position return is controlled by the commands of the controller, so set up the home position return method on the Motion controller side. Although home position return data is not used on the conversion unit side, set up the home position return method in order for an error not to occur when executing [Project Batch Check/Conversion].

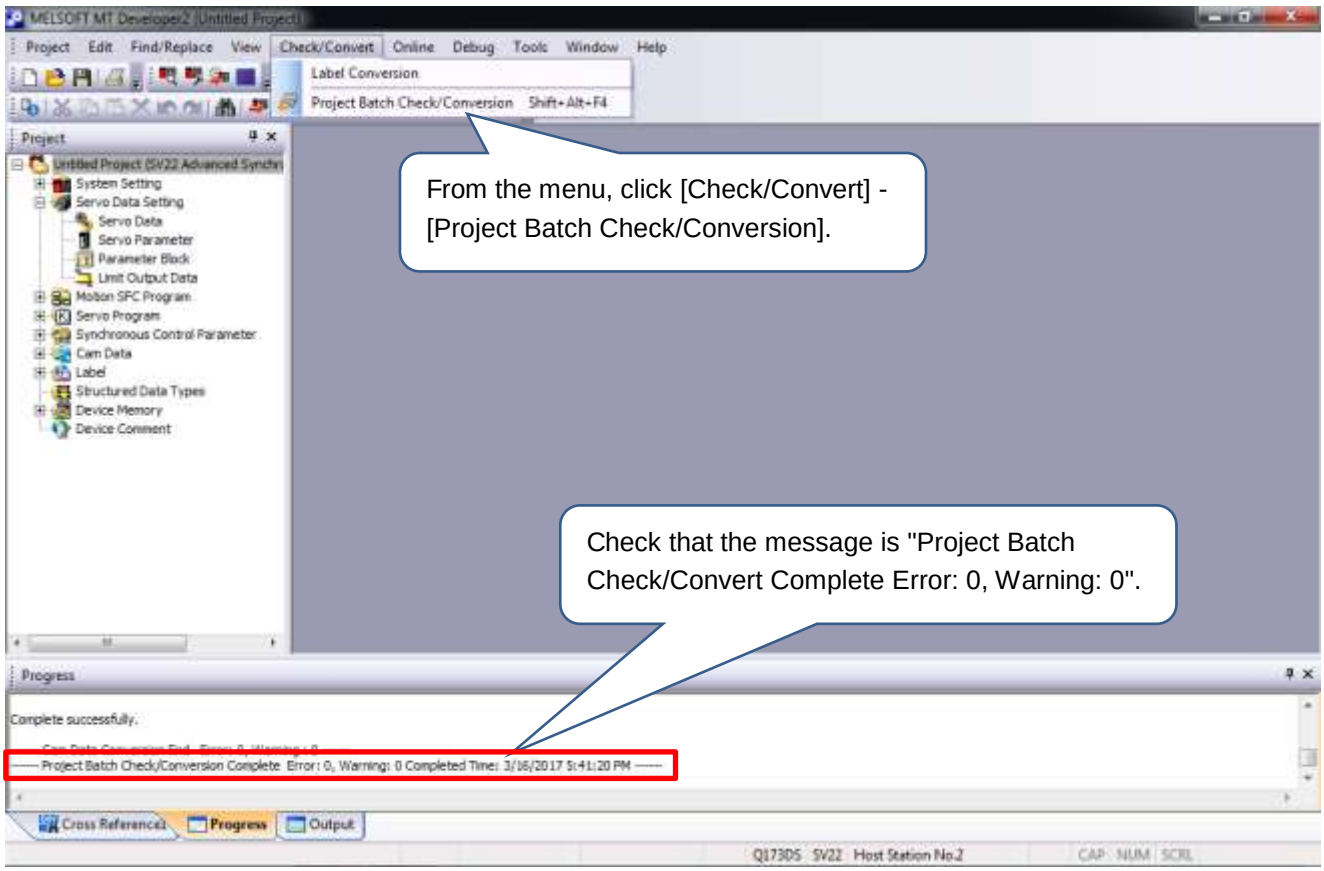


8)Click [Servo Data Settings]-[Servo Parameters] in the project window, and set up the MR-J4-B/ MR-J3-B servo parameters for the conversion unit to match the settings for the Motion controller (MR-H-B/MR-J2-B/MR-J2S-B servo parameters).



POINT
Refer to [Appendix-3] for comparisons of the MR-H-B/MR-J2-B/MR-J2S-B and the MR-J4-B/MR-J3-B servo parameters.

9) From the menu, click [Check/Convert] - [Project Batch Check/Conversion].
Check that the message: "Project Batch Check/Convert Complete Error: 0, Warning: 0" is in the output window. If any other message appears, eliminate errors.

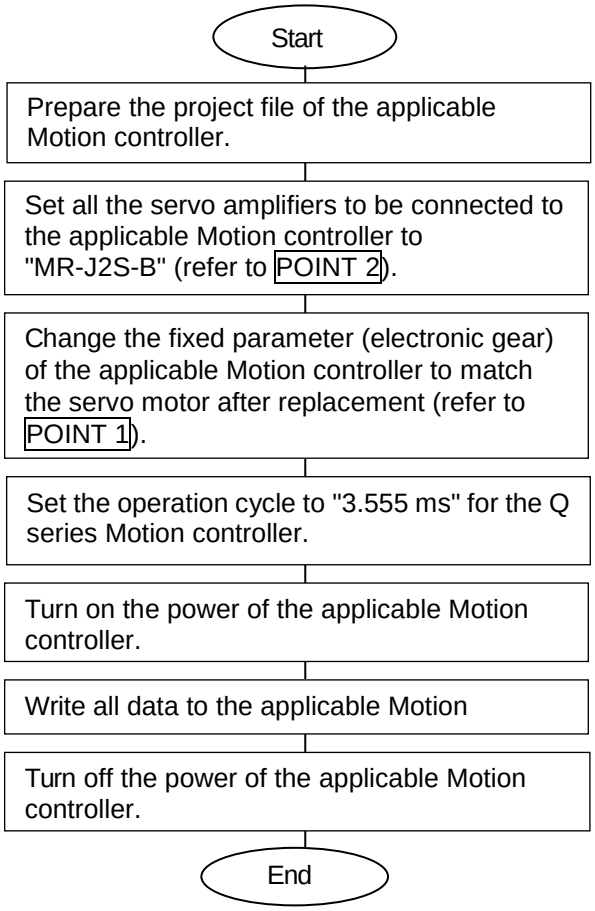


Now the setting up of the conversion unit is completed.

5.2.2 Setting the Motion controller

■ Applicable Motion controller
A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU/Q172CPU(N)/Q173CPU(N)
■ Applicable software
SW3RNC-GSV(A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU)
MELSOFT MT Works2(Q172CPU(N)/Q173CPU(N))

(1) Setting procedure for the Motion controller
(a) Prepare the project file of the applicable Motion controller.
(b) Set all the servo amplifiers to be connected to the applicable Motion controller to "MR-J2S-B".
(c) Change the fixed parameter (electronic gear) of the applicable Motion controller to match the servo motor after replacement.
(d) Set the operation cycle to "3.555 ms" for the Q series Motion controller.
(e) Turn on the power of the applicable Motion controller.
(f) Write all data to the applicable Motion controller.
(g) Turn off the power of the applicable Motion controller.



■ When there is no project file, read the project from the Motion controller.

■ For axes assigned to MR-J2-B and MR-H-B, change to MR-J2S-B in the system setting.
When changing the system setting to "MR-J2S-B", the servo parameters are initialized, so set the parameters by referring to POINT 2.

■Communication type: When the communication type is SSCNET III/H, the servo motor will be changed to a motor with resolution of 4194304 PLS, so the fixed parameter (electronic gear) must be changed.
Communication type: When the communication type is SSCNET III, the servo motor will be changed to a motor with resolution of 262144 PLS, so the fixed parameter (electronic gear) must be changed.

POINT 1 Example of the electronic gear setting (Example of SV43・MR-J4-B)

<A171SHCPU(N)/A172SHCPU(N)/A173UHCPU/A273UHCPU>

"Example of electronic gear setting from before motor replacement (Resolution: 131072 pulses/rev) and at the time of HG motor replacement (Resolution: 4194304 pulses/rev)"

For the electronic gear before motor replacement (number of pulses per revolution: 32768 pulses; movement amount per revolution: 1.6000 mm; unit scaling factor: 10), the following shows the electronic gear settings at the time of HG motor replacement.

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution} \times \text{unit scaling factor}} = \frac{32768\ \text{pulse} \times (4194304\ \text{pulse/rev} \div 131072\ \text{pulse/rev})}{1.6000\ \text{mm} \times 10} = \frac{32768\ \text{pulse}}{0.0500\ \text{mm} \times 10}$$

The number of pulses per revolution and the movement amount per revolution are settable only within 1 to 65535. Set the reduced fraction.

In the electronic gear example, the number of pulses per revolution is set to 32768, the movement amount per revolution is set to 0.0500 mm, and the unit scaling factor is set to 10.

* With a case where a reduced fraction cannot be set, a position accuracy error will be generated. For details, refer to Section 5.4 (1).

<Q172CPU(N)/Q173CPU(N)>

"Example of electronic gear setting from before motor replacement (Resolution: 131072 pulses/rev) and at the time of HG motor replacement (Resolution: 4194304 pulses/rev)"

For the electronic gear before motor replacement (number of pulses per revolution: 32768 pulses; movement amount per revolution: 16.0000 mm), the following shows the electronic gear settings at the time of HG motor replacement.

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution}} = \frac{32768\ \text{pulse} \times (4194304\ \text{pulse/rev} \div 131072\ \text{pulse/rev})}{16.0000\ \text{mm}} = \frac{1048576\ \text{pulse}}{16.0000\ \text{mm}}$$

In the electronic gear example, the number of pulses per revolution is set to 1048576 pulses, and the movement amount per revolution is set to 16.0000 mm.

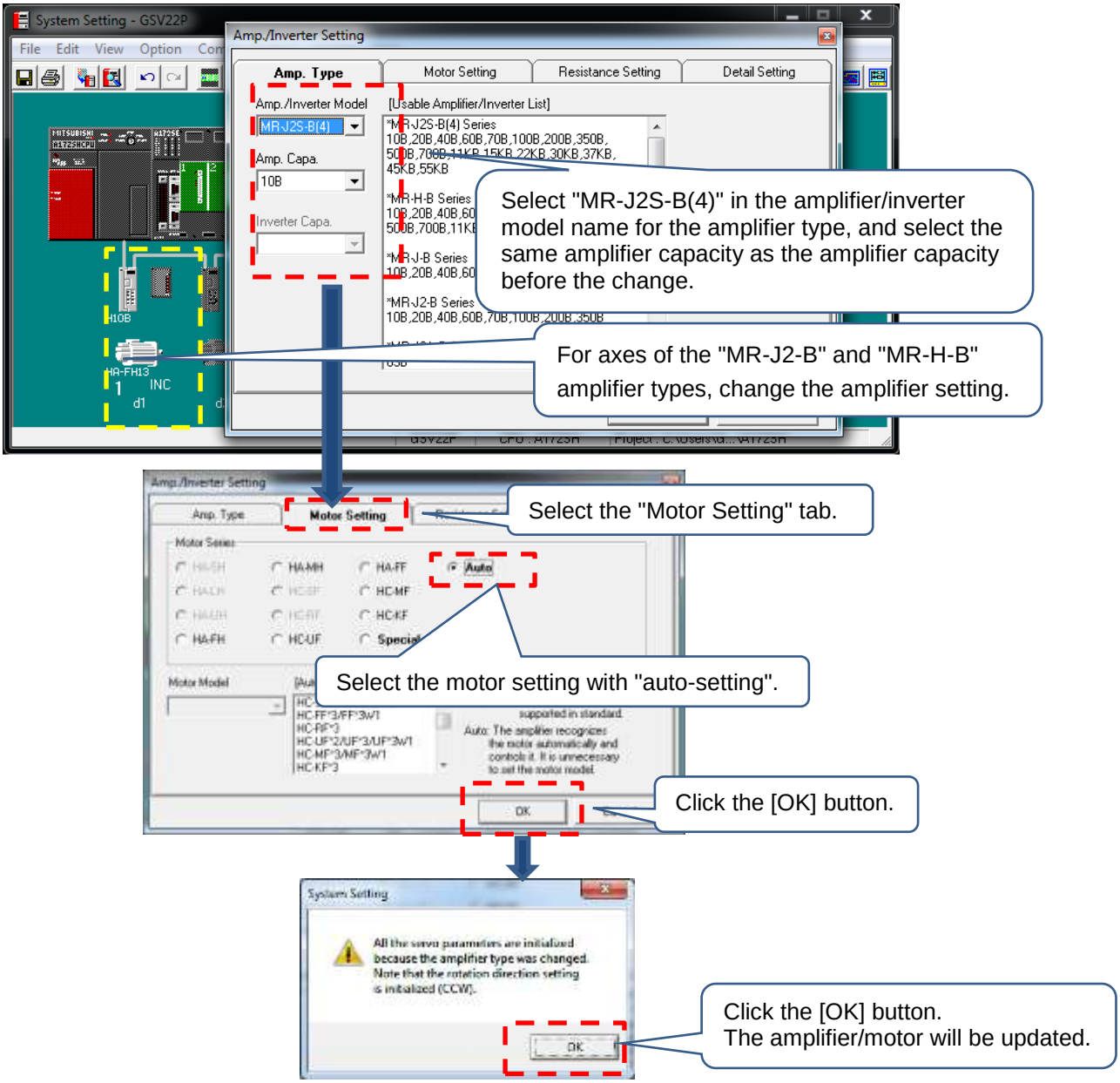
POINT 2 How to change "MR-J2-B" and "MR-H-B" to "MR-J2S-B"

Step 1: The servo parameters are initialized when changing amplifier settings in the system settings, so the following servo parameters are recorded for the "MR-J2-B" axis and "MR-H-B" axis.

MR-H-B/MR-J2-B servo parameters		Checking method
No.	Name	
1	Amplifier setting	Check either one of "INC/ABS" in "Detailed Settings" on an amplifier setting screen in the system setting screens.
7	Rotation direction selection	Set either "forward rotation (CCW)/reverse rotation (CW)" in the servo parameter setting screen.

Step 2: For the axes with the amplifier type set to "MR-J2-B" and "MR-H-B" in the system set tings for the applicable Motion controller, change the amplifier type to "MR-J2S-B" and select "auto-setting" for the motor setting.

["System Setting" screen for SW3RNC-GSV]



Step 3: Set the amplifier setting and rotation direction selection again that were recorded in Step 1.

5.2.3 Adjusting the servo gain

■ Applicable servo amplifier

<Communication type: SSCNET III/H>

MR-J4-B/MR-J4W2-B/MR-J4W3-B

<Communication type: SSCNET III>

MR-J4-B (J3 compatibility mode)/MR-J4W2-B (J3 compatibility mode)/
MR-J4W3-B (J3 compatibility mode)/MR-J3-B/MR-J3W-B

■ Applicable peripheral software

MELSOFT MT Works2

(1) Steps for servo gain adjustment

(a) Connect the personal computer and servo amplifier with a USB cable.

