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MITSUBISHI ELECTRIC SERVO SYSTEM CONTROLLER

Migration Guide from Positioning Module to Simple Motion Module [QD75M(H) ⇒ RD77MS]

QD75MH1/QD75M1
QD75MH2/QD75M2
QD75MH4/QD75M4



MELSEC iQ-R series



RD77MS2
RD77MS4

● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. Refer to the MELSEC iQ-R Module Configuration Manual for a description of the PLC system safety precautions.

In this manual, the safety precautions are classified into two levels: “WARNING” and “CAUTION”.



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



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

Under some circumstances, failure to observe the precautions given under “CAUTION” may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety. Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller.
Failure to do so may result in an accident due to an incorrect output or malfunction.
 - (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
 - (2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
 - Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
 - Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
 - (3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to "General Safety Requirements" in the MELSEC iQ-R Module Configuration Manual.
 - (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- For the operating status of each station after a communication failure, refer to manuals relevant to the network. Incorrect output or malfunction due to a communication failure may result in an accident.
- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

[Design Precautions]

WARNING

- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used.
- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Failure to do so may result in an accident due to an incorrect output or malfunction.
- To maintain the safety of the programmable controller system against unauthorized access from external devices via the network, take appropriate measures. To maintain the safety against unauthorized access via the Internet, take measures such as installing a firewall.
- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
 - (1) Machine home position return is controlled by two kinds of data: a home position return direction and a home position return speed. Deceleration starts when the proximity dog signal turns on. If an incorrect home position return direction is set, motion control may continue without deceleration. To prevent machine damage caused by this, configure an interlock circuit external to the programmable controller.
 - (2) When the module detects an error, the motion slows down and stops or the motion rapidly stops, depending on the stop group setting in parameter. Set the parameter to meet the specifications of a positioning control system. In addition, set the home position return parameter and positioning data within the specified setting range.
 - (3) Outputs may remain on or off, or become undefined due to a failure of a component such as an insulation element and transistor in an output circuit, where the module cannot detect any error. In a system that the incorrect output could cause a serious accident, configure an external circuit for monitoring output signals.
- If safety standards (ex., robot safety rules, etc.) apply to the system using the module, servo amplifier and servomotor, make sure that the safety standards are satisfied.
- Construct a safety circuit externally of the module or servo amplifier if the abnormal operation of the module or servo amplifier differs from the safety directive operation in the system.
- Do not remove the SSCNETIII cable while turning on the control circuit power supply of the module and servo amplifier. Do not see directly the light generated from SSCNETIII connector of the module or servo amplifier and the end of SSCNETIII cable. When the light gets into eyes, you may feel something wrong with eyes. (The light source of SSCNETIII complies with class1 defined in JISC6802 or IEC60825-1.)

[Design Precautions]

WARNING

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100 mm or more between them. Failure to do so may result in malfunction due to noise.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so also may cause malfunction or failure of the module.
- When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not Open in Program" for "Opening Method Setting" in the module parameters. If "Open in Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the communication line, and external devices cannot execute the remote RUN functions.

[Installation Precautions]

WARNING

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

[Installation Precautions]

CAUTION

- Use the programmable controller in an environment that meets the general specifications in the Safety Guidelines included with the base unit. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.
- To mount a module with no module fixing hook, place the concave part(s) located at the bottom onto the guide(s) of the base unit, push in the module, and fix it with screw(s). Incorrect interconnection may cause malfunction, failure, or drop of the module.
- When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause malfunction.
- When using an SD memory card, fully insert it into the SD memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.
- Securely insert an extended SRAM cassette into the cassette connector of the CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction.
- Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, or connector. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
- After installation and wiring, attach the included terminal cover to the module before turning it on for operation. Failure to do so may result in electric shock.

[Wiring Precautions]

CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the module. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100 mm or more between them. Failure to do so may result in malfunction due to noise.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact. Do not clamp the extension cables with the jacket stripped. Doing so may change the characteristics of the cables, resulting in malfunction.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

WARNING

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

[Startup and Maintenance Precautions]

CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25 cm away in all directions from the programmable controller. Failure to do so may cause malfunction.

[Startup and Maintenance Precautions]

CAUTION

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not mount/remove the module to/from the base unit, and the terminal block to/from the module, and do not insert/remove the extended SRAM cassette to/from the CPU module more than 50 times (IEC 61131-2 compliant) respectively. Exceeding the limit may cause malfunction.
- After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
- Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.
- Do not touch the integrated circuits on the circuit board of an extended SRAM cassette. Doing so may cause malfunction or failure of the module.
- Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.
- Before testing the operation, set a low speed value for the speed limit parameter so that the operation can be stopped immediately upon occurrence of a hazardous condition.
- Confirm and adjust the program and each parameter before operation. Unpredictable movements may occur depending on the machine.
- When using the absolute position system function, on starting up, and when the module or absolute position motor has been replaced, always perform a home position return.
- Before starting the operation, confirm the brake function.
- Do not perform a megger test (insulation resistance measurement) during inspection.
- After maintenance and inspections are completed, confirm that the position detection of the absolute position detection function is correct.
- Lock the control panel and prevent access to those who are not certified to handle or install electric equipment.

[Operating Precautions]

CAUTION

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

[Disposal Precautions]

CAUTION

- When disposing of this product, treat it as industrial waste.
- When disposing of batteries, separate them from other wastes according to the local regulations. For details on battery regulations in EU member states, refer to the MELSEC iQ-R Module Configuration Manual.

[Transportation Precautions]

CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to the MELSEC iQ-R Module Configuration Manual.
- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

INTRODUCTION

Please read this manual carefully so that equipment is used to its optimum.

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1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.1 Benefits of Migration

Migrating from the existing system using QD75M/QD75MH Positioning modules to a new system using MELSEC iQ-R series Simple Motion module RD77MS4/RD77MS2 (hereinafter called RD77MS), which support the programs on the QD75M/QD75MH, is recommended. We also recommend migrating servo amplifiers to the MR-J4 series at the same time.

Migrating not only allows the system to run for longer periods, but also has the following advantages.

(1) High-speed operation and high functionality of Positioning module (Simple Motion module)

The Simple Motion module RD77MS achieves the maximum operation cycle of 0.444 ms/4 axes, enabling a dramatically fast operation.

The controller also achieves further advanced motion control with a wide variety of motion control functions.

→ Increased productivity from higher speeds and functionality of the controller

(2) High-speed communication by SSCNETIII/H 

Speeding up and improving noise tolerance of servo system network communications are achieved by optical communication. A long distance cable of 100 m can be also used.

→ Increased speeds over the entire facility

(3) Servo amplifier MR-J4 and servo motor 

The latest MR-J4 series achieves high performance operation with a variety of functions including one-touch tuning, a 22-bit high resolution encoder (4194304 pulse/rev), and 2.5 kHz speed frequency response. The product lineup includes multi-axis servo amplifiers that contribute to energy saving, space saving, and reduced wiring of a machine. The MR-J4 series compatible rotary servo motor, HG series enables to output high torque at high speed. Linear servo motors and direct drive motors are also available. Select the motor type according to your application from our extensive product lineup.

→ Increase of applications, improved performance, energy saving, downsizing, and reduced wiring of drive systems

(4) Lower maintenance cost

After 5 years of usage, the products will need maintenance, such as replacement of the whole circuit board due to the life of components including electrolytic capacitors and memories.

To use the system the longest possible, an early migration to the latest model is recommended in terms of performance and quality.

→ Increased equipment longevity

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.2 Main Target Models for Migration

The main target models for replacement described in this section are as follows.

(1) Positioning modules

Product name	Model before migration		Model after migration
SSCNET Positioning module	QD75M1		RD77MS2 ^(Note-1)
	QD75M2		RD77MS4
	QD75M4		RD77MS2 ^(Note-1)
SSCNETIII Positioning module	QD75MH1		RD77MS4
	QD75MH2		RD77MS2 ^(Note-1)
	QD75MH4		RD77MS4

(Note-1): The number of control axes is increased from 1 to 2.

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(2) Servo amplifiers and servo motors (a) For QD75M

Before migration from QD75M			After migration to RD77MS		
Servo amplifier		Servo motor	Servo amplifier		Servo motor
MR-J2S series	MR-J2S-□B	HC-KFS□	MR-J4 series	MR-J4-□B(-RJ) MR-J4W2-□B MR-J4W3-□B	HG-KR□
		HC-MFS□			HG-MR□
		HC-SFS□			HG-SR□
		HC-LFS□			HG-RR□
		HC-RFS□			HG-UR□
HA-LFS□	HG-JR□				
HC-UFS□					
MR-J2M series	MR-J2M-□DU	HC-KFS□			
		HC-MFS□			
		HC-UFS□			
MR-H series	MR-H□B(N)	HA-FF□			
		HA-FH□			
		HA-LH□			
		HA-MH□			
		HA-SH□			
		HA-UH□			
		HC-KF□			
		HC-MF□			
		HC-RF□			
		HC-SF□			
		HC-UF□			
		HA-LF□			
		HA-LH□K			
		MR-J2 series	MR-J2-□B	HC-MF□	
HA-FF□					
HC-SF□					
HA-RF□					
HC-UF□					
MR-J2-Jr series	MR-J2-03B5	HC-AQ□(B)D	MR-J4W2-0303B6	HG-AK□(B)D	
		HC-AQ□(B)S		HG-AK□(B)	

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(b) For QD75MH

The existing MR-J3 series servo amplifiers can be used in the replaced system with RD77MS, however, it is strongly recommended to replace them with the latest MR-J4 series.

1) Servo amplifiers and rotary servo motors

Before migration from QD75MH				After migration to RD77MS		
Servo amplifier		Rotary servo motor		Servo amplifier		Rotary servo motor
MR-J3 series	MR-J3-□B	HF-KP□		MR-J4 series	MR-J4-□B(-RJ)	HG-KR□
	MR-J3W-□B	HF-MP□			MR-J4W2-□B	HG-MR□
	MR-J3-□BS	HF-SP□			MR-J4W3-□B	HG-SR□
	MR-J3-□B-RJ006	HF-JP□				HG-RR□
	HC-LP□		HG-UR□			
	HC-RP□			HG-JR□		
	HC-UP□					
	HA-LP□					

2) Servo amplifiers and linear servo motors

Before migration from QD75MH				After migration to RD77MS		
Servo amplifier		Linear servo motor		Servo amplifier		Linear servo motor
MR-J3 series	MR-J3-□B-RJ004	LM-H2□		MR-J4 series	MR-J4-□B(-RJ)	LM-H3□
		LM-F□			MR-J4W2-□B	LM-F□
		LM-K2□			MR-J4W3-□B	LM-K2□
		LM-U2□				LM-U2□

3) Servo amplifiers and direct drive motors

Before migration from QD75MH				After migration to RD77MS		
Servo amplifier		Direct drive motor		Servo amplifier		Direct drive motor
MR-J3 series	MR-J3-□B-RJ080W	TM-RFM□		MR-J4 series	MR-J4-□B(-RJ)	TM-RFM□
					MR-J4W2-□B	
					MR-J4W3-□B	

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(3) Servo system network

(a) For QD75M

Item		SSCNET SERVO SYSTEM CONTROLLER NETWORK		SSCNETIII/H SERVO SYSTEM CONTROLLER NETWORK	
Communications medium		Metal cable		Optical fiber cable	
Communications speed		5.6 Mbps		150 Mbps	
Communications cycle	Send	0.88 ms/1.77 ms/3.55 ms		0.222 ms/0.444 ms/0.888 ms	
	Receive	3.55ms		0.222 ms/0.444 ms/0.888 ms	
Number of control axes		Up to 8 axes/line		Up to 16 axes/line	
Transmission distance		Maximum overall distance: 30 m		[Standard code for inside panel and standard cable for outside panel] Up to 20 m between stations Maximum overall distance: 320 m (20 m × 16 axes) [Long distance cable] Up to 100 m between stations Maximum overall distance: 1600 m (100 m × 16 axes)	

(b) For QD75MH

Item		SSCNETIII SERVO SYSTEM CONTROLLER NETWORK		SSCNETIII/H SERVO SYSTEM CONTROLLER NETWORK	
Communications medium		Optical fiber cable		← (same as SSCNETIII)	
Communications speed		50 Mbps		150 Mbps	
Communications cycle	Send	0.44 ms/0.88 ms		0.222 ms/0.444 ms/0.888 ms	
	Receive	0.44 ms/0.88 ms		0.222 ms/0.444 ms/0.888 ms	
Number of control axes		Up to 16 axes/line		← (same as SSCNETIII)	
Transmission distance		[Standard code for inside panel and standard cable for outside panel] Up to 20 m between stations Maximum overall distance: 320 m (20 m × 16 axes)		← (same as SSCNETIII)	
		[Long distance cable] Up to 50 m between stations Maximum overall distance: 800 m (50 m × 16 axes)		[Long distance cable] Up to 100 m between stations Maximum overall distance: 1600 m (100 m × 16 axes)	

(4) Engineering environment (required)

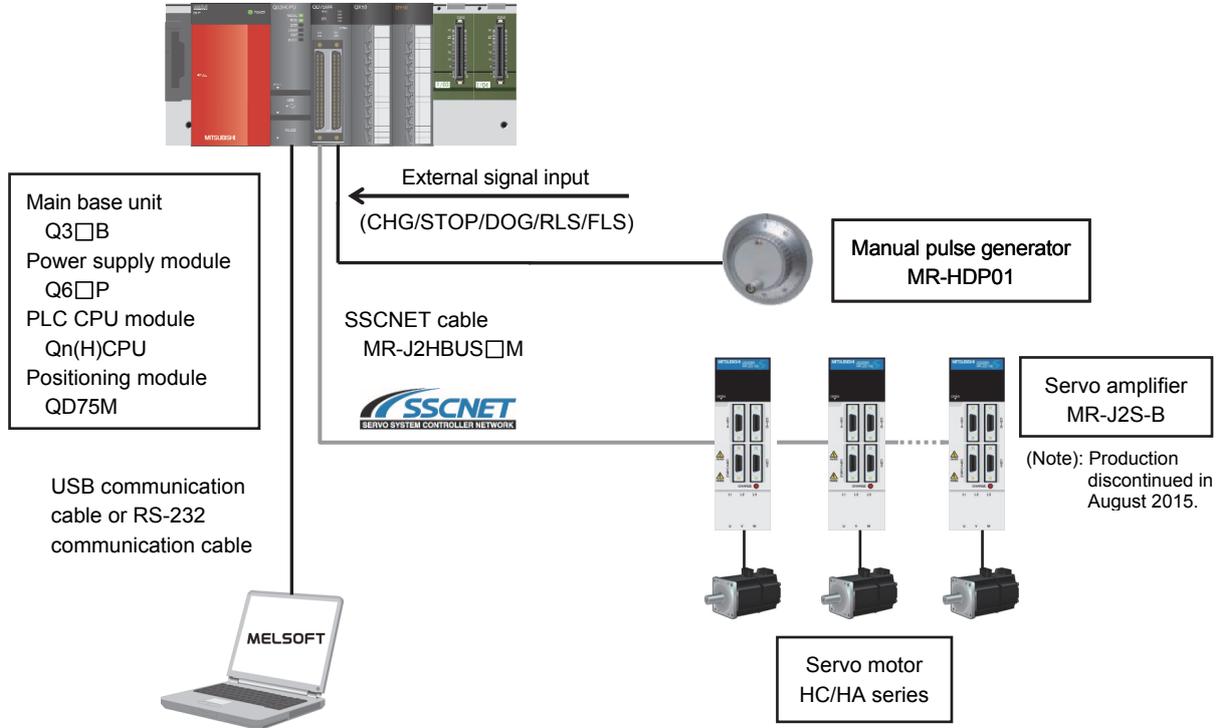
Product name	Model	Version
MELSOFT GX Works3	SW1DND-GXW3-E	Ver.1.000A or later
MELSOFT MR Configurator2 ^(Note-1)	SW1DNC-MRC2-E	Ver.1.27D or later

(Note-1): The Servo Setup Software MRJW3-SETUP161E is required when a combination of MR-J4-B-RJ020 and MR-J4-T20 is used as MR-J2S-B.

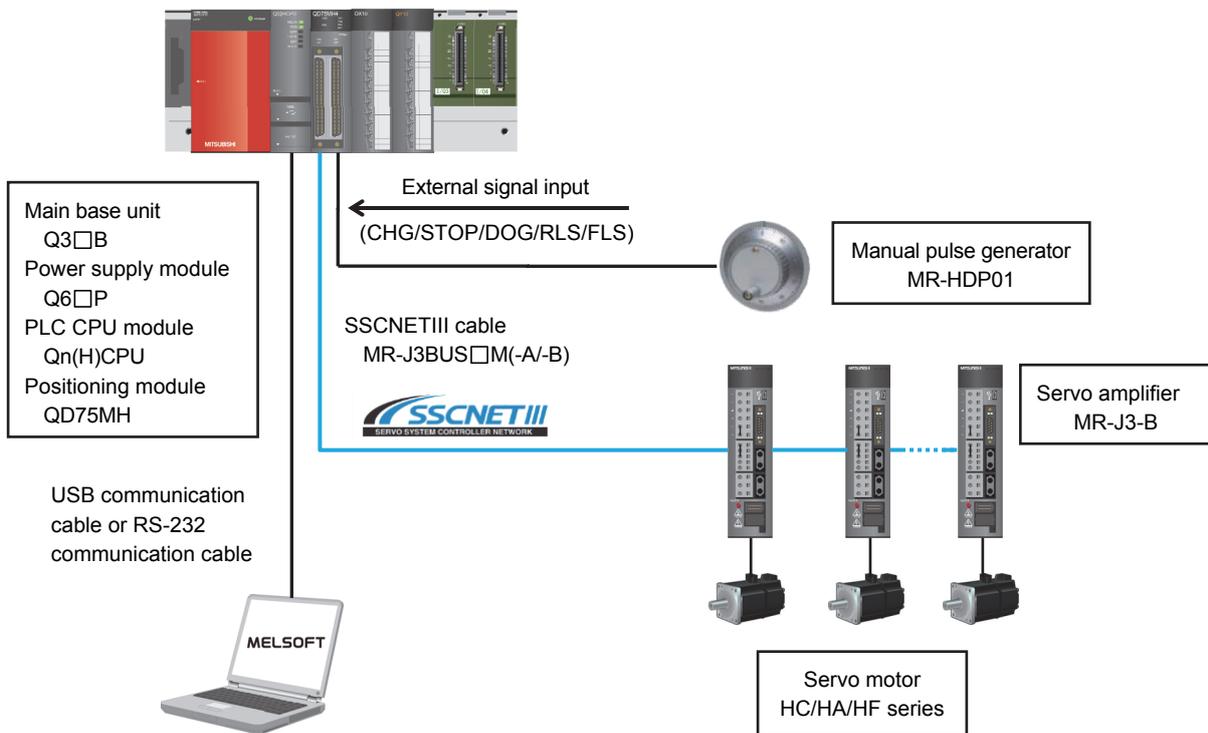
1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.3 System Configuration

1.3.1 System configuration using QD75M before migration

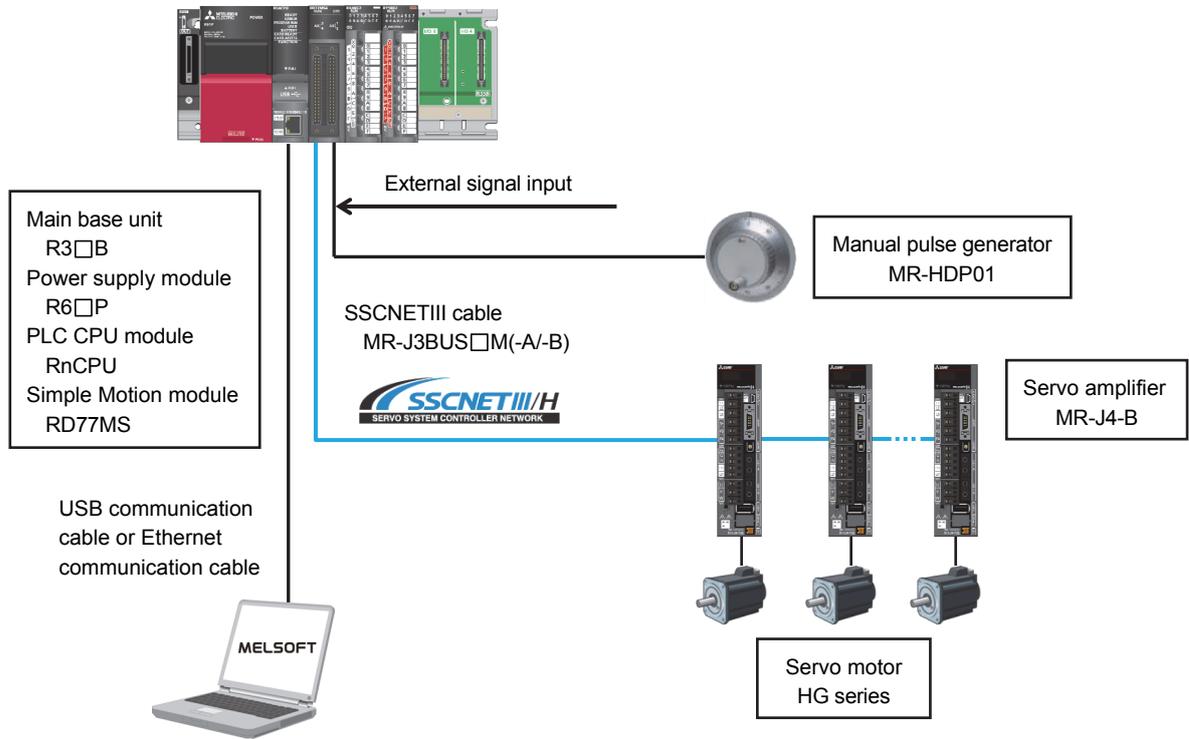


1.3.2 System configuration using QD75MH before migration



1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.3.3 System configuration using RD77MS after migration

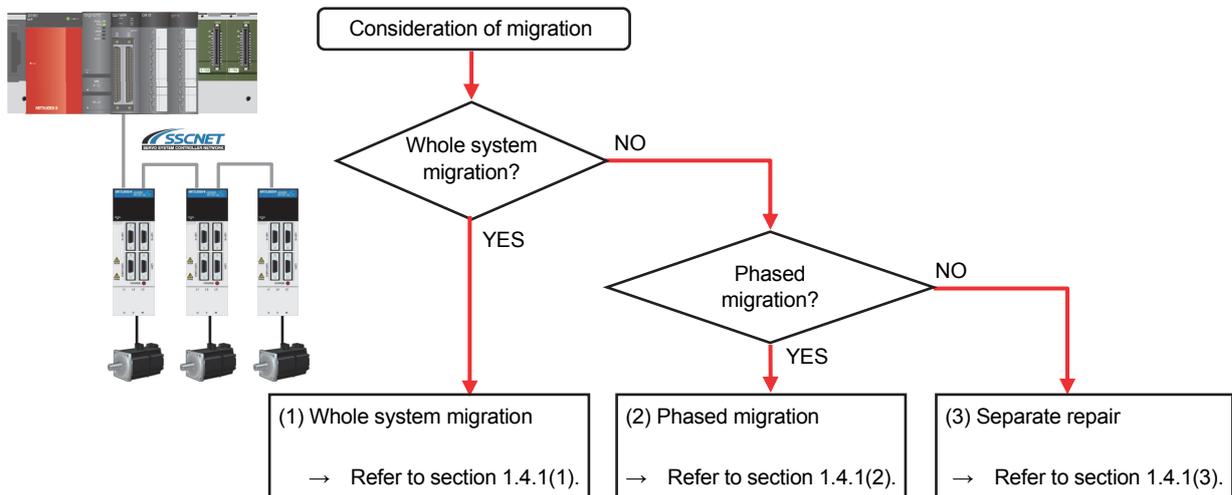


1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.4 Case Study on Migration

1.4.1 Case study for QD75M

The following describes a case study for migrating the existing system using QD75M.



(1) Whole system migration (recommended)

The controller, servo amplifiers, servo motors, and servo system network are replaced simultaneously. Although a large-scale installation is required, the whole system migration allows the system to operate for longer periods. (Refer to section 1.4.1(1).)

(2) Phased migration (When the whole system migration is difficult due to the installation period and cost.)

The MR-J2S-B servo amplifiers are gradually replaced with the MR-J4-B servo amplifiers, and then the controller is eventually replaced with RD77MS in the final phase. (Refer to section 1.4.1(2).)

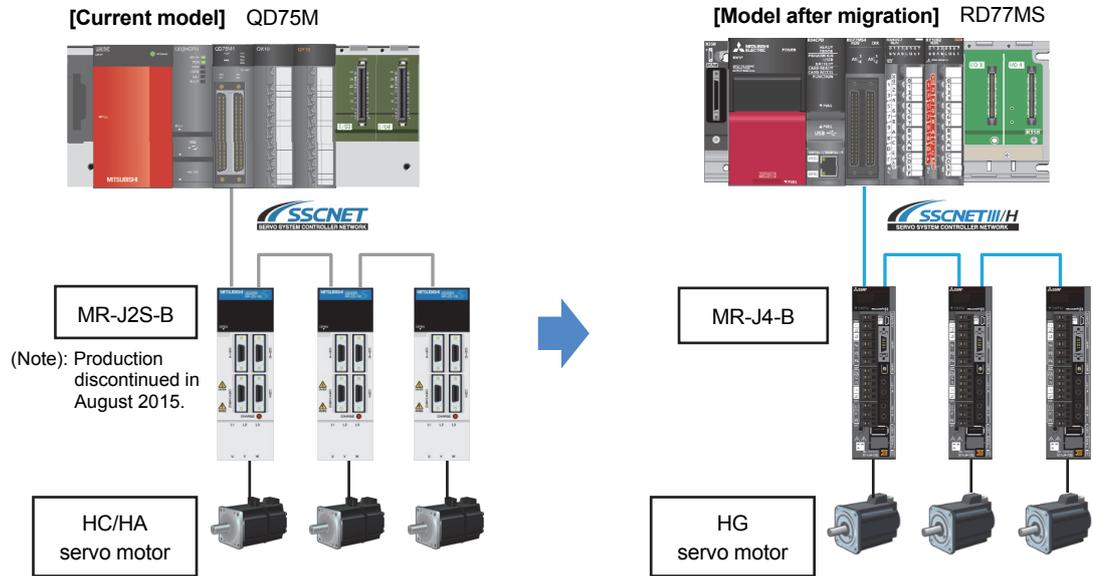
(3) Separate repair

This is a replacement method for when the servo amplifier or the servo motor malfunctions. (Refer to section 1.4.1(3).)

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(1) Whole system migration (recommended) [QD75M]

The following shows the system when the whole system migration takes place.



