

## ***SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [1 / 74]***

[Issue No.]	SSC-A-0004-A
[Title]	Migration Guide from QD77MS Simple Motion Module to RD78G Motion Module (Simple Motion Mode)
[Date of Issue]	October 2021
[Relevant Models]	RD78G4, RD78G8, RD78G16, QD77MS2, QD77MS4, QD77MS16

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Thank you for your continued support of Mitsubishi Electric servo system controllers. This technical bulletin provides precautions when migrating the existing system using QD77MS2/QD77MS4/QD77MS16 (hereinafter called QD77MS) to a new system using RD78G4/RD78G8/RD78G16 (hereinafter called RD78G).

The new system uses RD78G Simple Motion mode (hereinafter called RD78G(S)). RD78G(S) is a function that provides the same usability as the previous models (Simple Motion modules) when RD78G is used with MR-J5-G. This function is supported by RD78G4/RD78G8/RD78G16.

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### **Point**

MELSEC-Q series modules, which do not have alternatives in the MELSEC iQ-R series, can be used by mounting them on the RQ extension base unit. When replacing the existing modules, the terminals and connectors may have to be changed. Refer to the "MELSEC iQ-R Module Configuration Manual" (SH-081262ENG) and the user's manual of the module for details.

The contents in this document are based on the product lines and the specifications of the modules and engineering software as of April 2021. The contents are subject to change without notice due to a product line expansion or a specification improvement. Please refer to the latest edition at the time of considering the migration.

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# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [2 / 74]

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## 1. WHEN MIGRATING MR-J4 SERIES TO MR-J5 SERIES

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

### 1.1. Correspondence Table for System Components

When using RD78G, use MELSEC iQ-R series compatible system components.

Item			When using QD77MS	When using RD78G	
			Model	Model	
Main base unit			Q3_B	R3_B	
Power supply module			Q6_P	R6_P	
Extension base unit			Q6_B	R6_B	
Extension cable			QC_B	RC_B	
CPU module	PLC CPU		Q_CPU	R_CPU	
	C Controller module		Q06CCPU-V, Q12DCCPU-V	-	
Simple Motion module/Motion module			QD77MS2	RD78G4 <sup>*1</sup>	
			QD77MS4	RD78G4	
			QD77MS16	RD78G16	
Input module	AC input	100 to 120 V AC	QX10(-TS)	RX10(-TS)	
		100 to 240 V AC	QX28	RX28	
	DC input (positive common)	24 V DC	QX40(-S1)(-TS)	RX40C7(-TS) <sup>*2</sup>	
			QX41(-S1)	RX41C4 <sup>*2</sup>	
			QX42(-S1)	RX42C4 <sup>*2</sup>	
			QX41-S2	RX41C6HS <sup>*2</sup>	
	DC input (negative common)	24 V DC	QX80(-TS)	RX40C7(-TS) <sup>*2</sup>	
			QX81	RX41C4 <sup>*2</sup>	
			QX82(-S1)	RX42C4 <sup>*2</sup>	
			QX81-S2	RX41C6HS <sup>*2</sup>	
DC input (positive/negative common shared)	5/12 V DC	QX70 QX71 QX72	-		
DC high-speed input (positive common)	24 V DC	QX40H	RX40PC6H		
	5 V DC	QX70H	RX61C6HS <sup>*2</sup>		
DC high-speed input (negative common)	24 V DC	QX80H	RX40NC6H		
	5 V DC	QX90H	RX61C6HS <sup>*2</sup>		
DC input/AC input	48 V DC/AC	QX50	-		
Output module	Relay output	24 V DC, 240 V AC	QY10(-TS) QY18A	RY10R2(-TS) RY18R2A	
		100 to 240 V AC	QY22	RY20S6	
	Transistor output (sink type)	12 to 24 V DC	QY40P(-TS) QY41P QY42P QY50	RY40NT5P(-TS) RY41NT2P RY42NT2P RY40NT5P	
			5 to 12 V DC	QY70	-
				QY71	RY41NT2H
	Transistor output (source type)	12 to 24 V DC	QY80(-TS) QY81P QY82P	RY40PT5P(-TS) RY41PT1P RY42PT1P	
	Transistor high-speed output (sink type)	5 to 24 V DC	QY41H	RY41NT2H	
	Transistor output (all points independent)	5 to 24 V DC	QY68A	-	

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Item			When using QD77MS	When using RD78G
			Model	Model
I/O combined module	DC input/transistor output	Input: 24 V DC Output: 12 to 24 V DC	QH42P	RH42C4NT2P
			QX41Y41P	-
			QX48Y57	-
Interrupt module			QI60	RX40C7 <sup>*2</sup>
Analog input module	Voltage/current input		Q64AD(H)	R60AD(H)4
			Q68ADV	R60ADV8
			Q68ADI	R60ADI8
Channel isolated analog input module	Voltage/current input		Q64AD-GH	-
			Q64ADH	R60AD8-G
	Current input		Q62AD-DGH	-
			Q66AD-DG	-
Analog output module	Voltage/current output		Q62DA(N)	R60DA4
			Q64DA(N)	
			Q64DAH	R60DAH4
	Voltage output		Q68DAV(N)	R60DAV8
	Current output		Q68DAI(N)	R60DAI8
Channel isolated analog output module	Voltage/current output		Q62DA-FG	-
			Q66DA-G	R60DA8-G
Analog I/O module	Voltage and current input/output		Q64AD2DA	-
External signal input module			QD77MS	RX41C4
INC synchronous encoder input module			QD77MS	RD62D2 (differential-input type, 2ch) <sup>*3</sup>
Manual pulse generator input module			QD77MS	RD62P2 (DC input, 2ch) <sup>*3</sup> RD62P2E (DC input, 2ch) <sup>*3</sup>
Serial absolute synchronous encoder			Q171ENC-W8	- <sup>*4</sup>
Manual pulse generator			MR-HDP01	MR-HDP01
Servo system network cable			MR-J3BUS_ MR-J3BUS_M-A MR-J3BUS_M-B	Ethernet cable Category 5e or higher, (double shielded/STP) straight cable

\*1. The maximum number of control axes is increased from 2 to 4.

\*2. This module is positive/negative common shared type.

\*3. Connect this module to an external power supply separately.

\*4. The encoder of HK-KT series servo motor can be used as a synchronous encoder when connected to MR-J5-\_G-RJ.

## Point

- Select the power supply module after estimating the system current consumption.
- RD78G has larger current consumption than QD77MS, and therefore the number of modules connected per power supply module is fewer.
- If the current capacity of the power supply module becomes insufficient as a result of migration, separate the system by using the extension base unit (R6\_B).
- Refer to the latest version of "Alternative model lists and project conversion procedure for the replacement of MELSEC-Q series models with MELSEC iQ-R series" (FA-A-0239) for details of the alternative models.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [4 / 74]

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## 1.2. Servo Amplifiers/Servo Motors/Servo System Network/Servo Motor Cables

The servo system network is changed from SSCNET III/H to CC-Link IE TSN.

Select a CC-Link IE TSN-compatible servo amplifier and servo motors/servo motor cables for the selected servo amplifier.

### (1) Servo amplifiers/rotary servo motors/servo motor cables

QD77MS		→	RD78G	
Servo amplifier			Servo amplifier	
MR-J4 series	MR-J4-_B MR-J4W2-_B MR-J4W3-_B MR-J4-_B-RJ		MR-J5 series	MR-J5-_G MR-J5W2-_G MR-J5W3-_G MR-J5-_G-RJ

QD77MS			→	RD78G		
Rotary servo motor				Rotary servo motor		
Features	Capacity	Model	Features	Capacity	Model	
Ultra-compact size	Ultra-small capacity	HG-AK_	Ultra-compact size	Ultra-small capacity	-	
Ultra-low inertia	Small capacity	HG-MR_	Ultra-low inertia	Small capacity	-	
	Medium capacity	HG-RR_		Medium capacity	HK-RT_	
Low inertia	Small capacity	HG-KR_	Low inertia	Small capacity	HK-KT_	
	Medium/large/ultra-large capacity	HG-JR_		Medium/large/ultra-large capacity	HK-KT_ HK-ST_ *1	
Medium inertia	Medium capacity	HG-SR_	Medium inertia	Medium capacity	HK-ST_	
Flat type	Medium capacity	HG-UR_	Flat type	Medium capacity	-	

\*1. The medium capacity range of HG-JR (3.3 kW to 5.0 kW) can be replaced with HK-ST\_.