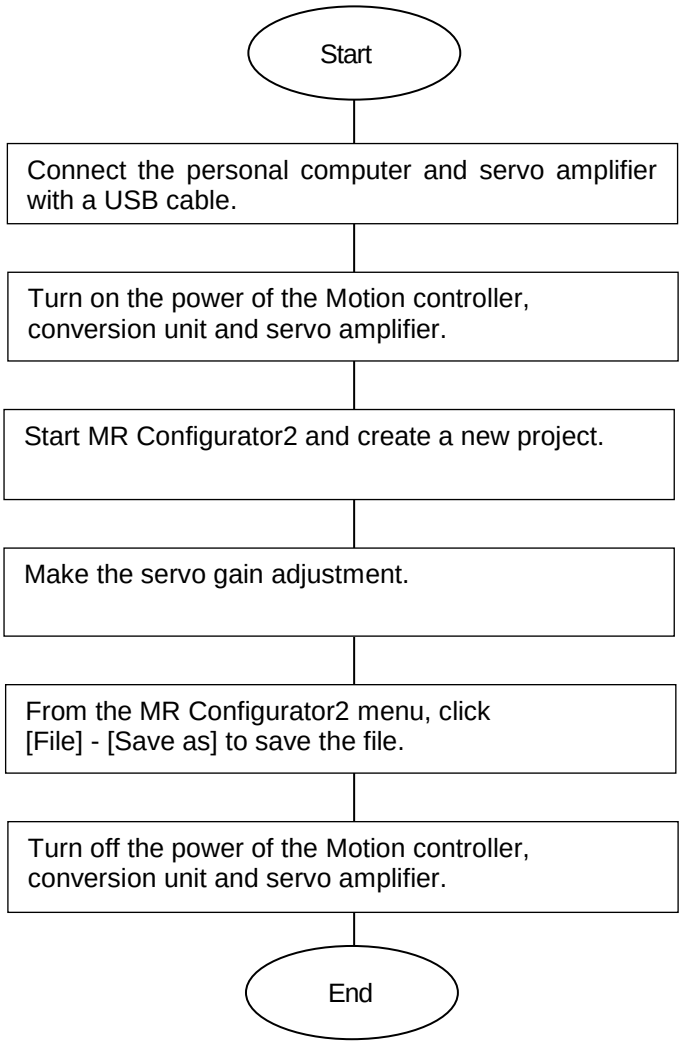
(b) Turn on the power of the Motion controller, conversion unit and servo amplifier.

(c) Start MR Configurator2 and create a new project.

(d) Make the servo gain adjustment.

(e) From the MR Configurator2 menu, click [File] - [Save as] to save the file.

(f) Turn off the power of the Motion controller, conversion unit and servo amplifier.



■ Select the servo amplifier type in the New window.

■ From the MR Configurator2 menu, click [Display]-[Docking Window]-[Servo Assistant], and make servo gain adjustments on the "Servo Assistant" screen that appears.

5.2.4 Applying the servo gain adjustment result setting

* This procedure is required only for Version E or earlier.

■ Applicable software

MELSOFT MT Works2, MR Configurator2

(1) Process for applying the servo gain adjustment result setting

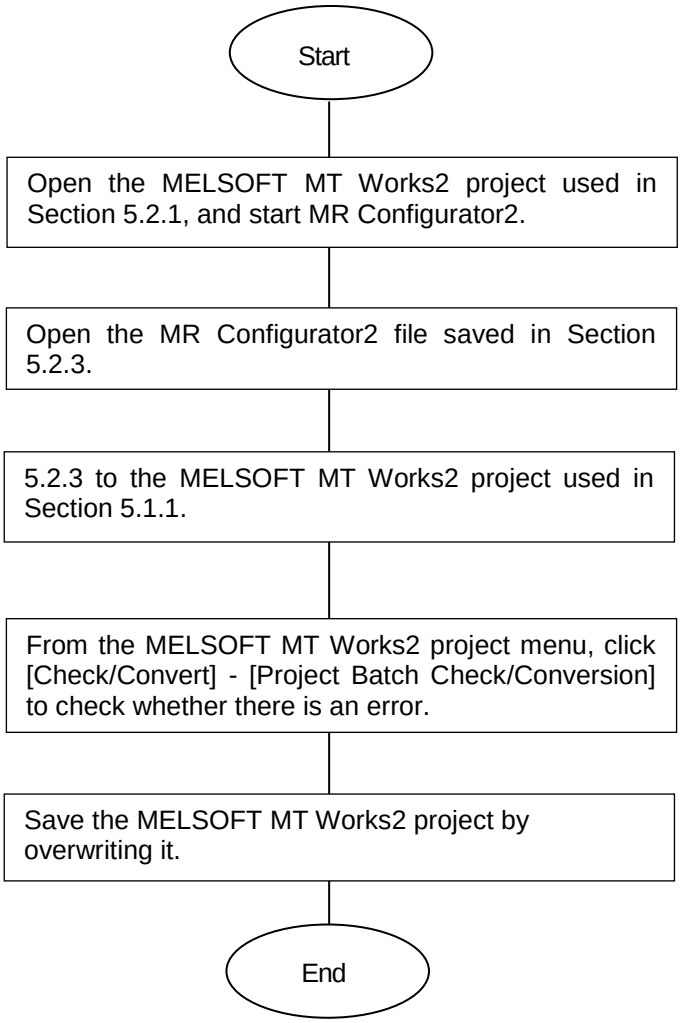
(a) Open the MELSOFT MT Works2 project used at Section 5.2.1 to start MR Configurator2.

(b) Open the MR Configurator2 file saved in Section 5.2.3.

(c) 5.2.3 to the MELSOFT MT Works2 project used in Section 5.1.1.

(d) From the MELSOFT MT Works2 project menu, click [Check/Convert] - [Project Batch Check/Conversion] to check whether there is an error.

(e) Save the MELSOFT MT Works2 project by overwriting it.

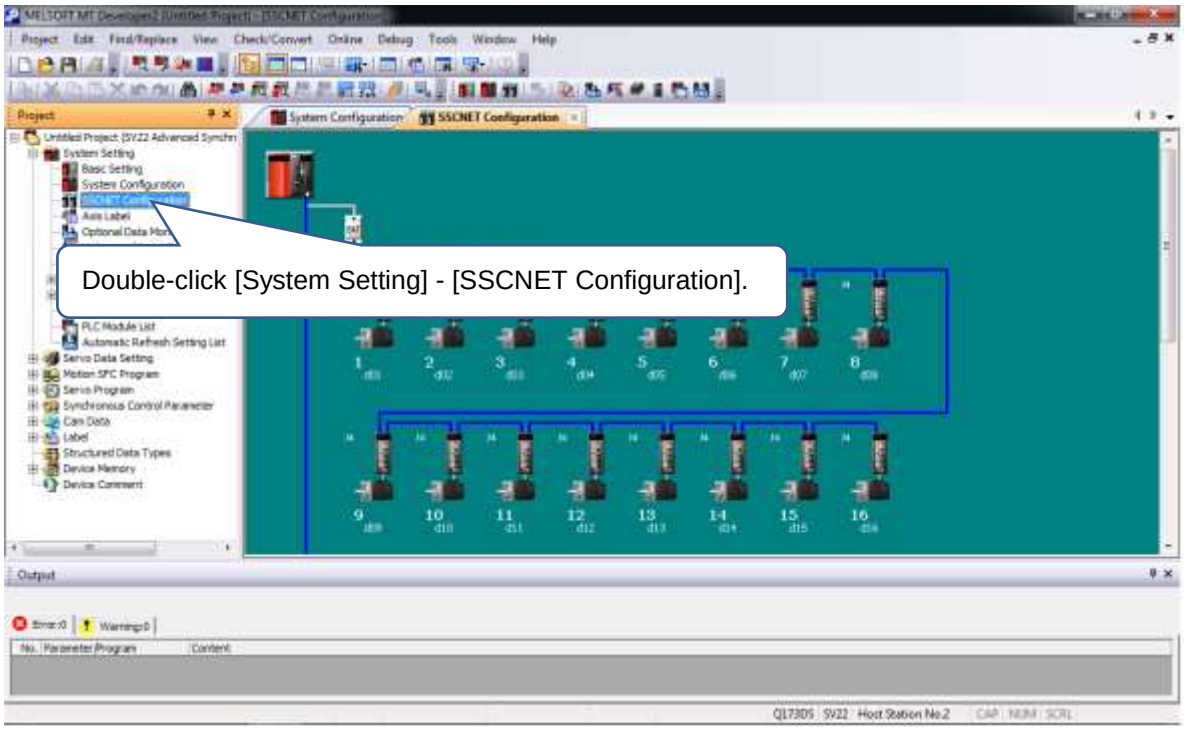


5.2.5 Writing parameters to the conversion unit

Perform the following procedures with the power supply of the conversion unit turned off, then turn on the power supply of the conversion unit.

- Connect the personal computer and conversion unit with a USB cable.
- Set the rotary switch of the conversion unit to "0".

(1) Open a MELSOFT MT Works2 project, and double-click [System Setting] - [SSCNET Configuration] in the window.



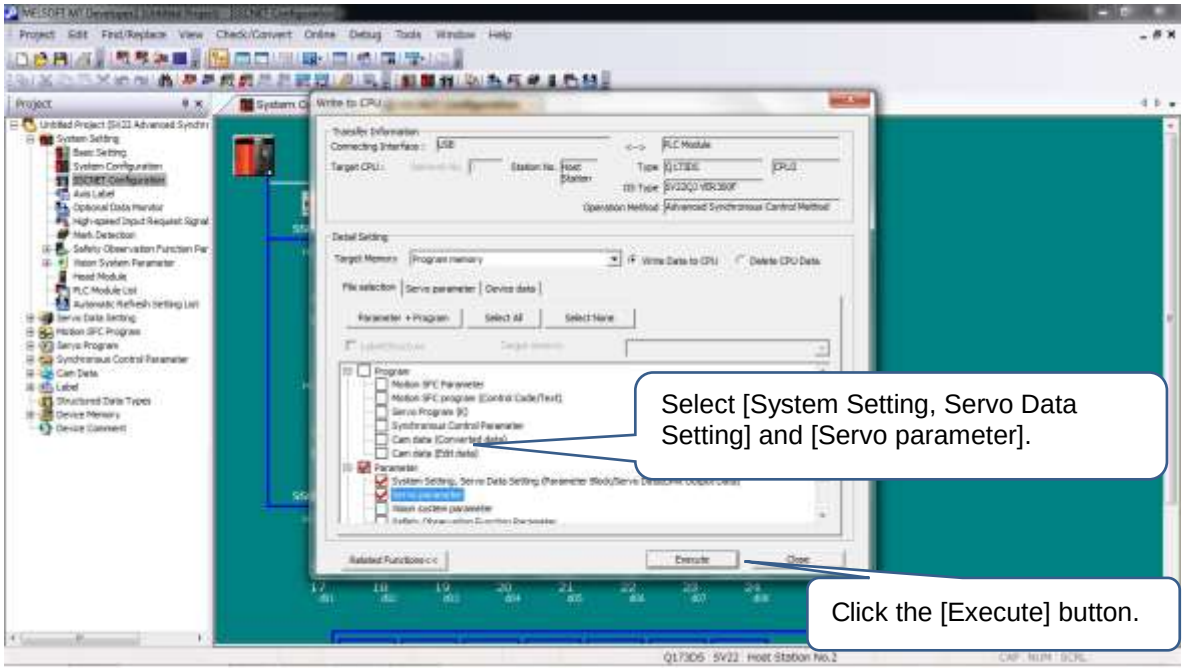
(2) From the menu, click [Online] - [Write to Motion].

(3) Write the setting to the Motion controller.

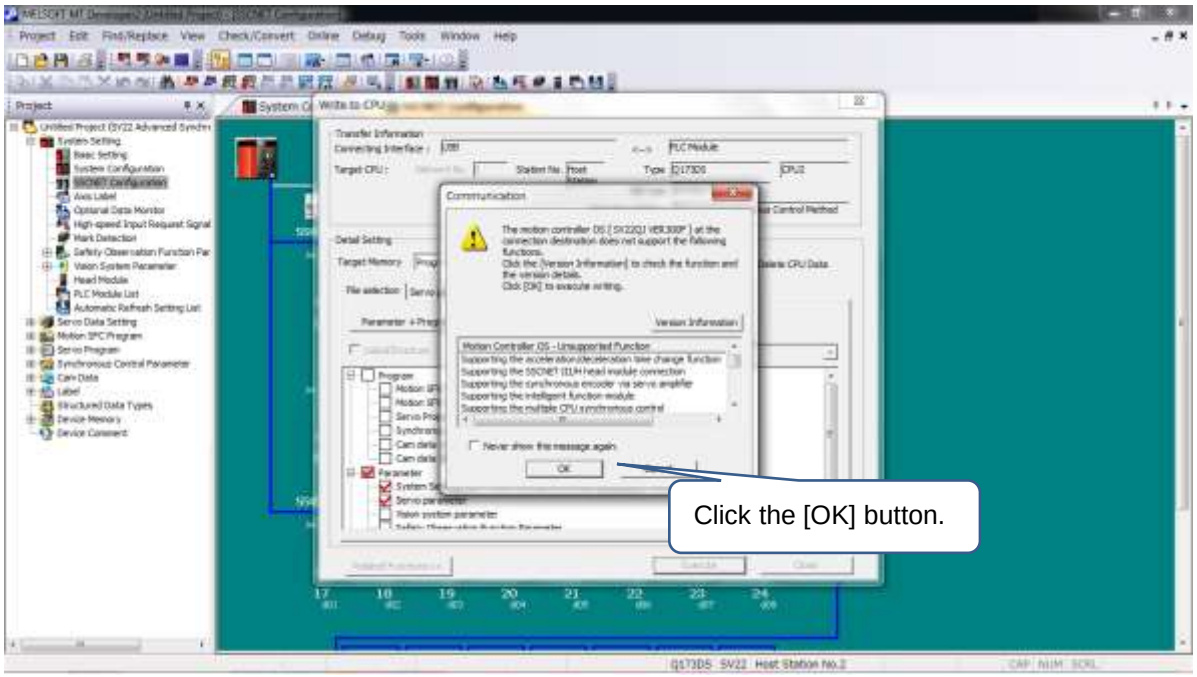
Select [System Setting, Servo Data Setting] and [Servo parameter] and click the [Execute] button.