[Changes in the system]

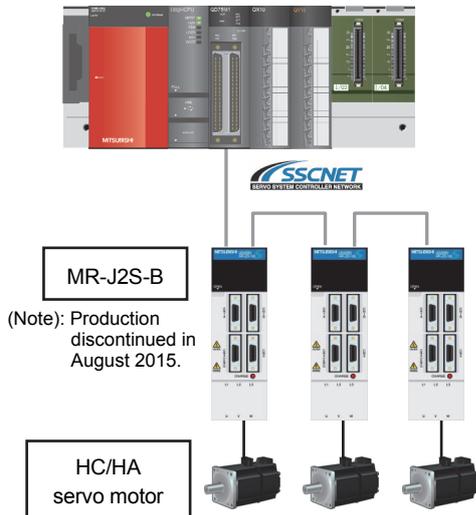
Product name	Model before migration	Model after migration
Main base unit	Q3□B	R3□B
PLC CPU module	Qn(H)CPU	RnCPU
Positioning module	QD75M	RD77MS
Servo amplifier	MR-J2S-B	MR-J4-B
Servo motor	HC/HA series	HG series

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(2) Phased migration [QD75M]

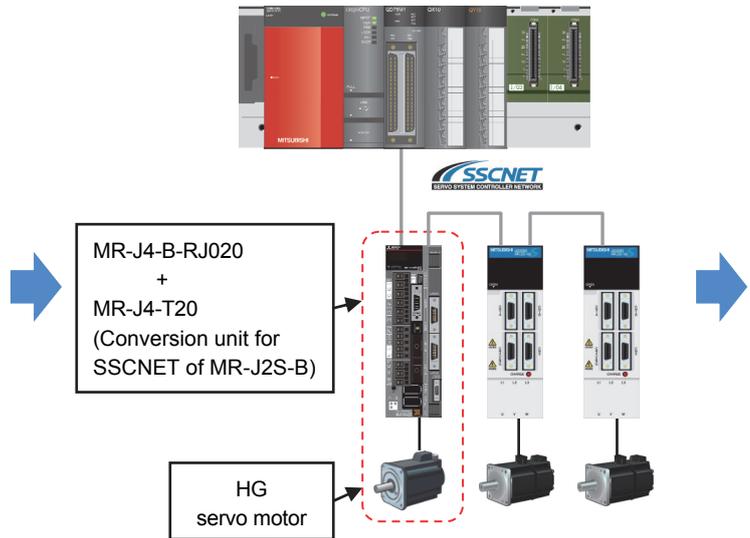
The following shows the procedure for the phased migration in which the MR-J2S-B servo amplifiers are gradually replaced with the MR-J4-B servo amplifiers, and eventually the controller with RD77MS in the final phase.

[Current system]



[Replacement - Phase 1]

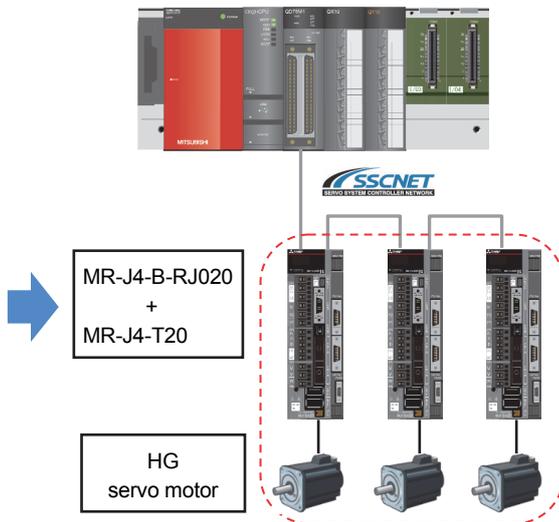
Servo amplifier and servo motor replacement for only one axis



(Note): For replacing only the servo amplifier or the servo motor, refer to "1.4.1(3) Separate repair".

[Replacement - Phase 2]

Servo amplifier and servo motor replacement for all axes

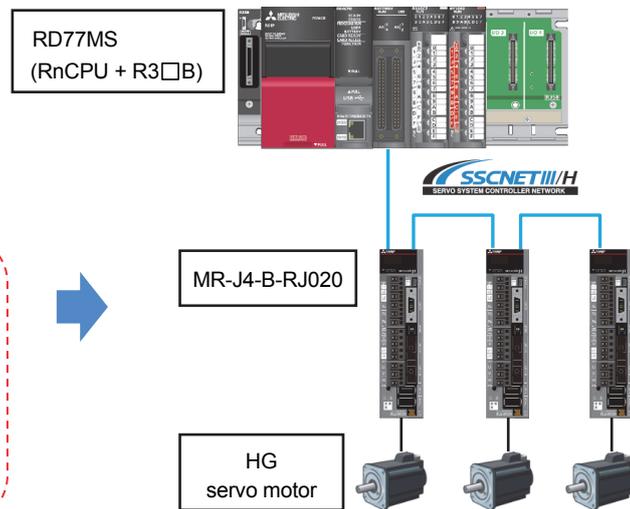


(Note): MR-J4-B-RJ020 + MR-J4-T20

↓
MR-J4-B-RJ020 connected to MR-J4-T20 operates as MR-J2S-B. In addition, MR-J4-B-RJ020 can drive both MR-J4 compatible HG servo motors and MR-J2S compatible HC/HA servo motors.

[Replacement - Phase 3]

Controller and servo network replacement



(Note): When replacing the servo system network, change the operation mode of MR-J4-B-RJ020 from the J2S mode to the J4 mode.

(Note): Remove MR-J4-T20.

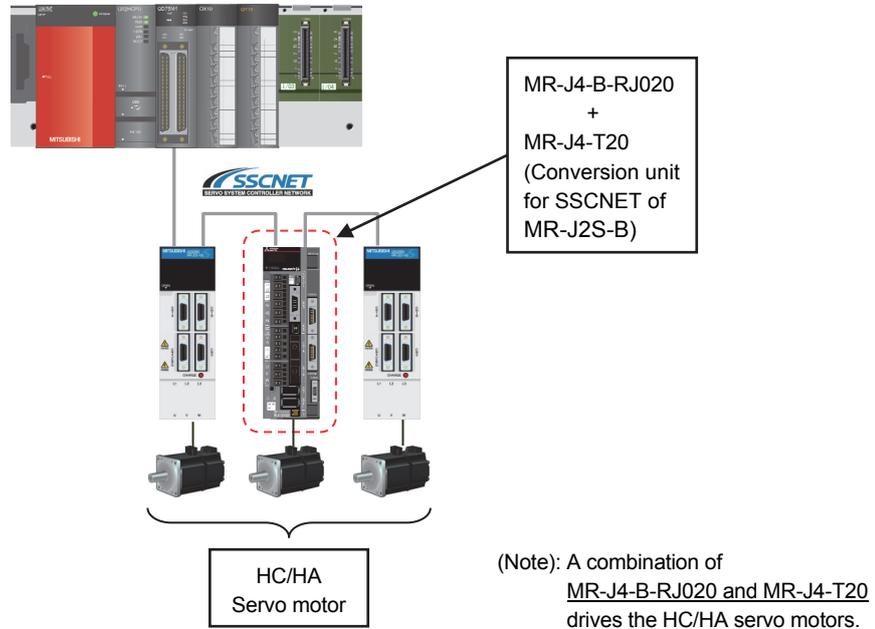
1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(3) Separate repair [QD75M]

The following shows the procedure for the separate repair.

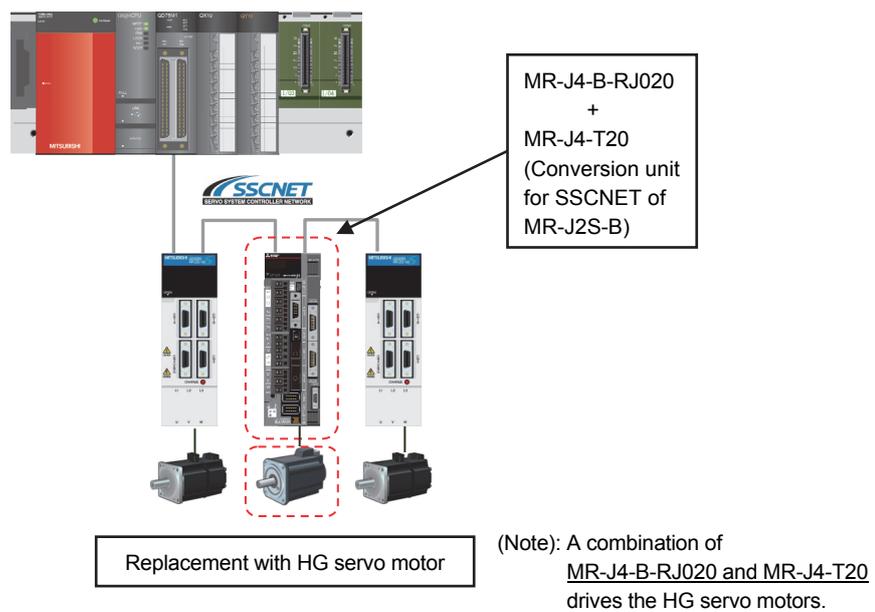
(a) When the MR-J2S-B servo amplifier has malfunctioned

Replace only the servo amplifier.



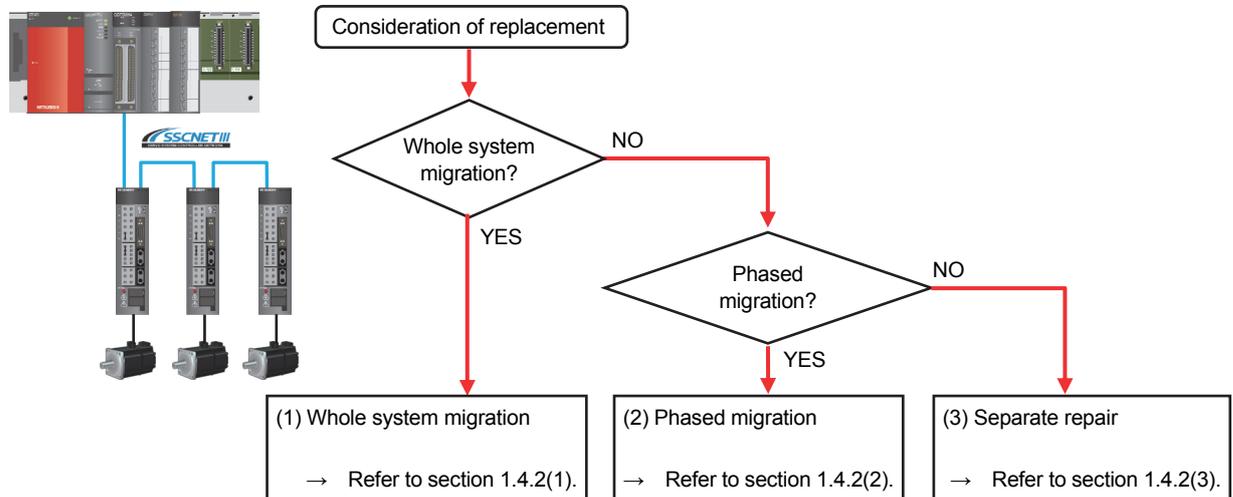
(b) When the HC/HA servo motor has malfunctioned

Simultaneously replace the servo amplifier and the malfunctioned servo motor.



1.4.2 Case study for QD75MH

The following describes a case study for migrating the existing system using QD75MH.



(1) Whole system migration (recommended)

The controller, servo amplifiers, servo motors, and servo system network are replaced simultaneously. Although a large-scale installation is required, the whole system migration allows the system to operate for longer periods. (Refer to section 1.4.2(1).)

(2) Phased migration (When the whole system migration is difficult due to the installation period and cost.)

The controller is replaced with RD77MS in the first phase, and then the MR-J3-B servo amplifiers are gradually replaced with MR-J4-B. (Refer to section 1.4.2(2).)

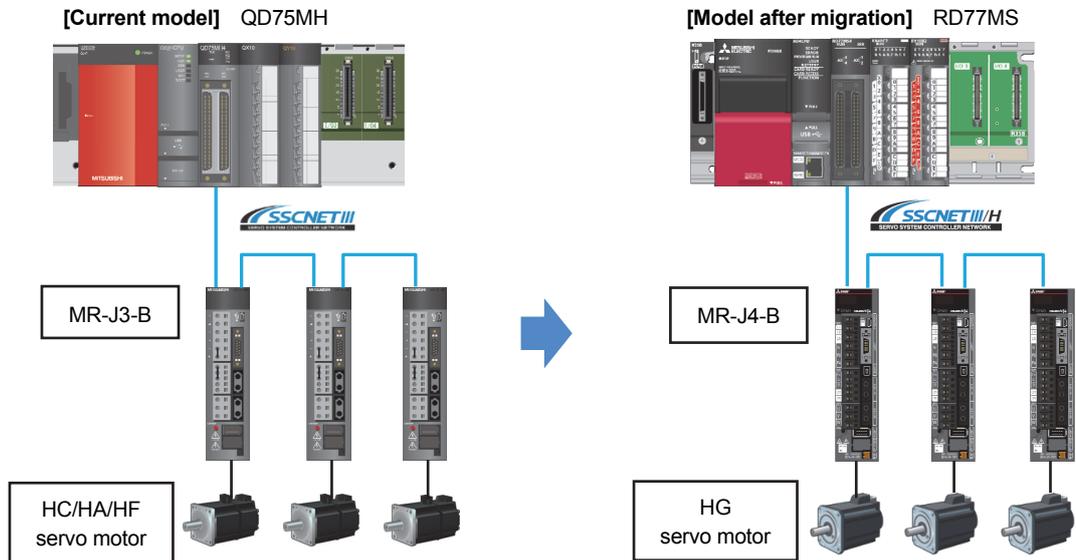
(3) Separate repair

This is a replacement method for when the controller, the servo amplifier, or the servo motor malfunctions. (Refer to section 1.4.2(3).)

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(1) Whole system migration (recommended) [QD75MH]

The following shows the system when the whole system migration takes place.



[Changes in the system]

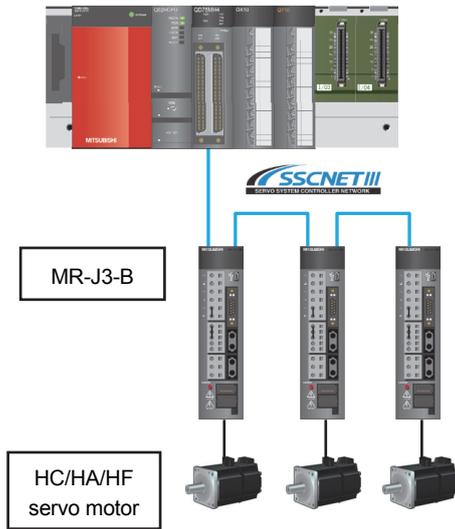
Product name	Model before migration	Model after migration
Main base unit	Q3□B	R3□B
PLC CPU module	Qn(H)CPU	RnCPU
Positioning module	QD75MH	RD77MS
Servo amplifier	MR-J3-B	MR-J4-B
Servo motor	HC/HA/HF series	HG series

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(2) Phased migration [QD75MH]

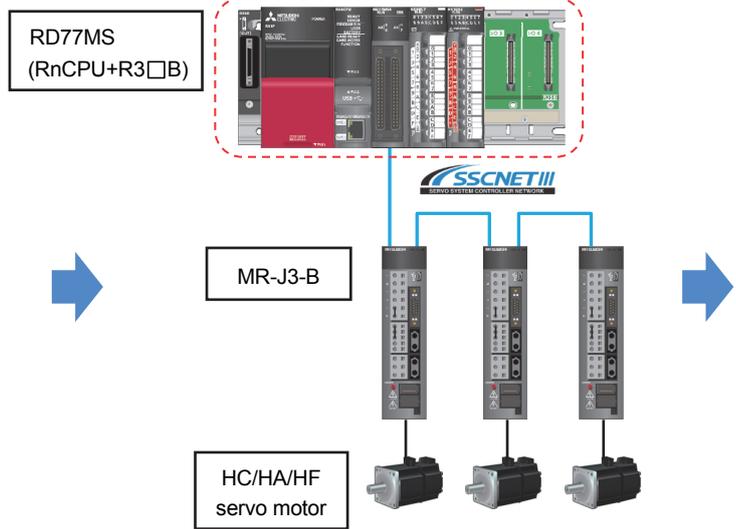
The following shows the procedure for the phased migration in which the controller is replaced with RD77MS in the first phase, and then the MR-J3-B servo amplifiers are gradually replaced with MR-J4-B in the following phases.

[Current model]



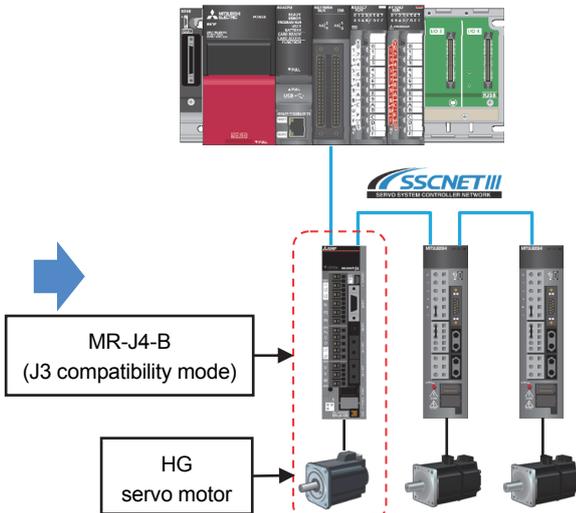
[Replacement - Phase 1]

Replacement of the controller



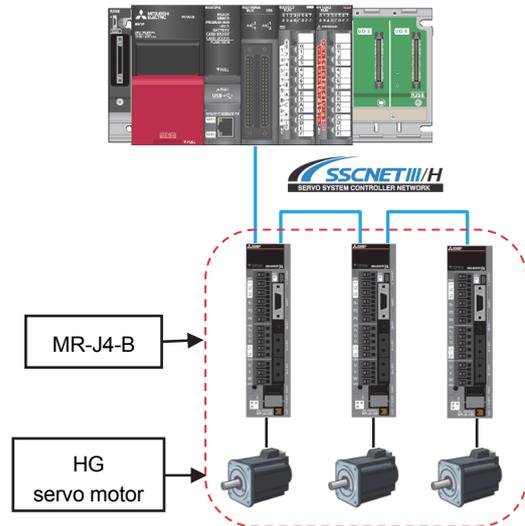
[Replacement - Phase 2]

Servo amplifier and servo motor replacement for only one axis



[Replacement - Phase 3]

Servo amplifier and servo motor replacement for all axes, and servo system network replacement



(Note): For replacing only the servo amplifier or the servo motor, refer to "1.4.2(3) Separate repair".

(Note): For details of the J3 compatibility mode, refer to "Transition from MELSERVO-J3/J3W Series to J4 Series Handbook".

(Note): When replacing all the servo amplifiers with MR-J4-B, the operation mode can be switched from "J3 compatibility mode" to "J4 mode". The servo system network is also changed from SSCNET III to SSCNET III/H.

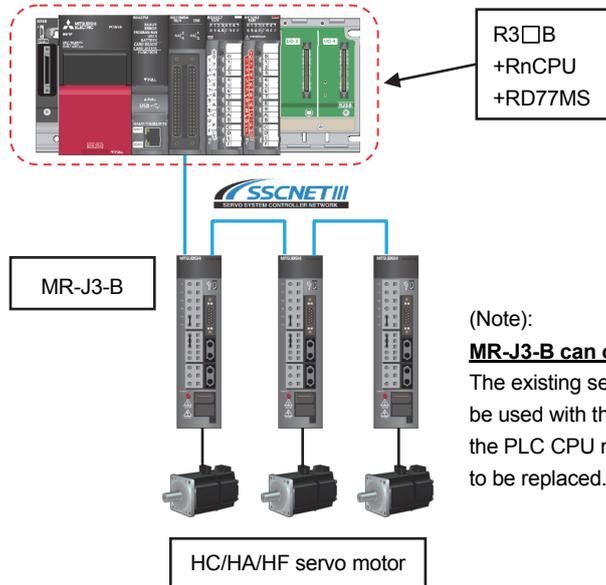
1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

(3) Separate repair

The following shows the procedure for the separate repair.

(a) When the controller has malfunctioned.

Replace only the controller.



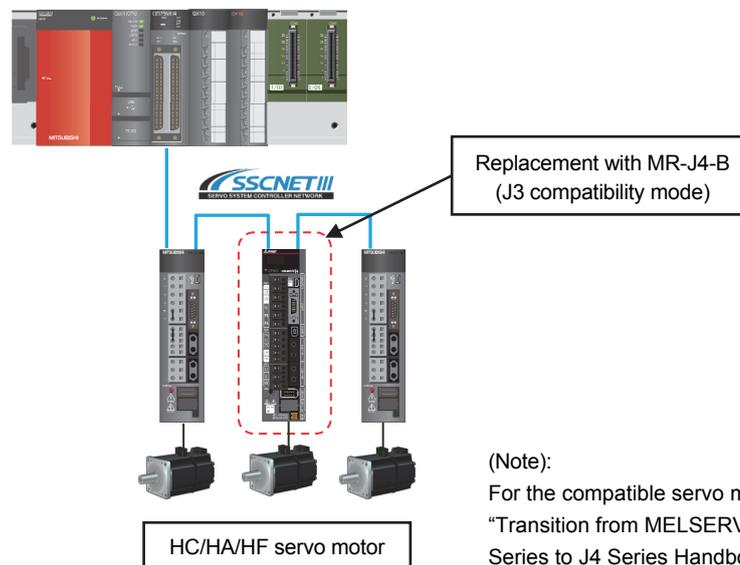
(Note):

MR-J3-B can operate with the replaced controller

The existing servo amplifiers and servo motors can be used with the new controller, however, note that the PLC CPU module and the main base unit needs to be replaced.

(b) When the MR-J3-B servo amplifier has malfunctioned.

Replace only the servo amplifier.

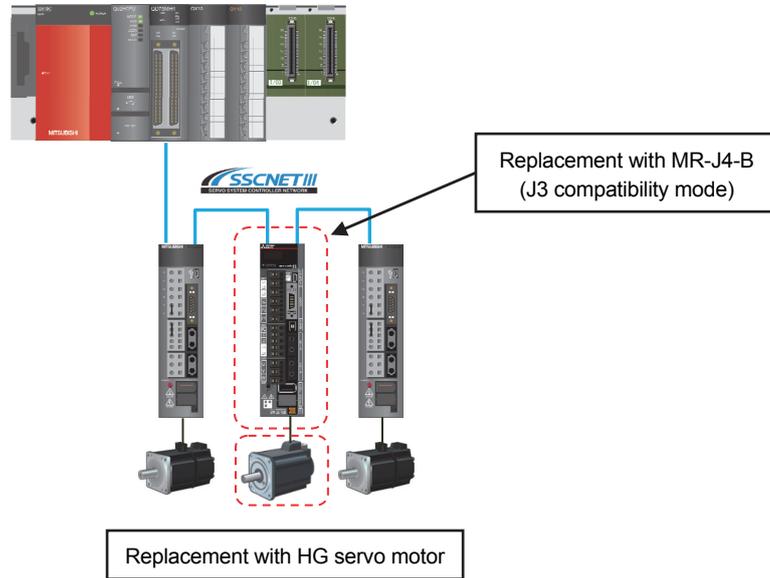


(Note):

For the compatible servo motors, refer to “Transition from MELSERVO-J3/J3W Series to J4 Series Handbook”.

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

- (c) When the HC/HA/HF servo motor has malfunctioned
Simultaneously replace the servo amplifier and the malfunctioned servo motor.



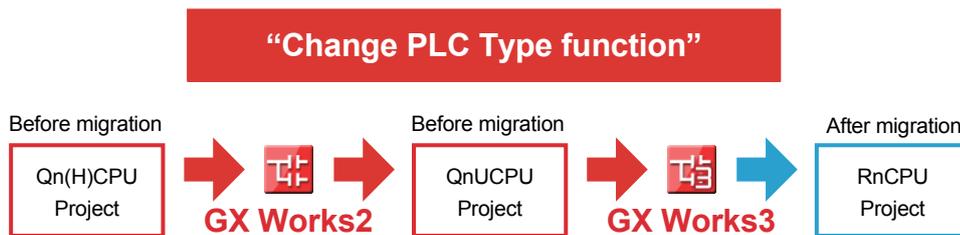
1.5 Project Diversion

The following functions can convert the projects of Qn(H)CPU into those of RnCPU.
For the procedure of project diversion, refer to the section below.

- QD75M ... “2.4 Project Diversion”
- QD75MH ... “3.4 Project Diversion”

(1) PLC CPU project

“Change PLC type function” of MELSOFT GX Works3



1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.6 Introduction of RD77MS16/RD77MS8

The MELSEC iQ-R series Simple Motion module RD77MS16 (up to 16 control axes) and RD77MS8 (up to 8 control axes) are also available.

	RD77MS16	RD77MS8	RD77MS4	RD77MS2
Maximum number of control axes	16 axes	8 axes	4 axes	2 axes
Command interface	SSCNETIII/H, SSCNETIII			
Maximum distance between stations [m]	100m (SSCNETIII/H), 50m (SSCNETIII)			
Maximum overall cable distance [m]	1600m (SSCNETIII/H) 800m (SSCNETIII)	800m (SSCNETIII/H) 400m (SSCNETIII)	400m (SSCNETIII/H) 200m (SSCNETIII)	200m (SSCNETIII/H) 100m (SSCNETIII)
Maximum number of connected optical hub units	8	7	3	1
Operation cycle	0.444ms to 3.555ms			

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.7 Relevant Documents

Refer to the following relevant documents for the replacement.

1.7.1 Relevant catalogs

<p>Servo System Controllers MELSEC iQ-R/MELSEC iQ-F Series</p>  <p>L(NA)03100</p>	<p>Servo amplifiers & Motors MELSERVO-J4</p>  <p>L(NA)03058</p>
<p>MELSERVO-J2-Super Transition Guide</p>  <p>L(NA)03091</p>	<p>Transition from MELSERVO-J2-Super/J2M Series to J4 Series Handbook</p>  <p>L(NA)03093</p>
<p>Transition from MELSERVO-J3/J3W Series to J4 Series Handbook</p>  <p>L(NA)03127</p>	

1. OVERVIEW OF MIGRATION FROM QD75M/QD75MH TO RD77MS

1.7.2 Relevant manuals

(1) Simple Motion module

Manual title	Manual No.
MELSEC iQ-R Simple Motion Module User's Manual (Startup)	IB-0300245
MELSEC iQ-R Simple Motion Module User's Manual (Application)	IB-0300247
MELSEC iQ-R Simple Motion Module User's Manual (Advanced Synchronous Control)	IB-0300249
RD77MS Before Using the Product	BCN-B62008-335E

(2) Servo amplifier

Manual title	Manual No.
MR-J4-_B_(-RJ) SERVO AMPLIFIER INSTRUCTION MANUAL	SH-030106
MR-J4 Servo amplifier Instructions and Cautions for Safe Use of AC Servos	IB-0300175E
MELSERVO-J4 Servo amplifier INSTRUCTION MANUAL TROUBLE SHOOTING	SH-030109
MR-J4W2-_B_/MR-J4W3-_B_/MR-J4W2-0303B6 SERVO AMPLIFIER INSTRUCTION MANUAL	SH-030105
Conversion Unit for SSCNET of MR-J2S-B Compatible AC Servo MR-J4-_B_-RJ020/MR-J4-DU_B_-RJ020/MR-CR55K_/MR-J4-T20 SERVO AMPLIFIER INSTRUCTION MANUAL	SH-030125
Instructions and Cautions for Drive of HC/HA Series Servo Motor with MR-J4-_B_-RJ020 Servo Amplifier	SH-030127
Conversion unit for SSCNET of MR-J2S-B MR-J4-T20 Installation Guide	IB-0300204E

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

2.1 Table of Components and Software

Prepare modules, servo amplifiers, and an engineering environment according to the following tables in this section.