Rotary servo motor			Servo amplifier power supply	0.01 kW	0.1 kW	1 kW	10 kW	200 kW
Ultra compact	MR-J4 series	HG-AK_	DC48 V/24 V	0.01 to 0.03 kW				
	MR-J5 series	N/A	-					
Ultra-low inertia	MR-J4 series	HG-MR_	200 V		0.05 to 0.75 kW			
	MR-J5 series	N/A	-					
	MR-J4 series	HG-RR_	200 V				1 to 5 kW	
		HK-RT_	200 V				1 to 7 kW	
MR-J5 series	HK-RT_4	400 V				1 to 3.5 kW		
	HK-RT_4	400 V						
Low inertia	MR-J4 series	HG-KR_	200 V		0.05 to 0.75 kW			
		HK-KT_	200 V			0.05 to 2 kW		
	MR-J5 series	HK-KT_4	200 V			0.2 to 1 kW		
		HK-KT_4	400 V		0.05 to 0.15 kW			
	MR-J5 series	HK-KT_4	400 V			0.4 to 2 kW		
		HK-KT_4	400 V					
	MR-J4 series	HG-JR_	200 V				0.5 to 37 kW	
		HK-KT_	200 V			0.6 to 2 kW		
		HK-KT_4	200 V			0.75 to 1 kW		
		HK-ST_	200 V				2.6 to 5 kW	
MR-J5 series	HG-JR_4	400 V				0.5 to 220 kW		
	HK-KT_4	400 V			0.6 to 2 kW			
MR-J5 series	HK-KT_4	400 V				2.6 to 5 kW		
	HK-KT_4	400 V						
Medium inertia	MR-J4 series	HG-SR_	200 V			0.5 to 7 kW		
		HK-ST_	200 V			0.5 to 7 kW		
	MR-J5 series	HK-ST_4	200 V			0.3 to 4.2 kW		
		HK-ST_4	200 V					
MR-J4 series	HG-SR_4	400 V				0.5 to 7 kW		
	HK-ST_4	400 V				0.5 to 3.5 kW		
Flat type	MR-J4 series	HG-UR_	200 V			0.75 to 5 kW		
	MR-J5 series	N/A	-					

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QD77MS			RD78G		
MR-J4 series	Rotary servo motor	Encoder cable/connector	MR-J5 series	Rotary servo motor	Encoder cable/connector
	HG-RR_	MR-J3ENSCBL_M-H/L		HK-RT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L MR-AENSCBL_M-H/L *1 MR-ENCNS2_*1 MR-J3ENSCBL_M-H/L *1 MR-J3SCNS_*1
	HG-KR_	MR-EKCBL_M-H/L MR-J3ENCBL_M-A_-H/L MR-J3ENSCBL_M-H/L MR-J3JCBL03M-A_-L MR-J3JSCBL03M-A_-L		HK-KT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L
	HG-JR_	MR-ENECBL_M-H-MTH MR-ENE4CBL_M-H-MTH MR-J3ENSCBL_M-H/L		HK-ST_	MR-AENSCBL_M-H/L MR-ENCNS2_*1 MR-J3ENSCBL_M-H/L MR-J3SCNS_*1
	HG-SR_	MR-J3ENSCBL_M-H/L			

\*1. This is used for HK-RT (3.5 kW to 7.0 kW).

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QD77MS			RD78G		
MR-J4 series	Rotary servo motor	Servo motor power cable/connector	MR-J5 series	Rotary servo motor	Servo motor power cable/connector
	HG-RR_	MR-PWCNS1/2		HK-RT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L MR-APWCNS5*1
	HG-KR_	MR-PWS1CBL_M-A_-H MR-PWS2CBL03M-A_-L		HK-KT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L
	HG-JR_	MR-PWCNS3/4/5		HK-ST_	MR-APWCNS4/5
	HG-SR_	MR-PWCNS3/4/5			

\*1. This is used for HK-RT (3.5 kW to 7.0 kW).

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QD77MS			RD78G		
MR-J4 series	Rotary servo motor	Electromagnetic brake cable/connector	MR-J5 series	Rotary servo motor	Electromagnetic brake cable/connector
	HG-RR_	—*1		HK-RT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L *2 MR-AEP2CBL_M-A_-H/L *2 MR-AEP2J10CBL03M-A_-L *2 MR-AEP2J20CBL03M-A_-L *2 MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L MR-BKCNS1_ *3 MR-BKCNS2_ *3
	HG-KR_	MR-BKS1CBL_M-A_-H/L MR-BKS2CBL03M-A_-L		HK-KT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L *2 MR-AEP2CBL_M-A_-H/L *2 MR-AEP2J10CBL03M-A_-L *2 MR-AEP2J20CBL03M-A_-L *2 MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L
	HG-JR_	MR-BKCNS1/2 MR-BKCNS1A/2A MR-BKCN		HK-ST_	MR-BKCNS1_ MR-BKCNS2_
HG-SR_	MR-BKCNS1/2 MR-BKCNS1A/2A				

\*1. The power connector of HG-RR series has electromagnetic brake terminals.

\*2. This cable does not include electromagnetic brake wires.

\*3. This is used for HK-RT (3.5 kW to 7.0 kW).



The cable for the HK-KT series and the HK-RT series (1.0 kW to 2.0 kW) has a single connector combining the motor power supply, encoder, and electromagnetic brake.

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## (2) Servo amplifiers/linear servo motors

QD77MS			→	RD78G		
Servo amplifier		Linear servo motor		Servo amplifier		Linear servo motor
MR-J4 series	MR-J4-_B MR-J4W2-_B MR-J4W3-_B	LM-H3_ LM-F_ LM-K2_ LM-U2_		MR-J5 series	MR-J5-_G MR-J5W2-_G MR-J5W3-_G	LM-H3_ LM-F_ LM-K2_ LM-U2_

## (3) Servo amplifiers/direct drive motors

QD77MS			→	RD78G		
Servo amplifier		Direct drive motor		Servo amplifier		Direct drive motor
MR-J4 series	MR-J4-_B MR-J4W2-_B MR-J4W3-_B	TM-RFM_ TM-RG2M_ TM-RU2M_		MR-J5 series	MR-J5-_G MR-J5W2-_G MR-J5W3-_G	TM-RFM_ TM-RG2M_ TM-RU2M_

### Point



When configuring an absolute position detection system with the MR-J5 series and a direct drive motor, a battery (MR-BAT6V1SET or MR-BAT6V1SET-A) and an absolute position storage unit (MR-BTAS01) are required.



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## (4) Comparison of servo system network

Item	 SSCNET III/H SERVO SYSTEM CONTROLLER NETWORK	→	 CC-Link IETSN
Communication medium	Optical fiber cable		Ethernet cable Category 5e or higher, (double shielded/STP) straight cable
Communication speed	150 Mbps		1 Gbps
Maximum distance between stations	[Standard code for inside panel and standard cable for outside panel] 20 m [Long distance cable] 100 m		100 m

## 1.3. Engineering Environment

Product name	Model	Version
MELSOFT GX Works3	SW1DND-GXW3-E	Ver.1.075D or later
Simple Motion module setting function (included in MELSOFT GX Works3)	-	Ver.1.165X or later
MELSOFT MR Configurator2 (included in MELSOFT GX Works3)	SW1DNC-MRC2-E	Ver.1.100E or later