<Cautions>

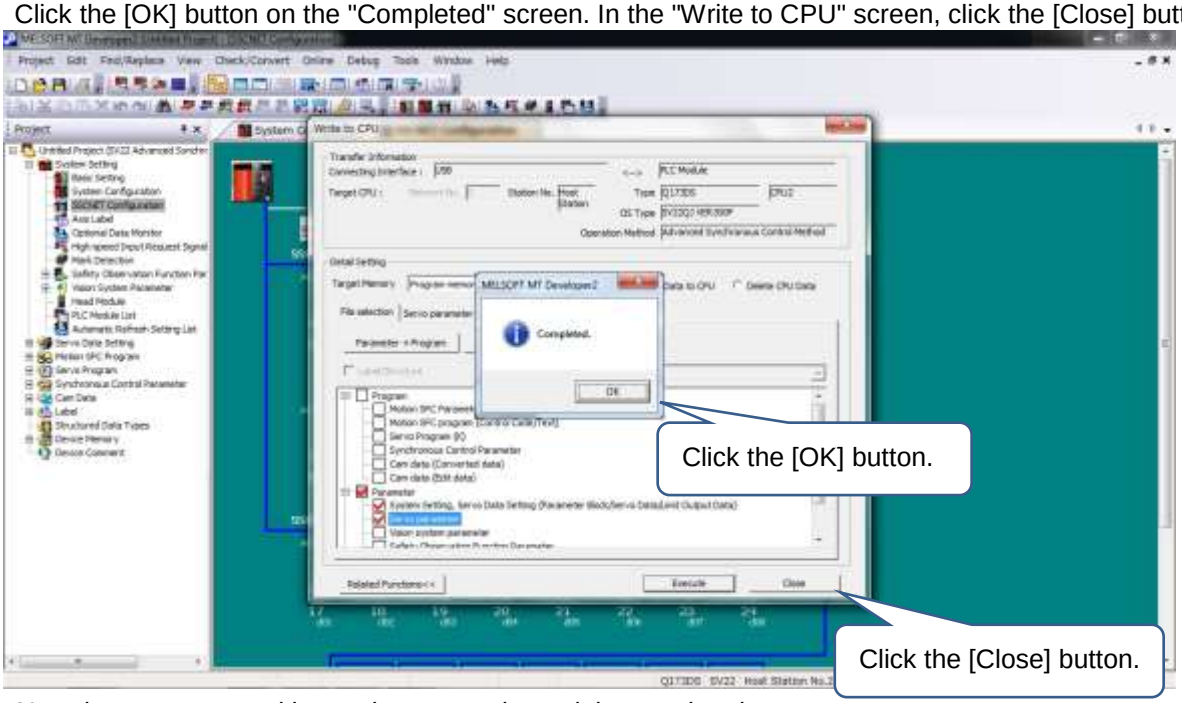
Do not select any settings other than [System Setting, Servo Data Setting] and [Servo parameter].



(4) The confirmation message "The motion controller OS [SV22QJ VER300F] at the connection destination does not support the following functions" will be displayed.



(5) When the writing is completed, the message "Completed" is displayed.
Click the [OK] button on the "Completed" screen. In the "Write to CPU" screen, click the [Close] button.



Now the parameter writing to the conversion unit is completed.
From the menu, select [Project] - [Save] to save the converted project.
Turn off the power supply of the conversion unit.

(6) Set the rotary switch of the conversion unit according to the SSCNET III/H (SSCNET III) line.
For details on the setting method, refer to Chapter 3 (5).

<Cautions>
When writing after selecting other than [System Setting, Servo Data Setting] and [Servo parameter], rewrite parameters to the conversion unit starting from the first step.

5.3 Restrictions

1) Changing the electronic gear setting of the A series Motion controller/Q series Motion controller
   The electronic gear settings (number of pulses per revolution, movement amount per revolution, unit scaling factor) must be changed.
   Set the values to match the actual motor after the change. (There is a possibility that the accuracy of the positioning could change by the electronic gear settings after an adjustment, so verify the operation.)
   In addition, when setting the electronic gear to increase the "pulses per revolution" for the same "movement amount per revolution", the setting range for some servo motors will become narrower. (Refer to Section 5.4.)
2) Motion controller operating system
   The OS software for the Motion controller is SV13/SV22/SV43.
   (The engineering software MELSOFT MT Works2 is not applicable.)
   Also, any other custom operating system is not applicable.
3) Precaution for converting parameters
   When converting parameters, cross-check the parameters and eliminate errors before writing the setting to the conversion unit.
4) Interface with peripheral devices
   Only USB communication is available for communication with the engineering software (MELSOFT MT Works2).
   MR Configurator2 cannot be connected to the conversion unit. Connect MR Configurator2 directly to the servo amplifier.
5) Communication
   - Set "3.555 ms" for the operation cycle setting of the Motion controller and conversion unit.
   - One conversion unit can convert SSCNET for up to 16 axes.
     Two conversion units are required for conversion of 17 to 32 axes.
   - The conversion unit sends the data received from the controller to the servo amplifiers with a delay of one communication cycle. The servo amplifiers also send data with a one-cycle delay.
   - The delay may affect machine accuracies for the axes used for interpolation control or synchronous control. Therefore, collectively replace all the servo amplifiers in the same line.
   - Test the operation when the deviation counter value or the actual current value is used because the servo amplifiers send data with a one-cycle delay.
   - Test the operation when the speed-position control command is used because the positioning accuracy may be changed.
6) Servo amplifier adjustment < Version E or earlier >
   For adjusting servo amplifiers, use MR Configurator2 to adjust the servo gain. Write the adjustment result to the conversion unit using MELSOFT MT Works2. Servo parameters are managed by the conversion unit. If the adjustment result is not written to the conversion unit after servo amplifiers are adjusted, the servo parameters will return to the previous value by turning off and on the conversion unit.
7) Turning the power off/on
   - Turn on the control circuit power supply for the Motion controller, conversion unit, and servo amplifier simultaneously to start the system.
   - When resetting the Motion controller or when powering it up again, power up the conversion unit as well.
   - When wire breakage occurs for the SSCNET cable and SSCNET III cable and when the cables are reconnected, power up the Motion controller and conversion unit again.
   - Do not turn the power off/on for the controls of the servo amplifier during the initial communication.

8) Speed Control (II) (VVF command / VVR command)
   - Speed Control (II) can be used with Q series Motion controller but cannot be used with A series Motion controller.
   - Using with A series Motion controller may result in overflow of internal calculations at time of setting the electronic gear for MR-J4-B/MR-J3-B.

9) Writing servo parameters to the conversion unit (replacing from MR-H-B/MR-J2-B)

When replacing MR-H-B/MR-J2-B with MR-J4-B/MR-J3-B at time of project conversion, the servo parameters to be written to the conversion unit must be reviewed. Use the project diversion function of MELSOFT MT Works2 to create data for the conversion unit. At that time, the servo amplifier settings will be replaced by MR-J4-B/MR-J3-B, but the axes of the MR-H-B/MR-J2-B with original servo amplifier settings will have the servo parameters initialized, so review the settings and set them in the conversion unit. Regarding the axes of the MR-J2S-B/MR-J2M-B with original servo amplifier settings, the servo parameters are retained when the servo amplifier settings are replaced by MR-J4-B/MR-J3-B.

Refer to [Appendix - 3] for the comparison of servo parameters between the MR-H-B/MR-J2-B/MR-J2S-B and the MR-J4-B/MR-J3-B.

10) Starting the system

When the SSCNET CN1 system is not yet in use, the system cannot be started according to the conversion unit H/W specification.

Be sure to start the system by using the SSCNET CN1 system.

11) Project diversion

Q173DSCPU (SV22) projects for the conversion unit cannot be diverted from SV43 projects. Use MELSOFT MT Works2 to create basic settings, configure SSCNET, and set servo parameters according to the Motion project. (Refer to Section 5.2.)

5.4 Cautions for differences in encoder resolution

Encoder resolution differs between the motor for an SSCNET compatible servo amplifier (MR-J2S-B, MR-J2-B, MR-H-B, etc.) and the motor for an SSCNET III/H compatible servo amplifier (MR-J4-B) or an SSCNET III compatible servo amplifier (MR-J4-B (J3 compatibility mode), MR-J3-B).

[Amplifier models and resolution for compatible motors]

Communication type	Amplifier model	Compatible motor	Encoder resolution
SSCNET	MR-J2-B	HC-MF, HC-FF, etc.	8192 [pulse/rev]
		HC-SF, etc.	16384 [pulse/rev]
	MR-J2S-B	HC-KFS, HC-MFS, HC-SFS, etc.	131072 [pulse/rev]
SSCNET III	MR-J3-B	HF-KP, HF-MP, HF-SP, etc.	262144 [pulse/rev]
	MR-J4-B (J3 compatibility mode)	HG-KR, HG-MR, HG-SR, etc.	262144 [pulse/rev]
SSCNET III/H	MR-J4-B	HG-KR, HG-MR, HG-SR, etc.	4194304 [pulse/rev]

For this reason, it is necessary to use a conversion unit and to change the electronic gear ratio by changing the settings of the following fixed parameters in order to replace a motor that supports an SSCNET compatible servo amplifier with a motor that supports an SSCNET III/H compatible servo amplifier or an SSCNET III compatible servo amplifier.

[Fixed parameters for electronic gear ratio]
- Number of pulses per revolution (AP)
- Movement amount per revolution (AL)
- Unit scaling factor (AM) * The setting for AM is applicable only to an A series Motion controller.

[Computation of electronic gear ratio]

$$\text{Electronic gear ratio} = \frac{AP}{AL \times AM}$$

The encoding resolution for a motor that supports an SSCNET III/H compatible servo amplifier (4194304 [pulse/rev]) is 32 times that of the encoding resolution for a motor that supports an SSCNET compatible servo amplifier (131072 [pulse/rev]). The electronic gear ratio present after switching to an SSCNET III/H compatible servo amplifier is also set at 32 times, but the following restrictions apply when using a conversion unit after changing the settings from the existing electronic gear ratio.
Details about the following restrictions are explained on the following pages.

[Restrictions by difference in encoder resolution]

Restriction		Controller restricted during use of conversion unit	
		SSCNET III/H mode	SSCNET III mode
1)	Setting of electronic gear (position accuracy error)	• A series Motion (OS: SV13, SV22, SV43)	• A series Motion (OS: SV13, SV22, SV43)
2)	Upper/lower stroke limit range setting (Reduces upper/lower stroke limit range)	• A series Motion (OS: SV13, SV43)	• A series Motion (OS: SV13, SV43)
3)	Backlash compensation amount setting (Reduces setting range)	• A series Motion (OS: SV13, SV22, SV43) • Q series Motion (OS: SV13, SV22, SV43)	• A series Motion (OS: SV13, SV22, SV43) • Q series Motion (OS: SV13, SV22, SV43)
4)	Command in-position setting (Reduces setting range)	• A series Motion (OS: SV13, SV22, SV43) • Q series Motion (OS: SV13, SV22, SV43)	• A series Motion (OS: SV13, SV22, SV43) • Q series Motion (OS: SV13, SV22, SV43)
5)	Mechanical system program setting (regarding settings and operation)	• Not supported	• Supported (No restriction)

(1) Electronic gear setting (position accuracy error)

Applicable controller: A series Motion: Compatible OS: SV13, SV22, SV43

At the time of using a conversion unit with an A series Motion controller, it is necessary to make electronic gear settings (number of pulses per revolution, movement amount per revolution, unit scaling factor) according to the servo amplifier after replacement. However, an error may be generated between the number of pulses outputted to the servo amplifier and the position accuracy for the actual movement amount of the machine because the setting range for the number of pulses per revolution is 1 pulse to 65535 pulses.

For example, when replacing MR-J2-B (encoder resolution: 8192 pulses/rev) with MR-J4-B (encoder resolution: 4194304 pulses/rev) in equipment to move 1000.0 μm for 1 motor revolution, the encoder resolution is 512 times greater, so the number of pulses per revolution must be scaled by 512 times, but a fractional calculation is necessary because the setting range for the number of pulses per revolution is 1 pulse to 65535 pulses.

<Setting electronic gear for MR-J2-B (encoder resolution: 8192 pulses/rev)>
Number of pulses per revolution: 8192 pulses
Movement amount per revolution: 1000.0 μm
Unit scaling factor: 1

Replace with MR-J4-B servo amplifier.
This shows 2 types of calculation example.

Calculation example 1 (simple calculation)

Setting electronic gear for MR-J4-B (encoder resolution: 4194304 pulses/rev)

The electronic gear for MR-J4-B has the number of pulses per revolution: 4194304 pulses and movement amount per revolution: 1000.0 μm. The setting range for the number of pulses per revolution is 1 pulse to 65535 pulses, so 4194304 pulses cannot be set for the number of pulses per revolution.

Therefore, set the values obtained by reducing the number of pulses per revolution and movement amount per revolution so that the number of pulses per revolution falls within the setting range. Furthermore, when the setting unit is mm, the movement amount per revolution must be a value up to the first decimal place.

If the value cannot be reduced with the following calculation, set the movement amount per revolution by rounding it off to one decimal place.

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution} \times \text{unit scaling factor}} = \frac{8192\ \text{pulse} \times 512}{1000.0\ \mu\text{m}} = \frac{4194304\ \text{pulse}}{1000.0\ \mu\text{m}}$$

$$= \frac{32768\ \text{pulse}}{7.8125\ \mu\text{m}} \fallingdotseq \frac{32768\ \text{pulse}}{7.8\ \mu\text{m}}$$

Scale the number of pulses per revolution before replacement by 512 times because the resolution is 512 times.

Perform reducing because the number of pulses per revolution is outside the setting range.

The number of pulses per revolution is reduced to 65535 or less and falls within the setting range, but the movement amount per revolution is beyond the first decimal place, so round it off to one decimal place.

The number of pulses per revolution is set to 32768, the movement amount per revolution is set to 7.8 μm, and the unit scaling factor is set to 1.

Calculation example 2 (devised calculation)

Step 1 Calculate movement amount per revolution X using the number of pulses per revolution as the maximum value (65535 pulses).

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution} \times \text{unit scaling factor}} = \frac{8192\ \text{pulse} \times 512}{1000.0\ \mu\text{m}} = \frac{4194304\ \text{pulse}}{1000.0\ \mu\text{m}} = \frac{65535\ \text{pulse}}{X}$$

X=15.62476... µm and is rounded at the second decimal place, resulting in 15.6µm for the movement amount per revolution.

Step 2 In this condition, the impact of rounding is great, so the number of pulses per revolution Y for movement amount per revolution 15.6 µm is calculated.

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution} \times \text{unit scaling factor}} = \frac{4194304\ \text{pulse}}{1000.0\ \mu\text{m}} = \frac{Y}{15.6\ \mu\text{m}}$$

This results in Y = 65431.1424... pulses, so the decimal is rounded off and the number of pulses per revolution becomes 65431 pulses.
The number of pulses per revolution is set to 65431, the movement amount per revolution is set to 15.6µm, and the unit scaling factor is set to 1.
The ratio of the number of pulses per revolution to movement amount per revolution approaches 4194304 pulses: 1000.0 µm, so error can be suppressed in comparison to calculation example 1 (simple calculation), and this improves the position accuracy.

There may be cases where position accuracy error will be improved by setting to MR-J4-B (J3 compatibility mode) (encoder resolution: 262144 pulses/rev).

Setting electronic gear for MR-J4-B (J3 compatibility mode) (encoder resolution: 262144 pulses/rev)

$$\frac{\text{Number of pulses per revolution}}{\text{Movement amount per revolution} \times \text{unit scaling factor}} = \frac{8192\ \text{pulse} \times 32}{1000.0\ \mu\text{m}} = \frac{262144\ \text{pulse}}{1000.0\ \mu\text{m}} = \frac{32768\ \text{pulse}}{125.0\ \mu\text{m}}$$

The number of pulses per revolution is set to 32768, the movement amount per revolution is set to 125.0 µm, and the unit scaling factor is set to 1.
* Reducing is performed because 262144 pulses cannot be set for the number of pulses per revolution, but 262144 pulses can be divided so there is no position accuracy error.