Product name	Model before migration	Model after migration
Positioning module	QD75M1	[Simple Motion module]
	QD75M2	RD77MS2 ^(Note-1)
	QD75M4	RD77MS4
PLC CPU module	Qn(H)CPU	RnCPU
Power supply module	Q6□P	R6□P
Main base unit	Q3□B	R3□B
Extension base unit	Q6□B	R6□B
Extension cable	QC□B	RC□B
Input module	MELSEC-Q series Input module	MELSEC iQ-R series Input module
Output module	MELSEC-Q series Output module	MELSEC iQ-R series Output module
Input/Output composite module	MELSEC-Q series Input/Output composite module	MELSEC iQ-R series Input/Output composite module
Analog input module	MELSEC-Q series Analog input module	MELSEC iQ-R series Analog input module
Analog output module	MELSEC-Q series Analog output module	MELSEC iQ-R series Analog output module
External device connector	A6CON1, A6CON2, A6CON3, A6CON4	A6CON1, A6CON2, A6CON4
Manual pulse generator	MR-HDP01	MR-HDP01 ^(Note-2)
SSCNET cable ^(Note-3)	MR-HBUS□M MR-J2HBUS□M	[SSCNETIII cable]
		MR-J3BUS□M
		MR-J3BUS□M-A
		MR-J3BUS□M-B ^(Note-4)

(Note-1): The number of control axes is increased from 1 to 2.

(Note-2): The existing MR-HDP01 can be used continuously with RD77MS.

In addition, Mitsubishi Electric has also confirmed the operation of the following manual pulse generator. Contact the manufacturer for details.

Product name	Model name	Description	Manufacturer
Manual pulse generator	UFO-M2-0025-2Z1-B00E	Number of pulses per revolution: 25 pulse/rev (100 pulse/rev after magnification by 4)	Nemicon Corporation

(Note-3): "□" indicates the cable length.

(015: 0.15m, 03: 0.3m, 05: 0.5m, 1: 1m, 5:5m, 10: 10m, 20: 20m, 30: 30m, 40: 40m, 50: 50m)

(Note-4): For a long distance cable of up to 100 m or an ultra-long bending life cable, contact Mitsubishi Electric System & Service Co., Ltd.

[Sales office] FA PRODUCT DIVISION mail: osb.webmaster@melsc.jp

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

2.1.1 Servo amplifiers and servo motors

The servo system network is changed from SSCNET to SSCNETIII/H.

Select a SSCNETIII/H compatible servo amplifier and a servo motor connectable to the selected servo amplifier.

Before migration from QD75M			After migration to RD77MS		
Servo amplifier		Servo motor	Servo amplifier		Servo motor
MR-J2S series	MR-J2S-□B	HC-KFS□ HC-MFS□ HC-SFS□ HC-LFS□ HC-RFS□ HA-LFS□ HC-UFS□	MR-J4 series	MR-J4-□B(-RJ) MR-J4W2-□B MR-J4W3-□B	HG-KR□ HG-MR□ HG-SR□ HG-RR□ HG-UR□ HG-JR□
MR-J2M series	MR-J2M-□DU	HC-KFS□ HC-MFS□ HC-UFS□			
MR-H series	MR-H□B(N)	HA-FF□ HA-FH□ HA-LH□ HA-MH□ HA-SH□ HA-UH□ HC-KF□ HC-MF□ HC-RF□ HC-SF□ HC-UF□ HA-LF□ HA-LH□K			
MR-J2 series	MR-J2-□B	HC-MF□ HA-FF□ HC-SF□ HA-RF□ HC-UF□			
MR-J2-Jr series	MR-J2-03B5	HC-AQ□(B)D HC-AQ□(B)S		MR-J4W2-0303B6	HG-AK□(B)D HG-AK□(B)

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

[Comparison of servo system network]

Item		 SSCNET SERVO SYSTEM CONTROLLER NETWORK	 SSCNET III/H SERVO SYSTEM CONTROLLER NETWORK
Communications medium		Metal cable	Optical fiber cable
Communications speed		5.6 Mbps	150 Mbps
Communications cycle	Send	0.88 ms/1.77 ms/3.55 ms	0.222 ms/0.444 ms/0.888 ms
	Receive	3.55ms	0.222 ms/0.444 ms/0.888 ms
Number of control axes		Up to 8 axes/line	Up to 16 axes/line
Transmission distance		Maximum overall distance: 30 m	[Standard code for inside panel and standard cable for outside panel] Up to 20 m between stations Maximum overall distance: 320 m (20 m × 16 axes) [Long distance cable] Up to 100 m between stations Maximum overall distance: 1600 m (100 m × 16 axes)

2.1.2 Engineering environment (required)

The engineering environment that supports RD77MS is as follows.

Product name	Model	Version
MELSOFT GX Works3	SW1DND-GXW3-E	Ver.1.000A or later
MELSOFT MR Configurator2 ^(Note-1)	SW1DNC-MRC2-E	Ver.1.27D or later

(Note-1): The Servo Setup Software MRZJW3-SETUP161E is required when a combination of MR-J4-B-RJ020 and MR-J4-T20 is used as MR-J2S-B.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

2.2 Differences Between QD75M and RD77MS

(1) Performance and specifications

▶ An item that requires a setting change at migration.

Item		Model						Points for migration
		QD75M1	QD75M2	QD75M4	RD77MS2	RD77MS4		
Number of control axes		1	2	4	2	4	-	
Operation cycle		3.55ms			0.444ms/0.888ms/1.777ms/ 3.555ms		▶ The default value differs. Set Pr.96 to "0002H".	
Control method	Speed-torque	Not provided			Provided		-	
	Synchronous	Not provided			Provided		-	
Starting time (1-axis linear control)	Trapezoidal acceleration/ deceleration	6.0ms			0.7ms (Operation cycle: 0.444ms), 1.1ms (Operation cycle: 0.888ms/1.777ms), 0.92ms (Operation cycle: 3.555ms)		-	
	S-curve acceleration/ deceleration	6.5ms						
Servo system network		SSCNET			SSCNETIII/H or SSCNETIII		▶ Select a servo system network which is compatible with the devices to be connected such as servo amplifiers. Pr.97 0: SSCNETIII 1: SSCNETIII/H	
Servo amplifier		MR-J2S-□B/MR-J2M-□DU/ MR-H-□B(N)/ MR-J2-□B/MR-J2-03B5			MR-J4-□B(-RJ)/ MR-J4W2-□B/MR-J4W3-□B/ MR-J4W2-0303B6		-	
Refresh cycle for monitor data		56.8ms	Feed machine value, Feed speed, Axis feedrate, External input signal, Forced stop input			Operation cycle		-
		3.55ms	Except for above					
Maximum frequency for manual pulse generator/ incremental synchronous encoder input	Signal input form	Voltage output/open collector type			Differential output type, Voltage output/open collector type		-	
	1 pulse input magnification	1 to 100			1 to 10000		-	
Machine home position return (Home position return method)		4 types (Proximity dog method, Count method1, Count method2, Data set method)			6 types (Proximity dog method, Count method1, Count method2, Data set method, Scale home position signal detection method, Driver home position return method (Note-1))		-	

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(Continued)

Item		Model			RD77MS2	RD77MS4	Points for migration
		QD75M1	QD75M2	QD75M4			
External signal selection function		Not provided (External input signal of QD75M only)			10 points • External input signal of RD77MS (FLS, RLS, DOG, STOP, DI) • External input signal of servo amplifier (FLS, RLS, DOG) • External input signal via CPU (Buffer memory: FLS, RLS, DOG)	20 points	▶ Confirm there is no problem with the connection of external input signals if the manual pulse generator in use is other than MR-HDP01. (Refer to section 2.3.2.)
Torque change function		Forward/reverse torque limit value same setting			Forward/reverse torque limit value same setting, individual setting		No need to change the setting since the default setting is "0: Forward/reverse torque limit value same setting".
Amplifier-less operation function		Not provided			Provided		-
Virtual servo amplifier function		Not provided			Provided		-
Mark detection function		Not provided			Provided		-
Optional data monitor function		Not provided			Provided		-
Event history function		Not provided			Provided		-
Connect/disconnect of SSCNET communication		Not provided (No need to set)			Provided		-
History data (start, error, warning)		Time (hour, minute, second)			Date and time (year, month, day, hour, minute, second)		-
External command signal	Switching signal	CHG signal (Select whether the signal starts positioning or performs speed-position switching with parameter settings)			DI signal (Select whether the signal starts positioning or performs speed-position switching with parameter settings)		The signal name has been changed. ▶ When an external command signal is used, "[Pr.95] External command signal selection" needs to be set.
Speed-position/position-speed switching control		Switched by external command signal (CHG)			Switched by the external command signal (DI) or the proximity dog signal (DOG), which is set with "[Pr.42] External command function selection"		The signal name has been changed.
Engineering environment		MELSOFT GX Works2 MELSOFT GX Developer MELSOFT GX Configurator-QP			MELSOFT GX Works3		-

(Note-1): The home position return set in driver (servo amplifier) is used.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(2) Exterior dimensions and mass

	QD75M1	QD75M2	QD75M4	RD77MS2	RD77MS4
Exterior dimensions [mm]					
	98.0[H]×27.4[W]×90.0[D]			106.0[H]×27.8[W]×110.0[D]	
Mass [kg]	0.15		0.16	0.22	0.23
Internal current consumption (5 VDC) [A]	0.4			1.0	

(3) Base unit

The MELSEC-Q series and the MELSEC iQ-R series are different in fixing holes' position in the base unit, dimensions, and mass. Refer to "QCPU User's Manual (Hardware Design, Maintenance and Inspection)" and "MELSEC iQ-R Module Configuration Manual" for details.

(4) Operation cycle

The operation cycle settings of QD75M can be imported to RD77MS when the projects of QD75M are diverted to RD77MS in MELSOFT GX Works3.

(Refer to section 2.4.1 for details of project diversion.)

However, if the operation cycle is set as default (automatic), the operation cycle will be changed. Set a fixed operation cycle where necessary by following the table below because the change in the operation cycle may change program execution timing.

[Control axes and operation cycle at default]

Item \ Model	QD75M	RD77MS
Number of control axes	Up to 4	Up to 16
Operation cycle (default)	3.55ms	0.444ms/1 to 4 axes 0.888ms/5 to 8 axes 1.777ms/9 to 16 axes

[Settable operation cycle]

QD75M	RD77MS
3.55ms	0.444ms
	0.888ms
	1.777ms
	3.555ms

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(5) Parameter setting

▶ An item that requires a setting change at migration.

Function	Specification		Points for migration
	QD75M	RD77MS	
Pr.17 Torque limit setting value	1 to 500 [%]	1 to 10000 [0.1%]	▶ When a torque limit value has been set in the program, the program needs to be revised.
Pr.24 Manual pulse generator/ incremental synchronous encoder input selection	Input selection for the manual pulse generator	Input selection for the manual pulse generator/incremental synchronous encoder	The parameter name has been changed.
Pr.54 Home position return torque limit value	1 to 300 [%]	1 to 10000 [0.1%]	▶ When a torque limit value has been set in the program, the program needs to be revised.
Pr.55 Operation setting for incompletion of home position return	– (Positioning control can be executed without completion of home position return.)	0: Positioning control is not executed. 1: Positioning control is executed.	▶ The default setting is “0: Positioning control is not executed”. Change it to “1: Positioning control is executed”.
Pr.116 to 119 FLS/RLS/DOG/STOP signal selection	– (External input signals of QD75M are used)	Pr.116 FLS signal selection Pr.117 RLS signal selection Pr.118 DOG signal selection Pr.119 STOP signal selection	▶ The parameters needs to be set again.
Pr.82 Forced stop valid/invalid selection	– (Forced stop is not available)	0: Valid (External input signal) 1: Invalid 2: Valid (Buffer memory)	▶ The default setting is “0: Valid (External input signal)”. Change it to “1: Invalid”.
Pr.84 Restart allowable range when servo OFF to ON	Pr.201 Restart allowable range when servo OFF to ON	Pr.84 Restart allowable range when servo OFF to ON	The parameter No. has been changed.
Pr.95 External command signal selection	– (External input signals of QD75M are used)	<RD77MS2> 0: Not used 1: DI1 : 10: DI10 <RD77MS4> 0: Not used 1: DI1 : 20: DI20	Set the external command signals (DI) to be used with “ Pr.95 External command signal selection”.
Pr.96 Operation cycle setting	–	0000H: 0.888ms 0001H: 1.777ms 0002H: 3.555ms 0200H: 0.444ms FFFFH: Automatic setting	▶ The default value differs. Set Pr.96 to “0002H”.
Pr.97 SSCNET setting		0: SSCNETIII 1: SSCNETIII/H	–
Start history	Indicates the start time by hour, minute, and second. Md.5 Start (Hour) Md.6 Start (Minute: second)	Indicates the start time by year, month, day, hour, minute, and second. Md.54 Start (Year: month) Md.5 Start (Day: hour) Md.6 Start (Minute: second)	More time information (Md.54) Year: month and Md.5 Day) is added. Review the program as needed.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75M	RD77MS	
Axis error occurrence time	Indicates the axis error occurrence time by hour, minute, and second. [Md.11] Axis error occurrence (Hour) [Md.12] Axis error occurrence (Minute: second)	Axis error occurrence time is indicated with the event history.	The monitoring method of axis error occurrence time has been changed.
Axis warning occurrence time	Indicates the axis warning occurrence time by hour, minute, and second. [Md.16] Axis warning occurrence (Hour) [Md.17] Axis warning occurrence (Minute: second)	Axis warning occurrence time is indicated with the event history.	The monitoring method of axis warning occurrence time has been changed.
[Md.31] Status	b0 : In speed control flag b1 : Speed-position switching latch flag b2 : Command in-position flag b3 : OPR request flag b4 : OPR complete flag b5 : Position-speed switching latch flag b9 : Axis warning detection b10: Speed change 0 flag	b0 : In speed control flag b1 : Speed-position switching latch flag b2 : Command in-position flag b3 : Home position return request flag b4 : Home position return complete flag b5 : Position-speed switching latch flag b9 : Axis warning detection b10: Speed change 0 flag b12: M-code ON b13: Error detection b14: Start complete b15: Positioning complete	"b12" to "b15" are assigned to X devices in QD75M, however, they are assigned to monitor data in RD77MS.
[Md.105] Connected device	[Md.105] Servo parameter This area stores the parameter currently used by the servo amplifier.	[Md.105] Connected device This area stores the vendor ID and module code of each axis when the power of the connected device is turned ON.	Changes in monitor function ► RD77MS automatically reads parameters from the servo amplifier, and the read parameters can be checked with the buffer memory.
[Md.107] Parameter error No.	When a servo error occurs, the corresponding bit turns ON, and the error is stored in the buffer memory.	When a servo error occurs, the value corresponding to the parameter No. is stored in [Md.107].	The monitoring method of servo error has been changed.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75M	RD77MS	
<p>[Md.108] Servo status 1</p>	<p>b0 : READY ON b1 : Servo ON b4 : Zero point pass b5 : In-position b6 : Zero speed b7 : Torque limit b13: Servo alarm b14: Servo warning</p>	<p>b0 : READY ON b1 : Servo ON b2,b3: Control mode b4 : Gain switching b5 : Fully closed loop control switching b7 : Servo alarm b12 : In-position b13 : Torque limit b14 : Absolute position lost b15 : Servo warning</p>	<p>▶ The servo status is assigned to [Md.108] and [Md.119] in RD77MS. The reference monitor No. needs to be changed.</p>
<p>[Md.119] Servo status 2</p>	-	<p>b0: Zero point pass b3: Zero speed b4: Speed limit b8: PID control</p>	
<p>[Cd.24] Speed-position switching enable flag</p>	<p>0: Speed control will not be taken over by position control even when the external command signal [CHG] comes ON. 1: Speed control will be taken over by position control when the external command signal [CHG] comes ON.</p>	<p>0: Speed control will not be taken over by position control even when the signal set in "[Cd.45] Speed-position switching device selection" comes ON. 1: Speed control will be taken over by position control even when the signal set in "[Cd.45] Speed-position switching device selection" comes ON.</p>	<p>▶ The external command signal name has been changed from "CHG" to "DI". In order to use the external command signal [DI] for speed-position switching, set "[Cd.45] Speed-position switching device selection" to [0: Use the external command signal for switching from speed control to position control].</p>
<p>[Cd.26] Position-speed switching enable flag</p>	<p>0: Position control will not be taken over by speed control even when the external command signal [CHG] comes ON. 1: Position control will be taken over by speed control when the external command signal [CHG] comes ON.</p>	<p>0: Position control will not be taken over by speed control even when the signal set in "[Cd.45] Speed-position switching device selection" comes ON. 1: Position control will be taken over by speed control when the signal set in "[Cd.45] Speed-position switching device selection" comes ON.</p>	<p>▶ The external command signal name has been changed from "CHG" to "DI". In order to use the external command signal [DI] for position-speed switching, set "[Cd.45] Speed-position switching device selection" to [0: Use the external command signal for switching from position control to speed control].</p>

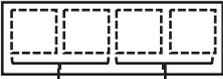
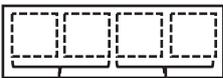
2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75M	RD77MS	
<u>Cd.30</u> Simultaneous starting own axis start data No.	<u>Cd.30</u> Simultaneous starting axis start data No. (Axis 1 start data No.)	<u>Cd.30</u> Simultaneous starting own axis start data No.	The parameter No. has been changed. ► To execute a simultaneous start, set " <u>Cd.43</u> Simultaneous starting axis".
<u>Cd.31</u> Simultaneous starting axis start data No.1	<u>Cd.31</u> Simultaneous starting axis start data No. (Axis 2 start data No.)	<u>Cd.31</u> Simultaneous starting axis start data No.1	
<u>Cd.32</u> Simultaneous starting axis start data No.2	<u>Cd.32</u> QD75M4 Simultaneous starting axis start data No. (Axis 3 start data No.)	<u>Cd.32</u> Simultaneous starting axis start data No.2	
<u>Cd.33</u> Simultaneous starting axis start data No.3	<u>Cd.33</u> QD75M4 Simultaneous starting axis start data No. (Axis 4 start data No.)	<u>Cd.33</u> Simultaneous starting axis start data No.3	

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75M	RD77MS	
<p>Cd.43 Simultaneous starting axis</p>	-	<p>[Low-order buffer memory] Set with a hexadecimal.</p>  <p>Simultaneous starting axis No.1 00 to 0F : Axis 1 to Axis 16</p> <p>Simultaneous starting axis No.2 00 to 0F : Axis 1 to Axis 16</p> <p>[High-order buffer memory] Set with a hexadecimal.</p>  <p>Simultaneous starting axis No.3 00 to 0F : Axis 1 to Axis 16</p> <p>Number of simultaneous starting axes 2 to 4: 2 axes to 4 axes</p>	-
<p>Cd.45 Speed-position switching device selection</p>	-	<p>[Speed-position switching control] 0: Use the external command signal for switching from speed control to position control. 1: Use the proximity dog signal for switching from speed control to position control 2: Use "Cd.46 Speed-position switching command" for switching from speed control to position control</p> <p>[Position-speed switching control] 0: Use the external command signal for switching from position control to speed control. 1: Use the proximity dog signal for switching from position control to speed control 2: Use "Cd.46 Speed-position switching command" for switching from position control to speed control</p>	-
<p>Cd.46 Speed-position switching command</p>	-	<p>[Speed-position switching control] 0: Not switch from speed control to position control 1: Switch from speed control to position control</p> <p>[Position-speed switching control] 0: Not switch from position control to speed control 1: Switch from position control to speed control</p>	-

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(Continued)

Function	Specification		Points for migration	
	QD75M	RD77MS		
[Cd.102] SSCNET control command	[Cd.102] Servo amplifier data read 0: Servo amplifier read complete 1: Servo amplifier read request	[Cd.102] SSCNET control command The connect/disconnect command of SSCNET communication is executed.	A change in control data function ▶ RD77MS automatically reads parameters in the servo amplifier, and the read parameters can be checked with the buffer memory.	
Axis stop	<QD75M1/2> Y4, Y5	<QD75M4> Y4 to Y7	[Cd.180] 1: Axis stop requested Other than 1: Axis stop not requested	-
Forward run JOG start	<QD75M1/2> Y8, YA	<QD75M4> Y8, YA, YC, YE	[Cd.181] 1 : JOG started Other than 1: JOG not started	-
Reverse run JOG start	<QD75M1/2> Y9, YB	<QD75M4> Y9, YB, YD, YF	[Cd.182] 1 : JOG started Other than 1: JOG not started	-
Execution prohibition flag	<QD75M1/2> Y14, Y15	<QD75M4> Y14 to Y17	[Cd.183] 1 : During execution prohibition Other than 1: Not during execution prohibition	-
Axis to be interpolated	[Da.5] Axis to be interpolated	[Da.20] Axis to be interpolated No.1 [Da.21] Axis to be interpolated No.2 [Da.22] Axis to be interpolated No.3	-	
[Da.16] Condition operator	01: **=P1 02: **≠P1 03: **≤P1 04: **≥P1 05: P1≤**≤P2 06: **≤P1,P2≤** 07: DEV=ON 08: DEV=OFF 10: Axis 1 selected QD75M2 QD75M4 20: Axis 2 selected QD75M2 QD75M4 30: Axis 1,2 selected QD75M2 QD75M4 40: Axis 3 selected QD75M2 QD75M4 50: Axis 1,3 selected QD75M4 60: Axis 2,3 selected QD75M4 70: Axis 1,2,3 selected QD75M4 80: Axis 4 selected QD75M4 90: Axis 1,4 selected QD75M4 A0: Axis 2,4 selected QD75M4 B0: Axis 1,2,4 selected QD75M4 C0: Axis 3,4 selected QD75M4 D0: Axis 1,3,4 selected QD75M4 E0: Axis 2,3,4 selected QD75M4	01: **=P1 02: **≠P1 03: **≤P1 04: **≥P1 05: P1≤**≤P2 06: **≤P1,P2≤** 07: DEV=ON 08: DEV=OFF	▶ “10” to “E0” of QD75M are assigned to “[Da.23] Number of simultaneously starting axes” and “[Da.24] to [Da.26] Simultaneously starting axis” in RD77MS.	

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75M	RD77MS	
<p>[Da.18] Parameter 1</p> <p>[Da.19] Parameter 2</p>	Set according to "[Da.16] Condition Operator".	Set according to "[Da.16] Condition Operator" and "[Da.23] Number of simultaneously starting axes".	-
<p>[Da.23] Number of simultaneously starting axes</p>	-	2: 2 axes 3: 3 axes 4: 4 axes	In order to execute a simultaneous start, set "[Da.23] Number of simultaneously starting axes".
<p>[Da.24] Simultaneously starting axis No.1</p> <p>[Da.25] Simultaneously starting axis No.2</p> <p>[Da.26] Simultaneously starting axis No.3</p>	-	0: Axis 1 selected 1: Axis 2 selected 2: Axis 3 selected 3: Axis 4 selected 4: Axis 5 selected 5: Axis 6 selected 6: Axis 7 selected 7: Axis 8 selected 8: Axis 9 selected 9: Axis 10 selected A: Axis 11 selected B: Axis 12 selected C: Axis 13 selected D: Axis 14 selected E: Axis 15 selected F: Axis 16 selected	Set [Da.24] to [Da.26] according to the number of simultaneous starting axes set in [Da.23].

(6) Items that need a review or a change following the servo system network change

Items	Differences		Change/revision
	QD75M	RD77MS	
Electronic gear	-	-	Change "[Pr.2] Number of pulses per rotation" and "[Pr.3] Movement amount per rotation" of the basic parameter 1 according to the resolution per the connected servo motor rotation.
Positioning data	-	-	Review the positioning data while taking into account the differences in resolution per the connected servo motor rotation and the setting changes in the electronic gear above.
Main circuit OFF warning	If the main circuit is turned OFF while "[Cd.100] Servo OFF command" is ON, the main circuit OFF warning 2149(E9) will not occur.	If the main circuit is turned OFF while "[Cd.100] Servo OFF command" is ON, the main circuit OFF warning 2149(E9) will occur.	The warning occurs when the main circuit is turned OFF while "[Cd.100] Servo OFF command" is ON. In order not to turn ON the main circuit OFF warning 2149(E9), change the PC18 servo parameter from "0□□□(H)" to "1□□□(H)".

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

2.3 Connection of manual pulse generator

2.3.1 Comparison of pin layout

The signal layout of the external device connection connector differs between QD75M and RD77MS. Since RD77MS is provided with a 5 VDC power supply output for manual pulse generator, the internal connection of the external input signal cable needs to be changed at replacement.

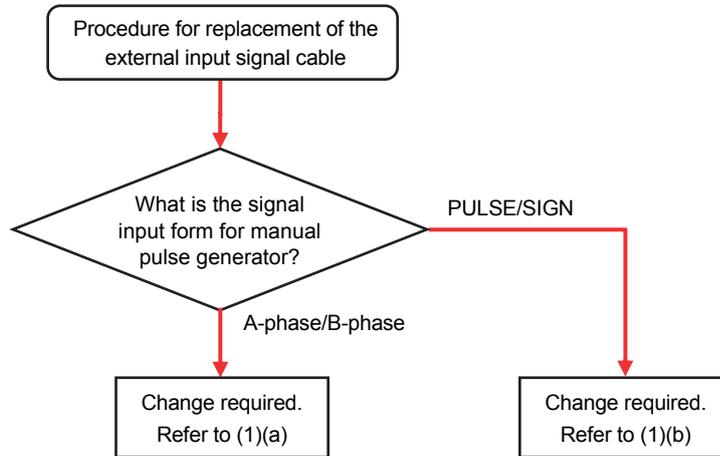
The following shows the differences in pin layout between QD75M and RD77MS.

QD75M					RD77MS			
Pin No.	Signal name	Pin No.	Signal name		Pin No.	Signal name	Pin No.	Signal name
1B20	PULSER B-	1A20	PULSER B+		1B20	HB	1A20	5V
1B19	PULSER A-	1A19	PULSER A+		1B19	HA	1A19	5V
1B18	No connect	1A18	No connect		1B18	HBL	1A18	HBH
1B17	No connect	1A17	No connect		1B17	HAL	1A17	HAH
1B15	No connect	1A15	No connect		1B15	5V	1A15	5V
1B14	No connect	1A14	No connect		1B14	SG	1A14	SG

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

2.3.2 External input signal cable replacement

Replace the external input signal cable by following the flowchart below.



[Precaution at replacement of the external input signal cable]

Set "1: Voltage-output/open-collector type" in "[Pr.89] Manual pulse generator/Incremental synchronous encoder input type selection" if the manual pulse generator/incremental synchronous encoder of voltage-output/open-collector type is used.

The default value is "1: Voltage-output/open-collector type".

Set the signal input form according to the program with "[Pr.24] Manual pulse generator/Incremental synchronous encoder input selection".

The 5 VDC power supply from the Simple Motion module must not be used if a separate power supply is applied to the manual pulse generator/incremental synchronous encoder. If a separate power supply is used, use a stabilized power supply of voltage 5 VDC ($\pm 5\%$ recommended). Use of a power supply with different voltage may cause a failure.