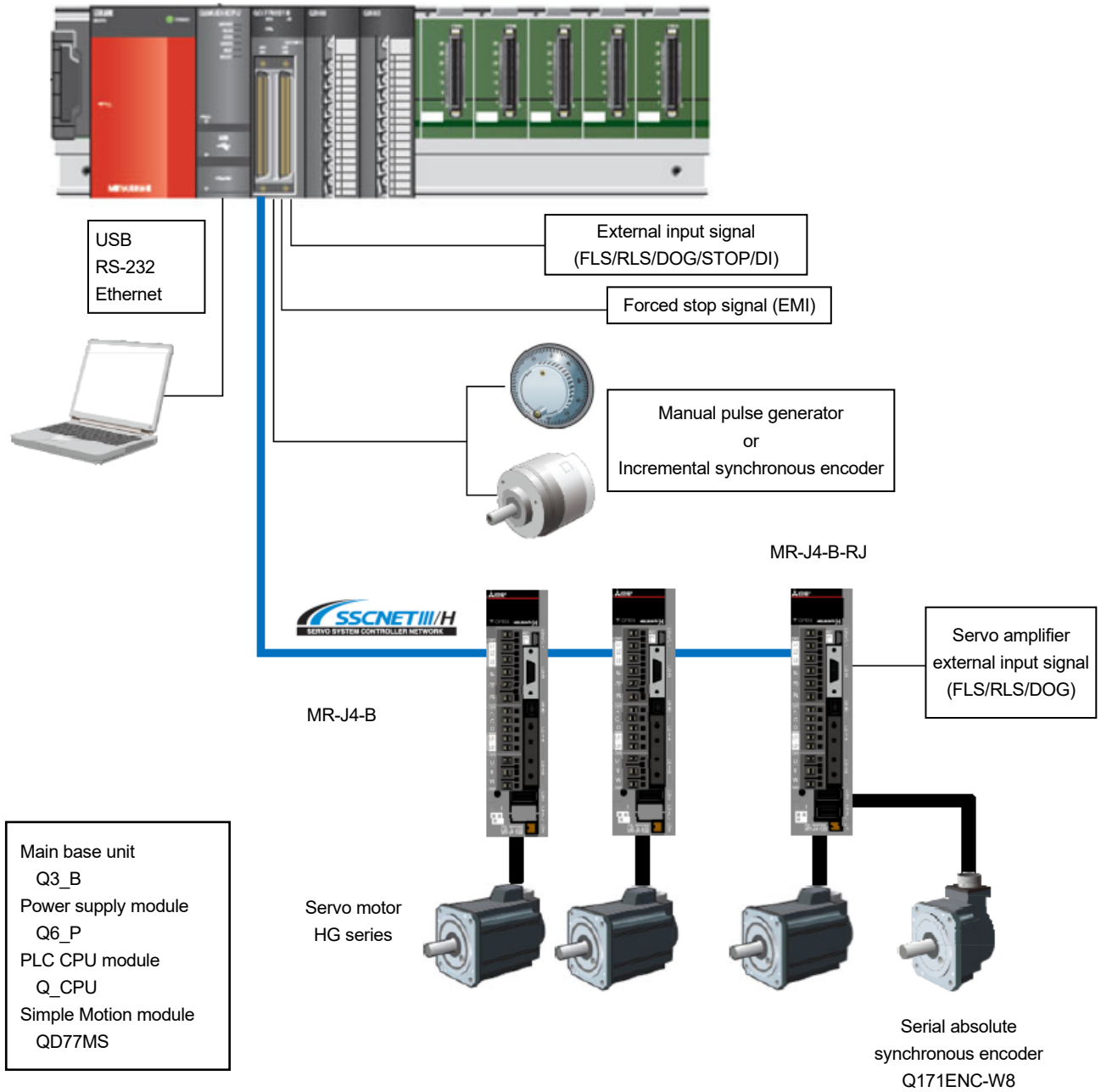
Supported servo amplifier functions and servo motor types vary by the version of MELSOFT MR Configurator2. Use the version which supports the devices to be used.

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## 1.4. System Configuration

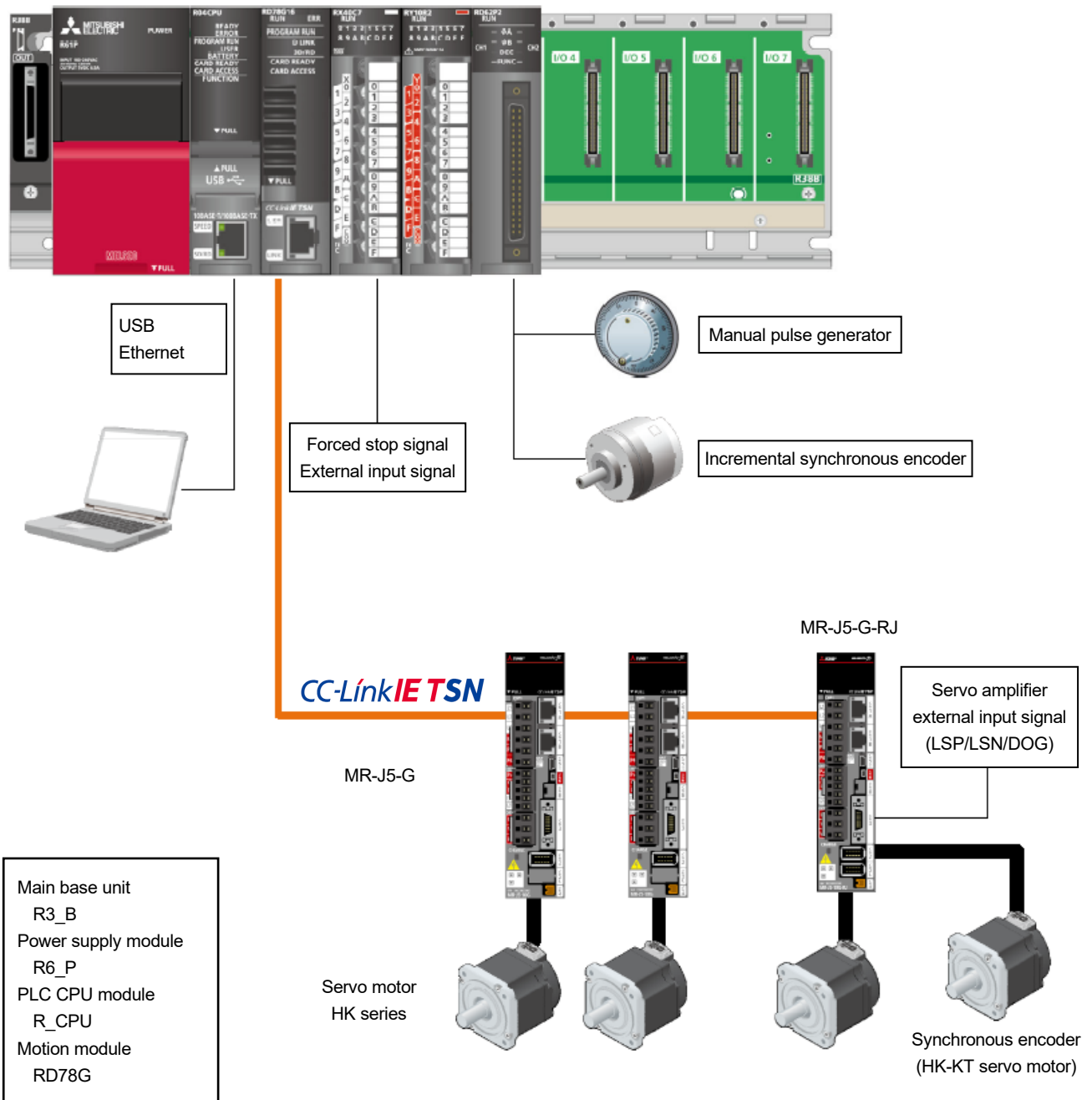
### 1.4.1. System configuration before migration (QD77MS and MR-J4 series)



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## 1.4.2. System configuration after migration (RD78G and MR-J5 series)



When using an absolute position detection system, change [Pr. PC29.5 [AL. 0E3 Absolute position counter warning] selection] from [1: Enabled (initial value)] to [0: Disabled].

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## 2. WHEN MIGRATING MR-J3 SERIES TO MR-J5 SERIES

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

### 2.1. Correspondence Table for System Components

When using RD78G, use MELSEC iQ-R series compatible system components.

Item		When using QD77MS		When using RD78G			
		Model		Model			
Main base unit		Q3_B		R3_B			
Power supply module		Q6_P		R6_P			
Extension base unit		Q6_B		R6_B			
Extension cable		QC_B		RC_B			
CPU module	PLC CPU	Q_CPU		R_CPU			
	C Controller module	Q06CCPU-V, Q12DCCPU-V Q24/26DHCCPU-__		- -			
Simple Motion module		QD77MS2		RD78G4 <sup>*1</sup>			
		QD77MS4		RD78G4			
		QD77MS16		RD78G16			
Input module	AC input	100 to 120 V AC	QX10(-TS)		RX10(-TS)		
		100 to 240 V AC	QX28		RX28		
	DC input (positive common)	24 V DC	QX40(-S1)(-TS)		RX40C7(-TS) <sup>*2</sup>		
			QX41(-S1)		RX41C4 <sup>*2</sup>		
			QX42(-S1)		RX42C4 <sup>*2</sup>		
			QX41-S2		RX41C6HS <sup>*2</sup>		
	DC input (negative common)	24 V DC	QX80(-TS)		RX40C7(-TS) <sup>*2</sup>		
			QX81		RX41C4 <sup>*2</sup>		
			QX82(-S1)		RX42C4 <sup>*2</sup>		
			QX81-S2		RX41C6HS <sup>*2</sup>		
	DC input (positive/negative common shared)	5/12 V DC	QX70		-		
			QX71 QX72				
DC high-speed input (positive common)	24 V DC	QX40H		RX40PC6H			
	5 V DC	QX70H		RX61C6HS <sup>*2</sup>			
DC high-speed input (negative common)	24 V DC	QX80H		RX40NC6H			
	5 V DC	QX90H		RX61C6HS <sup>*2</sup>			
DC input/AC input	48 V DC/AC	QX50		-			
Output module	Relay output	24 V DC, 240 V AC	QY10(-TS) QY18A		RY10R2(-TS) RY18R2A		
		100 to 240 V AC	QY22		RY20S6		
	Transistor output (sink type)	12 to 24 V DC	QY40P(-TS) QY41P QY42P QY50		RY40NT5P(-TS) RY41NT2P RY42NT2P RY40NT5P		
			5 to 12 V DC	QY70		-	
				QY71		RY41NT2H	
	Transistor output (source type)	12 to 24 V DC	QY80(-TS) QY81P QY82P		RY40PT5P(-TS) RY41PT1P RY42PT1P		
	Transistor high-speed output (sink type)	5 to 24 V DC	QY41H		RY41NT2H		
	Transistor output (all points independent)	5 to 24 V DC	QY68A		-		