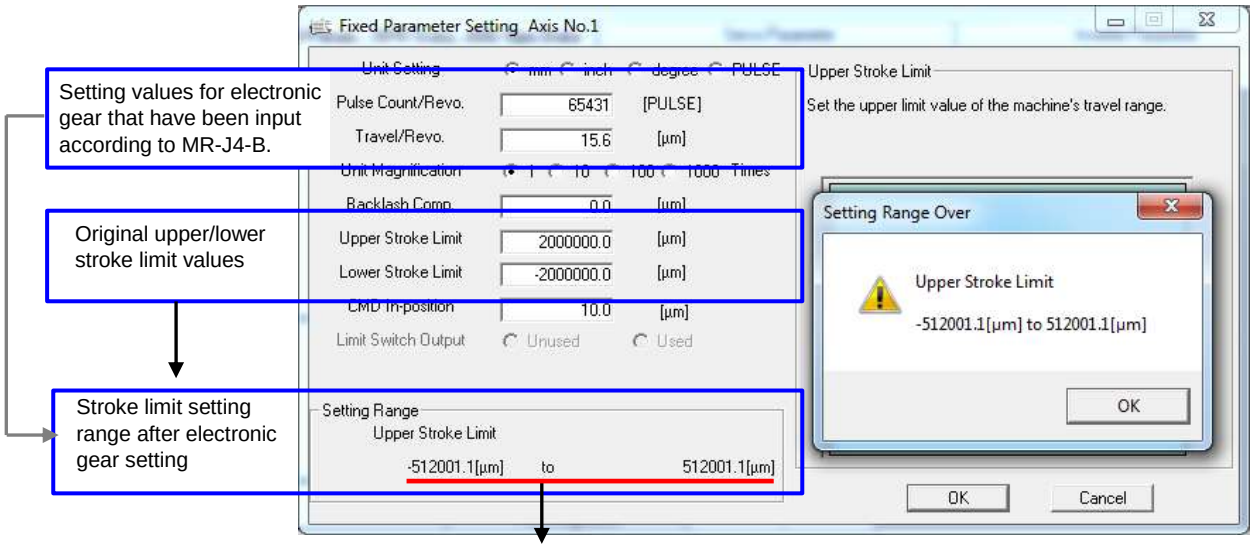
(2) Upper/lower stroke limit range setting (Reduces upper/lower stroke limit range)

Applicable controller: A series Motion Compatible OS: SV13, SV43

<Upper/lower stroke limit range setting for A series Motion controller>

At the time of using a conversion unit with an A series Motion controller, if the electronic gear settings (number of pulses per revolution, movement amount per revolution, unit scaling factor) are made according to the servo amplifier after replacement, there may be cases where the settable range for the upper/lower stroke limit reduces and does not enter the original setting range as a result of the pulse calculation with the set electronic gear.
It is necessary to confirm that the upper/lower stroke limit values after settings range reduction are within the stroke of the actual equipment and to adjust the range when not within the stroke of the actual equipment. (Including cases where the settings are default values (upper limit value) and the setting range is enough for the stroke of the actual machine.)

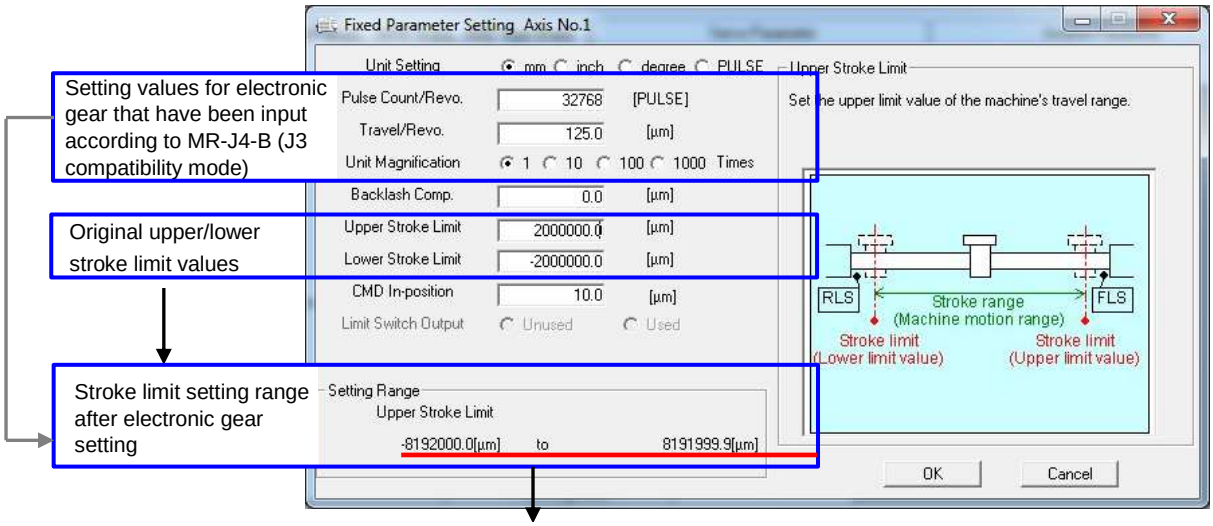
Example: Electronic gear settings for MR-J4-B with encoder resolution 4194304 pulses/rev and motor movement amount per revolution 1000.0 µm.



With the above example, the stroke limit setting range after electronic gear setting is -512001.1 µm to 512001.1 µm, but the original upper stroke limit value is 2000000.0 µm and lower stroke limit value is -2000000.0 µm, so range adjustment is necessary.

The stroke setting range can be improved by setting the J4 amplifier to the J3 compatibility mode.

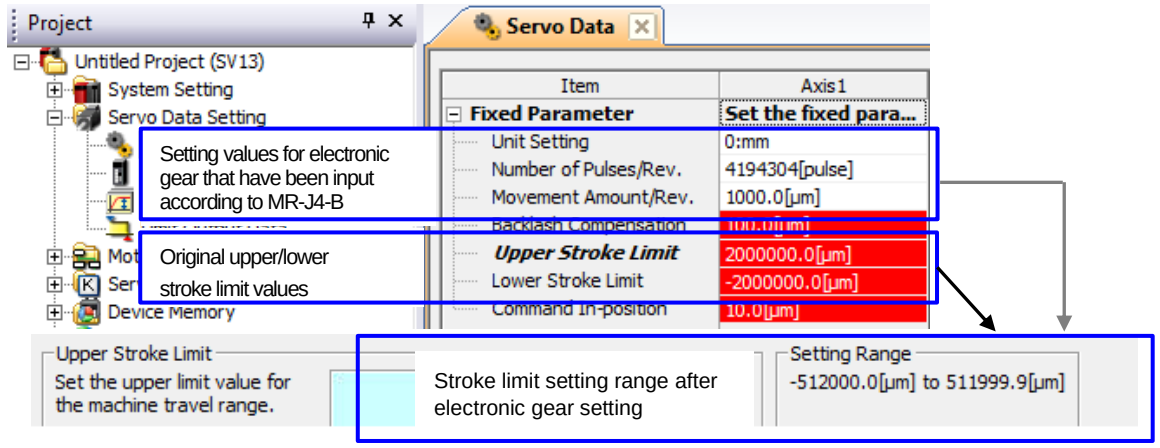
Example: Electronic gear settings for MR-J4-B (J3 compatibility mode) with encoder resolution 262144 pulses/rev and motor movement amount per revolution 1000.0 µm.



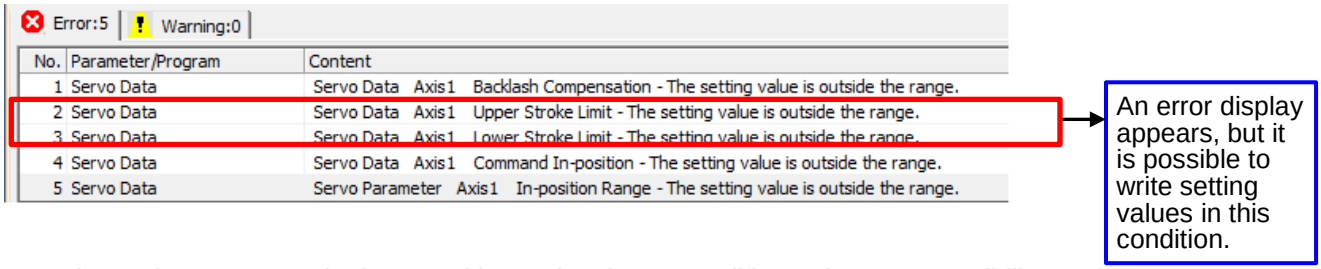
With the above example, the stroke limit setting range after electronic gear setting is -8192000.0 µm to 8191999.9 µm, and that is within the original upper stroke limit value 2000000.0 µm and lower stroke limit value -2000000.0 µm, so the setting values can be used without modification.

<Upper/lower stroke limit range setting for Q series Motion controller>
When outside the stroke limit range with Q series Motion controller, an error will be displayed for the upper/lower stroke limit values of the servo data screen, but writing to the Q series Motion controller is possible, so it is possible to perform a stroke check with the setting values written by the Q series Motion controller itself and to control positioning within the stroke limit range.

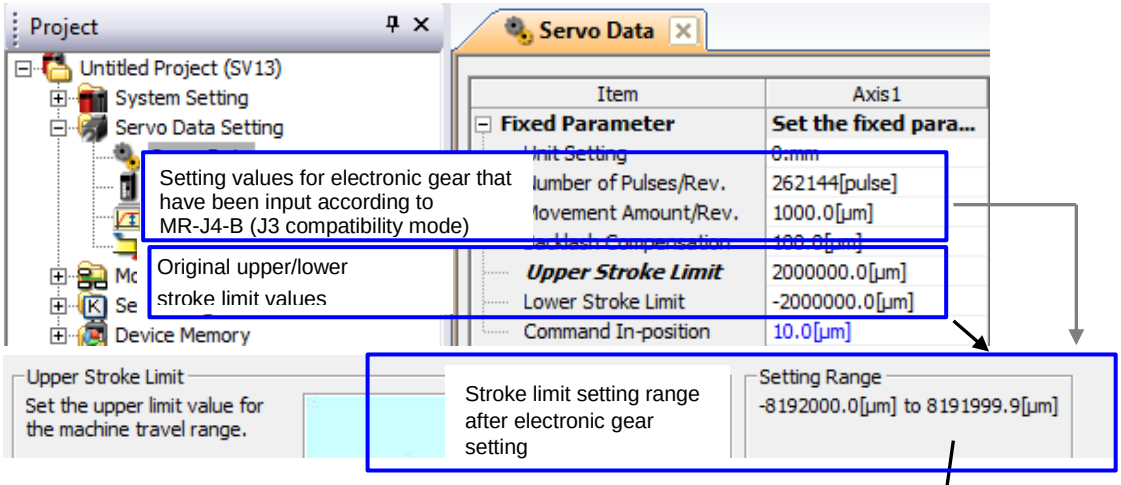
Example: Electronic gear settings for MR-J4-B with encoder resolution 4194304 pulses/rev and motor movement amount per revolution 1000.0 µm.



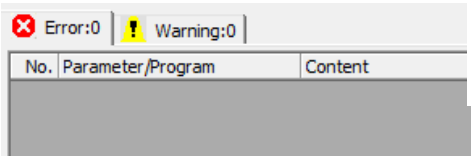
Error content



The stroke setting range can be improved by setting the J4 amplifier to the J3 compatibility mode.
Example: Electronic gear settings for MR-J4-B (J3 compatibility mode) with encoder resolution 262144 pulses/rev and motor movement amount per revolution 1000.0 µm.



Error content



With the above example, the stroke limit setting range after electronic gear setting is -8192000.0 µm to 8191999.9 µm, and that is within the original upper stroke limit value 2000000.0 µm and lower stroke limit value -2000000.0 µm, so the setting values can be used without modification.

(3) Backlash compensation amount setting (Reducing the setting range)

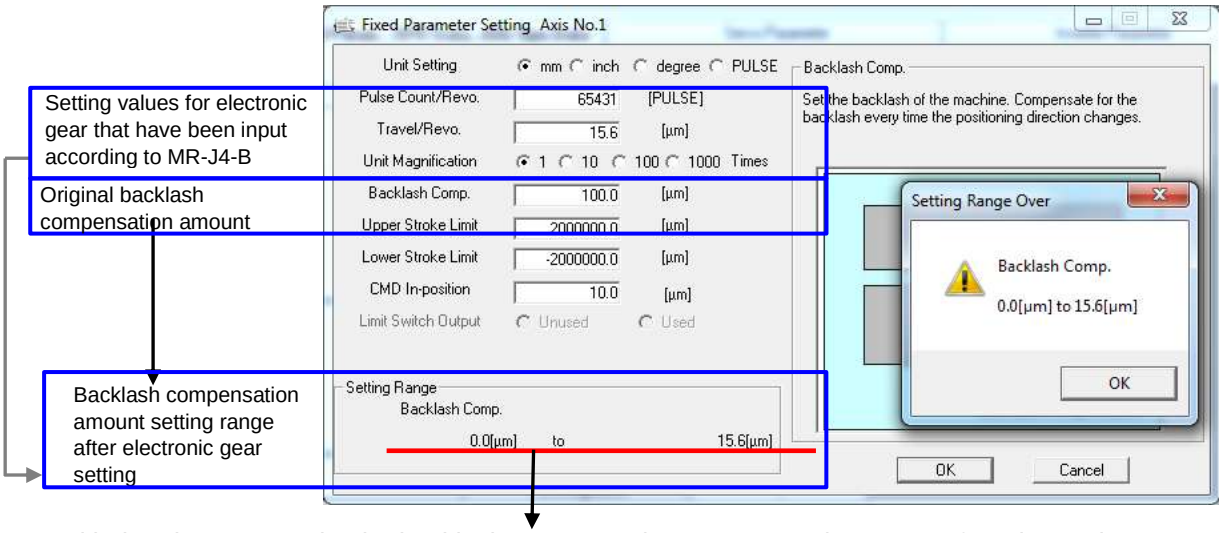
Applicable controller: A/QN series Motion Compatible OS: SV13, SV22, SV43

When using the conversion unit with settings identical to the upper/lower stroke limit range settings, there are cases where the settable range for the backlash compensation amount is reduced and does not enter the original settings range. as a result of the pulse calculation with the set electronic gear.

It is necessary to check the actual equipment for the backlash compensation amount after reducing the setting range and to adjust the range when outside the setting range.