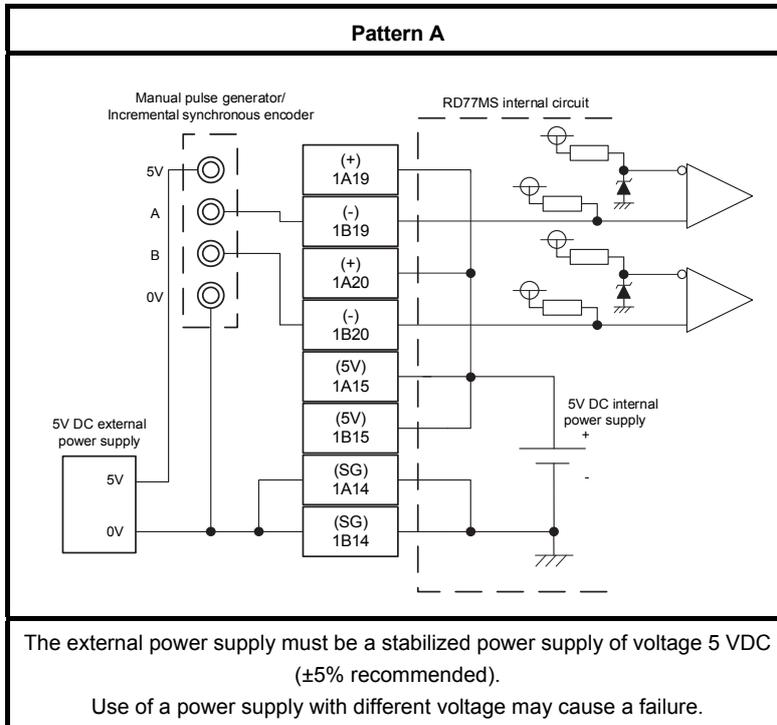
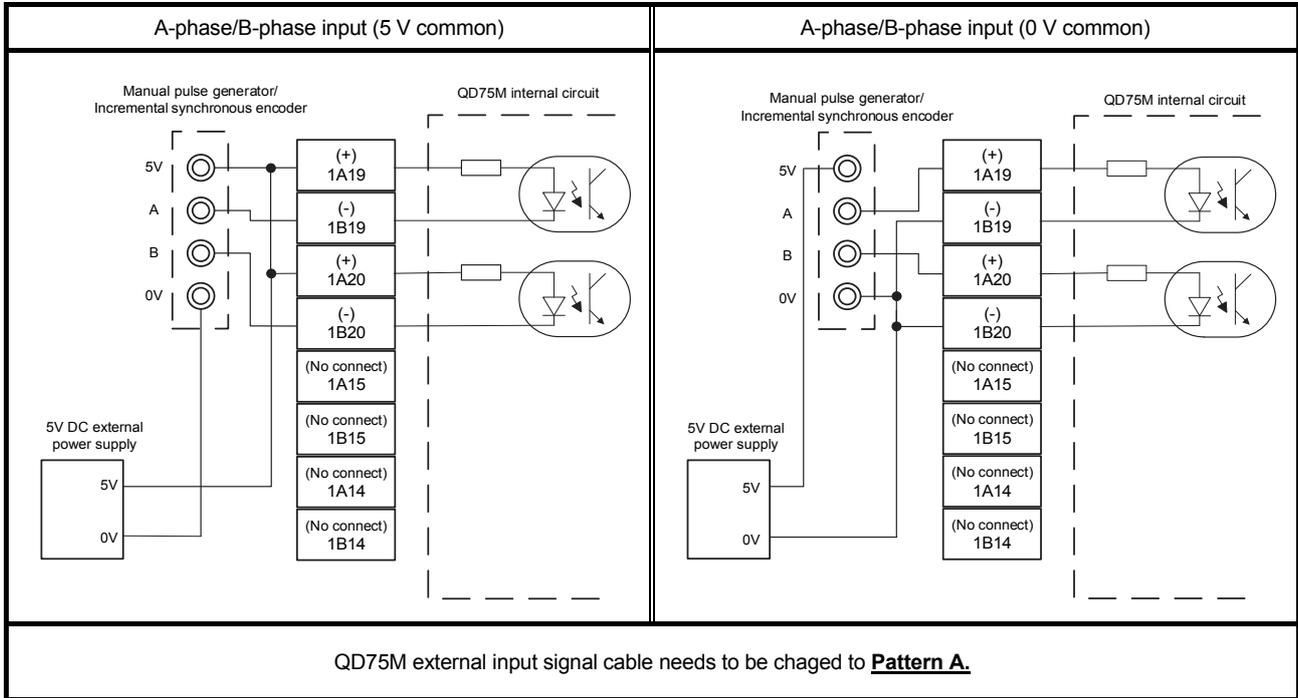
The connection terminals for the manual pulse generator of RD77MS Simple Motion module (1A20 to 1A17, 1B20 to 1B17) are not electrically isolated. Therefore, **be sure to connect the 0 V (-) of the manual pulse generator/incremental synchronous encoder and the SG of RD77MS when using a separate power supply.**

Refer to "MELSEC iQ-R Simple Motion Module User's Manual (Startup)" for details of wiring of the external input signal cable.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

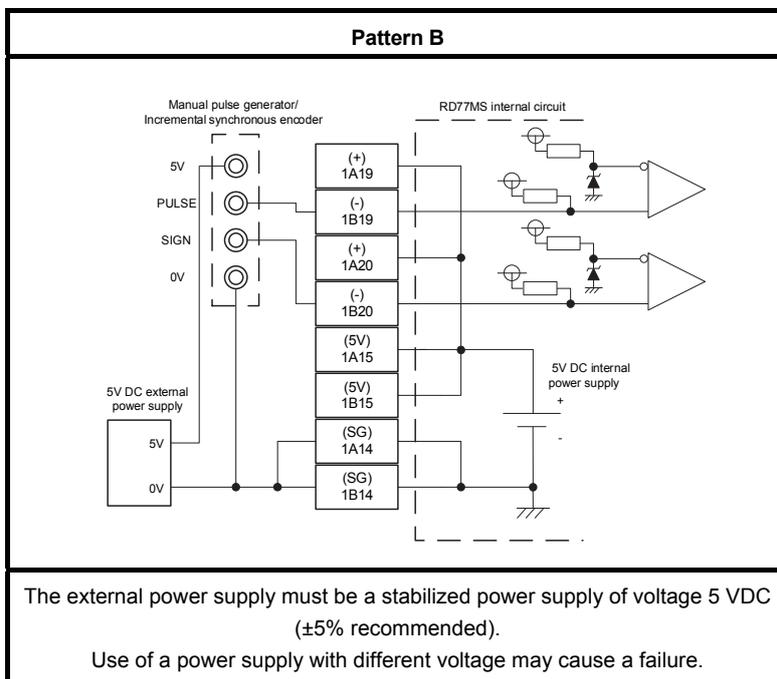
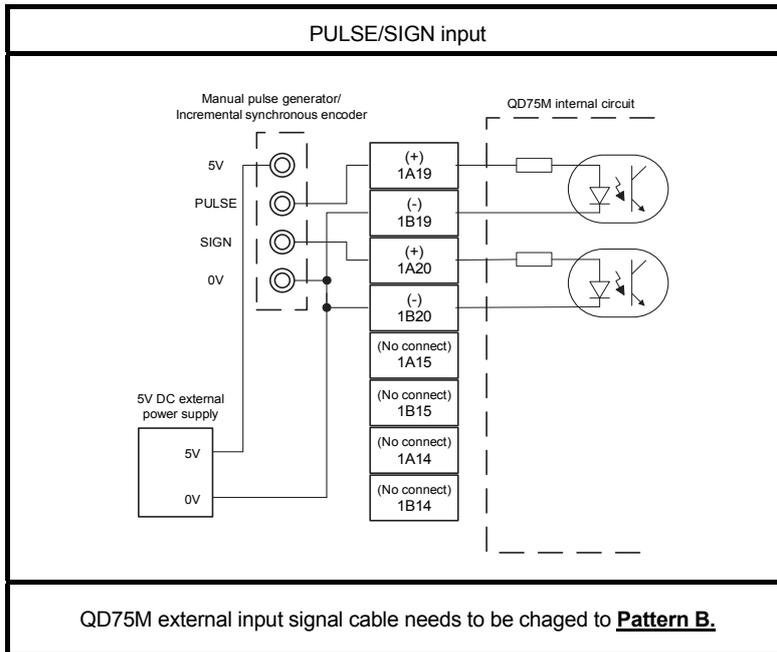
(1) Wiring example for external input signal cable

(a) When the signal input form is A-phase/B-phase



2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(b) When the signal input form is PULSE/SIGN



2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

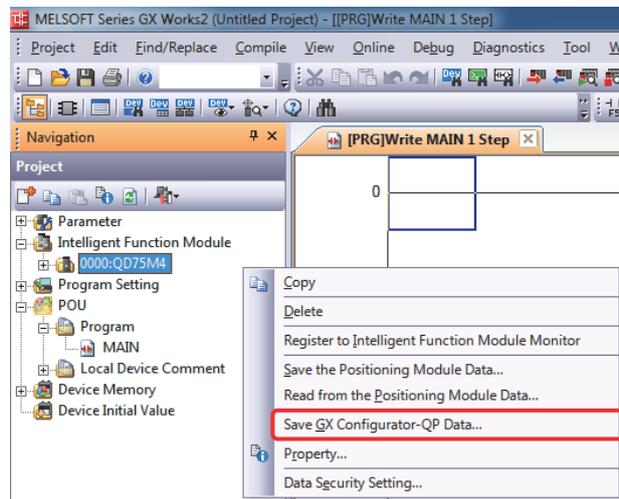
2.4 Project Diversion

2.4.1 Project diversion procedures by engineering environment

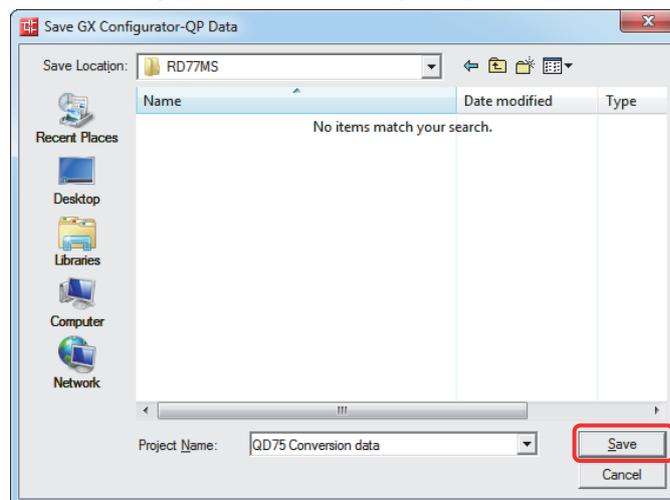
- (1) Procedures for QD75M projects diversion by MELSOFT GX Works2
MELSOFT GX Works2 (Simple Motion module setting tool) cannot directly read QD75M data. Therefore, the diversion is carried out after the data is saved in MELSOFT GX Configurator-QP format.

The following shows the diversion procedure.

- 1) Start MELSOFT GX Works2. Read the project to be diverted.
- 2) Select “QD75M” from “Intelligent function module” in the navigation tree, and right-click on it.
- 3) Select “Save GX Configurator-QP Data” from the context menu to open “Save GX Configurator-QP Data” screen.



- 4) Enter the project name, and click [Save].



Saving in MELSOFT GX Configurator-QP format is complete.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(2) Procedures for PLC CPU projects diversion by MELSOFT GX Works3

MELSOFT GX Works3 can read projects created in MELSOFT GX Works2.

If the PLC CPU is other than the following models, the programmable controller type needs to be changed to universal models.

- Universal model QCPU
- High-speed universal model QCPU
- Universal model process CPU

Refer to “GX Works2 Version 1 Operating Manual (Common)” for restrictions on the programmable controller type changes.

In addition, refer to the following Technical Bulletins for details of the programmable controller type changes.

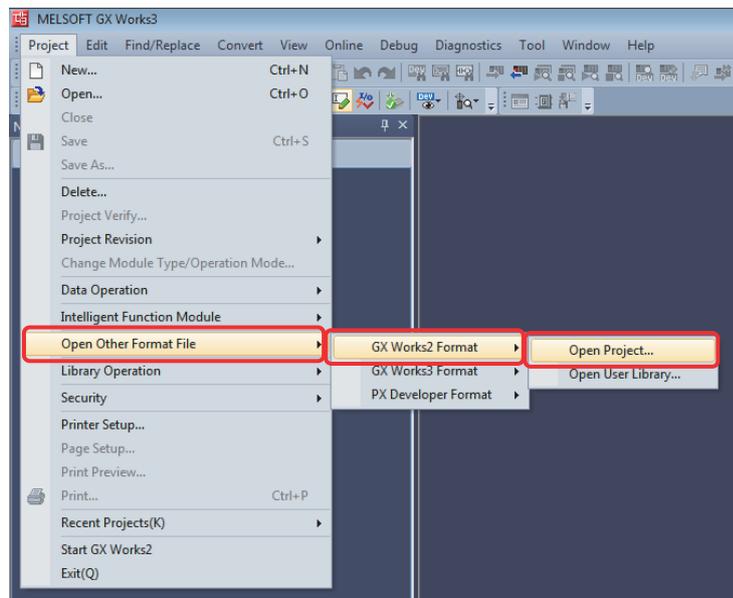
(Note): Contact your local sales office for details.

- Method of replacing Basic model QCPU with Universal model QCPU (FA-A-0054)
- Method of replacing High Performance model QCPU with Universal model QCPU (FA-A-0001)
- Method of replacing High Performance model QCPU with Universal model QCPU (Introduction) (FA-A-0209)

[Procedures when projects in which universal model QCPU is set is diverted to MELSOFT GX Works3]

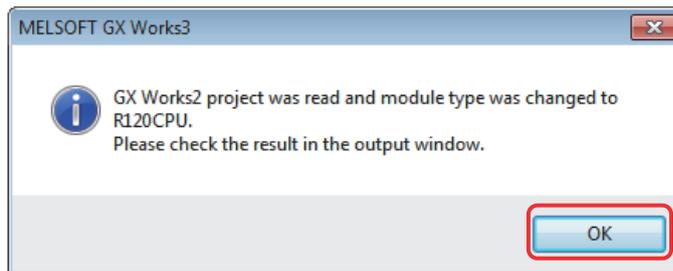
Refer to “GX Works3 Operating Manual” for details of replacing MELSOFT GX Works2 projects as those for MELSOFT GX Works3.

- 1) Start MELSOFT GX Works3. Select [Open Other Format File] - [GX Works2 Format] - [Open Project...] from “Project” menu.



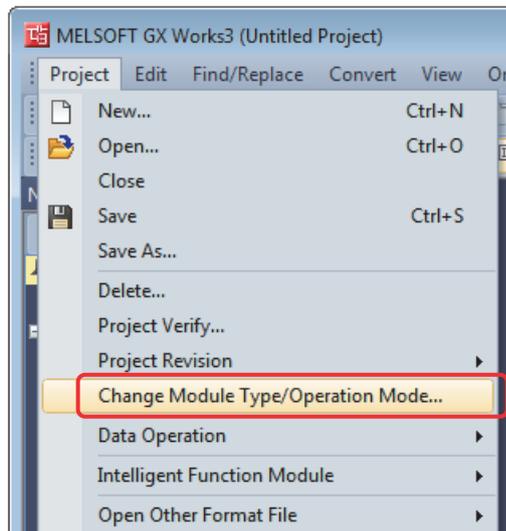
2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

- 2) Select the project to be diverted on the “Open GX Works2 Format Project” screen, and click “OK”.
- 3) Check the following precaution at project diversion, and click “OK”.
[Precaution]
When MELSOFT GX Works2 projects are read by MELSOFT GX Works3, the MELSEC-Q series PLC CPUs are automatically changed to R120CPU.
- 4) After MELSOFT GX Works2 project is read, click “OK”.
(Make sure to check the model change result in the output window.)



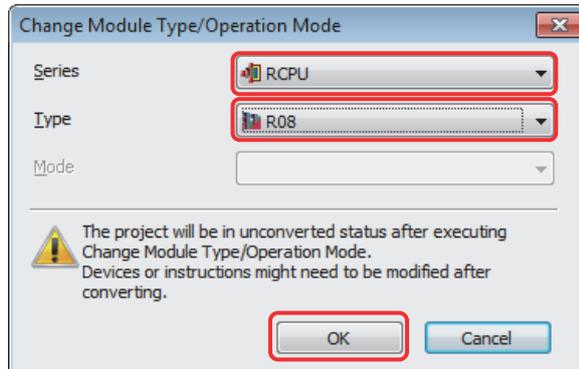
When the PLC CPU is replaced with other than R120CPU, execute the following 5) to 7).

- 5) Select “Change Module Type/Operation Mode...” in “Project” menu to open “Change Module Type/Operation Mode” screen.



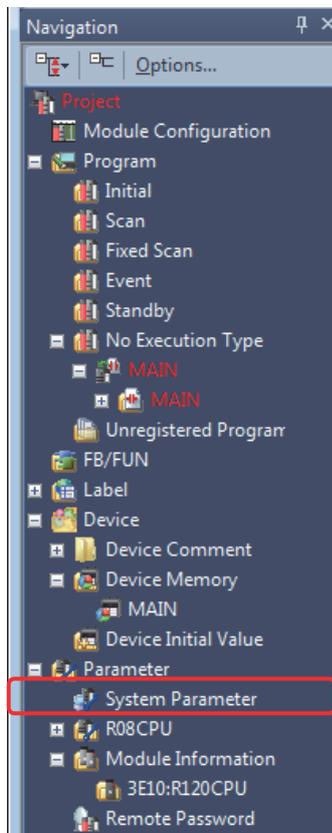
2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

- 6) Select RCPU for “Series” and the replaced PLC CPU model for “Type” (the setting example below: R08CPU). Click “OK”.



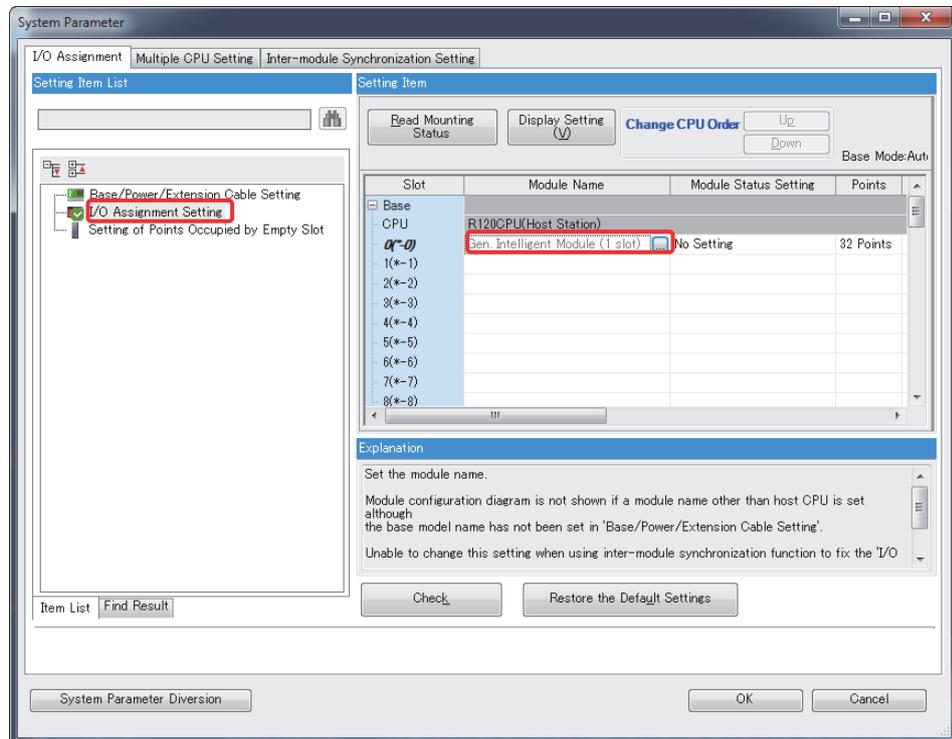
- 7) Click “OK” after confirming the precautions at model change.
The model change result is indicated in the “output window” of MELSOFT GX Works3. When QD75M is set in the project of MELSOFT GX Works2, it is changed to “Gen. Intelligent Module (1 slot)” in MELSOFT GX Works3. Therefore, “Gen. Intelligent Module (1 slot)” needs to be manually changed to RD77MS. The procedure is described in the following 8) and later.

- 8) Double-click “System Parameter” in the navigation tree to open “System Parameter” screen.

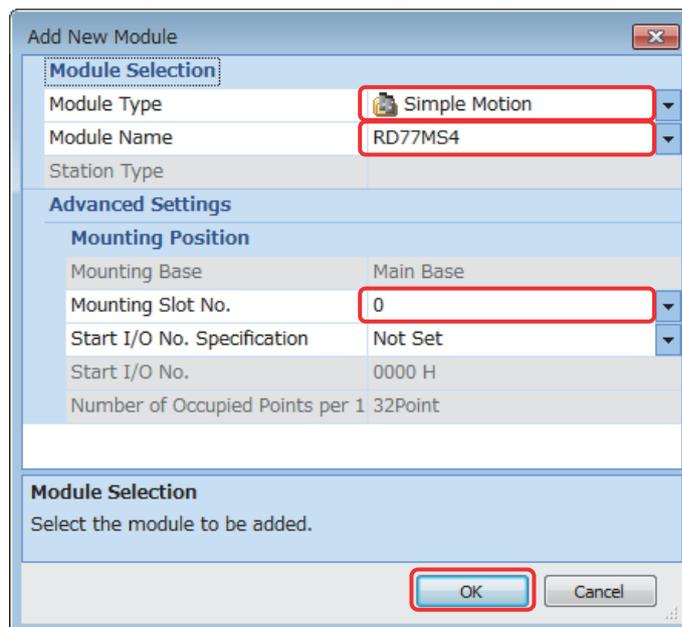


2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

- 9) Double-click on the “Gen. Intelligent Module (1 slot)” in [I/O Assignment Setting] on “System Parameter” screen to open “Add New Module” screen.

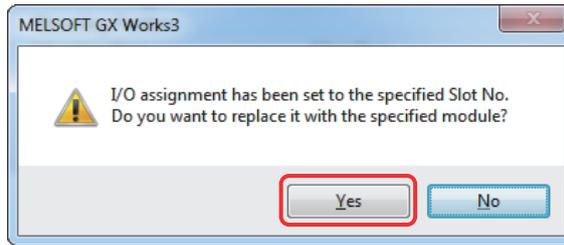


- 10) On the “Add New Module” screen, select “Simple Motion Module” for [Module Type], the replaced Simple Motion module model for [Module Name] (the setting example below: RD77MS4), and the slot No. for [Mounting Slot No]. Click [OK].

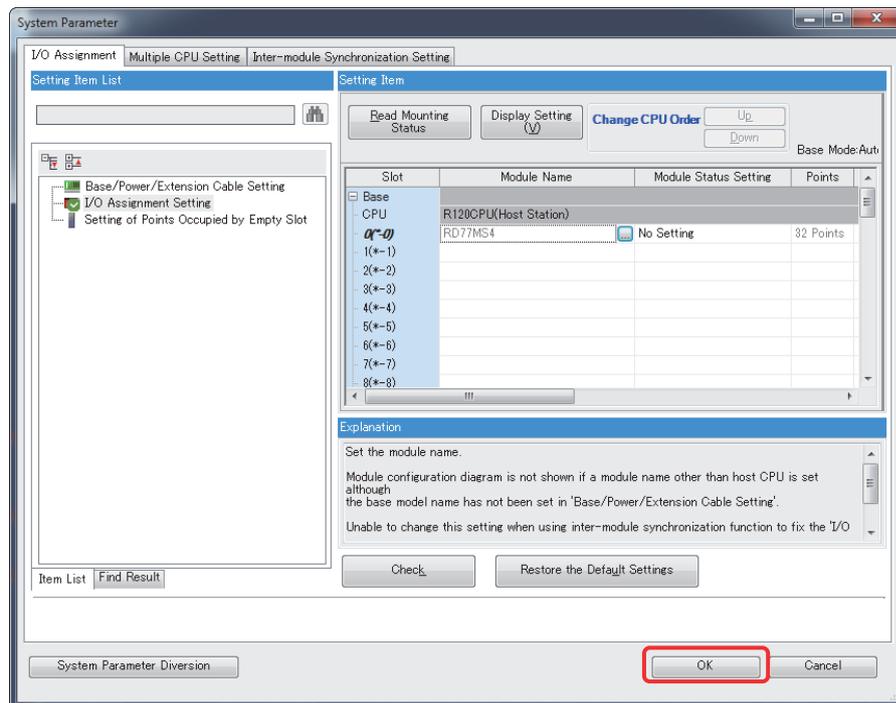


2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

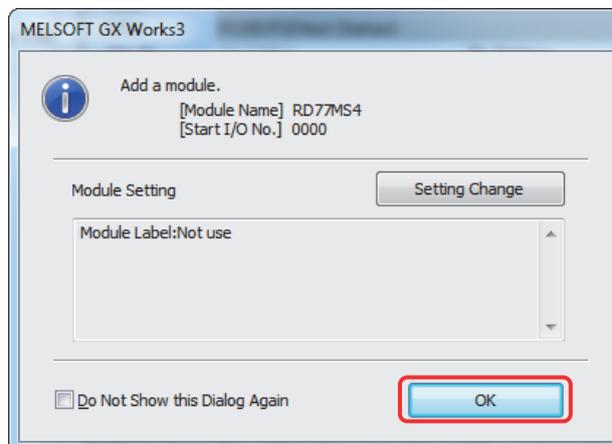
11) Click “Yes”.



12) Click “OK” on the “System parameter” screen.

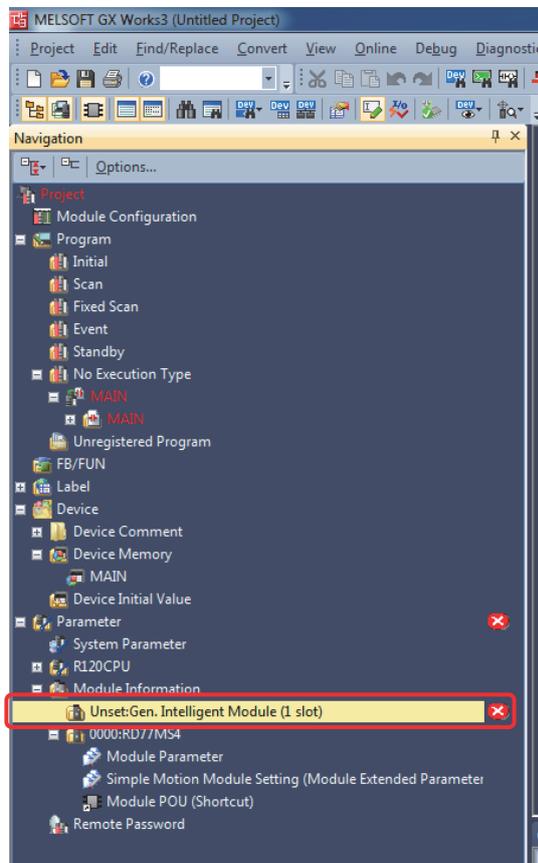


13) Click “OK” on the module label setting confirmation screen.