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Item			When using QD77MS	When using RD78G
			Model	Model
I/O combined module	DC input/transistor output	Input: 24 V DC Output: 12 to 24 V DC	QH42P	RH42C4NT2P
			QX41Y41P	-
			QX48Y57	-
Interrupt module			QI60	RX40C7 <sup>*2</sup>
Analog input module		Voltage/current input	Q64AD(H)	R60AD(H)4
		Voltage input	Q68ADV	R60ADV8
		Current input	Q68ADI	R60ADI8
Channel isolated analog input module		Voltage/current input	Q64AD-GH	-
			Q64ADH	R60AD8-G
		Current input	Q62AD-DGH	-
Analog output module		Voltage/current output	Q62DA(N)	R60DA4
			Q64DA(N)	-
			Q64DAH	R60DAH4
		Voltage output	Q68DAV(N)	R60DAV8
Channel isolated analog output module		Voltage/current output	Q68DAI(N)	R60DAI8
			Q62DA-FG	-
			Q66DA-G	R60DA8-G
Analog I/O module		Voltage and current input/output	Q64AD2DA	-
External signal input module			QD77MS	RX41C4
INC synchronous encoder input module			QD77MS	RD62D2 (differential-input type, 2ch) <sup>*3</sup>
Manual pulse generator input module			QD77MS	RD62P2 (DC input, 2ch) <sup>*3</sup> RD62P2E (DC input, 2ch) <sup>*3</sup>
Manual pulse generator			MR-HDP01	MR-HDP01
Servo system network cable			MR-J3BUS_ MR-J3BUS_M-A MR-J3BUS_M-B	Ethernet cable Category 5e or higher, (double shielded/STP) straight cable

\*1. The maximum number of control axes is increased from 2 to 4.

\*2. This module is positive/negative common shared type.

\*3. Connect this module to an external power supply separately.

## Point

- Select the power supply module after estimating the system current consumption.
- RD78G has larger current consumption than QD77MS, and therefore the number of modules connected per power supply module is fewer.
- If the current capacity of the power supply module becomes insufficient as a result of migration, separate the system by using the extension base unit (R6\_B).
- Refer to the latest version of "Alternative model lists and project conversion procedure for the replacement of MELSEC-Q series models with MELSEC iQ-R series" (FA-A-0239) for details of the alternative models.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [14 / 74]

[Issue No.] SSC-A-0004-A

## 2.2. Servo Amplifiers/Servo Motors/Servo System Network/Servo Motor Cables

The servo system network is changed from SSCNET III to CC-Link IE TSN.

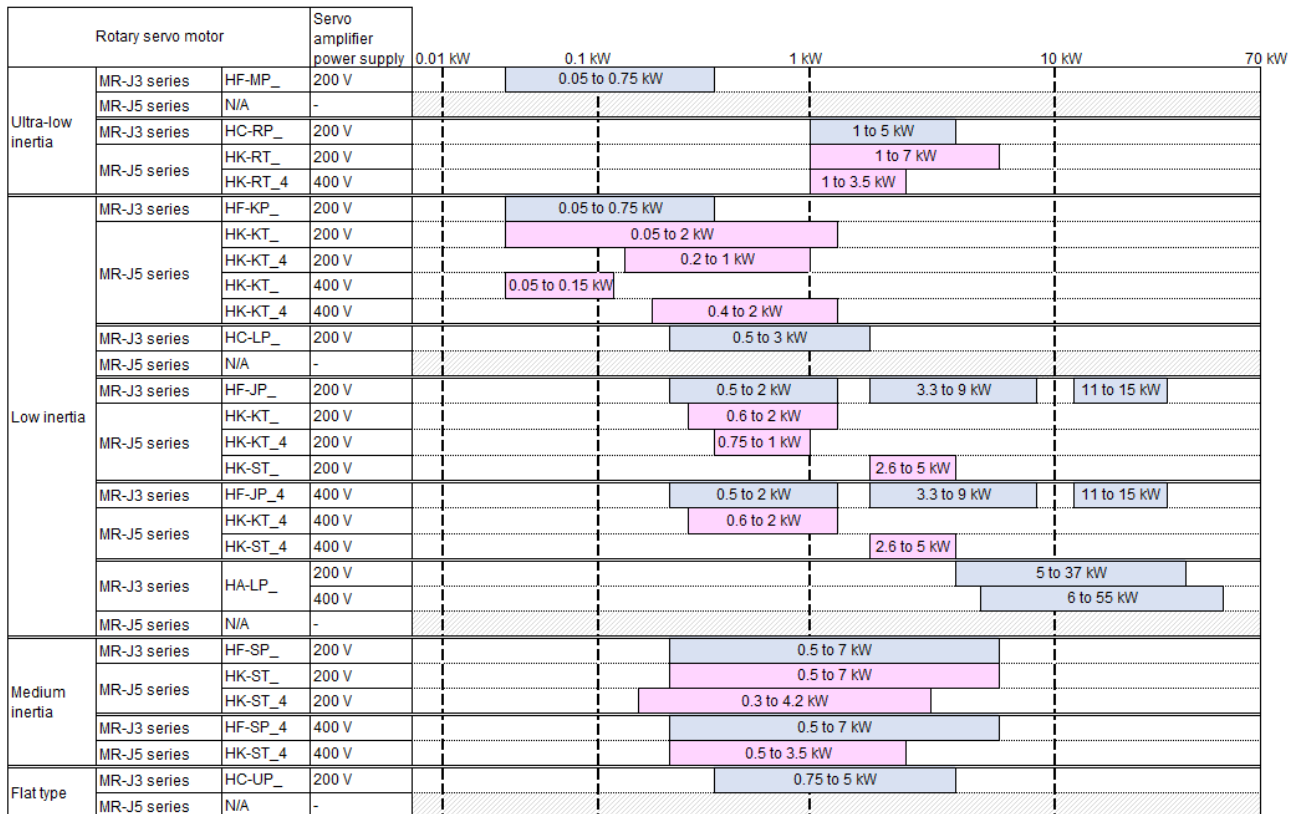
Select a CC-Link IE TSN-compatible servo amplifier and servo motors/servo motor cables for the selected servo amplifier.

### (1) Servo amplifiers/rotary servo motors/servo motor cables

QD77MS		→	RD78G	
Servo amplifier			Servo amplifier	
MR-J3 series	MR-J3-_B MR-J3W-_B MR-J3-_BS MR-J3-_B-RJ006		MR-J5 series	MR-J5-_G MR-J5W2-_G MR-J5W3-_G MR-J5-_G-RJ

QD77MS			→	RD78G		
Rotary servo motor				Rotary servo motor		
Features	Capacity	Series	Features	Capacity	Series	
Ultra-low inertia	Small capacity	HF-MP_	Ultra-low inertia	Small capacity	-	
	Medium capacity	HC-RP_		Medium capacity	HK-RT_	
Low inertia	Small capacity	HF-KP_	Low inertia	Small capacity	HK-KT_	
	Medium capacity	HC-LP_		Medium capacity	-	
	Medium/large capacity	HF-JP_		Medium/large capacity	HK-KT_	HK-ST_ *1
		HA-LP_		-	-	-
Medium inertia	Medium capacity	HF-SP_	Medium inertia	Medium capacity	HK-ST_	
Flat type	Medium capacity	HC-UP_	Flat type	Medium capacity	-	

\*1. The medium capacity range of HF-JP (3.3 kW to 5.0 kW) can be replaced with HK-ST\_.