< Backlash compensation amount setting for A series Motion controller >

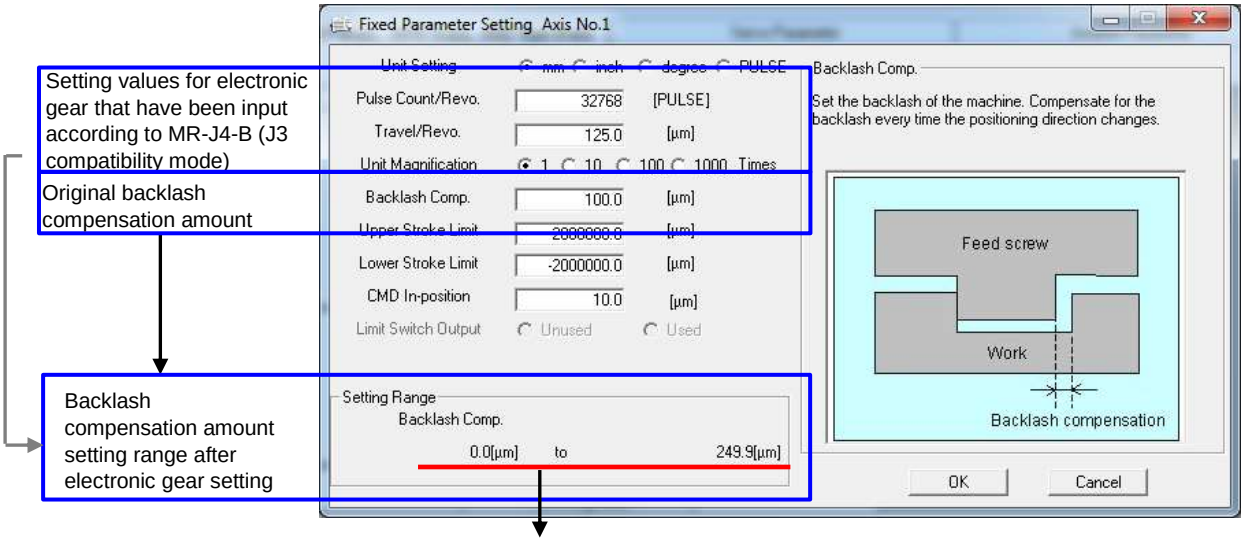
Example: Electronic gear settings for MR-J4-B with encoder resolution 4194304 pulses/rev and motor movement amount per revolution 1000.0 µm.



With the above example, the backlash compensation amount setting range after electronic gear setting is 0.0 µm to 15.6 µm, and the original backlash compensation amount is 100.0 µm, so adjustment of the range is necessary.

The command in-position setting range can be improved by setting the MR-J4-B to the J3 compatibility mode.

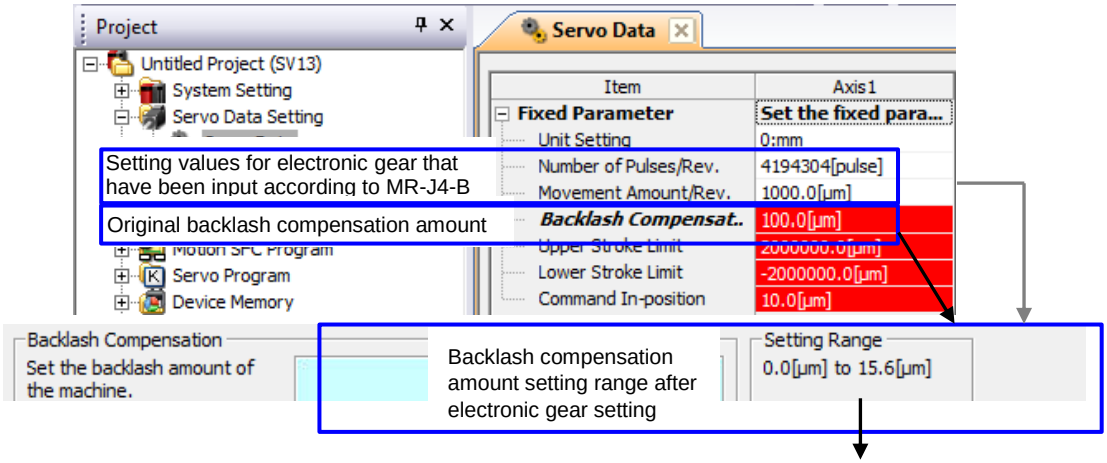
Example: Electronic gear settings for MR-J4-B (J3 compatibility mode) with encoder resolution 262144 pulses/rev and motor movement amount per revolution 1000.0 µm.



With the above example, the backlash compensation amount setting range after electronic gear setting is 0.0 µm to 249.9 µm, and the original backlash compensation amount is 100.0 µm, so the setting values can be used without modification.

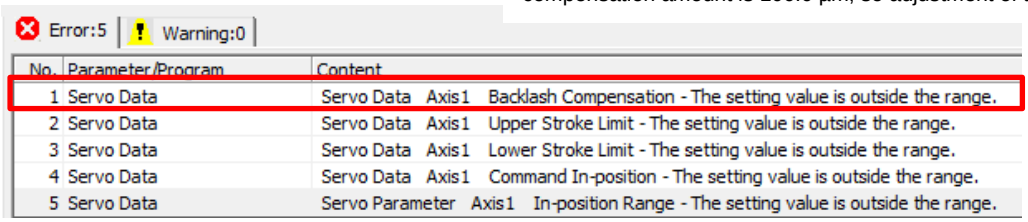
<Backlash compensation amount setting for Q series Motion controller>

Example: Electronic gear settings for MR-J4-B with encoder resolution 4194304 pulses/rev and motor movement amount per revolution 1000.0 µm.



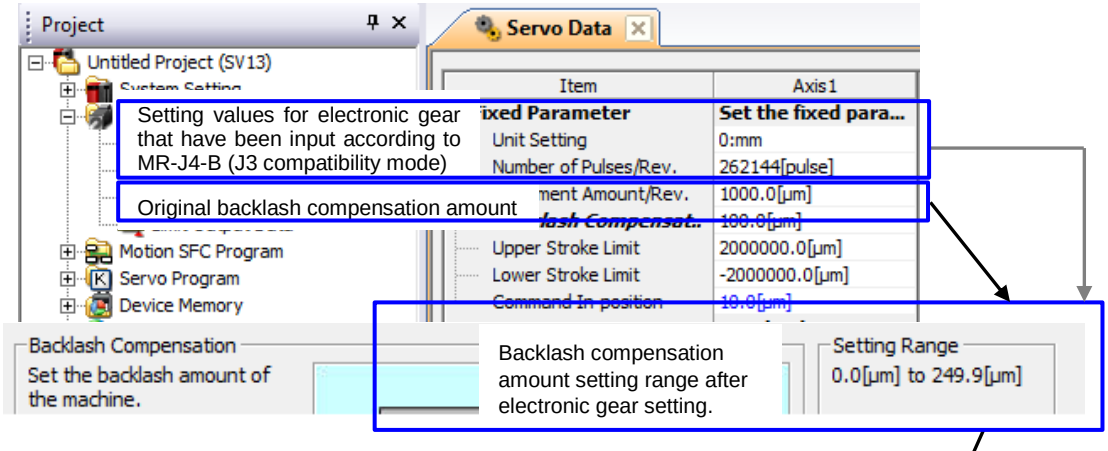
With the above example, the backlash compensation amount settable range after electronic gear setting is 0.0 µm to 15.6 µm, and the original backlash compensation amount is 100.0 µm, so adjustment of the range is necessary.

Error content

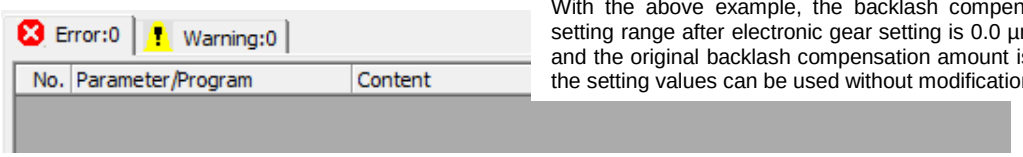


The backlash compensation amount setting range can be improved by setting the MR-J4-B to the J3 compatibility mode.

Example: Electronic gear settings for MR-J4-B (J3 compatibility mode) with encoder resolution 262144 pulses/rev and motor movement amount per revolution 1000.0 µm.



Error content



With the above example, the backlash compensation amount setting range after electronic gear setting is 0.0 µm to 249.9 µm, and the original backlash compensation amount is 100.0 µm, so the setting values can be used without modification.

(4) Command in-position setting (Reduces setting range)

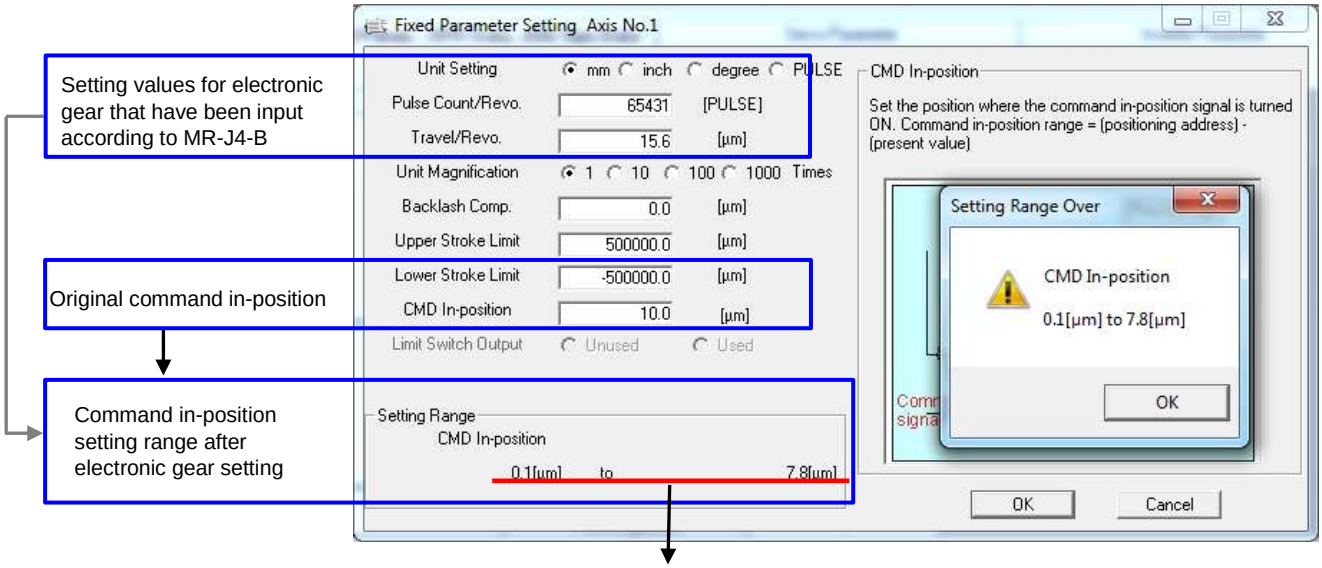
Applicable controller: A/QN series Motion Compatible OS: SV13, SV22, SV43

When using the conversion unit with settings identical to the upper/lower stroke limit range settings, there are cases where the settable range for the command in-position is reduced and does not enter the original setting range as a result of the pulse calculation with the set electronic gear.

It is necessary to check the actual equipment for the command in-position after reducing the setting range and to adjust the range when outside the setting range.

<Command in-position setting for A series Motion controller>

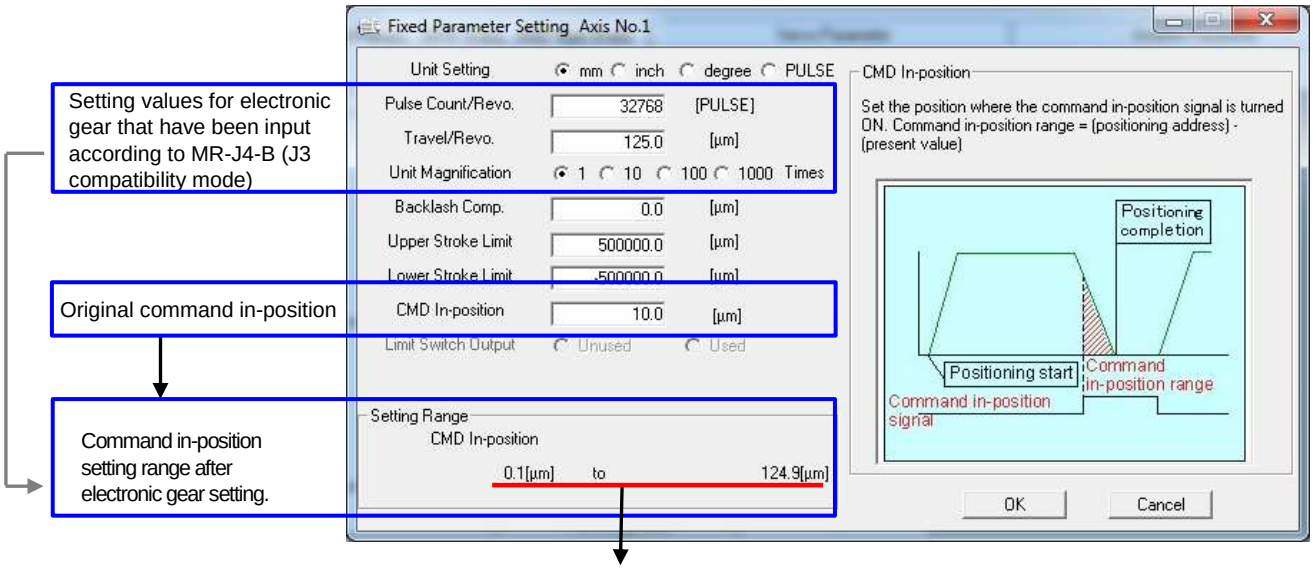
Example: Electronic gear settings for MR-J4-B with encoder resolution 4194304 pulses/rev and motor movement amount per revolution 1000.0 µm.



With the above example, the command in-position setting range after electronic gear setting is 0.1 µm to 7.8 µm, and the original command in-position is 10.0 µm, so adjustment of the range is necessary.

The command in-position setting range can be improved by setting the MR-J4-B to the J3 compatibility mode.

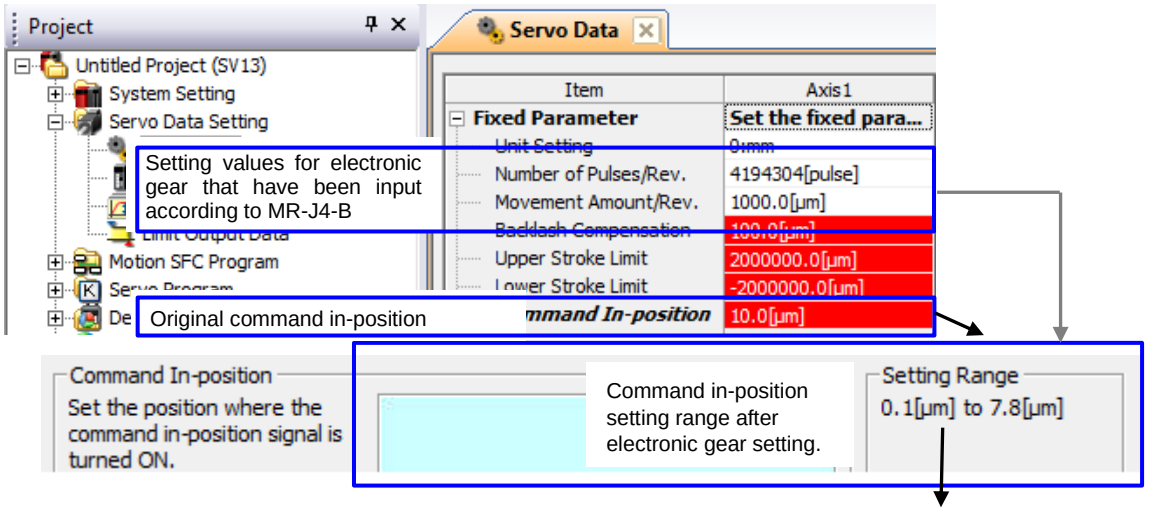
Example: Electronic gear settings for MR-J4-B (J3 compatibility mode) with encoder resolution 262144 pulses/rev and motor movement amount per revolution 1000.0 µm.



With the above example, the command in-position setting range after electronic gear setting is 0.1 µm to 124.9 µm, and the original command in-position is 10.0 µm, so the setting value can be used without modification.