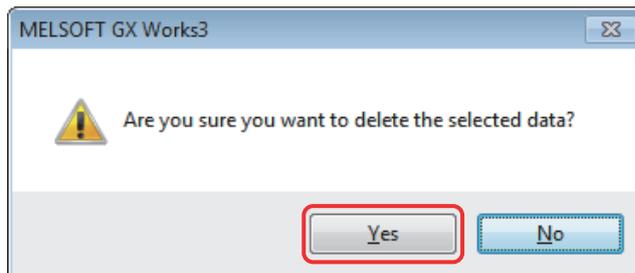


2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

- 14) Select “Unset: Gen. Intelligent Module (1 slot)” from “Module Information” in the navigation tree, and delete it with delete key.



- 15) Click “Yes”.



The diversion is complete.

Though a model change has been executed, conversion has not finished yet. Make sure to execute “Rebuilt All” before writing to PLC CPU.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

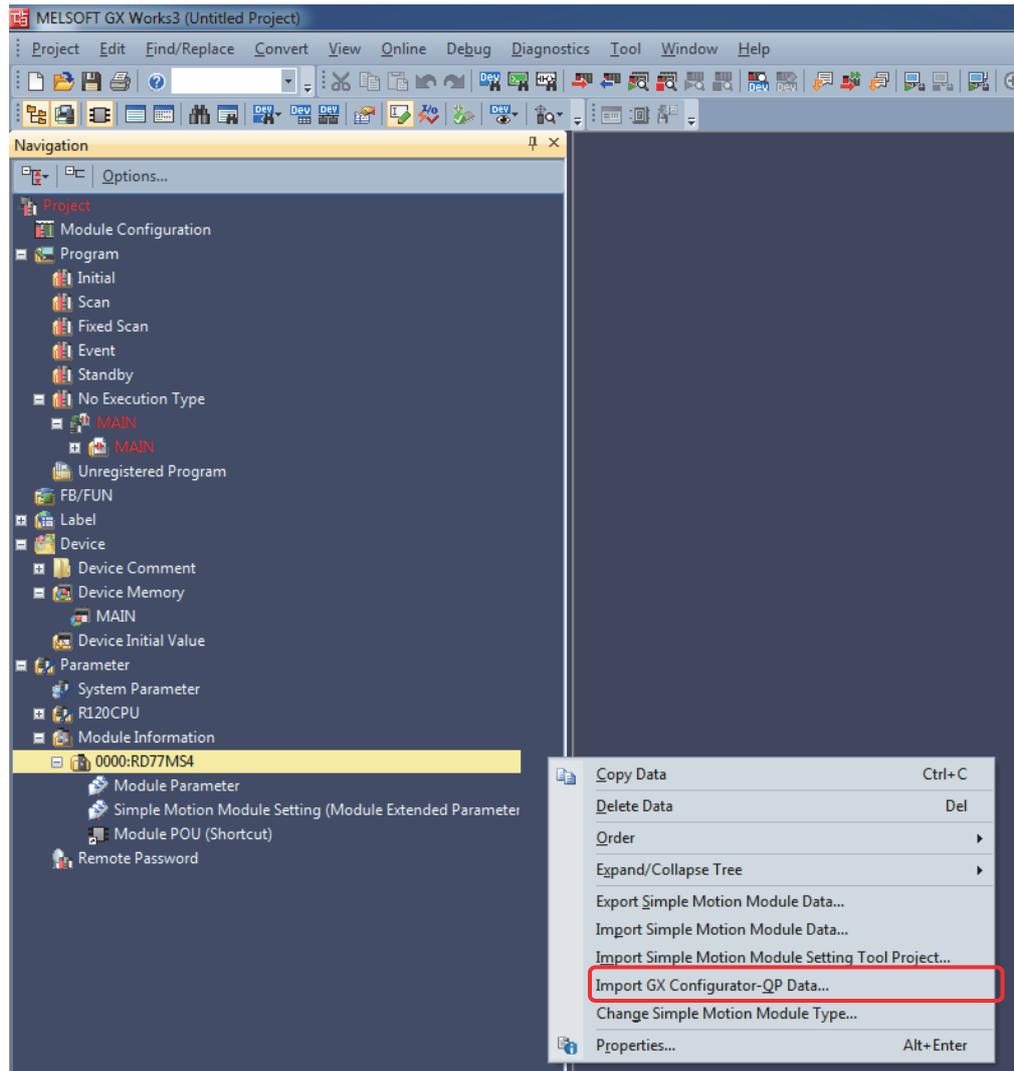
(3) Procedures for QD75M format data diversion

The following shows the procedure for diverting MELSOFT GX Configurator-QP format data to RD77MS.

1) Start MELSOFT GX Works3. Open the project data created in (2) in this section.

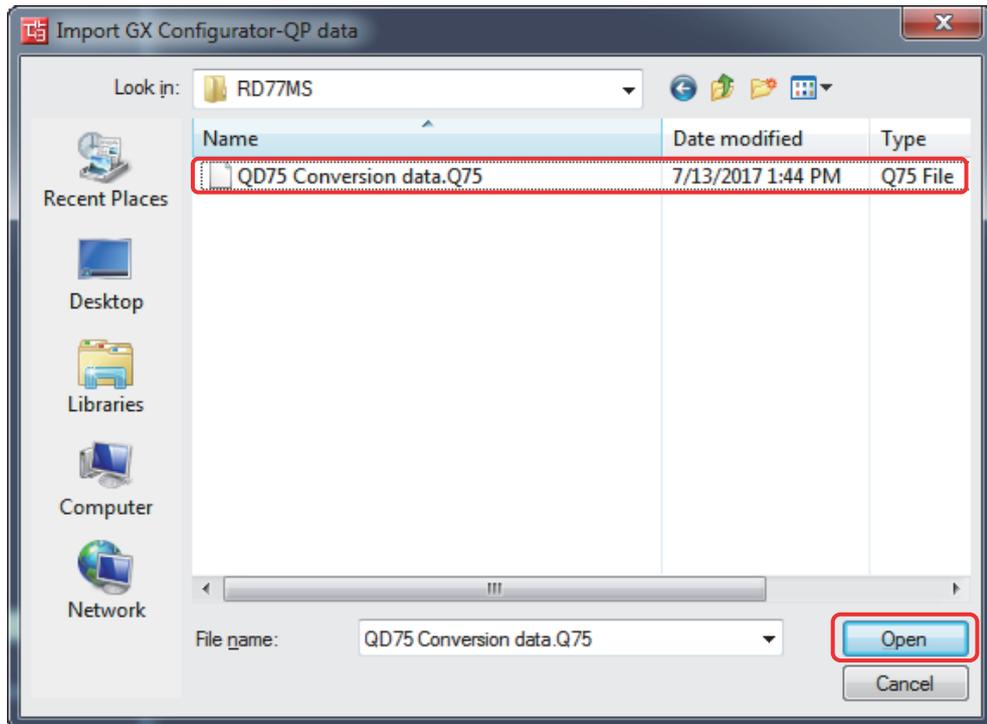
2) Select “RD77MS” under “Module Information” in the navigation tree, and right-click on it.

3) Select “Import GX Configurator-QP Data...” from the context menu.

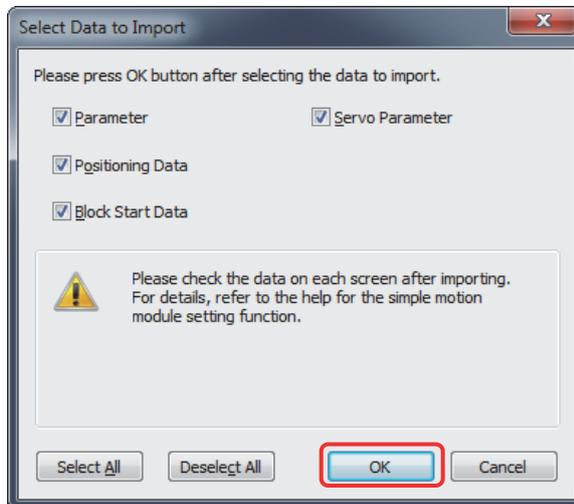


2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

4) Select the data created in (1) in this section, and click [Open].

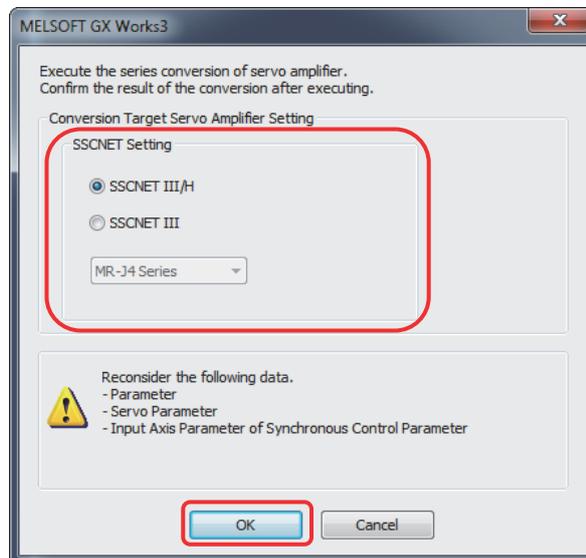


5) Click "OK" on "Select Data to Import" screen.



2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

- 6) Execute the series conversion of the servo amplifier. Select the SSCNET to be used (SSCNETIII or SSCNETIII/H) for the replaced servo amplifiers (for RD77MS), and click [OK].

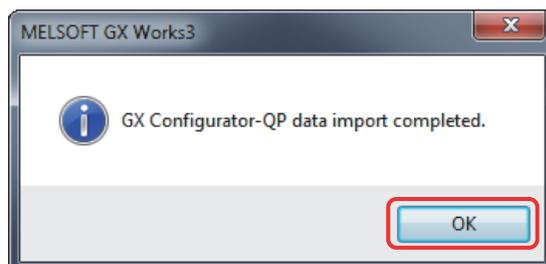


(Note): Refer to “MELSEC iQ-R Simple Motion Module User’s Manual (Application)” for the servo system networks supported by the replaced servo amplifiers and SSCNETIII compatible devices (SSCNETIII or SSCNETIII/H).

(Note): When servo parameters settings are changed from “MR-J2S series” to “MR-J4 series”, the parameter conversion is carried out based on conversion rules. However, when converting parameters of the models older than MR-J2S series (MR-H-B, MR-H-BN, MR-J-B, MR-J2-B, MR-J2Jr-B), the servo parameters are initialized.

Refer to “Simple Motion Module Setting Help [Appendix] - [Servo parameter conversion]” for the conversion rules.

- 7) When the project diversion completion message appears, click “OK”.



The diversion is completed.

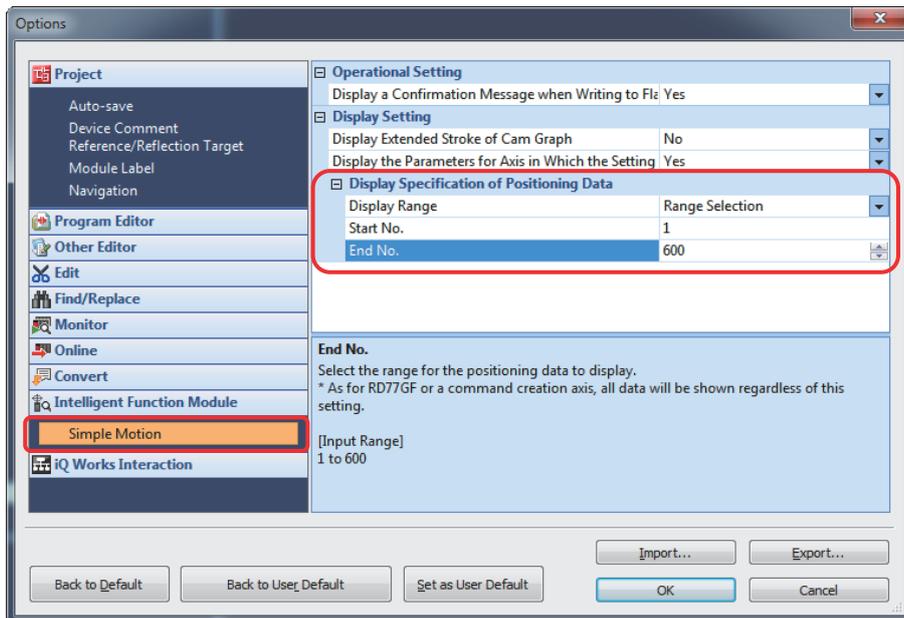
2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(4) Restrictions on positioning data at migration

The memory structure of positioning data differs between RD77MS and QD75M.

For RD77MS, the positioning data of No.101 or later is not the buffer memory but the internal memory. Therefore, values cannot be written directly from a sequence program.

If the current data before migration is written directly from a sequence program to the QD75M positioning data of No.101 or later, those data needs to be set to the positioning data of No.101 or later with MELSOFT GX Works2 “Simple Motion Module setting tool”. Additionally, the RD77MS positioning data of No.101 or later will not be displayed by default setting. In order to set those positioning data, select [Tool] - [Option] from the Menu bar in MELSOFT GX Works3, and change the data display range on the screen below (“Simple Motion” in the “Intelligent Function Module”).



(a) When the positioning data is No.100 or before

All the data can be written to the buffer memory.

There is no change because data can be written to the buffer memory from a sequence program.

(b) When the positioning data is No.101 or later

The positioning data is written to the internal memory.

Unlike QD75M, data cannot be written directly to RD77MS from a sequence program.

[Major changes]

Item	QD75M	RD77MS
Positioning data (No.101 to 600)	3000+6000n to 7999+6000n	Cannot be set to the buffer memory (Can be changed only with MELSOFT GX Wroks3)
Block start area (No.7002 to 7004)	26400+1000n to 26999+1000n	Same as the above

n: Axis No.-1

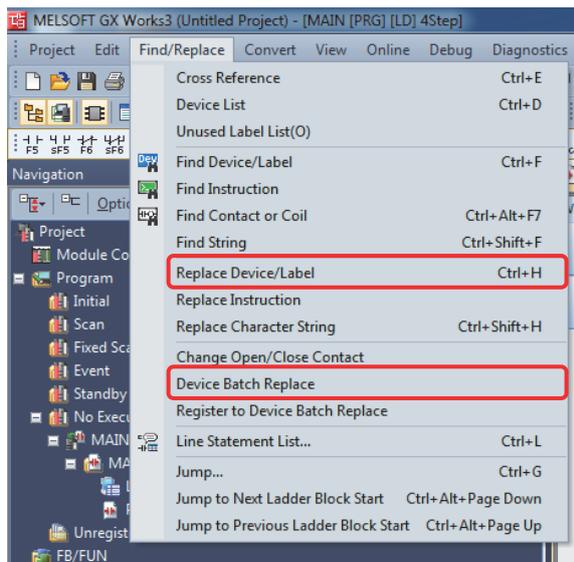
2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

2.4.2 Replacement of buffer memory No. and I/O signals in sequence program

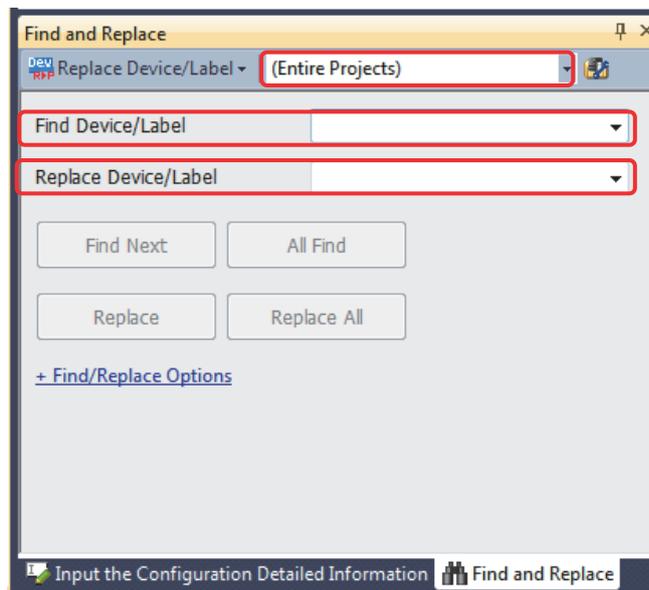
The device replacement function of MELSOFT GX Works3 replaces the buffer memory No. and I/O signals in the sequence program.

The following shows the replacement procedure.

- 1) Start MELSOFT GX Works3. Read the target project data.
- 2) Select [Replace Device/Label] or [Device Batch Replace] from [Find/Replace] menu.



- 3) Set the target place to search, "Find Device/Label", and "Replace Device/Label" correctly.



2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(1) Buffer memory

Replace the buffer memory No. by referring to the table below.

[Major changes]

Item		QD75M	RD77MS
Axis monitor data (Md.20 to 499)		800+100n to 899+100n	2400+100n to 2499+100n
System monitor data		1200 to 1499	4000 to 4299
Axis control data (From Cd.3)		1500+100n to 1599+100n	4300+100n to 5899+100n
System control data		1900 to 1999	5900 to 5999
Positioning data (No.1 to 100)		2000+6000n to 2999+6000n	6000+1000n to 6999+1000n
Positioning data (No.101 to 600) ^(Note-1)		3000+6000n to 7999+6000n	Cannot be set to the buffer memory (Can be changed only with MELSOFT GX Works3)
Block start area (No.7000, 7001)	Block start data	26000+1000n to 26399+1000n	22000+400n to 22399+400n
	Condition data		
Block start area (No.7002 to 7004) ^(Note-1)	Block start data	26400+1000n to 26999+1000n	Cannot be set to the buffer memory (Can be changed only with MELSOFT GX Works3)
	Condition data		

n: Axis No.-1

(Note-1): Refer to section 2.4.1(4) for details.

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(2) Comparison of I/O signals

(a) Signal direction: Positioning module (Simple Motion module) → PLC CPU

Device No.	QD75M		RD77MS			
	Signal name					
X0	QD75M READY		RD77MS READY			
X1	Synchronization flag					
X2	Use prohibited		Use prohibited ^(Note-2)			
X3						
X4	Axis 1	M-code ON ^(Note-1)				
X5	Axis 2					
X6	Axis 3					
X7	Axis 4					
X8	Axis 1	Error detection ^(Note-1)				
X9	Axis 2					
XA	Axis 3					
XB	Axis 4	BUSY				
XC	Axis 1					
XD	Axis 2					
XE	Axis 3					
XF	Axis 4	Start complete ^(Note-1)		BUSY		
X10	Axis 1					Axis 1
X11	Axis 2					Axis 2
X12	Axis 3					Axis 3
X13	Axis 4	Axis 4				
X14	Axis 1	Positioning complete ^(Note-1)				Axis 5
X15	Axis 2					Axis 6
X16	Axis 3					Axis 7
X17	Axis 4					Axis 8
X18	Use prohibited		Axis 9			
X19			Axis 10			
X1A			Axis 11			
X1B			Axis 12			
X1C			Axis 13			
X1D			Axis 14			
X1E			Axis 15			
X1F			Axis 16			

(Note-1): These signals are included in the buffer memory "[Md.31] Status" in RD77MS.

(Note-2): There are some devices that will become "Use prohibited" after replacing the existing model with RD77MS. The device No. with "Use prohibited" are used by system. Therefore, a user cannot use them. In the case of using them, the operation is not guaranteed.

RD77MS buffer memory "[Md.31] Status"		
Buffer memory address	Signal name	
2417+100n	b12	M-code ON
	b13	Error detection
	b14	Start complete
	b15	Positioning complete

n: Axis No.-1

2. DETAILS OF MIGRATION FROM QD75M TO RD77MS

(b) Signal direction: PLC CPU → Positioning module (Simple Motion module)

	QD75M		RD77MS			
Device No.	Signal name					
Y0	PLC READY					
Y1	All axis servo ON					
Y2	Use prohibited		Use prohibited ^(Note-2)			
Y3						
Y4					Axis 1	Axis stop ^(Note-1)
Y5					Axis 2	
Y6	Axis 3					
Y7	Axis 4					
Y8	Axis 1	Forward run JOG start ^(Note-1)				
Y9		Reverse run JOG start ^(Note-1)				
YA	Axis 2	Forward run JOG start ^(Note-1)				
YB		Reverse run JOG start ^(Note-1)				
YC	Axis 3	Forward run JOG start ^(Note-1)				
YD		Reverse run JOG start ^(Note-1)				
YE	Axis 4	Forward run JOG start ^(Note-1)				
YF		Reverse run JOG start ^(Note-1)				
Y10	Axis 1	Positioning start	Axis 1	Positioning start		
Y11	Axis 2		Axis 2			
Y12	Axis 3		Axis 3			
Y13	Axis 4		Axis 4			
Y14	Axis 1	Execution prohibition flag ^(Note-1)	Axis 5			
Y15	Axis 2		Axis 6			
Y16	Axis 3		Axis 7			
Y17	Axis 4		Axis 8			
Y18	Use prohibited		Axis 9			
Y19			Axis 10			
Y1A			Axis 11			
Y1B			Axis 12			
Y1C			Axis 13			
Y1D			Axis 14			
Y1E			Axis 15			
Y1F			Axis 16			

(Note-1): These signals are included in the buffer memory "[Cd.180] to [Cd.183]" in RD77MS.

(Note-2): There are some devices that will become "Use prohibited" after replacing the existing model with RD77MS. The device No. with "Use prohibited" are used by system. Therefore, a user cannot use them. In the case of using them, the operation is not guaranteed.

RD77MS buffer memory "[Cd.180] to [Cd.183]"	
Buffer memory address	Signal name
30100+10n	Axis stop
30101+10n	Forward run JOG start
30102+10n	Reverse run JOG start
30103+10n	Execution prohibition flag

n: Axis No.-1

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

3.1 Table of Components and Software

Prepare modules, servo amplifiers, and an engineering environment according to the following tables in this section.

Product name	Model before migration		Model after migration
Positioning module	QD75MH1 QD75MH2 QD75MH4		[Simple Motion module] RD77MS2 ^(Note-1) RD77MS4
PLC CPU module	Qn(H)CPU		RnCPU
Power supply module	Q6□P		R6□P
Main base unit	Q3□B		R3□B
Extension base unit	Q6□B		R6□B
Extension cable	QC□B		RC□B
Input module	MELSEC-Q series Input module		MELSEC iQ-R series Input module
Output module	MELSEC-Q series Output module	➔	MELSEC iQ-R series Output module
Input/Output composite module	MELSEC-Q series Input/Output composite module		MELSEC iQ-R series Input/Output composite module
Analog input module	MELSEC-Q series Analog input module		MELSEC iQ-R series Analog input module
Analog output module	MELSEC-Q series Analog output module		MELSEC iQ-R series Analog output module
External device connector	A6CON1, A6CON2, A6CON3, A6CON4		A6CON1, A6CON2, A6CON4
Manual pulse generator	MR-HDP01		MR-HDP01 ^(Note-2)
SSCNETIII cable ^(Note-3)	MR-J3BUS□M MR-J3BUS□M-A MR-J3BUS□M-B ^(Note-4)		←(same as the left)

(Note-1): The number of control axes is increased from 1 to 2.

(Note-2): The existing MR-HDP01 can be used continuously with RD77MS.

In addition, Mitsubishi Electric has also confirmed the operation of the following manual pulse generator. Contact the manufacturer for details.

Product name	Model name	Description	Manufacturer
Manual pulse generator	UFO-M2-0025-2Z1-B00E	Number of pulses per revolution: 25 pulse/rev (100 pulse/rev after magnification by 4)	Nemicon Corporation

(Note-3): "□" indicates the cable length.

(015: 0.15m, 03: 0.3m, 05: 0.5m, 1: 1m, 5:5m, 10: 10m, 20: 20m, 30: 30m, 40: 40m, 50: 50m)

(Note-4): For a long distance cable of up to 100 m or an ultra-long bending life cable, contact Mitsubishi Electric System & Service Co., Ltd.

[Sales office] FA PRODUCT DIVISION mail: osb.webmaster@melsc.jp

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

3.1.1 Servo amplifiers and servo motors

The servo system network is changed from SSCNETIII to SSCNETIII/H.

Select a SSCNETIII/H compatible servo amplifier and a servo motor connectable to the selected servo amplifier.

(1) Servo amplifiers/Rotary servo motors

Before migration from QD75MH				After migration to RD77MS		
Servo amplifier		Rotary servo motor		Servo amplifier		Rotary servo motor
MR-J3 series	MR-J3-□B	HF-KP□	➔	MR-J4 series	MR-J4-□B(-RJ)	HG-KR□
	MR-J3W-□B	HF-MP□			MR-J4W2-□B	HG-MR□
	MR-J3-□BS	HF-SP□			MR-J4W3-□B	HG-SR□
	MR-J3-□B-RJ006	HF-JP□				HG-RR□
		HC-LP□				HG-UR□
HC-RP□		HG-JR□				
	HC-UP□					
	HA-LP□					

(2) Servo amplifiers/Linear servo motors

Before migration from QD75MH				After migration to RD77MS		
Servo amplifier		Linear servo motor		Servo amplifier		Linear servo motor
MR-J3 series	MR-J3-□B-RJ004	LM-H2□	➔	MR-J4 series	MR-J4-□B(-RJ)	LM-H3□
		LM-F□			MR-J4W2-□B	LM-F□
		LM-K2□			MR-J4W3-□B	LM-K2□
		LM-U2□				LM-U2□

(3) Servo amplifiers/Direct drive motors

Before migration from QD75MH				After migration to RD77MS		
Servo amplifier		Direct drive motor		Servo amplifier		Direct drive motor
MR-J3 series	MR-J3-□B-RJ080W	TM-RFM□	➔	MR-J4 series	MR-J4-□B(-RJ)	TM-RFM□
					MR-J4W2-□B	
					MR-J4W3-□B	

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(4) Comparison of servo system network

Item			
Communications medium		Optical fiber cable	← (same as SSCNETIII)
Communications speed		50 Mbps	150 Mbps
Communications cycle	Send	0.44 ms/0.88 ms	0.222 ms/0.444 ms/0.888 ms
	Receive	0.44 ms/0.88 ms	0.222 ms/0.444 ms/0.888 ms
Number of control axes		Up to 16 axes/line	← (same as SSCNETIII)
Transmission distance		[Standard code for inside panel and standard cable for outside panel] Up to 20 m between stations Maximum overall distance: 320 m (20 m × 16 axes)	← (same as SSCNETIII)
		[Long distance cable] Up to 50 m between stations Maximum overall distance: 800 m (50 m × 16 axes)	[Long distance cable] Up to 100 m between stations Maximum overall distance: 1600 m (100 m × 16 axes)

3.1.2 Engineering environment (required)

The engineering environment that supports RD77MS is as follows.

Product name	Model	Version
MELSOFT GX Works3	SW1DND-GXW3-E	Ver.1.000A or later
MELSOFT MR Configurator2	SW1DNC-MRC2-E	Ver.1.27D or later

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

3.2 Differences Between QD75MH and RD77MS

(1) Performance and specifications

▶ An item that requires a setting change at migration.