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [15 / 74]

[Issue No.] SSC-A-0004-A

QD77MS			RD78G		
MR-J3 series	Rotary servo motor	Encoder cable/connector	MR-J5 series	Rotary servo motor	Encoder cable/connector
	HC-RP_	MR-J3ENSCBL_M-H/L MR-J3SCNS_	→	HK-RT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L MR-AENSCBL_M-H/L *1 MR-ENCNS2_ *1 MR-J3ENSCBL_M-H/L *1 MR-J3SCNS_ *1
	HF-KP_	MR-EKCBL_M-H/L MR-J3ENCBL_M-A_-H/L MR-J3ENSCBL_M-H/L MR-J3JCBL03M-A_-L MR-J3JSCBL03M-A_-L MR-J3SCNS		HK-KT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L
	HF-JP_	MR-ENECNS MR-ENECBL_M-H MR-J3ENSCBL_M-H/L MR-J3SCNS_		HK-ST_	MR-AENSCBL_M-H/L MR-ENCNS2_ MR-J3ENSCBL_M-H/L MR-J3SCNS_
	HF-SP_	MR-J3ENSCBL_M-H/L MR-J3SCNS_			

\*1. This is used for HK-RT (3.5 kW to 7.0 kW).

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [16 / 74]

[Issue No.] SSC-A-0004-A

QD77MS			RD78G			
MR-J3 series	Rotary servo motor	Servo motor power cable/connector	→	MR-J5 series	Rotary servo motor	Servo motor power cable/connector
	HC-RP_	MR-PWCNS1/2		HK-RT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L MR-APWCNS5*1	
	HF-KP_	MR-PWS1CBL_M-A_-H/L MR-PWS2CBL03M-A_-L		HK-KT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L MR-AEP2CBL_M-A_-H/L MR-AEP2J10CBL03M-A_-L MR-AEP2J20CBL03M-A_-L MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L	
	HF-JP_	MR-PWCNS3/4/5		HK-ST_	MR-APWCNS4/5	
HF-SP_	MR-PWCNS3/4/5					

\*1. This is used for HK-RT (3.5 kW to 7.0 kW).



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [17 / 74]

[Issue No.] SSC-A-0004-A

QD77MS			RD78G		
MR-J3 series	Rotary servo motor	Electromagnetic brake cable/connector	MR-J5 series	Rotary servo motor	Electromagnetic brake cable/connector
	HC-RP_	-		HK-RT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L *1 MR-AEP2CBL_M-A_-H/L *1 MR-AEP2J10CBL03M-A_-L *1 MR-AEP2J20CBL03M-A_-L *1 MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L MR-BKCNS1_ *2 MR-BKCNS2_ *2
	HF-KP_	MR-BKS1CBL_M-A_-H/L MR-BKS2CBL03M-A_-L		HK-KT_	MR-AEKCBL_M-H/L MR-AENSCBL_M-H/L MR-AEP1CBL_M-A_-H/L *1 MR-AEP2CBL_M-A_-H/L *1 MR-AEP2J10CBL03M-A_-L *1 MR-AEP2J20CBL03M-A_-L *1 MR-AEPB1CBL_M-A_-H/L MR-AEPB2CBL_M-A_-H/L MR-AEPB2J10CBL03M-A_-L MR-AEPB2J20CBL03M-A_-L
	HF-JP_	MR-BKCNS1_ MR-BKCN		HK-ST_	MR-BKCNS1_ MR-BKCNS2_
	HF-SP_	MR-BKCNS1_			

\*1. This cable does not include electromagnetic brake wires.

\*2. This is used for HK-RT (3.5 kW to 7.0 kW).



The cable for the HK-KT series and the HK-RT series (1.0 kW to 2.0 kW) has a single connector combining the motor power supply, encoder, and electromagnetic brake.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [18 / 74]

[Issue No.] SSC-A-0004-A

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## (2) Servo amplifiers/linear servo motors

QD77MS			→	RD78G		
Servo amplifier		Linear servo motor		Servo amplifier		Linear servo motor
MR-J3 series	MR-J3-_B-RJ004	LM-H2_ LM-F_ LM-K2_ LM-U2_		MR-J5 series	MR-J5-_G MR-J5W2-_G MR-J5W3-_G	LM-H3_ LM-F_ LM-K2_ LM-U2_

## (3) Servo amplifiers/direct drive motors

QD77MS			→	RD78G		
Servo amplifier		Direct drive motor		Servo amplifier		Direct drive motor
MR-J3 series	MR-J3-_B-RJ080W	TM-RFM_		MR-J5 series	MR-J5-_G MR-J5W2-_G MR-J5W3-_G	TM-RFM_

### Point

When configuring an absolute position detection system with the MR-J5 series and a direct drive motor, a battery (MR-BAT6V1SET or MR-BAT6V1SET-A) and an absolute position storage unit (MR-BTAS01) are required.

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# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [19 / 74]

[Issue No.] SSC-A-0004-A

## (4) Comparison of servo system network

Item	SSCNET III SERVO SYSTEM CONTROLLER NETWORK	→	CC-Link I E TSN
Communication medium	Optical fiber cable		Ethernet cable Category 5e or higher, (double shielded/STP) straight cable
Communication speed	50 Mbps		1 Gbps
Maximum distance between stations	[Standard code for inside panel and standard cable for outside panel] 20 m [Long distance cable] 50 m		100 m

## 2.3. Engineering Environment

The engineering environment that supports RD78G(S) is as follows.

Product name	Model	Version
MELSOFT GX Works3	SW1DND-GXW3-E	Ver.1.075D or later
Simple Motion module setting function (included in MELSOFT GX Works3)	-	Ver.1.165X or later
MELSOFT MR Configurator2 (included in MELSOFT GX Works3)	SW1DNC-MRC2-E	Ver.1.100E or later



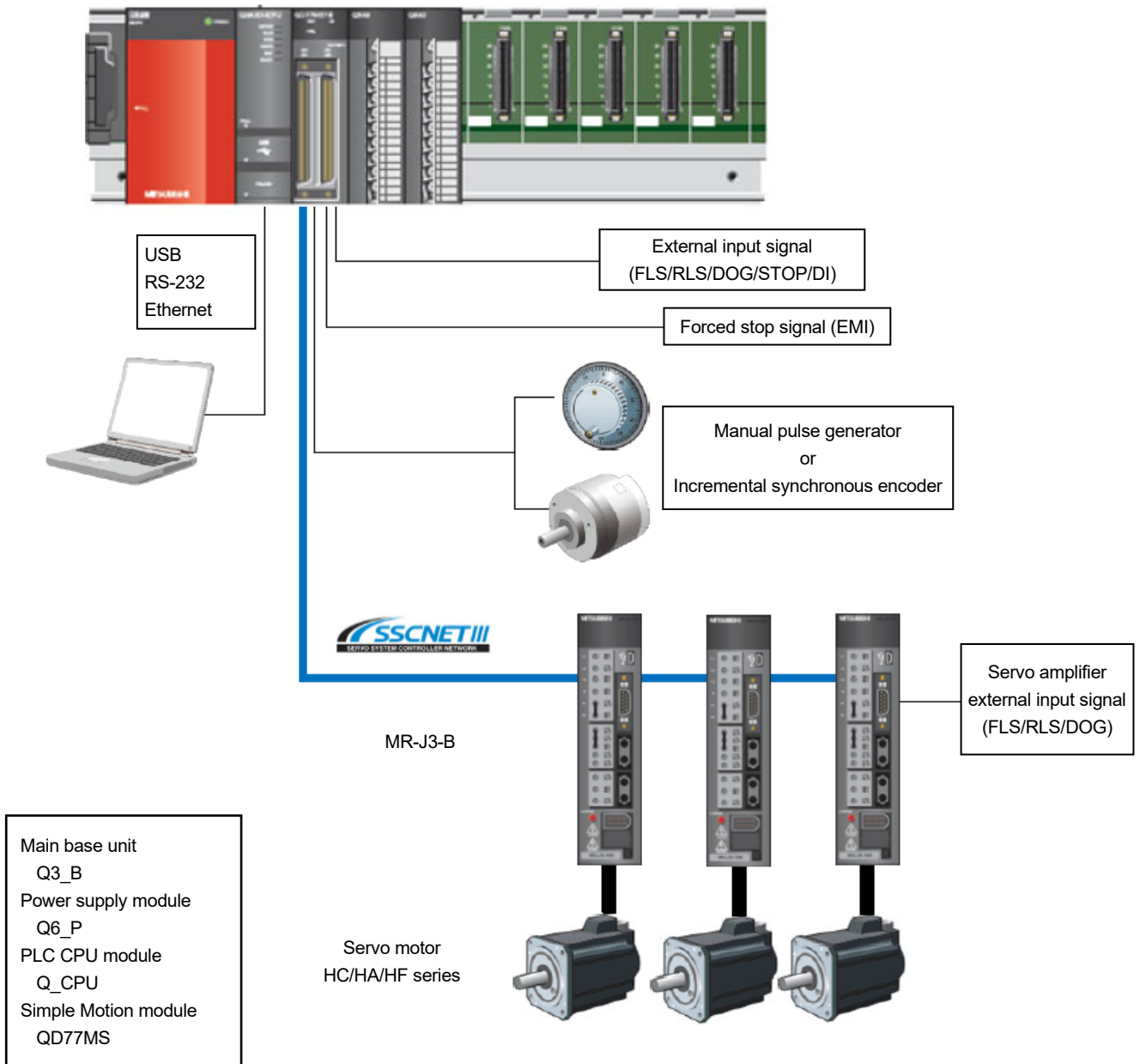
Supported servo amplifier functions and servo motor types vary by the version of MELSOFT MR Configurator2. Use the version which supports the devices to be used.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [20 / 74]