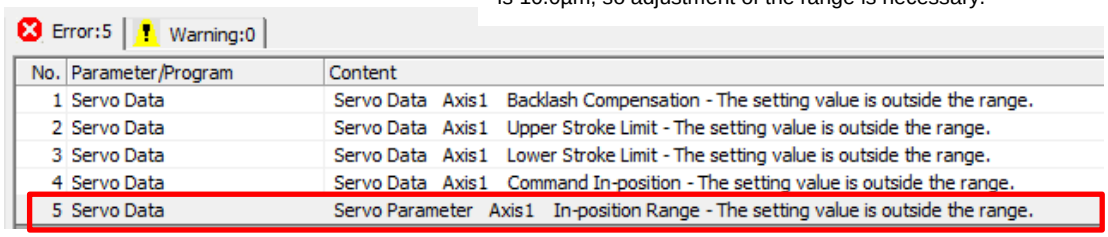
<Command in-position setting for Q series Motion controller>

Example: Electronic gear settings for MR-J4-B with encoder resolution 4194304 pulses/rev and motor movement amount per revolution 1000.0 µm.



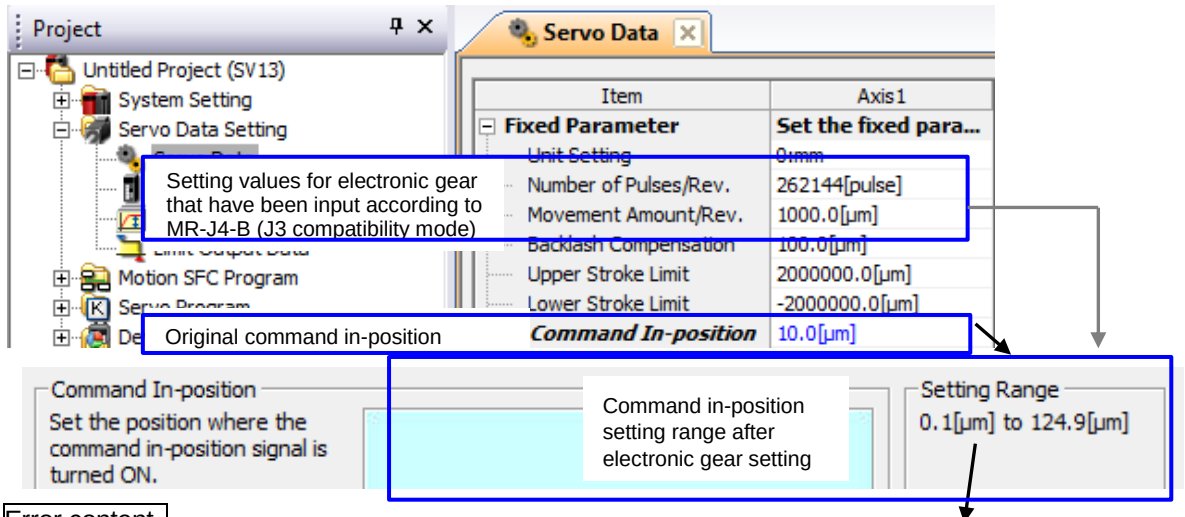
With the above example, the command in-position setting range after electronic gear setting is 0.1µm to 7.8µm, and the original command in-position is 10.0µm, so adjustment of the range is necessary.

Error content



The command in-position setting range can be improved by setting the MR-J4-B to the J3 compatibility mode.

Example: Electronic gear settings for MR-J4-B (J3 compatibility mode) with encoder resolution 262144 pulses/rev and motor movement amount per revolution 1000.0 µm.



Error content

With the above example, the command in-position setting range after electronic gear setting is 0.1 µm to 124.9 µm, and the original command in-position is 10.0 µm, so the setting value can be used without modification.

(5) Mechanical system program setting (regarding settings and operation)

Applicable controller: A/QN series Motion Applicable OS: SV22

With the system configuration of the conversion unit, the mechanical system program supports only the communication type: SSCNET III mode.

Cautions

With the communication type: SSCNET III/H mode：do not use the mechanical system program.

With the communication type: SSCNET III/H mode, the encoder resolution for the motor of the SSCNET III/H compatible servo amplifier is of higher resolution (4194304 pulses/rev) than the encoder resolution of an SSCNET compatible servo amplifier, so overflow occurs at the operation that has passed the module of the mechanical system program, and the servo motor may operate unexpectedly.

It is necessary to use a conversion unit and to change the following mechanical module parameters in order to replace an SSCNET compatible servo amplifier with an SSCNET III compatible servo amplifier (encoder resolution: 262144 [pulse/rev]).

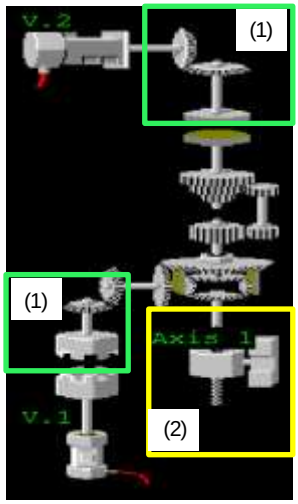
Mechanical module		Parameter
(1) Transmission module	Gear	Gear ratio (number of gear teeth on input axis side, number of gear teeth on output axis side)
(2) Output module	Roller	Number of pulses per revolution of the roller
	Ball screw	Number of pulses per revolution of the ball screw
	Rotary table	Number of pulses per revolution of the rotary table
	Cam	Number of pulses per revolution of the cam axis

<Parameter settings for mechanical module of A series Motion controller>

Setting example for gear ratio (transmission module) and the number of pulses per revolution of the ball screw (output module), when switching from MR-J2-B to MR-J4-B (J3 compatibility mode). (The output module uses a "ball screw".)

When switching from MR-J2-B encoder resolution (8192 [pulse/rev]) to MR-J4-B (J3 compatibility mode) encoder resolution (262144 [pulse/rev]), the encoder resolution is 32 times. For that reason, the gear ratio (transmission module) and the number of pulses per revolution of the ball screw (output module) are scaled 32 times to match the encoder resolution of MR-J4-B (J3 compatibility mode).

[Example of mechanical module configuration]



(1) Transmission module: gear
Match the gear ratio setting with the MR-J4-B (J3 compatibility mode) encoder resolution.

(2) Output module: ball screw
Match the setting for the number of pulses per revolution of the ball screw with the MR-J4-B (J3 compatibility mode) encoder resolution.

(1) Parameter setting for gear ratio (transmission module) (With A series Motion controller)

Scale the gear ratio setting prior to replacement by 32 times, as shown below, in order to match the MR-J2-B encoder resolution with the MR-J4-B (J3 compatibility mode) encoder resolution.

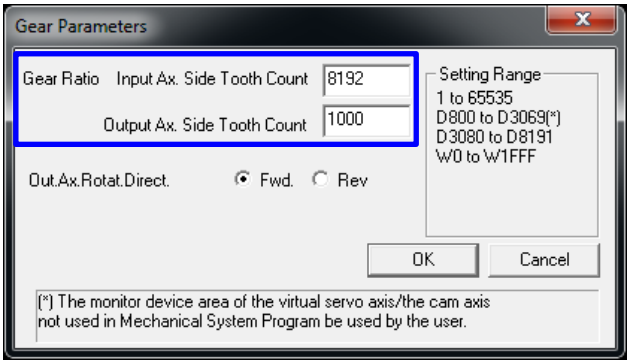
Gear ratio prior to replacement
(MR-J2-B)

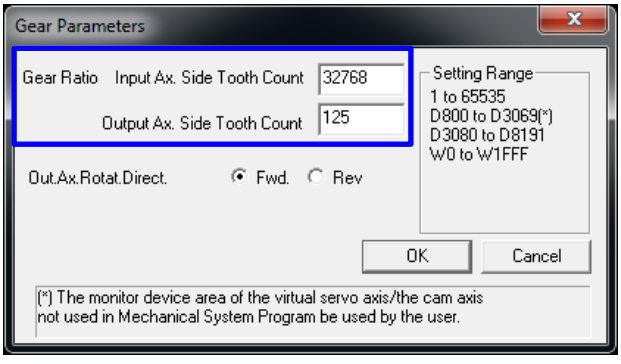
$$\text{Gear ratio} = \frac{\text{Number of gear teeth on input axis side}}{\text{Number of gear teeth on output axis side}} = \frac{8192}{1000}$$

Gear ratio: 32 times

Gear ratio after replacement
(MR-J4-B (J3 compatibility mode))

$$\text{Gear ratio} = \frac{\text{Number of gear teeth on input axis side}}{\text{Number of gear teeth on output axis side}} = \frac{8192 \times 32}{1000} = \frac{32768}{125}$$

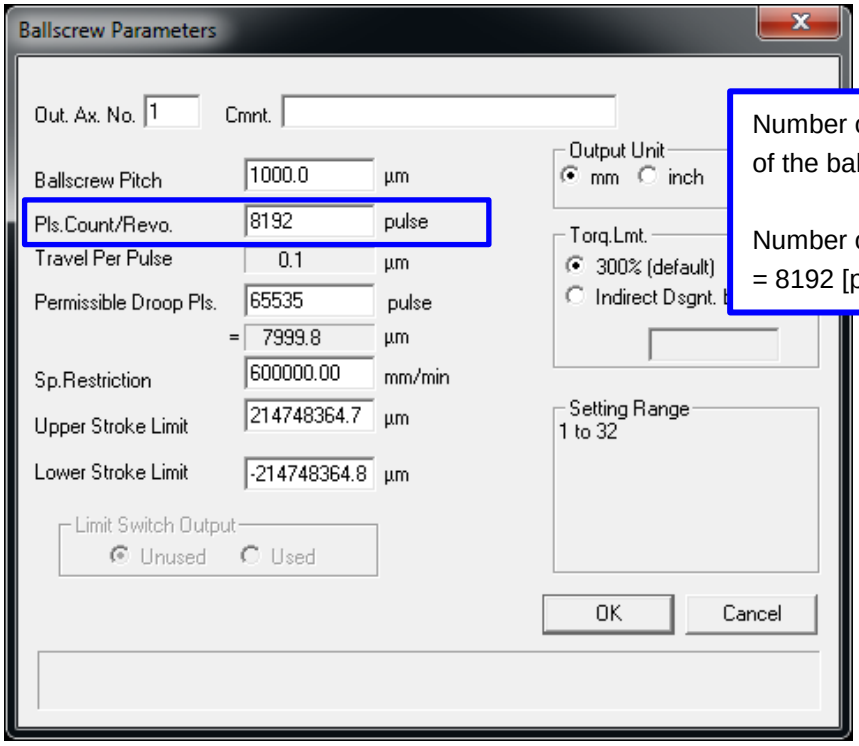




(2) Parameter settings for the number of pulses per revolution of the ball screw (output module) (With A series Motion controller)

Scale the number of pulses per revolution of the ball screw prior to replacement by 32 times, as shown below, in order to match the MR-J2-B encoder resolution with the MR-J4-B (J3 compatibility mode) encoder resolution.

Number of pulses per revolution of the ball screw prior to replacement (MR-J2-B)

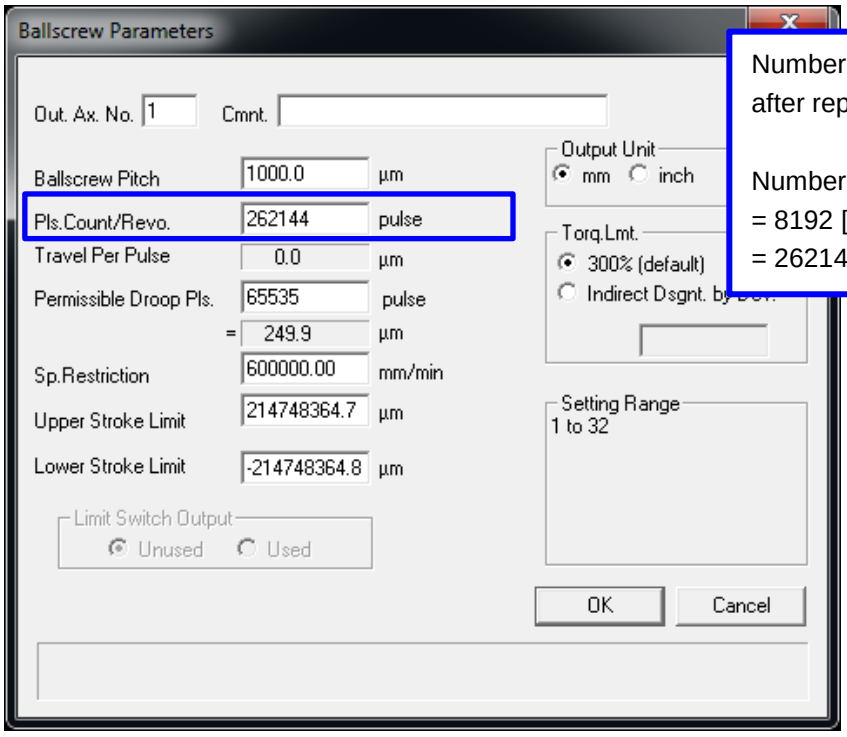


Number of pulses per revolution of the ball screw prior to replacement

Number of pulses per revolution of the ball screw = 8192 [pulse]

Number of pulses per revolution of the ball screw: 32 times

Number of pulses per revolution of the ball screw after replacement (MR-J4-B (J3 compatibility mode))



Number of pulses per revolution of the ball screw after replacement

Number of pulses per revolution of the ball screw = 8192 [pulse]×32 = 262144 [pulse]

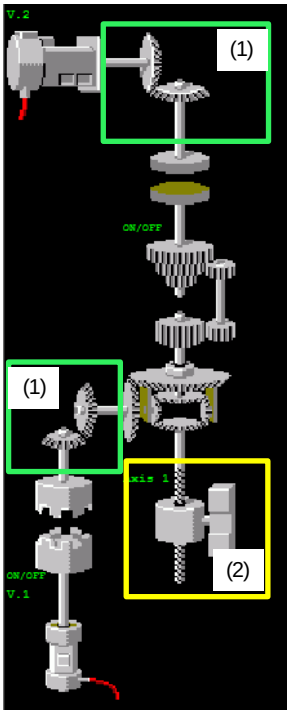
5. SETTING AND PROCEDURE BEFORE STARTING OPERATIONS

<Parameter settings for mechanical module of Q series Motion controller>

Example: Setting example for gear ratio (transmission module) and the number of pulses per revolution of the ball screw (output module), when switching from MR-J2-B to MR-J4-B (J3 compatibility mode). (The output module uses a "ball screw".)

When switching from MR-J2-B encoder resolution (8192 [pulse/rev]) to MR-J4-B (J3 compatibility mode) encoder resolution (262144 [pulse/rev]), the encoder resolution is 32 times. For that reason, the gear ratio (transmission module) and the number of pulses per revolution of the ball screw (output module) are scaled 32 times to match the encoder resolution of MR-J4-B (J3 compatibility mode).

[Example of mechanical module configuration]



(1) Transmission module: gear
Match the gear ratio setting with the MR-J4-B (J3 compatibility mode) encoder resolution.

(2) Output module: ball screw
Match the setting for the number of pulses per revolution of the ball screw with the MR-J4-B (J3 compatibility mode) encoder resolution.