Item		Model					
		QD75MH1	QD75MH2	QD75MH4	RD77MS2	RD77MS4	Points for migration
Number of control axes		1	2	4	2	4	-
Operation cycle		1.77ms			0.444ms/0.888ms/1.777ms/ 3.555ms		▶ The default value differs. Set Pr.96 to "0001H".
Control method	Speed-torque	Not provided			Provided		-
	Synchronous	Not provided			Provided		-
Starting time (1-axis linear control)	Trapezoidal acceleration/ deceleration	3.5ms			0.7ms (Operation cycle: 0.444ms), 1.1ms (Operation cycle: 0.888ms/1.777ms), 0.92ms (Operation cycle: 3.555ms)		-
	S-curve acceleration/ deceleration	4.0ms					
Servo system network		SSCNETIII			SSCNETIII/H or SSCNETIII		▶ Select a servo system network which is compatible with the devices to be connected such as servo amplifiers. Pr.97 0: SSCNETIII 1: SSCNETIII/H
Servo amplifier		MR-J3-□B/MR-J3W-□B/ MR-J3-□BS/MR-J3W-□B-RJ006/ MR-J3-□B-RJ004/ MR-J3-□B-RJ080W			MR-J4-□B(-RJ)/ MR-J4W2-□B/MR-J4W3-□B		-
Servo parameter group	SSCNETIII/H	Not provided			PA, PB, PC, PD, PE, PS, PF, Po, PL		-
	SSCNETIII	PA, PB, PC, PD, PE, PS			PA, PB, PC, PD, PE, PS, PF, Po		-
Refresh cycle for monitor data		56.8ms	Feed machine value, Feed speed, Axis feedrate, External input signal, Forced stop input		Operation cycle		-
		1.77ms	Except for above				
Maximum frequency for manual pulse generator/ incremental synchronous encoder input	Signal input form	Voltage output/open collector type			Differential output type, Voltage output/open collector type		-
	1 pulse input magnification	1 to 1000			1 to 10000		-

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(Continued)

Item		Model			RD77MS2	RD77MS4	Points for migration	
		QD75MH1	QD75MH2	QD75MH4				
Machine home position return (Home position return method)		4 types (Proximity dog method, Count method1, Count method2, Data set method)			6 types (Proximity dog method, Count method1, Count method2, Data set method, Scale home position signal detection method, Driver home position return method <small>(Note-1)</small>)		-	
External signal selection function		<ul style="list-style-type: none"> External input signal of QD75MH (FLS, RLS, DOG, STOP, DI, CHG) External input signal of servo amplifier (FLS, RLS, DOG) 			10 points	20 points	<ul style="list-style-type: none"> External input signal of RD77MS (FLS, RLS, DOG, STOP, DI) External input signal of servo amplifier (FLS, RLS, DOG) External input signal via CPU (Buffer memory: FLS, RLS, DOG) 	<ul style="list-style-type: none"> Confirm there is no problem with the connection of external input signals if the manual pulse generator in use is other than MR-HDP01. (Refer to section 3.3.2.)
Torque change function					Forward/reverse torque limit value same setting			
Amplifier-less operation function		Not provided			Provided		-	
Virtual servo amplifier function		Not provided			Provided		-	
Mark detection function		Not provided			Provided		-	
Optional data monitor function		Not provided			Provided		-	
Event history function		Not provided			Provided		-	
Connect/disconnect of SSCNET communication		Not provided (No need to set)			Provided		-	
History data (start, error, warning)		Time (hour, minute, second)			Date and time (year, month, day, hour, minute, second)		-	
External command signal	Switching signal	CHG signal (Select whether the signal starts positioning or performs speed-position switching with parameter settings)			DI signal (Select whether the signal starts positioning or performs speed-position switching with parameter settings)		<ul style="list-style-type: none"> The signal name has been changed. When an external command signal is used, "[Pr.95] External command signal selection" needs to be set. 	
Speed-position/ position-speed switching control		Switched by external command signal (CHG)			Switched by the external command signal (DI) or the proximity dog signal (DOG), which is set with "[Pr.42] External command function selection"		<ul style="list-style-type: none"> The signal name has been changed. 	
Engineering environment		MELSOFT GX Works2 MELSOFT GX Developer MELSOFT GX Configurator-QP			MELSOFT GX Works3		-	

(Note-1): The home position return set in driver (servo amplifier) is used.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(2) Exterior dimensions and mass

	QD75MH1	QD75MH2	QD75MH4	RD77MS2	RD77MS4
Exterior dimensions [mm]					
	98.0[H]×27.4[W]×90.0[D]			106.0[H]×27.8[W]×110.0[D]	
Mass [kg]	0.15		0.16	0.22	0.23
Internal current consumption (5 VDC) [A]	0.6			1.0	

(3) Base unit

The MELSEC-Q series and the MELSEC iQ-R series are different in fixing holes' position in the base unit, dimensions, and mass. Refer to "QCPU User's Manual (Hardware Design, Maintenance and Inspection)" and "MELSEC iQ-R Module Configuration Manual" for details.

(4) Operation cycle

The operation cycle settings of QD75MH can be imported to RD77MS when the projects of QD75MH are diverted to RD77MS in MELSOFT GX Works3.

(Refer to section 3.4.1 for details of project diversion.)

However, if the operation cycle is set as default (automatic), the operation cycle will be changed. Set a fixed operation cycle where necessary by following the table below because the change in the operation cycle may change program execution timing.

[Control axes and operation cycle at default]

Item \ Model	QD75MH	RD77MS
Number of control axes	Up to 4	Up to 16
Operation cycle (default)	1.77ms	0.444ms/1 to 4 axes 0.888ms/5 to 8 axes 1.777ms/9 to 16 axes

[Settable operation cycle]

QD75MH	RD77MS
1.77ms	0.444ms
	0.888ms
	1.777ms
	3.555ms

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(5) Parameter setting

▶ An item that requires a setting change at migration.

Function	Specification		Points for migration
	QD75MH	RD77MS	
Pr.17 Torque limit setting value	1 to 1000 [%]	1 to 10000 [0.1%]	▶ When a torque limit value has been set in the program, the program needs to be revised.
Pr.24 Manual pulse generator/ incremental synchronous encoder input selection	Input selection for the manual pulse generator	Input selection for the manual pulse generator/incremental synchronous encoder	The parameter name has been changed.
Pr.54 Home position return torque limit value	1 to 1000 [%]	1 to 10000 [0.1%]	▶ When a torque limit value has been set in the program, the program needs to be revised.
Pr.55 Operation setting for incompletion of home position return	- (Positioning control can be executed without completion of home position return.)	0: Positioning control is not executed. 1: Positioning control is executed.	▶ The default setting is "0: Positioning control is not executed". Change it to "1: Positioning control is executed".
Pr.116 to 119 FLS/RLS/DOG/STOP signal selection	- (External input signals of QD75MH are used)	Pr.116 FLS signal selection Pr.117 RLS signal selection Pr.118 DOG signal selection Pr.119 STOP signal selection	▶ The parameters needs to be set again.
Pr.95 External command signal selection	- (External input signals of QD75MH are used)	<RD77MS2> 0: Not used 1: DI1 : 10: DI10 <RD77MS4> 0: Not used 1: DI1 : 20: DI20	Set the external command signals (DI) to be used with " Pr.95 External command signal selection".
Pr.96 Operation cycle setting	-	0000H: 0.888ms 0001H: 1.777ms 0002H: 3.555ms 0200H: 0.444ms FFFFH: Automatic setting	▶ The default value differs. Set Pr.96 to "0001H".
Pr.97 SSCNET setting		0: SSCNETIII 1: SSCNETIII/H	-
Start history	Indicates the start time by hour, minute, and second. Md.5 Start (Hour) Md.6 Start (Minute: second)	Indicates the start time by year, month, day, hour, minute, and second. Md.54 Start (Year: month) Md.5 Start (Day: hour) Md.6 Start (Minute: second)	More time information (Md.54 Year: month and Md.5 Day) has been added. Review the program as needed.
Axis error occurrence time	Indicates the axis error occurrence time by hour, minute, and second. Md.11 Axis error occurrence (Hour) Md.12 Axis error occurrence (Minute: second)	Axis error occurrence time is indicated with the event history.	The monitoring method of axis error occurrence time has been changed.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75MH	RD77MS	
Axis warning occurrence time	Indicates the axis warning occurrence time by hour, minute, and second. [Md.16] Axis warning occurrence (Hour) [Md.17] Axis warning occurrence (Minute: second)	Axis warning occurrence time is indicated with the event history.	The monitoring method of axis warning occurrence time has been changed.
[Md.31] Status	b0 : In speed control flag b1 : Speed-position switching latch flag b2 : Command in-position flag b3 : OPR request flag b4 : OPR complete flag b5 : Position-speed switching latch flag b9 : Axis warning detection b10: Speed change 0 flag	b0 : In speed control flag b1 : Speed-position switching latch flag b2 : Command in-position flag b3 : Home position return request flag b4 : Home position return complete flag b5 : Position-speed switching latch flag b9 : Axis warning detection b10: Speed change 0 flag b12: M-code ON b13: Error detection b14: Start complete b15: Positioning complete	"b12" to "b15" are assigned to X devices in QD75MH, however, they are assigned to monitor data in RD77MS.
[Md.107] Parameter error No.	When a servo error occurs, the corresponding bit turns ON, and the error is stored in the buffer memory.	When a servo error occurs, the value corresponding to the parameter No. is stored in [Md.107].	The monitoring method of servo error has been changed.
[Md.108] Servo status 1	[Lower-order buffer memory] b0: Zero point pass b3: Zero speed [High-order buffer memory] b0 : READY ON b1 : Servo ON b7 : Servo alarm b12: In-position b13: Torque limit b14: Absolute position lost b15: Servo warning	b0 : READY ON b1 : Servo ON b2,b3: Control mode b4 : Gain switching b5 : Fully closed loop control switching b7 : Servo alarm b12 : In-position b13 : Torque limit b14 : Absolute position lost b15 : Servo warning	▶ The servo status is assigned to [Md.108] and [Md.119] in RD77MS. The reference monitor No. needs to be changed.
[Md.119] Servo status 2	-	b0: Zero point pass b3: Zero speed b4: Speed limit b8: PID control	

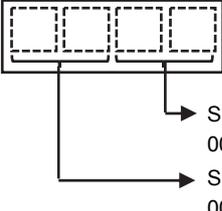
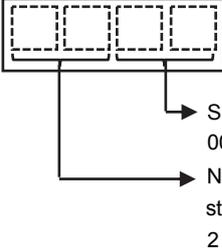
3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75MH	RD77MS	
<p>Cd.24 Speed-position switching enable flag</p>	<p>0: Speed control will not be taken over by position control even when the external command signal [CHG] comes ON. 1: Speed control will be taken over by position control when the external command signal [CHG] comes ON.</p>	<p>0: Speed control will not be taken over by position control even when the signal set in "Cd.45 Speed-position switching device selection" comes ON. 1: Speed control will be taken over by position control even when the signal set in "Cd.45 Speed-position switching device selection" comes ON.</p>	<p>▶ The external command signal name has been changed from "CHG" to "DI". In order to use the external command signal [DI] for speed-position switching, set "Cd.45 Speed-position switching device selection" to [0: Use the external command signal for switching from speed control to position control].</p>
<p>Cd.26 Position-speed switching enable flag</p>	<p>0: Position control will not be taken over by speed control even when the external command signal [CHG] comes ON. 1: Position control will be taken over by speed control when the external command signal [CHG] comes ON.</p>	<p>0: Position control will not be taken over by speed control even when the signal set in "Cd.45 Speed-position switching device selection" comes ON. 1: Position control will be taken over by speed control when the signal set in "Cd.45 Speed-position switching device selection" comes ON.</p>	<p>▶ The external command signal name has been changed from "CHG" to "DI". In order to use the external command signal [DI] for position-speed switching, set "Cd.45 Speed-position switching device selection" to [0: Use the external command signal for switching from position control to speed control].</p>
<p>Cd.30 Simultaneous starting own axis start data No.</p>	<p>Cd.30 Simultaneous starting axis start data No. (Axis 1 start data No.)</p>	<p>Cd.30 Simultaneous starting own axis start data No.</p>	<p>The parameter No. has been changed. ▶ To execute a simultaneous start, set "Cd.43 Simultaneous starting axis".</p>
<p>Cd.31 Simultaneous starting axis start data No.1</p>	<p>Cd.31 Simultaneous starting axis start data No. (Axis 2 start data No.)</p>	<p>Cd.31 Simultaneous starting axis start data No.1</p>	
<p>Cd.32 Simultaneous starting axis start data No.2</p>	<p>Cd.32 QD75MH4 Simultaneous starting axis start data No. (Axis 3 start data No.)</p>	<p>Cd.32 Simultaneous starting axis start data No.2</p>	
<p>Cd.33 Simultaneous starting axis start data No.3</p>	<p>Cd.33 QD75MH4 Simultaneous starting axis start data No. (Axis 4 start data No.)</p>	<p>Cd.33 Simultaneous starting axis start data No.3</p>	

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75MH	RD77MS	
<p>Cd.43 Simultaneous starting axis</p>	-	<p>[Low-order buffer memory] Set with a hexadecimal.</p>  <p>Simultaneous starting axis No.1 00 to 0F : Axis 1 to Axis 16</p> <p>Simultaneous starting axis No.2 00 to 0F : Axis 1 to Axis 16</p> <p>[High-order buffer memory] Set with a hexadecimal.</p>  <p>Simultaneous starting axis No.3 00 to 0F : Axis 1 to Axis 16</p> <p>Number of simultaneous starting axes 2 to 4: 2 axes to 4 axes</p>	-
<p>Cd.45 Speed-position switching device selection</p>	-	<p>[Speed-position switching control] 0: Use the external command signal for switching from speed control to position control. 1: Use the proximity dog signal for switching from speed control to position control 2: Use "Cd.46 Speed-position switching command" for switching from speed control to position control</p> <p>[Position-speed switching control] 0: Use the external command signal for switching from position control to speed control. 1: Use the proximity dog signal for switching from position control to speed control 2: Use "Cd.46 Speed-position switching command" for switching from position control to speed control</p>	-
<p>Cd.46 Speed-position switching command</p>	-	<p>[Speed-position switching control] 0: Not switch from speed control to position control 1: Switch from speed control to position control</p> <p>[Position-speed switching control] 0: Not switch from position control to speed control 1: Switch from position control to speed control</p>	-

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(Continued)

Function	Specification		Points for migration	
	QD75MH	RD77MS		
Axis stop	<QD75MH1/2> Y4, Y5	<QD75MH4> Y4 to Y7	Cd.180 1: Axis stop requested Other than 1: Axis stop not requested	-
Forward run JOG start	<QD75MH1/2> Y8, YA	<QD75MH4> Y8, YA, YC, YE	Cd.181 1 : JOG started Other than 1: JOG not started	-
Reverse run JOG start	< QD75MH1/2> Y9, YB	<QD75MH4> Y9, YB, YD, YF	Cd.182 1 : JOG started Other than 1: JOG not started	-
Execution prohibition flag	<QD75MH1/2> Y14, Y15	<QD75MH4> Y14 to Y17	Cd.183 1 : During execution prohibition Other than 1: Not during execution prohibition	-
Axis to be interpolated	Da.5 Axis to be interpolated	Da.20 Axis to be interpolated No.1 Da.21 Axis to be interpolated No.2 Da.22 Axis to be interpolated No.3		-
Da.16 Condition operator	01: **=P1 02: **≠P1 03: **≤P1 04: **≥P1 05: P1≤**≤P2 06: **≤P1,P2≤** 07: DEV=ON 08: DEV=OFF 10: Axis 1 selected QD75MH2 QD75MH4 20: Axis 2 selected QD75MH2 QD75MH4 30: Axis 1,2 selected QD75MH2 QD75MH4 40: Axis 3 selected QD75MH2 QD75MH4 50: Axis 1,3 selected QD75MH4 60: Axis 2,3 selected QD75MH4 70: Axis 1,2,3 selected QD75MH4 80: Axis 4 selected QD75MH4 90: Axis 1,4 selected QD75MH4 A0: Axis 2,4 selected QD75MH4 B0: Axis 1,2,4 selected QD75MH4 C0: Axis 3,4 selected QD75MH4 D0: Axis 1,3,4 selected QD75MH4 E0: Axis 2,3,4 selected QD75MH4	01: **=P1 02: **≠P1 03: **≤P1 04: **≥P1 05: P1≤**≤P2 06: **≤P1,P2≤** 07: DEV=ON 08: DEV=OFF	▶ “10” to “E0” of QD75MH are assigned to “ Da.23 Number of simultaneously starting axes” and “ Da.24 to Da.26 Simultaneously starting axis” in RD77MS.	

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(Continued)

Function	Specification		Points for migration
	QD75MH	RD77MS	
[Da.18] Parameter 1	Set according to "[Da.16] Condition Operator".	Set according to "[Da.16] Condition Operator" and "[Da.23] Number of simultaneously starting axes".	-
[Da.19] Parameter 2			
[Da.23] Number of simultaneously starting axes	-	2: 2 axes 3: 3 axes 4: 4 axes	In order to execute a simultaneous start, set "[Da.23] Number of simultaneously starting axes".
[Da.24] Simultaneously starting axis No.1	-	0: Axis 1 selected	Set [Da.24] to [Da.26] according to the number of simultaneous starting axes set in [Da.23].
[Da.25] Simultaneously starting axis No.2		1: Axis 2 selected	
[Da.26] Simultaneously starting axis No.3		2: Axis 3 selected	
		3: Axis 4 selected	
		4: Axis 5 selected	
		5: Axis 6 selected	
		6: Axis 7 selected	
		7: Axis 8 selected	
		8: Axis 9 selected	
		9: Axis 10 selected	
		A: Axis 11 selected	
		B: Axis 12 selected	
		C: Axis 13 selected	
		D: Axis 14 selected	
		E: Axis 15 selected	
		F: Axis 16 selected	

(6) Items that need a review or a change following the servo system network change

Items	Differences		Change/revision
	QD75MH	RD77MS	
Electronic gear	-	-	Change "[Pr.2] Number of pulses per rotation" and "[Pr.3] Movement amount per rotation" of the basic parameter 1 according to the resolution per the connected servo motor rotation.
Positioning data	-	-	Review the positioning data while taking into account the differences in resolution per the connected servo motor rotation and the setting changes in the electronic gear above.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

3.3 Connection of manual pulse generator

3.3.1 Comparison of pin layout

The signal layout of the external device connection connector differs between QD75MH and RD77MS. Since RD77MS is provided with a 5 VDC power supply output for manual pulse generator, the internal connection of the external input signal cable needs to be changed at replacement.

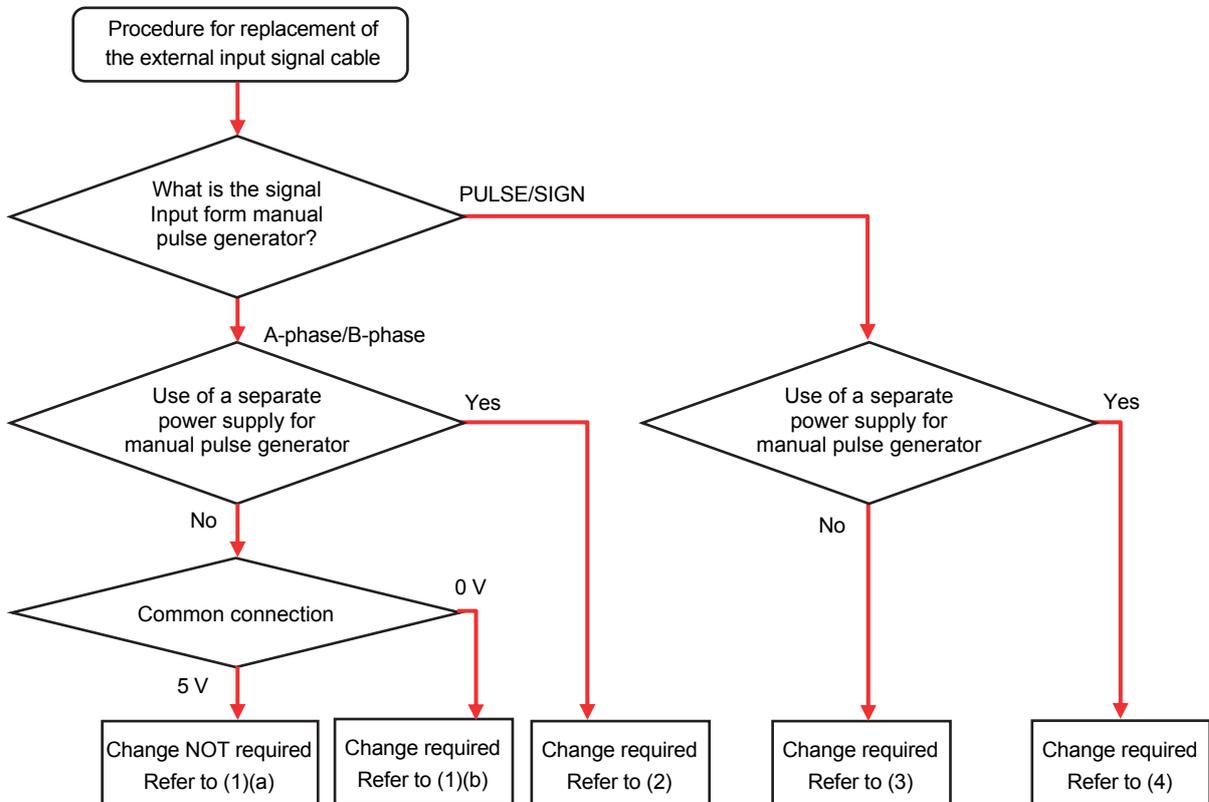
The following shows the differences in pin layout between QD75MH and RD77MS.

QD75MH					RD77MS			
Pin No.	Signal name	Pin No.	Signal name		Pin No.	Signal name	Pin No.	Signal name
1B20	PULSER B-	1A20	PULSER B+	1B20	HB	1A20	5V	
1B19	PULSER A-	1A19	PULSER A+	1B19	HA	1A19	5V	
1B18	No connect	1A18	No connect	1B18	HBL	1A18	HBH	
1B17	No connect	1A17	No connect	1B17	HAL	1A17	HAH	

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

3.3.2 External input signal cable replacement

Replace the external input signal cable by following the flowchart below.



[Precaution at replacement of the external input signal cable]

Set "1: Voltage-output/open-collector type" in "[Pr.89] Manual pulse generator/Incremental synchronous encoder input type selection" if the manual pulse generator/incremental synchronous encoder of voltage-output/open-collector type is used.

The default value is "1: Voltage-output/open-collector type".

Set the signal input form according to the program with "[Pr.24] Manual pulse generator/Incremental synchronous encoder input selection".

The 5 VDC power supply from the Simple Motion module must not be used if a separate power supply is applied to the manual pulse generator/incremental synchronous encoder. If a separate power supply is used, use a stabilized power supply of voltage 5 VDC ($\pm 5\%$ recommended). Use of a power supply with different voltage may cause a failure.

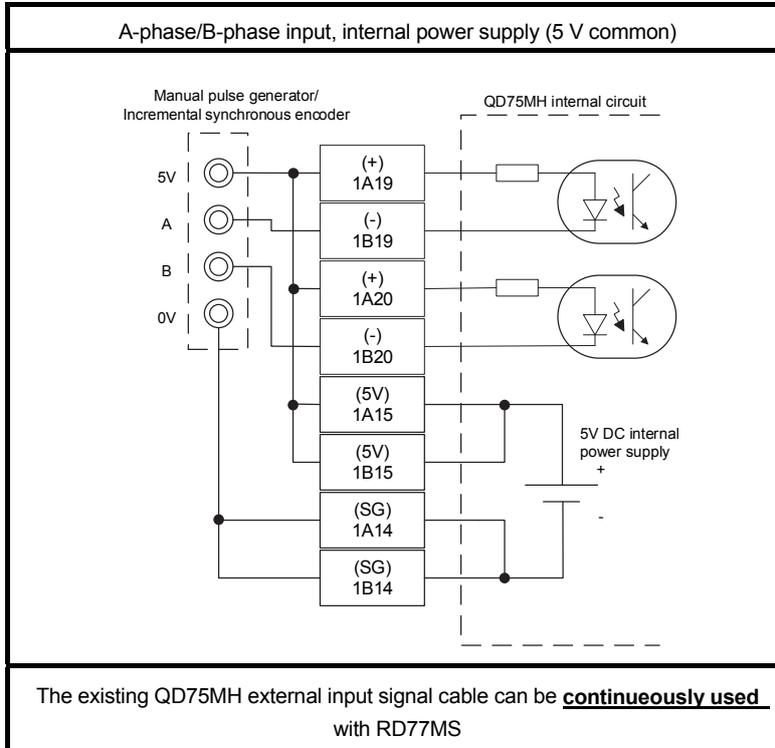
The connection terminals for the manual pulse generator of RD77MS Simple Motion module (1A20 to 1A17, 1B20 to 1B17) are not electrically isolated. Therefore, **be sure to connect the 0 V (-) of the manual pulse generator/incremental synchronous encoder and the SG of RD77MS when using a separate power supply.**

Refer to "MELSEC iQ-R Simple Motion Module User's Manual (Startup)" for details of wiring of the external input signal cable.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

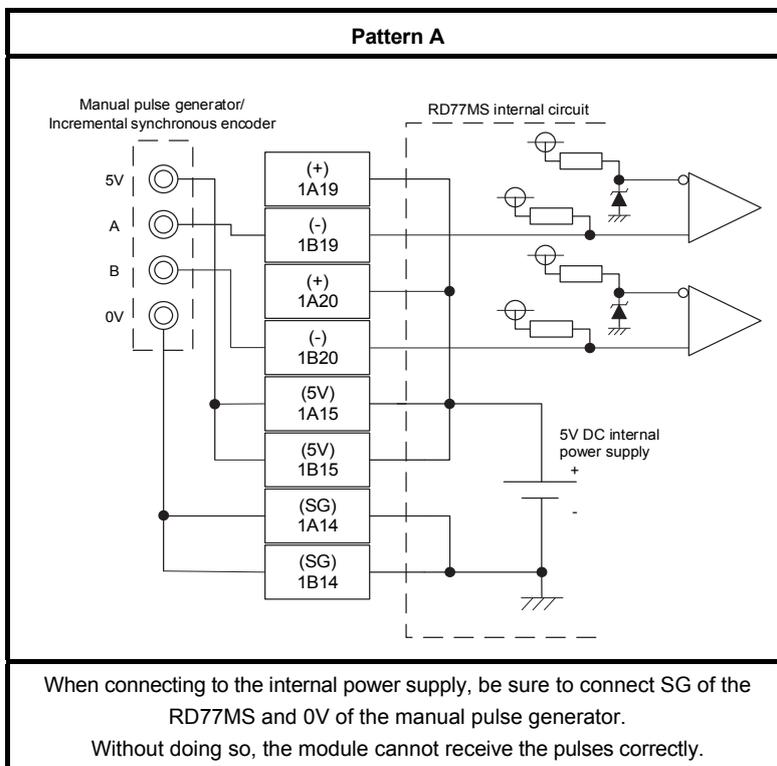
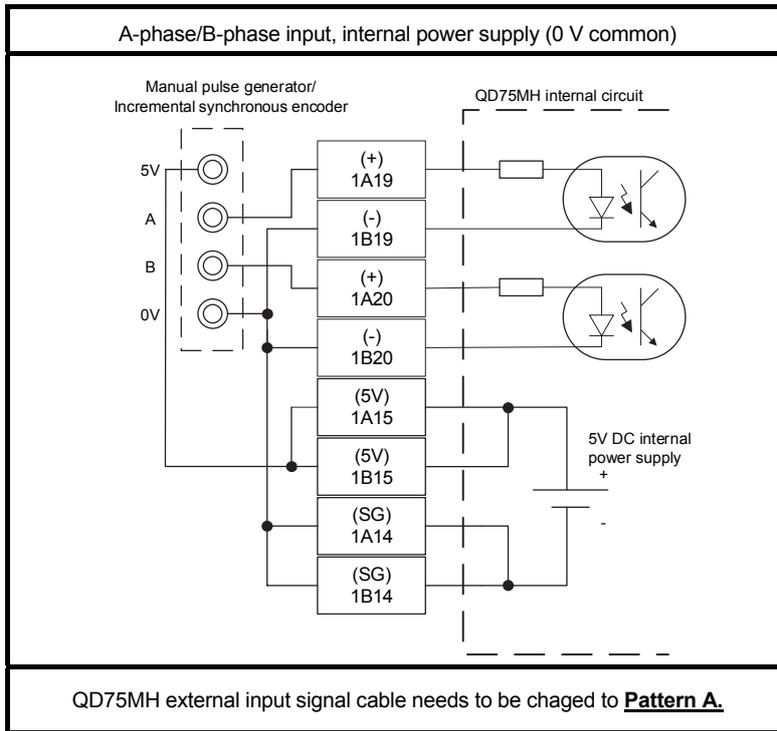
(1) When the signal input form is A-phase/B-phase (internal power supply use)