[Issue No.] SSC-A-0004-A

## 2.4. System Configuration

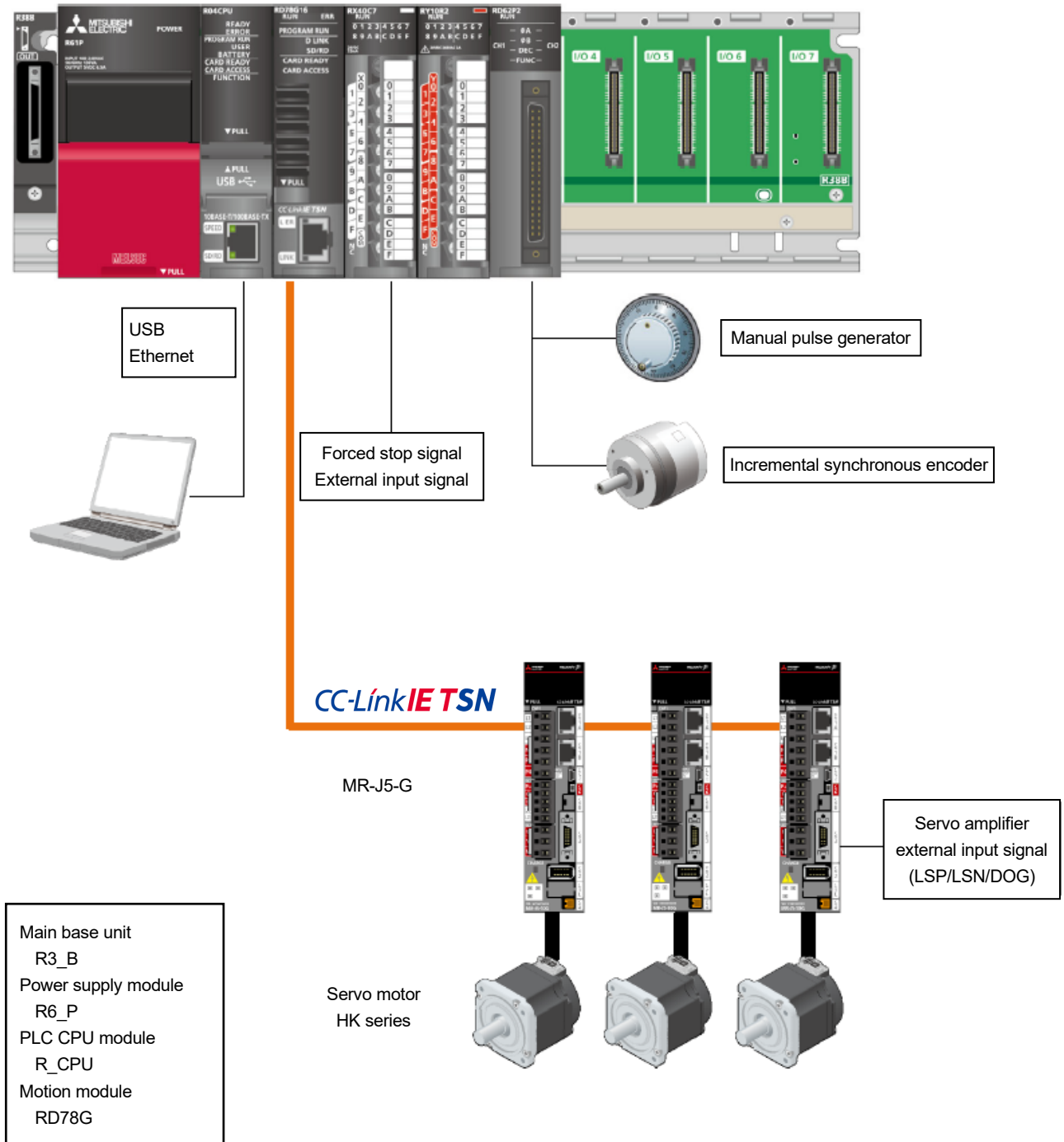
### 2.4.1. System configuration before migration (QD77MS and MR-J3 series)



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [21 / 74]

[Issue No.] SSC-A-0004-A

## 2.4.2. System configuration after migration (RD78G and MR-J5 series)



When using an absolute position detection system, change [Pr. PC29.5 [AL. 0E3 Absolute position counter warning] selection] from [1: Enabled (initial value)] to [0: Disabled].

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [22 / 74]

[Issue No.] SSC-A-0004-A

## 3. DIFFERENCES BETWEEN QD77MS AND RD78G

### 3.1. Performance Specifications

Item	QD77MS			RD78G(S)		Points for migration
	QD77MS2	QD77MS4	QD77MS16	RD78G4(S)	RD78G16(S)	
Maximum number of control axes	2	4	16	4	16	
Network	SSCNET III SSCNET III/H			CC-Link IE TSN		
Buffer memory assignment compatibility	×		○	-	-	
Operation cycle	0.88 ms/1.77 ms			0.25 ms/0.50 ms/1.00 ms 2.00 ms/4.00 ms		
Number of applicable modules	Up to 64			Up to 32 (Up to 8 modules can be controlled by one CPU.)		
Machine home position return function	5 types (proximity dog method, count method1, count method2, data set method, scale home position signal detection method)			1 type (driver home position return method)		Set the parameters related to home position return with the positioning control parameters (PT) of servo parameters.
Home position return retry	○			×		To use this function, set PC19.0 ([AL. 099 Stroke limit warning] selection) to "1: Disabled".
Home position shift	○			×		Set this function with the positioning control parameters (PT) of servo parameters.
Speed-position switching control	[Cd.45] Speed-position switching device selection 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.			[Cd.45] Speed-position switching device selection 0: Use the external command signal for switching from speed control to position control (operation cycle accuracy). 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.		· The signal is fetched at operation cycle.
Torque limit	1 % unit			0.1% unit		
Motor rotation speed	0.1 r/min unit			0.01 r/min unit		
Forced stop	0: Valid (external input) 1: Invalid 2: Valid (buffer memory)			- 1: Invalid 2: Valid (buffer memory)		
Speed change	Buffer memory, built-in DI			Buffer memory, external signal of servo amplifier		
Skip	Buffer memory, built-in DI			Buffer memory, external signal of servo amplifier		
Servo parameter operation	Transmission during initialized communication, transmission when PLC READY is turned on, 1-word writing, 2-word writing			Parameter transmission during initialized communication, parameter reading with specified size, parameter writing with specified size		When changing servo parameters during RUN time, use the servo transient transmission function.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [23 / 74]