(1) Parameter setting for gear ratio (transmission module) (With Q series Motion controller)

Scale the gear ratio setting prior to replacement by 32 times, as shown below, in order to match the MR-J2-B encoder resolution with the MR-J4-B (J3 compatibility mode) encoder resolution.

Gear ratio prior to replacement
(MR-J2-B)

$$\text{Gear ratio} = \frac{\text{Number of gear teeth on input axis side}}{\text{Number of gear teeth on output axis side}} = \frac{8192}{1000}$$

Gear ratio:
32 times

Gear ratio after replacement
(MR-J4-B (J3 compatibility mode))

$$\text{Gear ratio} = \frac{\text{Number of gear teeth on input axis side}}{\text{Number of gear teeth on output axis side}} = \frac{8192 \times 32}{1000} = \frac{32768}{125}$$

Main Shaft Gear

Parameter Item	Setting Value
Gear Ratio Input Axis Side Teeth Number	8192
Gear Ratio Output Axis Side Teeth Number	1000
Rotation Direction	Forward

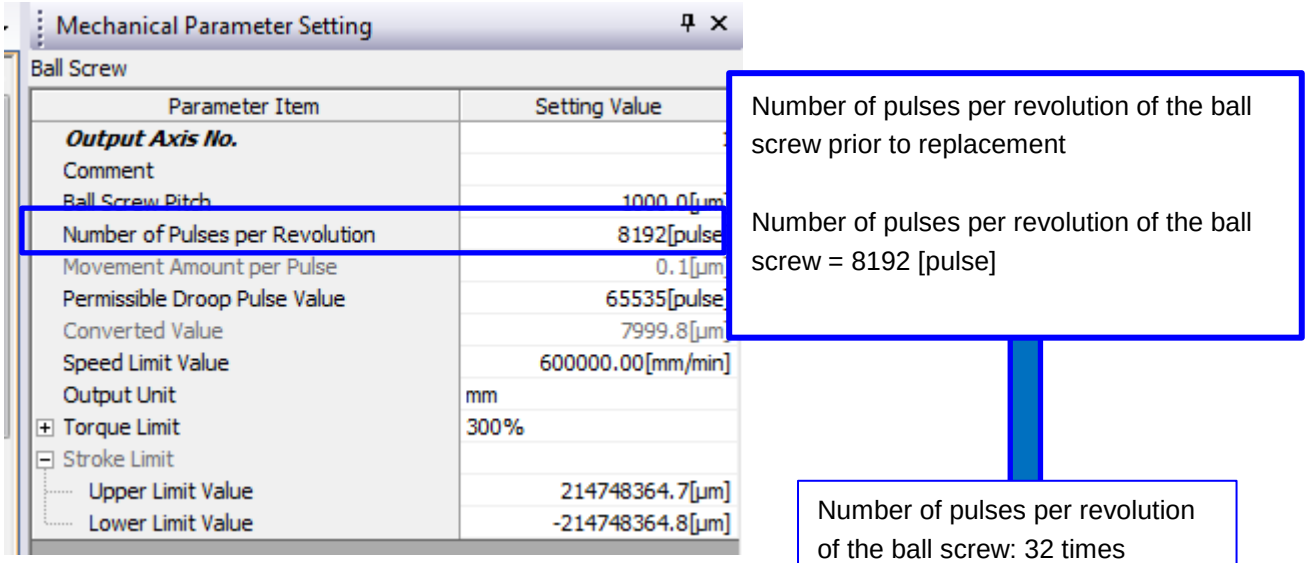
Main Shaft Gear

Parameter Item	Setting Value
Gear Ratio Input Axis Side Teeth Number	32768
Gear Ratio Output Axis Side Teeth Number	125
Rotation Direction	Forward

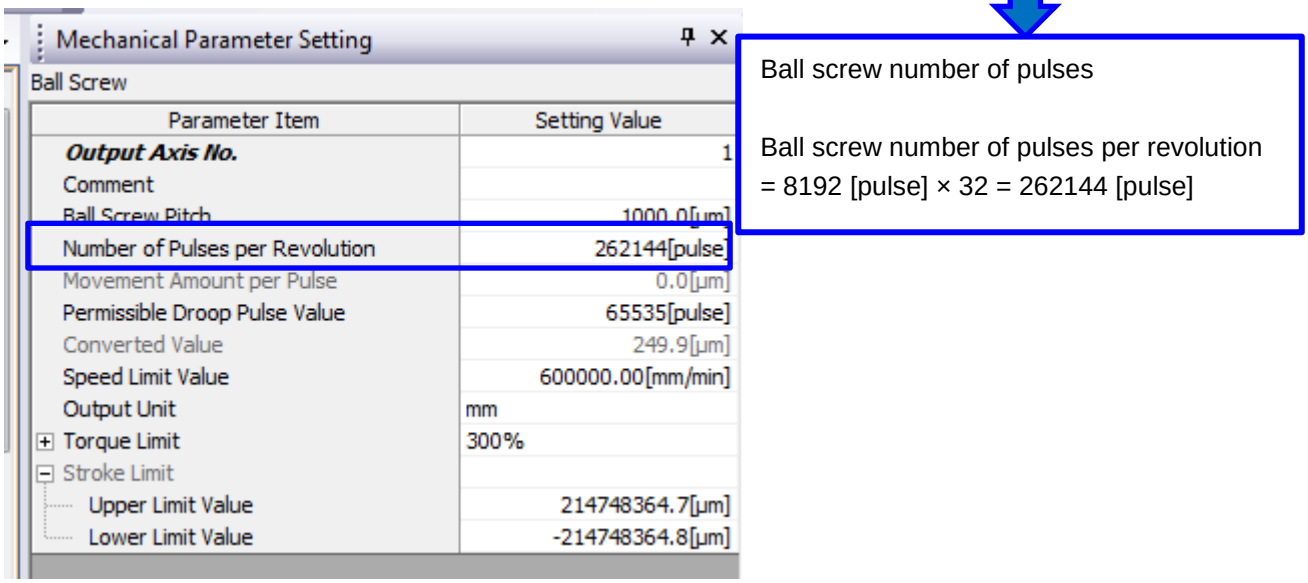
(2) Parameter settings for the number of pulses per revolution of the ball screw (output module) (With Q series Motion controller)

Scale the number of pulses per revolution of the ball screw prior to replacement by 32 times, as shown below, in order to match the MR-J2-B encoder resolution with the MR-J4-B (J3 compatibility mode) encoder resolution.

Number of pulses per revolution of the ball screw prior to replacement (MR-J2-B)



Number of pulses per revolution of the ball screw after replacement (MR-J4-B (J3 compatibility mode))



6. TROUBLESHOOTING

The following shows the corrective actions for the errors displayed on the 7-segment LED display of the conversion unit.

1) System setting errors

LED display			Error description	Corrective action
	0	4	Axis number not set	Check the rotary switch of the conversion unit. Refer to Chapter 3 (5) for the rotary switch settings of the conversion unit.
				Write the system settings to the conversion unit. For details on the writing method, refer to Section 5.1.5.
	1	3	System setting not registered	Write the system settings to the conversion unit. For details on the writing method, refer to Section 5.1.5.
	2	6	Servo parameter not registered	Write servo parameters to the conversion unit. For details on the writing method, refer to Section 5.1.5.

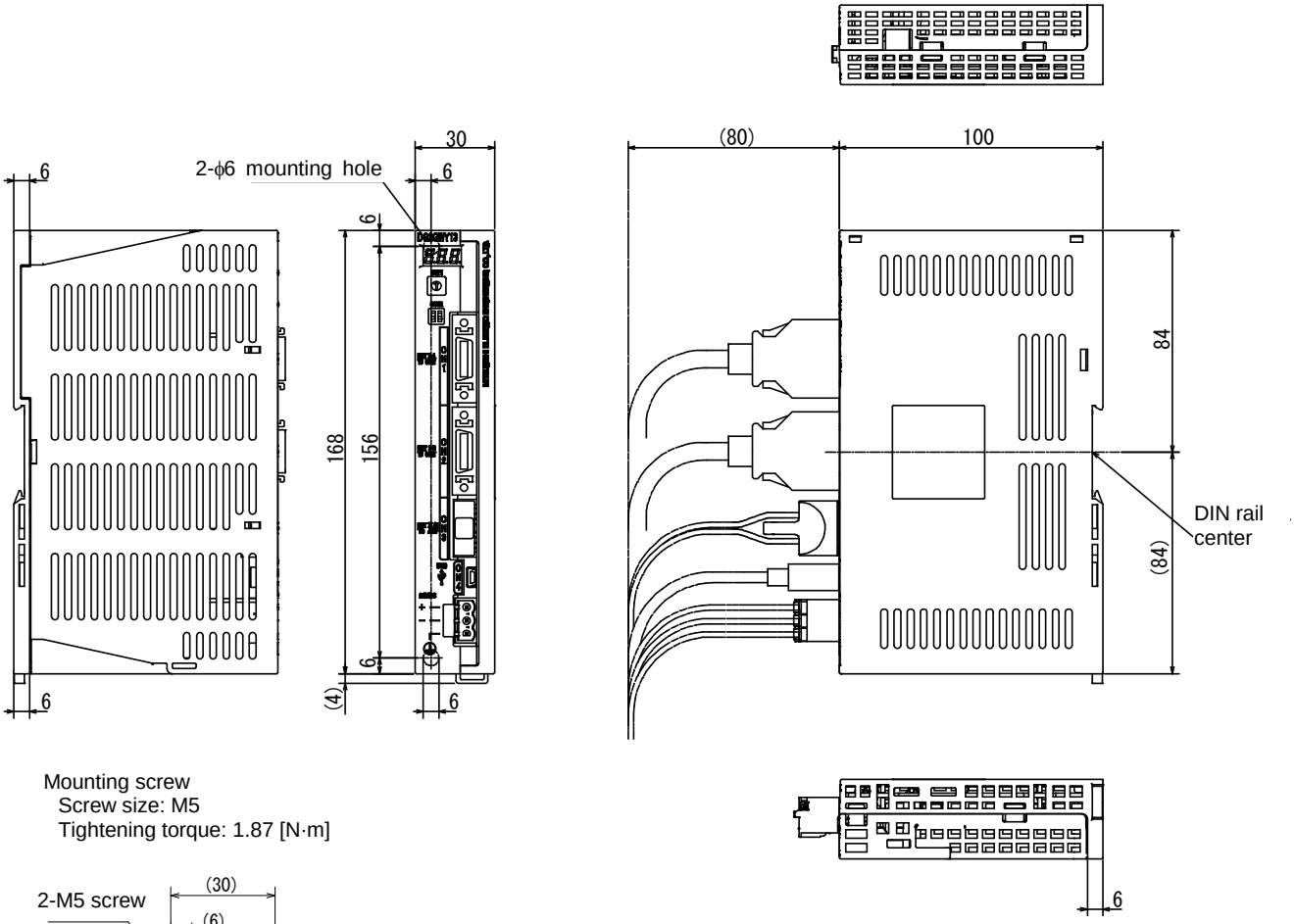
2) Servo amplifier errors

Refer to Chapter 1 TROUBLESHOOTING FOR SERVO AMPLIFIER (DRIVE UNIT) of the "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" (SH(NA)030109) for details of servo amplifier errors and troubleshooting.

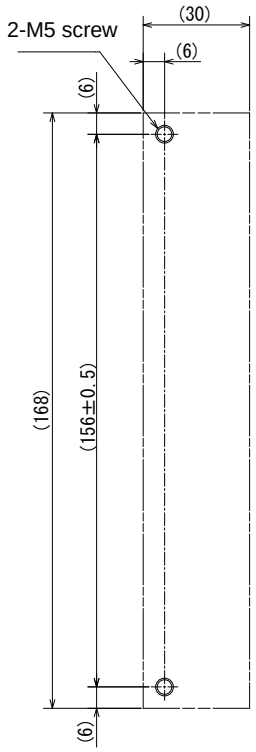
3) SSCNET communication error

LED display			Error description	Corrective action
	A	A	SSCNET communication error	Check that the controller power supply is on.
				Check the SSCNET cable connection.

7. EXTERNAL DIMENSIONS



Mounting screw
Screw size: M5
Tightening torque: 1.87 [N·m]



Mounting hole machining diagram

Appendix

Appendix-1

WARRANTY

Please confirm the following product warranty details before using this product.

Gratis Warranty Term and Gratis Warranty Range

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arising during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product.

■ Gratis Warranty Term

The term of warranty for Product is one (1) year after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first.
Warranty period for repaired Product cannot exceed the original warranty period before any repair work.

■ Gratis Warranty Range

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, user manual for the Product, and the caution label affixed to the Product.

Onerous Repair Term after Discontinuation 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 discontinuation of production for each model is issued by our distributors.
(2) Please note that the Product (including its spare parts) cannot be ordered after its discontinuation of production.

Exclusion of Loss in Opportunity and Secondary Loss from Warranty Liability

Whether under or after the term of warranty, we are not liable for any damage arising from causes for which we are not responsible, any losses of opportunity and / or profit incurred by you due to a failure of the Product, any damage, secondary damage or compensation for accidents arising under a specific circumstance that are foreseen or unforeseen by our company, any damage to products other than the Product, and any other operations conducted by you.

Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

Appendix

Appendix-2

Compliance to the EMC and Low Voltage Directives

Compliance to the EMC Directive, which is one of the EU Directives, has been a legal obligation for the products sold in European countries since 1996 as well as the Low Voltage Directive since 1997.
To prove the compliance with the EMC and Low Voltage Directives, manufacturers must issue an EC Declaration of Conformity and the products must bear a CE marking.

(1) Authorized representative in Europe

The authorized representative in Europe is shown below.
Name: Mitsubishi Electric Europe B.V.
Address: Gothaer strase 8, 40880 Ratingen, Germany

(2) Installation to the control panel

The conversion unit is an open type device. Ensure the conversion unit is installed inside a control panel for use. Also, install the remote stations of each network inside the control panel.
Waterproof type remote stations can be installed outside of the control panel.
Installing the conversion unit inside a control panel ensures both safety and effective shielding of electromagnetic noise generated by the conversion unit.

1) Control panel

(a) Use a conductive control panel.
(b) When attaching the control panel's top plate or base plate using bolts, mask the area used for grounding so that the area is not painted.
(c) To ensure good electrical contact with the control panel, mask the mounting bolt area of the inner plate in the control panel so that contact between surfaces can be ensured over the widest possible area.
(d) Ground the control panel with a thick wire to ensure a low impedance connection to ground even at high frequencies.
(e) Holes in the control panel must measure 10 cm or less in diameter, or 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.

2) Connection of power line and ground wire

(a) Provide a grounding point near the FG terminals. Ground the FG terminals with the thickest and shortest possible wire (wire length: 30 cm or shorter, diameter: 2 mm or less).
(b) Twist the grounding wire from the grounding point with the power supply wire. This enables more noise from the power supply wire to run off to the ground. However, when a noise filter has been installed on the power supply wire, twisting with the grounding wire is not required.