(a) 5 V common



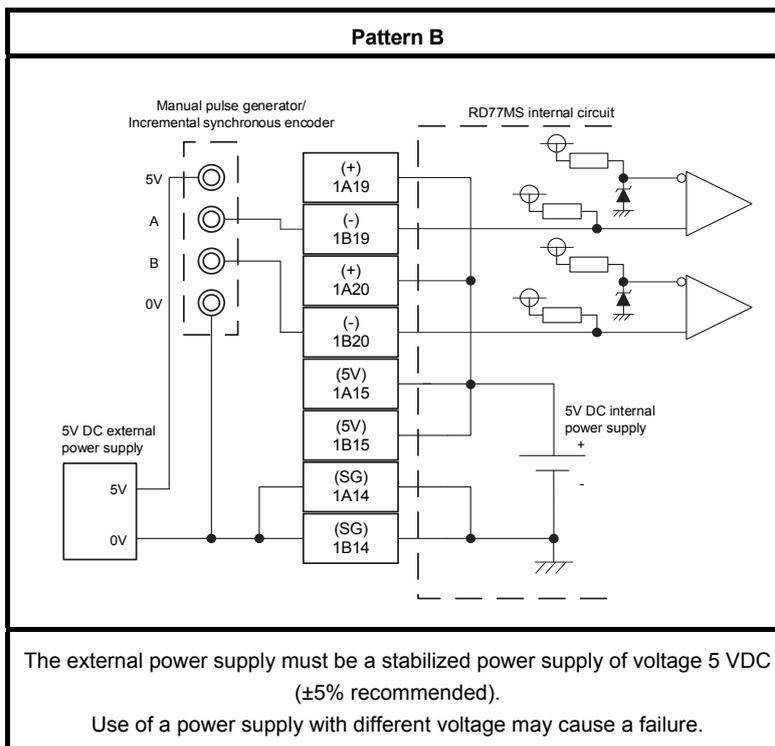
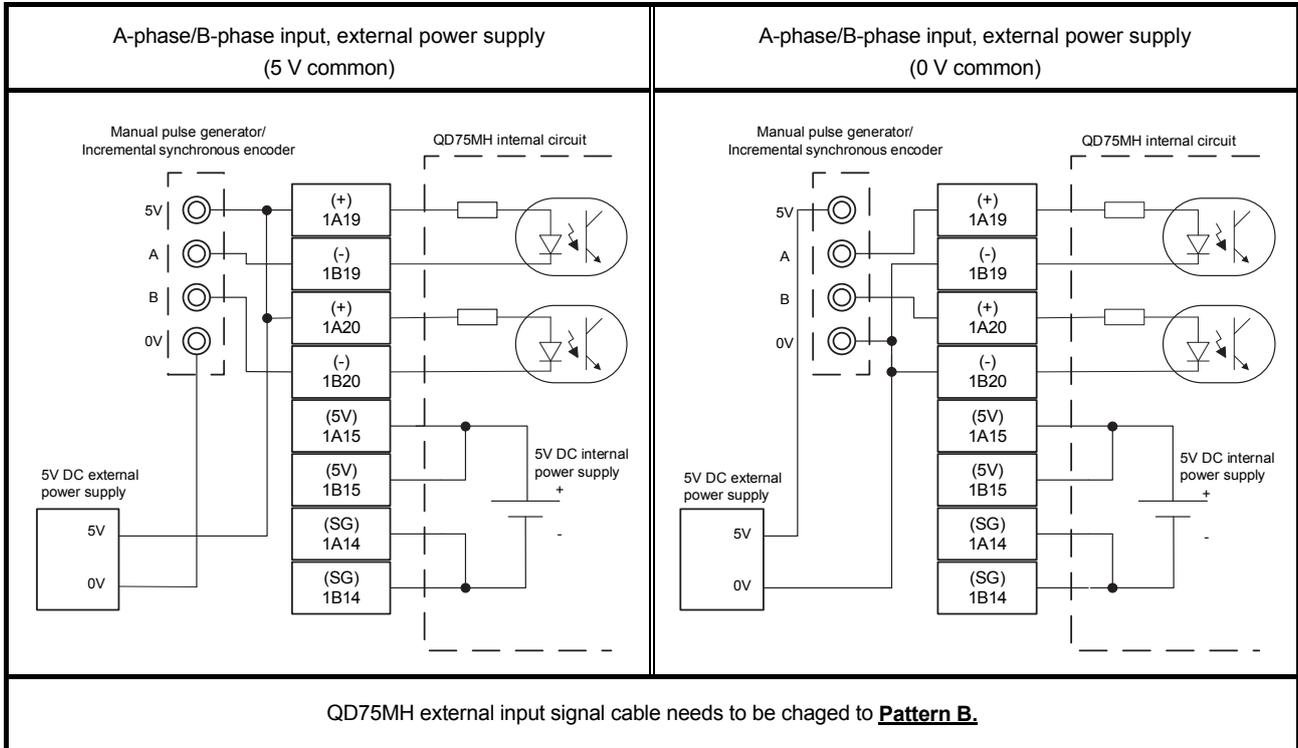
3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(b) 0 V common



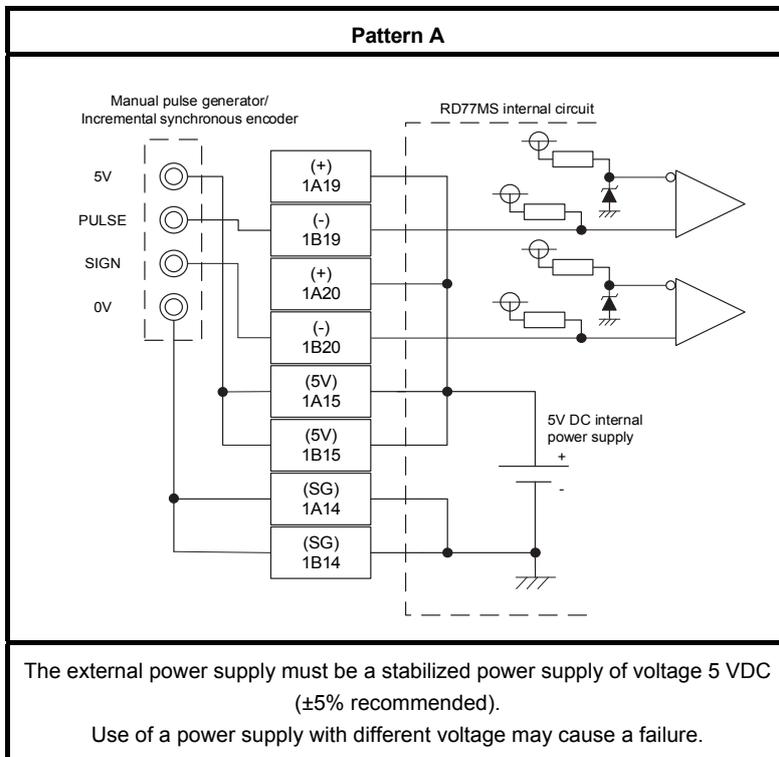
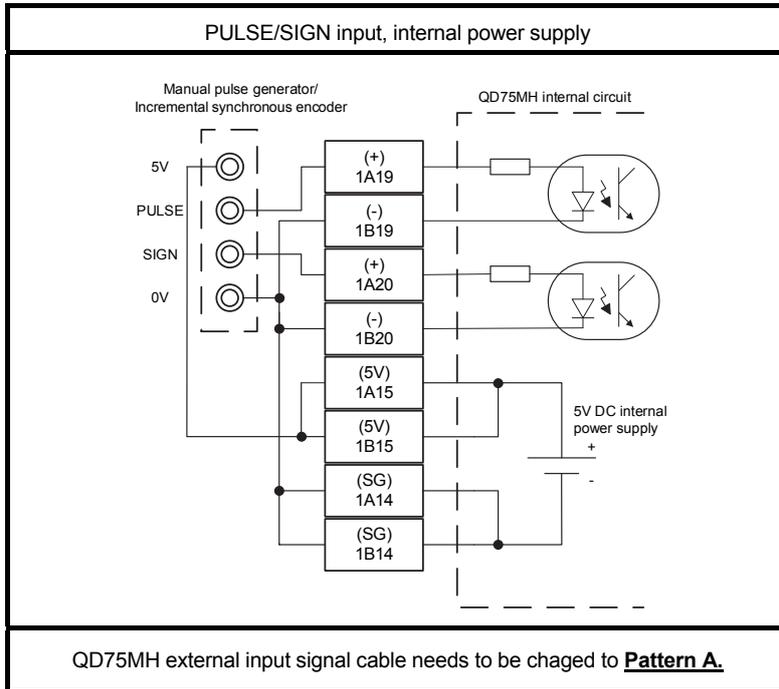
3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(2) When the signal input form is A-phase/B-phase (an external power supply is used for manual pulse generator)



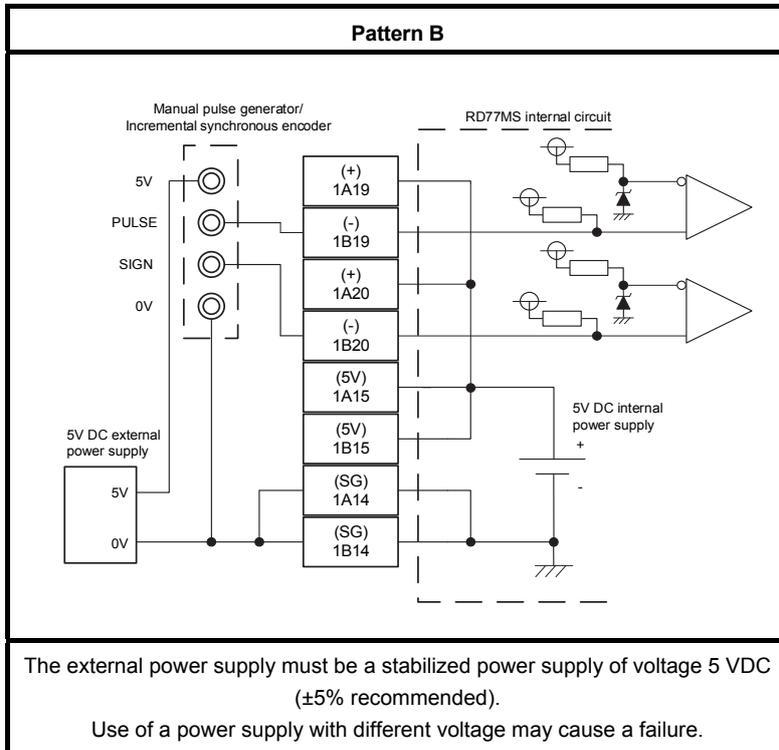
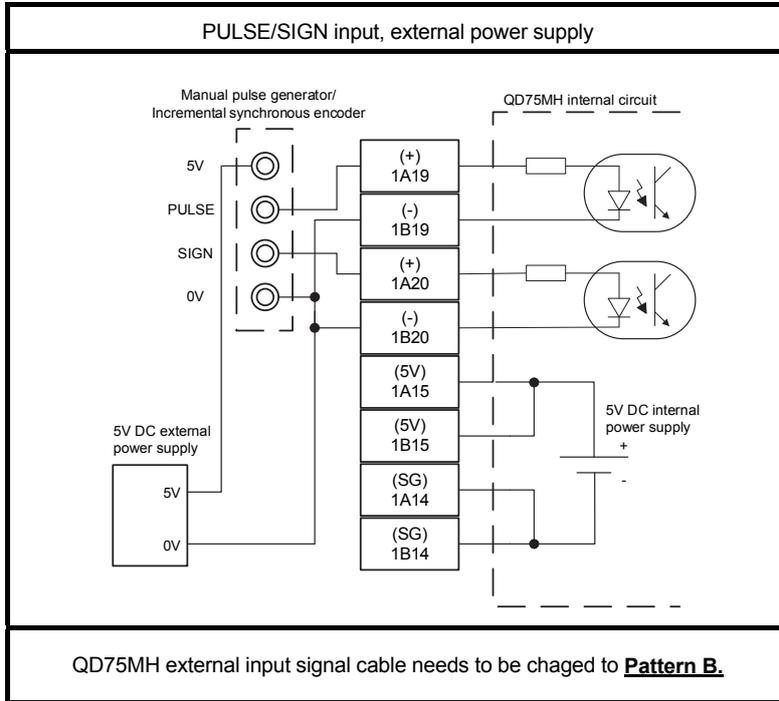
3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(3) When the signal input form is PULSE/SIGN (internal power supply use)



3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

- (4) When the signal input form is PULSE/SIGN (an external power supply is used for manual pulse generator power)



3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

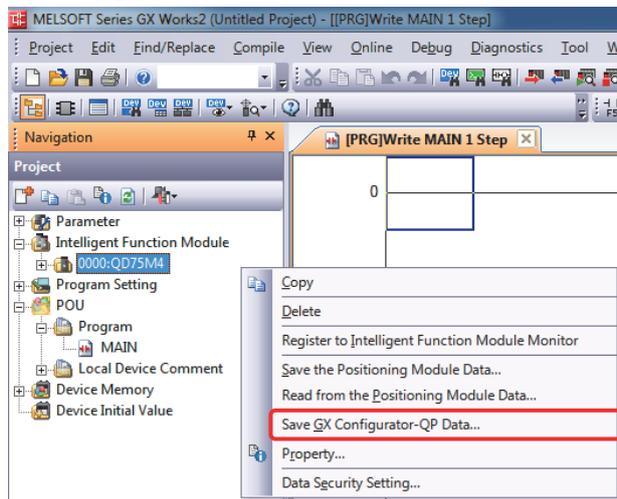
3.4 Project Diversion

3.4.1 Project diversion procedures by engineering environment

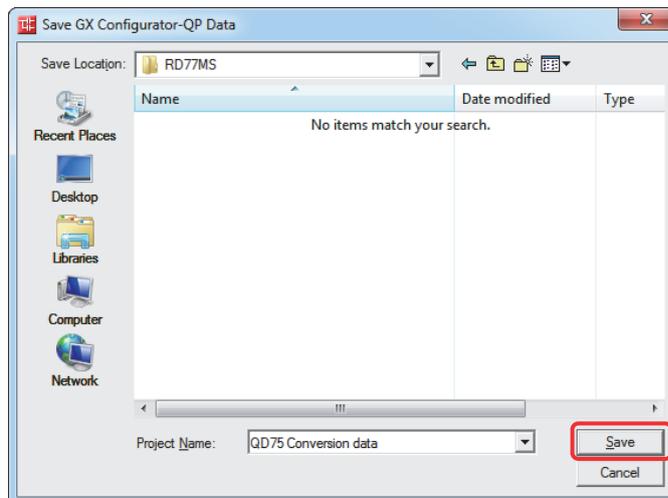
- (1) Procedures for QD75MH projects diversion by MELSOFT GX Works2
MELSOFT GX Works2 (Simple Motion module setting tool) cannot directly read QD75MH data. Therefore, the diversion is carried out after the data is saved in MELSOFT GX Configurator-QP format.

The following shows the diversion procedure.

- 1) Start MELSOFT GX Works2. Read the project to be diverted.
- 2) Select “QD75MH” from “Intelligent function module” in the navigation tree, and right-click on it.
- 3) Select “Save GX Configurator-QP Data” from the context menu to open “Save GX Configurator-QP Data” screen.



- 4) Enter the project name, and click [Save].



Saving in MELSOFT GX Configurator-QP format is complete.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(2) Procedures for PLC CPU projects diversion by MELSOFT GX Works3

MELSOFT GX Works3 can read projects created in MELSOFT GX Works2.

If the PLC CPU is other than the following models, the programmable controller type needs to be changed to universal models.

- Universal model QCPU
- High-speed universal model QCPU
- Universal model process CPU

Refer to “GX Works2 Version 1 Operating Manual (Common)” for restrictions on the programmable controller type changes.

In addition, refer to the following Technical Bulletins for details of the programmable controller type changes.

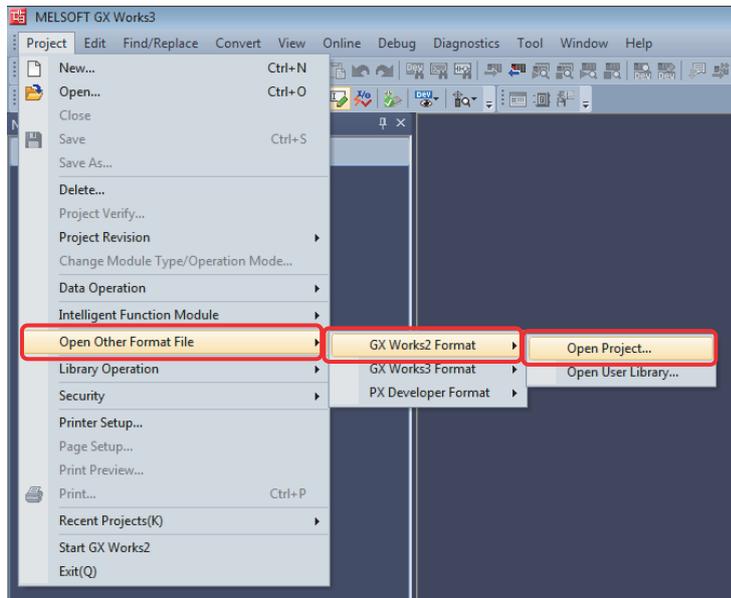
(Note): Contact your local sales office for details.

- Method of replacing Basic model QCPU with Universal model QCPU (FA-A-0054)
- Method of replacing High Performance model QCPU with Universal model QCPU (FA-A-0001)
- Method of replacing High Performance model QCPU with Universal model QCPU (Introduction) (FA-A-0209)

[Procedures when projects in which universal model QCPU is set is diverted to MELSOFT GX Works3]

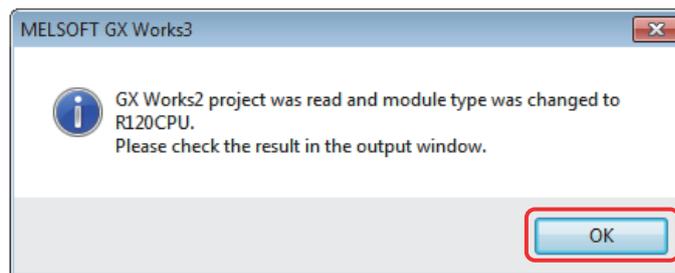
Refer to “GX Works3 Operating Manual” for details of replacing MELSOFT GX Works2 projects as those for MELSOFT GX Works3.

- 1) Start MELSOFT GX Works3. Select [Open Other Format File] - [GX Works2 Format] - [Open Project...] from “Project” menu.



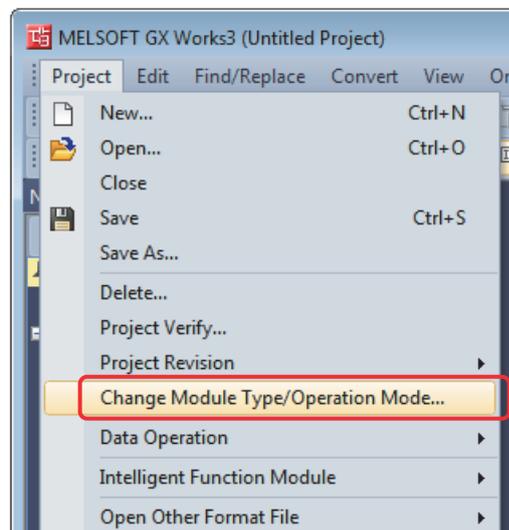
3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

- 2) Select the project to be diverted on the “Open GX Works2 Format Project” screen, and click “OK”.
- 3) Check the following precaution at project diversion, and click “OK”.
[Precaution]
When MELSOFT GX Works2 projects are read by MELSOFT GX Works3, the MELSEC-Q series PLC CPUs are automatically changed to R120CPU.
- 4) After MELSOFT GX Works2 project is read, click “OK”.
(Make sure to check the model change result in the output window.)



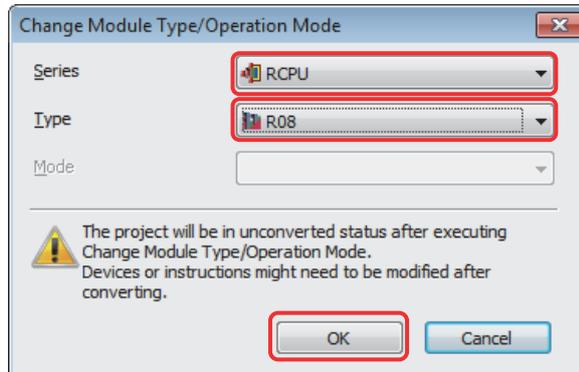
When the PLC CPU is replaced with other than R120CPU, execute the following 5) to 7).

- 5) Select “Change Module Type/Operation Mode...” in “Project” menu to open “Change Module Type/Operation Mode” screen.



3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

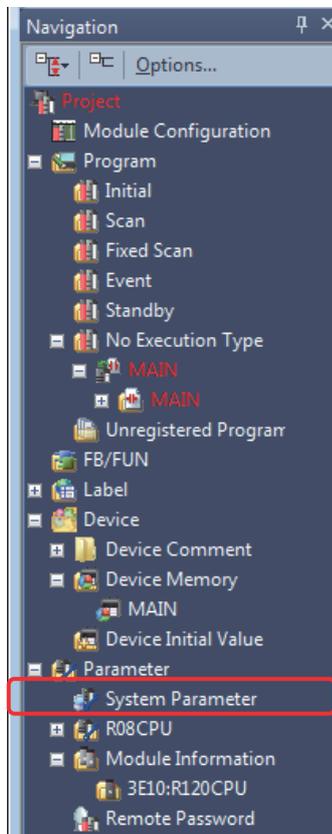
- 6) Select RCPU for “Series” and the replaced PLC CPU model for “Type” (the setting example below: R08CPU). Click “OK”.



- 7) Click “OK” after confirming the precautions at model change.
The model change result is indicated in the “output window” of MELSOFT GX Works3.

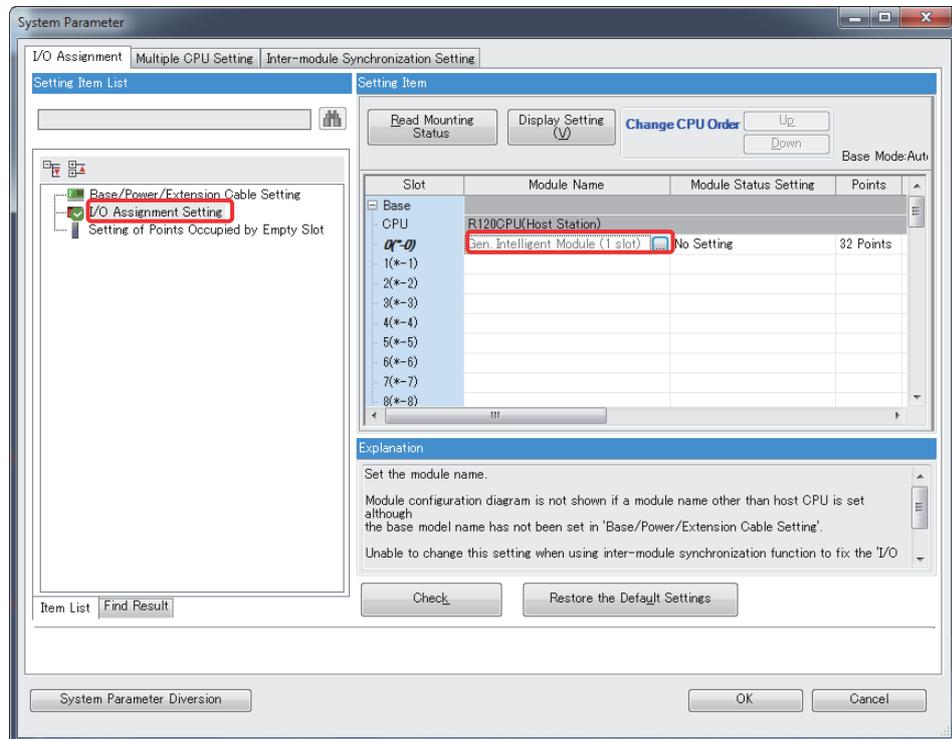
When QD75MH is set in the project of MELSOFT GX Works2, it is changed to “Gen. Intelligent Module (1 slot)” in MELSOFT GX Works3. Therefore, “Gen. Intelligent Module (1 slot)” needs to be manually changed to RD77MS. The procedure is described in the following 8) and later.

- 8) Double-click “System Parameter” in the navigation tree to open “System Parameter” screen.

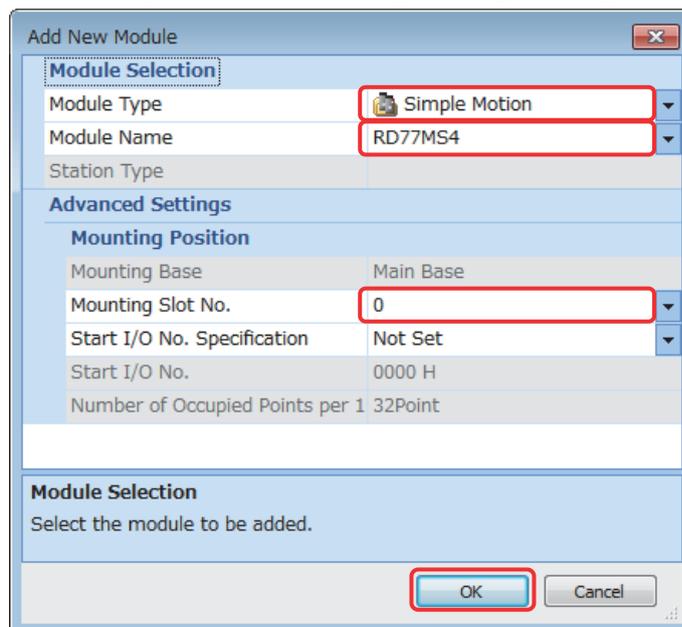


3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

- 9) Double-click on the “Gen. Intelligent Module (1 slot)” in [I/O Assignment Setting] on “System Parameter” screen to open “Add New Module” screen.