[Issue No.] SSC-A-0004-A

Item	QD77MS			RD78G(S)		Points for migration
	QD77MS2	QD77MS4	QD77MS16	RD78G4(S)	RD78G16(S)	
Servo parameter management	Managed by a Simple Motion module (possible to change using the buffer memory)			Managed by a CPU module/a servo amplifier (when the parameters are managed by a CPU module, the parameters changed by a servo amplifier is baked up. The backup is performed periodically following the setting of [Pr. PN20 Parameter automatic backup update interval].)		
	PA, PB, PC, PD, PE, PS, PF, Po, PL, PT		PA, PB, PC			
External input signal setting	Modules, servo amplifier (FLS, RLS), buffer memory			- Servo amplifier (LSP, LSN, DOG), buffer memory		
Amplifier-less operation	○			×		Use the virtual servo amplifier function as an alternative.
Servo amplifier command value error check function	○			×		
Error history	○			×		Check the error/warning histories with the event history of the CPU module.
Warning history	○			×		
Error code Warning code	MELSEC-Q series code system			MELSEC iQ-R series code system		
Mark detection	4 settings		16 settings	16 settings		
Mark detection accuracy	10 us (built-in DI)			Operation cycle		
Driver communication	○			×		
Changing the cam axis length per cycle	×			○		
Servo input axis	2 axes	4 axes	16 axes	4 axes	16 axes	
Command generation axis	2 axes	4 axes	8 axes	4 axes	8 axes	
Number of synchronous encoder axes	4 axes			4 axes	16 axes	
Synchronous encoder axis type	Built-in, via a CPU or a servo amplifier			Via a CPU or a servo amplifier		
Synchronous encoder axis start	Buffer memory, built-in DI			Buffer memory, external signal of servo amplifier		
Clutch smoothing	0: Direct 1: Time constant method (Exponent) 2: Time constant method (Linear) 3: Slippage method (Exponent) 4: Slippage method (Linear)			0: Direct 1: Time constant method (Exponent) 2: Time constant method (Linear) 3: Slippage method (Exponent) 4: Slippage method (Linear) 5: Slippage method (Linear: Input value follow up)		

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [24 / 74]

[Issue No.] SSC-A-0004-A

Item	QD77MS			RD78G(S)		Points for migration
	QD77MS2	QD77MS4	QD77MS16	RD78G4(S)	RD78G16(S)	
Clutch	ON control mode 0: No clutch 1: Clutch command ON/OFF 2: Clutch command leading edge 3: Clutch command trailing edge 4: Address mode 5: High speed input request OFF control mode 0: OFF control invalid 1: One-shot OFF 2: Clutch command leading edge 3: Clutch command trailing edge 4: Address mode 5: High speed input request			ON control mode 0: No clutch 1: Clutch command ON/OFF 2: Clutch command leading edge 3: Clutch command trailing edge 4: Address mode 5: High speed input request (operation cycle accuracy) OFF control mode 0: OFF control invalid 1: One-shot OFF 2: Clutch command leading edge 3: Clutch command trailing edge 4: Address mode 5: High speed input request (operation cycle accuracy)		The signal is fetched at the operation cycle for "5: The high speed input request".
Dedicated instruction	○ (1 to 4 axes only)			×		Use the module FB as an alternative.

## 3.2. Replacement of I/O Signals and Buffer Memory

### 3.2.1. Two-axis/Four-axis module

(1) I/O signal

I/O signal		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"Synchronization flag" (X1)	"Synchronization flag" (X1)	Create an interlock in the program that allows access to the buffer memory after the synchronization flag [X1] is turned on.
"BUSY" (XC, XD, XE, XF)	"BUSY" (X10 to X13)	Change the device No.
"M code ON" "Error detection" "Start complete" "Positioning complete" (X4 to X7, X8 to XB, X10 to X13, X14 to X17)	"[Md.31] Status" (2417+100n) · b12: M code ON · b13: Error detection · b14: Start complete · b15: Positioning complete	Change the input signals to PLC CPU (device X) in the program to the indicated buffer memory.
"Axis stop" (Y4 to Y7)	"[Cd.180] Axis stop" (30100+10n)	Change the output signals from PLC CPU (device Y) in the program to the indicated buffer memory.
"Forward run JOG start" (Y8, YA, YC, YE)	"[Cd.181] Forward run JOG start" (30101+10n)	
"Reverse run JOG start" (Y9, YB, YD, YF)	"[Cd.182] Reverse run JOG start" (30102+10n)	
"Execution prohibition flag" (Y14 to Y17)	"[Cd.183] Execution prohibition flag" (30103+10n)	

n: Axis No. -1



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [25 / 74]

[Issue No.] SSC-A-0004-A

## (2) Parameter area

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Pr.22] Input signal logic selection" (31+150n)	"[Pr.22] Input signal logic selection" (31+150n)	Refer to 3.2.1.(1) for details.
"[Pr.89] Manual pulse generator/Incremental synchronous encoder input type selection". (67)	-	The manual pulse generator/incremental synchronous encoder input type selection function has been removed.
"[Pr.24] Manual pulse generator/incremental synchronous encoder input selection" (33)	-	The manual pulse generator/incremental synchronous encoder input selection function has been removed.
"[Pr.43] Home position return method" (70+150n)	"[Pr.43] Home position return method" (70+150n)	The settings of these parameters are as follows because the servo system network has been changed to CC-Link IE TSN.
"[Pr.46] Home position return speed" (74+150n, 75+150n)	"[Pr.46] Home position return speed" (74+150n, 75+150n)	· Home position return method 8: Driver home position return method
"[Pr.51] Home position return acceleration time selection" (82+150n)	"[Pr.51] Home position return acceleration time selection" (82+150n)	· Home position return speed The high-speed home position return is executed with the home position return speed.
"[Pr.52] Home position return deceleration time selection" (83+150n)	"[Pr.52] Home position return deceleration time selection" (83+150n)	· Home position return acceleration time selection and home position return deceleration time selection These parameters are valid only when the high-speed home position return is executed.
"[Pr.47] Creep speed" (76+150n, 77+150n)	-	The settings of these parameters are not necessary because only "8: Driver home position return method" is selectable for "[Pr.43] Home position return method".
"[Pr.48] Home position return retry" (78+150n)	-	
"[Pr.50] Setting for the movement amount after proximity dog ON" (80+150n, 81+150n)	-	
"[Pr.53] Home position shift amount" (84+150n, 85+150n)	-	
"[Pr.54] Home position return torque limit value" (83+150n)	-	
"[Pr.56] Speed designation during home position shift" (88+150n)	-	
"[Pr.57] Dwell time during home position return retry" (89+150n)	-	
"[Pr.97] SSCNET setting" (106)	-	The setting of this parameter is not necessary because the servo system network has been changed to CC-Link IE TSN.
"[Pr.82] Forced stop valid/invalid selection" (35)	"[Pr.82] Forced stop valid/invalid selection" (35)	The setting value "0: Valid (external input signal)" has been removed in RD78G(S). Refer to the description of "[Pr.82] Forced stop valid/invalid selection" for details.
"[Pr.87] Pulse conversion unit: Waiting time after clear signal output" (91+150n)	-	The waiting time after the pulse conversion unit clear signal output function has been removed.
"[Pr.86] Pulse conversion unit: Home position return request setting" (90+150n)	-	The pulse conversion unit home position return request setting function has been removed.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [26 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Pr.80] External input signal selection" (32+150n)	"[Pr.116] FLS signal selection" "[Pr.117] RLS signal selection" "[Pr.118] DOG signal selection" "[Pr.119] STOP signal selection" (116+150n, 117+150n, 118+150n, 119+150n)	Refer to 3.2.1.(1) for details.
"[Pr.17] Torque limit setting value" (26+150n)	"[Pr.17] Torque limit setting value" (26+150n)	The unit for the torque limit value has been changed. Multiply the setting value by 10. QD77MS: [%] RD78G(S): [0.1 %] In addition, the initial value has been changed. QD77MS: 300 [%] RD78G(S): 3000 [0.1 %] [Example] 100 % ("100" is set in the buffer memory.) → 100.0 % (set "1000" in the buffer memory.)
"[Pr.90] Operation setting for speed-torque control mode" (68+150n)	"[Pr.90] Operation setting for speed-torque control mode" (68+150n)	The setting value "b12 to b15: Condition selection at mode switching" has been changed as follows. <ul style="list-style-type: none"> <li>· 0: Check the switching conditions in Simple Motion module.</li> <li>· 1: According to the servo amplifier specification</li> </ul> [Additional information] When this parameter is set to "0: Check the switching conditions in Simple Motion module.", and the mode switching condition is not satisfied, a warning occurs and the mode switching is disabled. When this parameter is set to "1: According to the servo amplifier specification", the mode switching condition is judged following the parameter [PC76] of the servo amplifier (refer to [PC76] of the servo amplifier).  [When switching the control mode without waiting for the motor stop] Set "b12 to b15: Condition selection at mode switching" of "[Pr.90] Operation setting for speed-torque control mode" to "1: According to the servo amplifier specification". Set "ZSP disabled selection at control switching" of "Function selection C-E (PC76)" to "Disabled". * With the setting above, note that the mode switching may cause vibrations and shock.
"[Pr.91] Optional data monitor: Data type setting 1" (100+150n)	"[Pr.91] Optional data monitor: Data type setting 1" (100+150n)	Set the index of the corresponding object of the slave device in "Optional data monitor: Data type setting".
	"[Pr.591] Optional data monitor: Data type expansion setting 1" (92+150n)	Set the sub index and size of the corresponding object of the slave device in "Optional data monitor: Data type expansion setting".
"[Pr.92] Optional data monitor: Data type setting 2" (101+150n)	"[Pr.92] Optional data monitor: Data type setting 2" (101+150n)	Refer to the manuals of the slave devices to be used for details.
	"[Pr.592] Optional data monitor: Data type expansion setting 2" (93+150n)	
"[Pr.93] Optional data monitor: Data type setting 3" (102+150n)	"[Pr.93] Optional data monitor: Data type setting 3" (102+150n)	
	"[Pr.593] Optional data monitor: Data type expansion setting 3" (94+150n)	