Appendix

Appendix-3

Servo parameter comparison table

(1) MR-H-B and MR-J4-B/MR-J3-B servo parameter comparison table

MR-H-B servo parameters				MR-J4-B/MR-J3-B servo parameters				Cautions
No	Name	Initial value	Customer setting value	No.	Name	Initial value	Customer setting value	
1	Amplifier setting	0000		PA03	Absolute position detection system	0000		
2	Regenerative resistor	0000		PA02	Regenerative option	0000		
3	Motor type	Per amplifier						No corresponding parameter (setting is unnecessary)
4	Motor capacity	Per amplifier						No corresponding parameter (setting is unnecessary)
5	Motor revolutions	2						No corresponding parameter (setting is unnecessary))
6	Number of feedback pulses	0						No corresponding parameter (setting is unnecessary)
7	Revolution direction selection	0		PA14	Revolution direction selection	0		
8	Auto tuning	1		PA08	Auto tuning mode	0001		Must change the setting value per auto tuning mode.
9	Servo response performance	0001		PA09	Auto tuning response performance	With J4: 16 With J3: 12		Must change the setting value referring to the guideline for machine resonance frequency.
10	Forward rotation torque limit value	300						No corresponding parameter (setting is unnecessary)
11	Reverse rotation torque limit value	300						No corresponding parameter (setting is unnecessary)
12	Load to motor inertia ratio	3.0		PB06	Load to motor inertia ratio	With J4: 7.00 With J3: 7.0		
13	Position loop gain 1	70		PB07	Model loop gain	With J4: 15.0 With J3: 24		
14	Speed loop gain 1	1200						No corresponding parameter (setting is unnecessary)
15	Position loop gain 2	25		PB08	Position loop gain	With J4: 37.0 With J3: 37		
16	Speed loop gain 2	600		PB09	Speed loop gain	823		
17	Speed integral compensation	20		PB10	Speed integral compensation	33.7		
18	Machine resonance suppression filter (notch filter)	0		PB13	Machine resonance suppression filter 1	4500		
				PB14	Notch shape selection 1	0000		
19	Feed forward gain	0		PB04	Feed forward gain	0		
20	In-position range	100		PA10	In-position range	With J4: 1600 With J3: 100		Must change the setting according to motor.
21	Electromagnetic brake sequence output	100		PC02	Electromagnetic brake sequence output	0		
22	Analog monitor output	0001		PC09	Analog monitor 1 output	0000		
				PC10	Analog monitor 2 output	0001		
23	Optional function 1 Low noise mode selection	0000						No corresponding parameter (setting is unnecessary)
24	Electromagnetic brake interlock output timing	0000		PA04	Selection of forced stop input and forced stop deceleration function	With J4: 2000 With J3: 0000		Set to "Forced stop deceleration function disabled (EM1)" to set identically to MR-H-B.
	Motor-less operation selection			PC05	Motor-less operation selection	0000		
25	For manufacturer setting	0000						No corresponding parameter (setting is unnecessary)
26	For manufacturer setting	0000						No corresponding parameter (setting is unnecessary)
27	Analog monitor 1 offset	0		PC11	Analog monitor 1 offset	0		
28	Analog monitor 2 offset	0		PC12	Analog monitor 2 offset	0		
29	Pre-alarm data selection	0001						No corresponding parameter (setting is unnecessary))
30	Zero speed	50		PC07	Zero speed	50		
31	Error excessive alarm level	80		PC01	Error excessive alarm level	With J4: 0 With J3: 3		Setting units differ (Select by using PC24 for kpulse → ×n rev:n)
				PC06	Function selection C-3 Error excessive alarm level unit selection	0000		

MR-H-B servo parameters				MR-J4-B/MR-J3-B servo parameters				Cautions
No	Name	Initial value	Customer setting value	No.	Name	Initial value	Customer setting value	
32	PI-PID control switching	0000		PB24	PI-PID control switching selection	0000		
33	For manufacturer setting	0000						
34	PI-PID switching position droop	0						No corresponding parameter (setting is unnecessary)
35	For manufacturer setting	0						
36	Speed differential compensation	980		PB11	Speed differential compensation	980		
37	For manufacturer setting							
38	For manufacturer setting							
39	For manufacturer setting							
40	Parameter writing inhibit	0000		PA19	Parameter writing inhibit	With J4: 00AB With J3: 000B		Change the setting value as needed.

(2) MR-J2-B and MR-J4-B/MR-J3-B servo parameter comparison table

MR-J2-B servo parameters				MR-J4-B/MR-J3-B servo parameters				Cautions
No	Name	Initial Value	Customer Setting Value	No.	Name	Initial Value	Customer Setting Value	
1	Amplifier setting	0000		PA03	Absolute position detection system selection	0000		
2	Regenerative option selection	0000		PA02	Regenerative option selection	0000		Must change the setting value per option model.
3	For manufacturer setting	0080						No corresponding parameter (setting is unnecessary)
4	For manufacturer setting	0						No corresponding parameter (setting is unnecessary)
5	For manufacturer setting	1						No corresponding parameter (setting is unnecessary)
6	For manufacturer setting	0						No corresponding parameter (setting is unnecessary)
7	Revolution direction selection	0		PA14	Revolution direction selection	0		
8	Must change the setting value per auto tuning mode.	0001		PA08	Gain adjustment mode selection	0001		Must change the setting value per auto tuning mode
9	Servo response performance	0001		PA09	Auto tuning response performance	With J4: 16 With J3: 12		Must change the setting value referring to the guideline for machine resonance frequency.
10	Forward rotation torque limit value	300						No corresponding parameter (setting is unnecessary)
11	Reverse rotation torque limit value	300						
12	Load to motor inertia ratio	70		PB06	Load to motor inertia ratio	With J4: 7.00 With J3: 7.0		Unit system differs (0.1 times → 0.01 times). Pay attention to the setting value.
13	Position loop gain 1	70		PB07	Model loop gain	With J4: 15.0 With J3: 24		Unit system differs (rad/s → 0.1 rad/s)
14	Speed loop gain 1	1200						No corresponding parameter (setting is unnecessary)
15	Position loop gain 2	25		PB08	Position loop gain	With J4: 37.0 With J3: 37		Unit system differs (rad/s → 0.1 rad/s)
16	Speed loop gain 2	600		PB09	Speed loop gain	823		
17	Speed integral compensation	20		PB10	Speed integral compensation	33.7		Unit system differs (rad/s → 0.1 rad/s)
18	Machine resonance suppression filter 1	0		PB13	Machine resonance suppression filter 1	4500		Must change the setting value per frequency and depth.
				PB14	Notch shape selection 1	0000		
19	Feed forward gain	0		PB04	Feed forward gain	0		
20	In-position range	100		PA10	In-position range	With J4: 1600 With J3: 100		Pay attention to the unit system. J2-B: Set by feedback pulse unit J4-B: Set by command pulse unit
21	Electromagnetic brake sequence output	100		PC02	Electromagnetic brake sequence output	0		
22	Analog monitor 1 output	0001		PC09	Analog monitor 1 output	0000		Must change the setting value per monitor output data.
				PC10	Analog monitor 2 output	0001		
23	Servo forced stop selection	0000		PA04	Function selection A-1 Servo forced stop selection	With J4: 2000 With J3: 0000		
24	Slight vibration suppression control selection	0000		PB24	Slight vibration suppression control selection	0000		
	Motor-less operation selection			PC05	Function selection C-2 Motor-less operation selection	0000		
25	For manufacturer setting	0000						
26	For manufacturer setting	0000						
27	Analog monitor 1 offset	0		PC11	Analog monitor 1 offset	0		Save to H/W. Must change the setting value.
28	Analog monitor 2 offset	0		PC12	Analog monitor 2 offset	0		Save to H/W. Must change the setting value.
29	For manufacturer setting	0001						

MR-J2-B servo parameters				MR-J4-B/MR-J3-B servo parameters				Cautions
No	Name	Initial value	Customer setting value	No.	Name	Initial value	Customer setting value	
30	Zero speed	50		PC07	Zero speed	50		
31	Error excessive alarm level	80		PC01	Error excessive alarm level	With J4: 0 With J3: 3		J2B: 0.025 rev. unit J4B: Can select 1/0.1/0.01/0.001 rev. unit
				PC06	Function selection C-3 Error excessive alarm level unit selection	0000		
32	PI-PID control switching selection	0000		PB24	PI-PID control switching selection	0000		Cannot switch by PI-PID switching position droop
33	For manufacturer setting	0000						
34	PI-PID switching position droop	0						No corresponding parameter (setting is unnecessary)
35	For manufacturer setting	0						
36	Speed differential compensation	980		PB11	Speed differential compensation	980		
37	For manufacturer setting	0						
38	For manufacturer setting	0						
39	For manufacturer setting	0						
40	Parameter writing inhibit	0000		PA19	Parameter writing inhibit	With J4: 00AB With J3: 000B		

(3) MR-J2S-B and MR-J4-B/MR-J3-B servo parameter comparison table

MR-J2S-B servo parameters				MR-J4-B/MR-J3-B servo parameters				Cautions
No	Name	Initial value	Customer setting value	No.	Name	Initial value	Customer setting value	
1	Amplifier setting Absolute position detection system selection	0000		PA03	Absolute position detection system selection	0000		
2	Regenerative option selection	0000		PA02	Regenerative option selection	0000		Must change the setting value per option model.
	External dynamic brake selection				Substitute with PD07 to PD09			
3	For servo system controller setting	0080						
4	For servo system controller setting	0000						
5	For servo system controller setting	1						
6	Number of feedback pulses	0						
7	Revolution direction selection	0		PA14	Revolution direction selection	0		
8	Auto tuning gain adjustment mode selection	0001		PA08	Gain adjustment mode selection	0001		Must change the setting value per auto tuning mode.
9	Servo response performance	(*1)		PA09	Auto tuning response performance	With J4: 16 With J3: 12		(*1) Initial value is as follows. 7kW or less: 0005 11 kW or more: 0002
10	Forward rotation torque limit value	300						
11	Reverse rotation torque limit value	300						
12	Load to motor inertia ratio	7.0		PB06	Load to motor inertia ratio	With J4: 7.00 With J3: 7.0		Unit system differs. (0.1 times → 0.01 times) Pay attention to the setting value
13	Position loop gain 1	(*2)		PB07	Model loop gain	With J4: 15.0 With J3: 24		Unit system differs. (rad/s → 0.1 rad/s) (*2) Initial value is as follows. 7kW or less: 35 11kW or more: 19
14	Speed loop gain 1	(*3)						(*3) Initial value is as follows. 7kW or less: 177 11kW or more: 96
15	Position loop gain 2	(*4)		PB08	Position loop gain	With J4: 37.0 With J3: 37		Unit system differs. (rad/s → 0.1 rad/s) (*4) Initial value is as follows. 7kW or less: 35 11kW or more: 19
16	Speed loop gain 2	(*5)		PB09	Speed loop gain	823		(*5) Initial value is as follows. 7kW or less: 817 11kW or more: 455
17	Speed integral compensation	(*6)		PB10	Speed integral compensation	33.7		Unit system differs. (ms → 0.1 ms) (*6) Initial value is as follows. 7kW or less: 48 11kW or more: 91
18	Machine resonance suppression filter 1	0000		PB13	Machine resonance suppression filter 1	4500		Must change the setting value per frequency and depth.
				PB14	Notch shape selection 1	0000		
19	Feed forward gain	0		PB04	Feed forward gain	0		
20	In-position range	100		PA10	In-position range	With J4: 1600 With J3: 100		Must change the setting according to motor.
21	Electromagnetic brake sequence output	0		PC02	Electromagnetic brake sequence output	0		
22	Analog monitor 1 output	0001		PC09	Analog monitor 1 output	0000		Must change the setting value per monitor output data.
	Analog monitor 2 output			PC10	Analog monitor 2 output	0001		

MR-J2S-B servo parameters				MR-J4-B/MR-J3-B servo parameters				Cautions
No	Name	Initial value	Customer setting value	No.	Name	Initial value	Customer setting value	
23	Optional function 1 Servo forced stop selection	0000		PA04	Function selection A-1 Servo forced stop selection	With J4: 2000 With J3: 0000		Forced stop deceleration function selection Set to "Forced stop deceleration function disabled (EM1)" to set identically to MR-J2S-_B_.
24	Slight vibration suppression control selection	0000		PB24	Slight vibration suppression control selection	0000		
	Motor-less operation selection			PC05	Function selection C-2 Motor-less operation selection	0000		
25	Low-pass filter selection	0000		PB23	Low-pass filter selection	0000		
	Adaptive vibration suppression control selection				No corresponding parameter			
	Adaptive vibration suppression control sensitivity selection				No corresponding parameter			
26	For manufacturer setting	0						
27	Analog monitor 1 offset	0		PC11	Analog monitor 1 offset	0		Save to H/W. Must change the setting value.
28	Analog monitor 2 offset	0		PC12	Analog monitor 2 offset	0		Save to H/W. Must change the setting value.
29	For manufacturer setting	0001						
30	Zero speed	50		PC07	Zero speed	50		
31	Error excessive alarm level	80		PC01	Error excessive alarm level	With J4: 0 With J3: 3		Unit system differs. MR-J2S-_B_: 0.025 rev. unit, MR-J4-_B_: Can select 1/0.1/0.01/0.001 rev. unit
				PC06	Function selection C-3 Error excessive alarm level unit selection	0000		
32	PI-PID control switching selection	0000		PB24	PI-PID control switching selection	0000		
33	Serial communication baud rate selection	0000			No corresponding parameter			
	Serial communication response delay time				No corresponding parameter			
	Encoder output pulse setting selection			PC03	Encoder output pulse setting selection	0000		
34	PI-PID switching position droop	0						
35	For manufacturer setting							
36	Speed differential compensation	980		PB11	Speed differential compensation	980		
37	For manufacturer setting							
38	Encoder output pulse	4000		PA15	Encoder output pulse	4000		Set encoder pulse (A phase, B phase) to be output by servo amplifier.
39	For manufacturer setting							
40	Parameter writing inhibit	0000		PA19	Parameter writing inhibit	With J4: 00AB With J3: 000B		Must change the setting value as needed.
41 to 48	For manufacturer setting							
49	Gain switching selection	0000		PB26	Gain switching selection	0000		
50	Gain switching condition	10		PB27	Gain switching condition	10		
51	Gain switching time constant	1		PB28	Gain switching time constant	1		
52	Load to motor inertia ratio 2	7.0		PB29	Load to motor inertia ratio after gain switching	With J4: 7.00 With J3: 7.0		Unit system differs. (0.1 times → 0.01 times) Pay attention to the setting value.
53	Position loop gain 2 change ratio	100		PB30	Position loop gain after gain switching	With J4: 0.0 With J3: 37		Must change the setting value by directly converting ratio.
54	Speed loop gain 2 change ratio	100		PB31	Speed loop gain after gain switching	With J4: 0 With J3: 823		Must change the setting value by directly converting ratio.

MR-J2S-B servo parameters				MR-J4-B/MR-J3-B servo parameters				Cautions
No	Name	Initial value	Customer setting value	No.	Name	Initial value	Customer setting value	
55	Speed integral compensation change ratio	100		PB32	Speed integral compensation after gain switching	With J4: 0.0 With J3: 33.7		Must change the setting value by directly converting ratio.
56 to 59	For manufacturer setting							
60	Optional function C Phase change of encoder pulse output	0000		PC03	Encoder output pulse phase selection	0000		
61	Notch frequency selection	0000		PB15	Machine resonance suppression filter 2	4500		Must change the setting value per frequency and depth.
	Notch depth selection			PB16	Notch shape selection 2	0000		
62 to 75	For manufacturer setting							

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