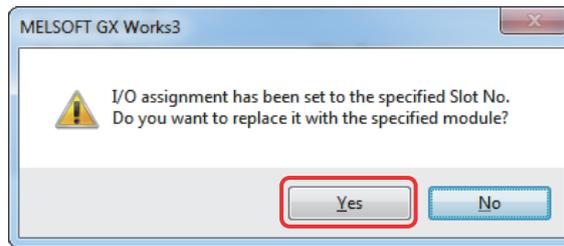


- 10) On the “Add New Module” screen, select “Simple Motion Module” for [Module Type], the replaced Simple Motion module model for [Module Name] (the setting example below: RD77MS4), and the slot No. for [Mounting Slot No]. Click [OK].

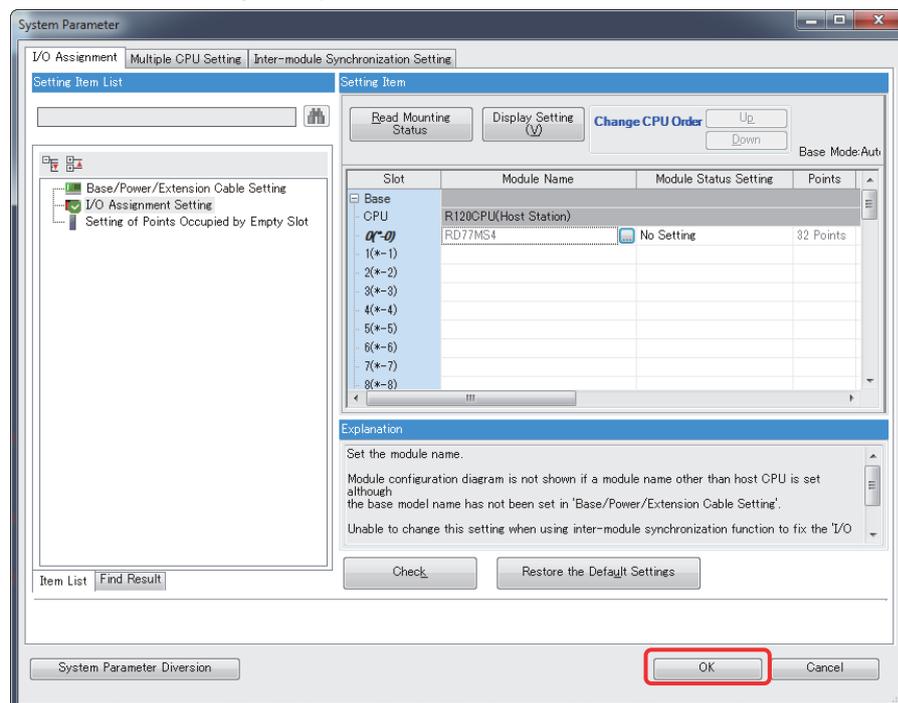


3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

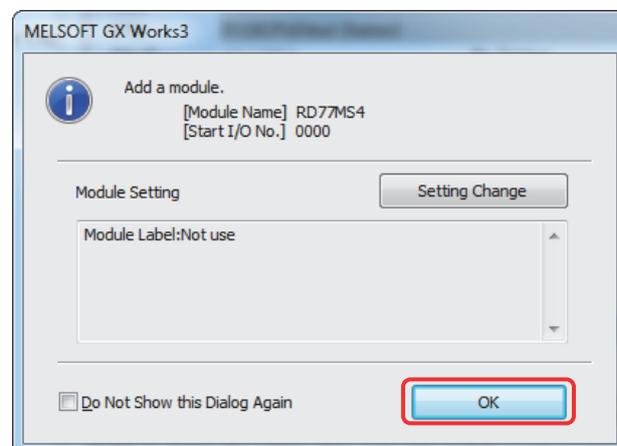
11) Click "Yes".



12) Click "OK" on the "System parameter" screen.

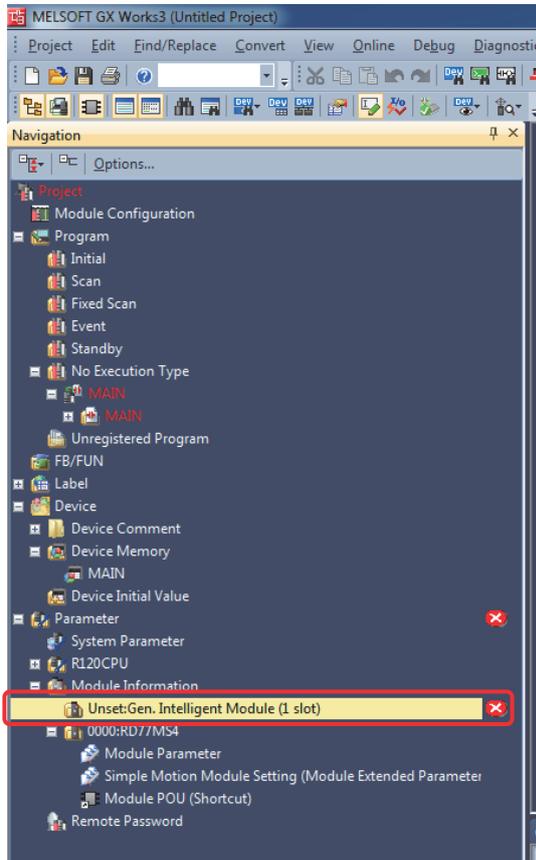


13) Click "OK" on the module label setting confirmation screen.

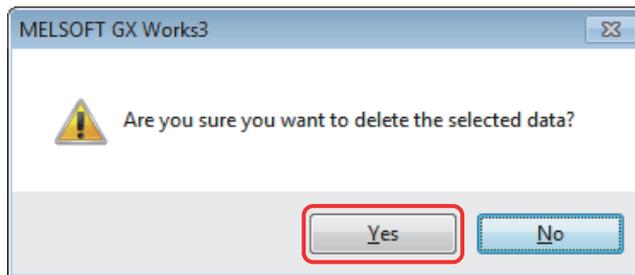


3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

- 14) Select “Unset: Gen. Intelligent Module (1 slot)” from “Module Information” in the navigation tree, and delete it with delete key.



- 15) Click “Yes”.



The diversion is complete.

Though a model change has been executed, conversion has not finished yet. Make sure to execute “Rebuilt All” before writing to PLC CPU.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

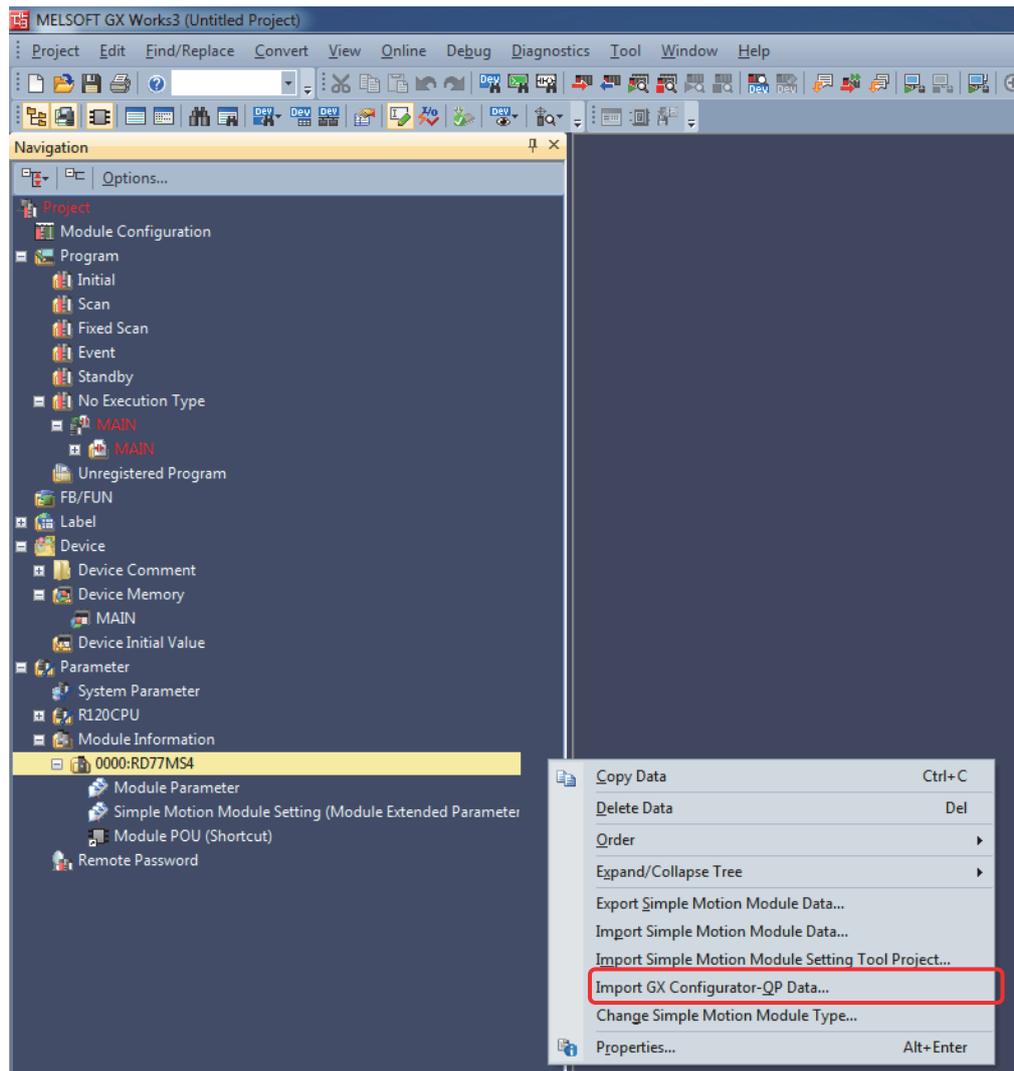
(3) Procedures for QD75MH format data diversion

The following shows the procedure for diverting MELSOFT GX Configurator-QP format data to RD77MS.

1) Start MELSOFT GX Works3. Open the project data created in (2) in this section.

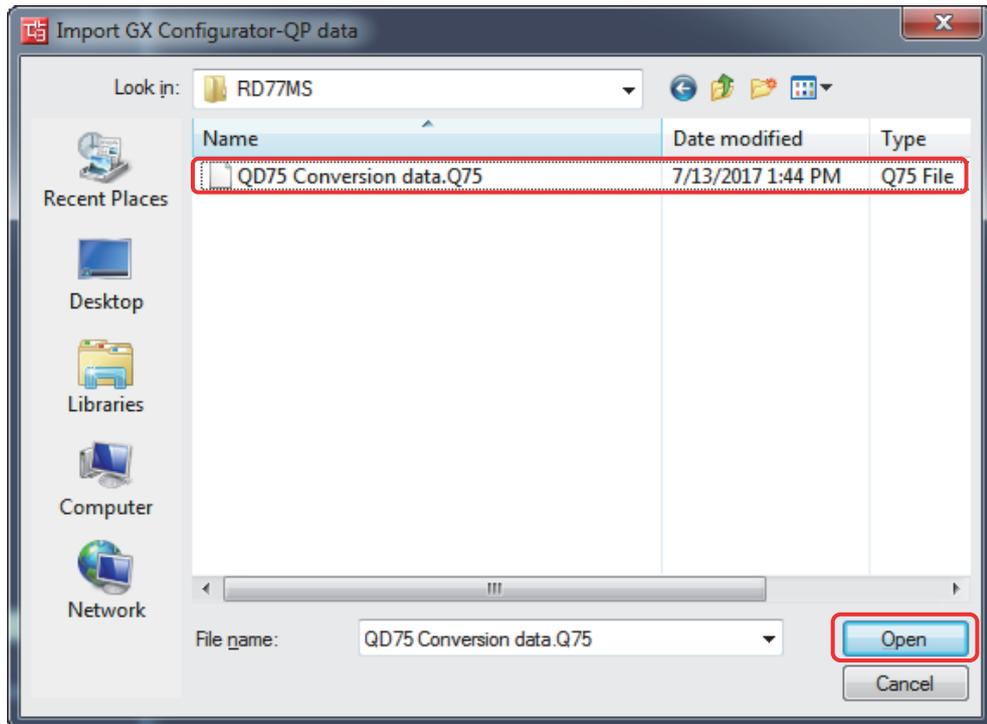
2) Select “RD77MS” under “Module Information” in the navigation tree, and right-click on it.

3) Select “Import GX Configurator-QP Data...” from the context menu.

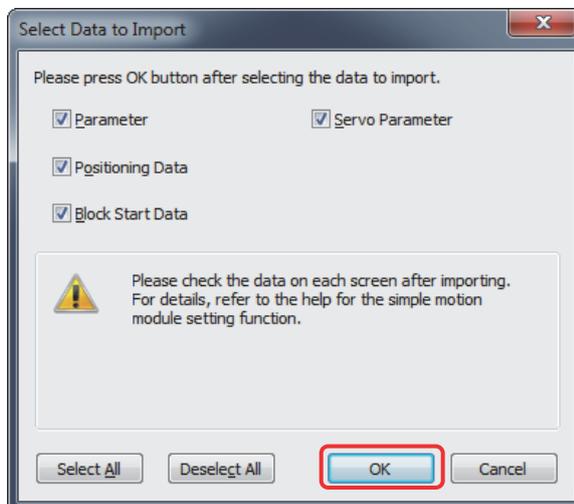


3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

4) Select the data created in (1) in this section, and click [Open].

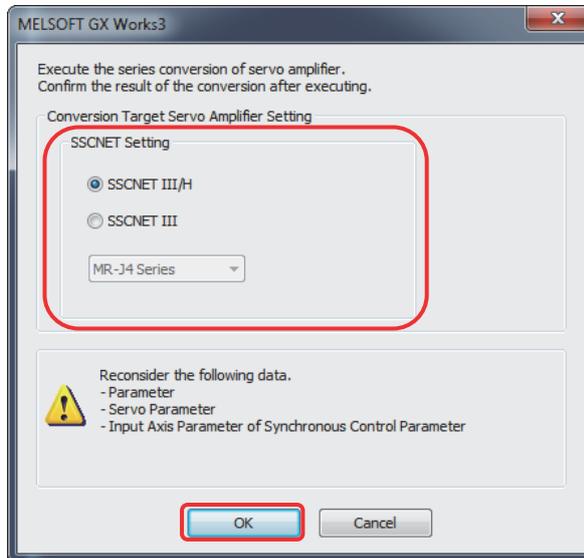


5) Click "OK" on "Select Data to Import" screen.



3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

- 6) Execute the series conversion of the servo amplifier. Select the SSCNET to be used (SSCNETIII or SSCNETIII/H) for the replaced servo amplifiers (for RD77MS), and click [OK].

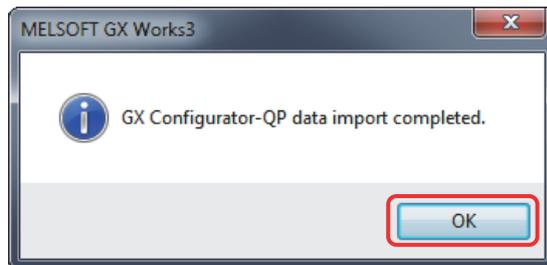


(Note): Refer to "MELSEC iQ-R Simple Motion Module User's Manual (Application)" for the servo system networks supported by the replaced servo amplifiers and SSCNETIII compatible devices (SSCNETIII or SSCNETIII/H).

(Note): When servo parameters settings are changed from "MR-J3 series" to "MR-J4 series", the parameter conversion is carried out based on conversion rules.

Refer to "Simple Motion Module Setting Help [Appendix] - [Servo parameter conversion]" for the conversion rules.

- 7) When the project diversion completion message appears, click "OK".

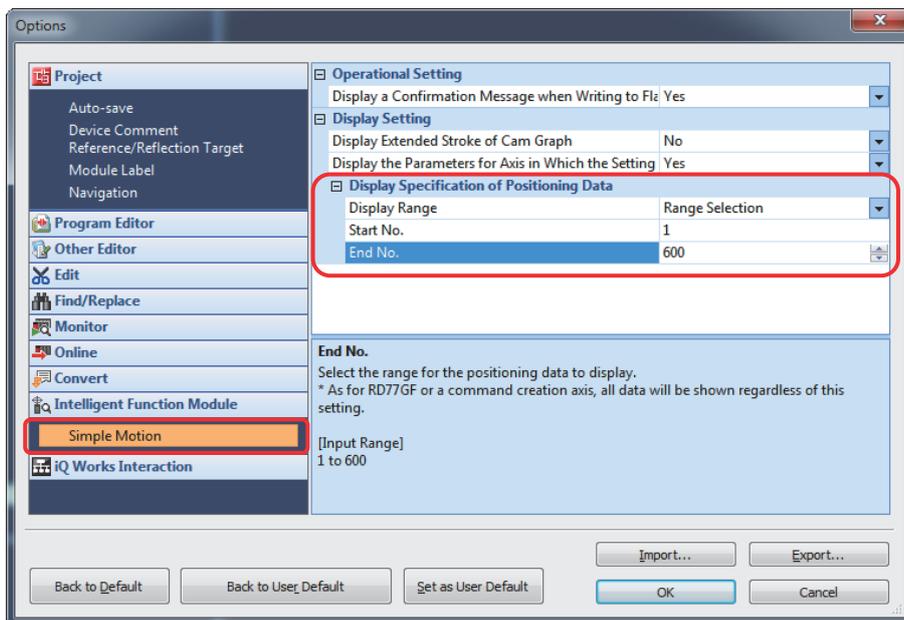


The diversion is completed.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(4) Restrictions on positioning data at migration

The memory structure of positioning data differs between RD77MS and QD75MH. For RD77MS, the positioning data of No.101 or later is not the buffer memory but the internal memory. Therefore, values cannot be written directly from a sequence program. If the current data before migration is written directly from a sequence program to the QD75MH positioning data of No.101 or later, those data needs to be set to the positioning data of No.101 or later with MELSOFT GX Works2 “Simple Motion Module setting tool”. Additionally, the RD77MS positioning data of No.101 or later will not be displayed by default setting. In order to set those positioning data, select [Tool] - [Option] from the Menu bar in MELSOFT GX Works3, and change the data display range on the screen below (“Simple Motion” in the “Intelligent Function Module”).



(a) When the positioning data is No.100 or before

All the data can be written to the buffer memory.

There is no change because data can be written to the buffer memory from a sequence program.

(b) When the positioning data is No.101 or later

The positioning data is written to the internal memory.

Unlike QD75MH, data cannot be written directly to RD77MS from a sequence program.

[Major changes]

Item	QD75MH	RD77MS
Positioning data (No.101 to 600)	3000+6000n to 7999+6000n	Cannot be set to the buffer memory (Can be changed only with MELSOFT GX Wroks3)
Block start area (No.7002 to 7004)	26400+1000n to 26999+1000n	Same as the above

n: Axis No.-1

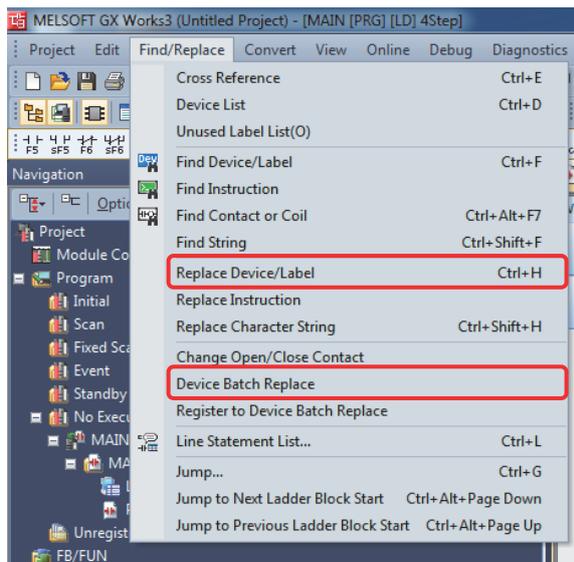
3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

3.4.2 Replacement of buffer memory No. and I/O signals in sequence program

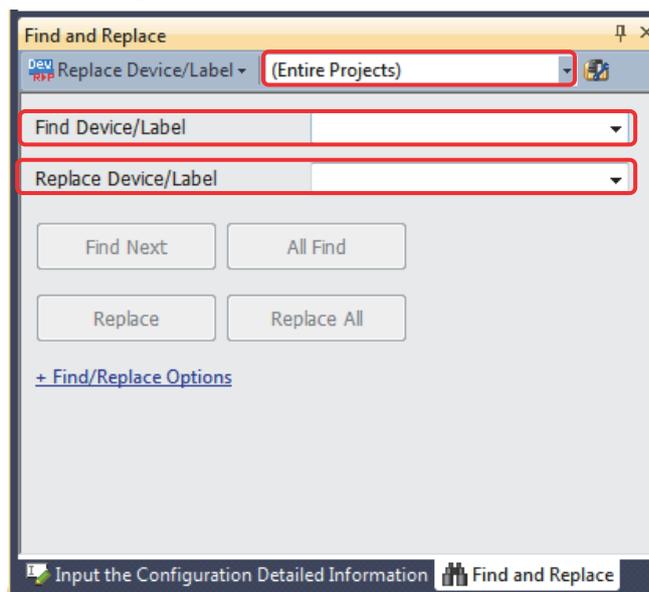
The device replacement function of MELSOFT GX Works3 replaces the buffer memory No. and I/O signals in the sequence program.

The following shows the replacement procedure.

- 1) Start MELSOFT GX Works3. Read the target project data.
- 2) Select [Replace Device/Label] or [Device Batch Replace] from [Find/Replace] menu.



- 3) Set the target place to search, "Find Device/Label", and "Replace Device/Label" correctly.



3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(1) Buffer memory

Replace the buffer memory No. by referring to the table below.

[Major changes]

Item		QD75MH	RD77MS
Axis monitor data (Md.20 to 499)		800+100n to 899+100n	2400+100n to 2499+100n
System monitor data		1200 to 1499	4000 to 4299
Axis control data (From Cd.3)		1500+100n to 1599+100n	4300+100n to 5899+100n
System control data		1900 to 1999	5900 to 5999
Positioning data (No.1 to 100)		2000+6000n to 2999+6000n	6000+1000n to 6999+1000n
Positioning data (No.101 to 600) ^(Note-1)		3000+6000n to 7999+6000n	Cannot be set to the buffer memory (Can be changed only with MELSOFT GX Works3)
Block start area (No.7000, 7001)	Block start data	26000+1000n to 26399+1000n	22000+400n to 22399+400n
	Condition data		
Block start area (No.7002 to 7004) ^(Note-1)	Block start data	26400+1000n to 26999+1000n	Cannot be set to the buffer memory (Can be changed only with MELSOFT GX Works3)
	Condition data		

n: Axis No.-1

(Note-1): Refer to section 3.4.1(4) for details.

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(2) Comparison of I/O signals

(a) Signal direction: Positioning module (Simple Motion module) → PLC CPU

Device No.	QD75MH		RD77MS									
	Signal name											
X0	QD75MH READY		RD77MS READY									
X1	Synchronization flag											
X2	Use prohibited		Use prohibited ^(Note-2)									
X3												
X4	Axis 1	M-code ON ^(Note-1)			Use prohibited ^(Note-2)							
X5	Axis 2											
X6	Axis 3											
X7	Axis 4											
X8	Axis 1	Error detection ^(Note-1)					Use prohibited ^(Note-2)					
X9	Axis 2											
XA	Axis 3											
XB	Axis 4											
XC	Axis 1	BUSY							Use prohibited ^(Note-2)			
XD	Axis 2											
XE	Axis 3											
XF	Axis 4											
X10	Axis 1	Start complete ^(Note-1)									Axis 1	BUSY
X11	Axis 2										Axis 2	
X12	Axis 3		Axis 3									
X13	Axis 4		Axis 4									
X14	Axis 1	Positioning complete ^(Note-1)	Axis 5	BUSY								
X15	Axis 2		Axis 6									
X16	Axis 3		Axis 7									
X17	Axis 4		Axis 8									
X18	Use prohibited		Axis 9		BUSY							
X19			Axis 10									
X1A			Axis 11									
X1B			Axis 12									
X1C			Axis 13									
X1D			Axis 14									
X1E			Axis 15									
X1F			Axis 16									

(Note-1): These signals are included in the buffer memory "[Md.31] Status" in RD77MS.

(Note-2): There are some devices that will become "Use prohibited" after replacing the existing model with RD77MS. The device No. with "Use prohibited" are used by system. Therefore, a user cannot use them. In the case of using them, the operation is not guaranteed.

RD77MS buffer memory "[Md.31] Status"		
Buffer memory address	Signal name	
2417+100n	b12	M-code ON
	b13	Error detection
	b14	Start complete
	b15	Positioning complete

n: Axis No.-1

3. DETAILS OF MIGRATION FROM QD75MH TO RD77MS

(b) Signal direction: PLC CPU → Positioning module (Simple Motion module)

	QD75MH		RD77MS			
Device No.	Signal name					
Y0	PLC READY					
Y1	All axis servo ON					
Y2	Use prohibited		Use prohibited ^(Note-2)			
Y3						
Y4					Axis 1	Axis stop ^(Note-1)
Y5					Axis 2	
Y6	Axis 3					
Y7	Axis 4					
Y8	Axis 1	Forward run JOG start ^(Note-1)				
Y9		Reverse run JOG start ^(Note-1)				
YA	Axis 2	Forward run JOG start ^(Note-1)				
YB		Reverse run JOG start ^(Note-1)				
YC	Axis 3	Forward run JOG start ^(Note-1)				
YD		Reverse run JOG start ^(Note-1)				
YE	Axis 4	Forward run JOG start ^(Note-1)				
YF		Reverse run JOG start ^(Note-1)				
Y10	Axis 1	Positioning start	Axis 1	Positioning start		
Y11	Axis 2		Axis 2			
Y12	Axis 3		Axis 3			
Y13	Axis 4		Axis 4			
Y14	Axis 1	Execution prohibition flag ^(Note-1)	Axis 5			
Y15	Axis 2		Axis 6			
Y16	Axis 3		Axis 7			
Y17	Axis 4		Axis 8			
Y18	Use prohibited		Axis 9			
Y19			Axis 10			
Y1A			Axis 11			
Y1B			Axis 12			
Y1C			Axis 13			
Y1D			Axis 14			
Y1E			Axis 15			
Y1F			Axis 16			

(Note-1): These signals are included in the buffer memory “[Cd.180] to [Cd.183]” in RD77MS.

(Note-2): There are some devices that will become “Use prohibited” after replacing the existing model with RD77MS. The device No. with “Use prohibited” are used by system. Therefore, a user cannot use them. In the case of using them, the operation is not guaranteed.

RD77MS buffer memory “[Cd.180] to [Cd.183]”	
Buffer memory address	Signal name
30100+10n	Axis stop
30101+10n	Forward run JOG start
30102+10n	Reverse run JOG start [†]
30103+10n	Execution prohibition flag

n: Axis No.-1

WARRANTY

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

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 2. Failure caused by unapproved modifications, etc., to the product by the user.
 3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
 6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Precautions for Choosing the Products

- (1) For the use of our Simple Motion module, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in Simple Motion module, and a backup or fail-safe function should operate on an external system to Simple Motion module when any failure or malfunction occurs.
- (2) Our Simple Motion module is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used. In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used. We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

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In some cases, trademark symbols such as '™' or '®' are not specified in this manual.

Migration Guide from Positioning Module to Simple Motion Module [QD75M(H) ⇒ RD77MS]

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