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [27 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Pr.94] Optional data monitor: Data type setting 4" (103+150n)	"[Pr.94] Optional data monitor: Data type setting 4" (103+150n)	
	"[Pr.594] Optional data monitor: Data type expansion setting 4" (95+150n)	
"[Pr.114] External command signal compensation valid/invalid setting" (114)	-	The external command signal compensation valid/invalid setting function has been removed. (Always valid)
"[Pr.96] Operation cycle setting" (147)	-	In RD78G(S), the operation cycle is set as the network communication cycle. The following shows the settable communication cycle. Communications cycle: 0.25 ms 0.5 ms 1 ms 2 ms 4 ms
"[Pr.100] Connected device" (30100+200n)	"[Pr.141] IP address (the third and fourth octets), (the first and second octets)" (58024+150n, 58025+150n)	The setting has been changed as follows because the servo system network has been changed to CC-Link IE TSN. The setting of "[Pr.100] Connected device" is not necessary. Set "[Pr.141] IP address" and "[Pr.142] Multidrop number".  [Additional information] · "[Pr.141] IP address": the IP address of the real servo amplifier to be used · "[Pr.142] Multidrop number": the identification No. for each servo motor connected to a multi-axis servo amplifier
	"[Pr.142] Multidrop number" (58028+150n)	

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [28 / 74]

[Issue No.] SSC-A-0004-A

## (3) Monitor data area

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Md.35] Torque limit stored value/forward torque limit stored value" (826+100n)	"[Md.35] Torque limit stored value/forward torque limit stored value" (2426+100n)	This monitor data has been changed as follows (1) Note that the unit for the torque limit value has been changed. QD77MS: [%] RD78G(S): [0.1 %] [Example] 100 % ("100" is set in the buffer memory.) → 100.0 % (set "1000" in the buffer memory.)  (2) "[Pr.54] Home position return torque limit value" is not stored.  (3) "[Pr.17] Torque limit setting value" or "[Cd.101] Torque output setting value" is not stored when a home position return is executed.
"[Md.120] Reverse torque limit stored value" (891+100n)	"[Md.120] Reverse torque limit stored value" (2491+100n)	This monitor data has been changed as follows · "[Pr.54] Home position return torque limit value" is not stored. · "[Pr.17] Torque limit setting value" or "[Cd.101] Torque output setting value" is not stored when a home position return is executed.
"[Md.103] Motor rotation speed" (854+100n, 855+100n)	"[Md.103] Motor rotation speed" (2454+100n, 2455+100n)	Note that the unit for the motor rotation speed has been changed. QD77MS: [0.1 r/min] RD78G(S): [0.01 r/min] [Example] 60.0 r/min ("600" is stored in the buffer memory.) → 60.00 r/min ("6000" is stored in the buffer memory.)  [Additional information] The unit is "pulse/s" when the servo parameter PT01.1 (speed/acceleration/deceleration unit selection) is set to "1: Command unit/s". (The same applies to linear servo motors.)
"[Md.107] Parameter error No." (870+100n)	-	The parameter error No. monitor function has been removed.
"[Md.109] Regenerative load ratio/Optional data monitor output 1" (878+100n)	"[Md.109] Regenerative load ratio/Optional data monitor output 1" (2478+100n)	The monitor data has been changed as follows. · The contents set in "[Pr.91] Optional data monitor: Data type setting 1" and "[Pr.591] Optional data monitor: Data type expansion setting 1" are stored.
"[Md.110] Effective load torque/Optional data monitor output 2" (879+100n)	"[Md.110] Effective load torque/Optional data monitor output 2" (2479+100n)	This monitor data has been changed as follows · The contents set in "[Pr.92] Optional data monitor: Data type setting 2" and "[Pr.592] Optional data monitor: Data type expansion setting 2" are stored.
"[Md.111] Peak torque ratio/Optional data monitor output 3" (880+100n)	"[Md.111] Peak torque ratio/Optional data monitor output 3" (2480+100n)	This monitor data has been changed as follows · The contents set in "[Pr.93] Optional data monitor: Data type setting 3" and "[Pr.593] Optional data monitor: Data type expansion setting 3" are stored.
"[Md.112] Optional data monitor output 4" (881+100n)	"[Md.112] Optional data monitor output 4" (2481+100n)	This monitor data has been changed as follows · The contents set in "[Pr.94] Optional data monitor: Data type setting 4" and "[Pr.594] Optional data monitor: Data type expansion setting 4" are stored.
"[Md.502] Driver operation alarm No." (59302+100n)	-	The driver alarm No. monitor function has been removed because the driver communication function has been removed.

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Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
The axis monitor data other than above (800+100n to 899+100n)	The axis monitor data other than above (2400+100n to 2499+100n)	Change the buffer memory address by adding 1600.
"[Md.8] Start history pointer" (1292) "[Md.3] Start information" "[Md.4] Start No." "[Md.5] Start Day: hour" "[Md.6] Start Minute: second" "[Md.7] Error judgment" "[Md.54] Start Year: month" (1212+5p, 1213+5p, 1214+5p, 1215+5p, 1216+5p, 1440+1p)	"[Md.8] Start history pointer" (87000) "[Md.3] Start information" "[Md.4] Start No." "[Md.5] Start Day: hour" "[Md.6] Start Minute: second" "[Md.7] Error judgment" "[Md.54] Start Year: month" (87010+10p, 87011+10p, 87013+10p, 87014+10p, 87016+10p, 87012+10p)	(1) Change the buffer memory address. (2) The storage range has been changed since the number of records has been expanded from 16 to 64. QD77MS: 0 to 15 RD78G(S): 0 to 63
"[Md.51] Amplifier-less operation mode status" (1432)	-	The amplifier-less operation mode status has been removed in RD78G(S). Use the virtual servo amplifier.
"[Md.53] SSCNET control status" (1433)	-	The SSCNET control status monitor function has been removed because the servo system network has been changed to CC-Link IE TSN.
"[Md.52] Communication between amplifiers axes searching flag" (1434)	-	The communication between amplifiers axes searching flag monitor function has been removed because the driver communication function has been removed.
"[Md.132] Operation cycle setting" (1438)	"[Md.132] Operation cycle setting" (4238)	In RD78G(S), the operation cycle is set as the network communication cycle. The following shows the settable communication cycle. Communications cycle: 0.25 ms 0.5 ms 1 ms 2 ms 4 ms
Error history/warning history (1293 to 1422, 1456 to 1487, 31300 to 31331)	-	The error and warning histories have been integrated into the event history. A buffer memory address is not assigned to the event history.
The system monitor data other than above (1200 to 1499)	The system monitor data other than above (4000 to 4299)	Change the buffer memory address by adding 2800.

p: Point No. -1

n: Axis No. -1

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## (4) Control data area

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Cd.13] Positioning operation speed override" (1513+100n)	"[Cd.13] Positioning operation speed override" (4313+100n)	This control data has been changed as follows. Setting range: 0 to 300 [%] When "0" is set, no warning occurs after the speed becomes zero and the speed change 0 flag turns on. The override function is invalid during the driver home position return.
"[Cd.14] New speed value" (1514+100n, 1515+100n)	"[Cd.14] New speed value" (4314+100n, 4315+100n)	The speed change function is invalid during the driver home position return.
"[Cd.22] New torque value/ forward new torque value" (1525+100n)	"[Cd.22] New torque value/ forward new torque value" (4325+100n)	The unit for the torque limit value has been changed. Multiply the setting value by 10. QD77MS: [%] RD78G(S): [0.1 %] [Example] 100 % ("100" is set in the buffer memory.) → 100.0 % (set "1000" in the buffer memory.)
"[Cd.101] Torque output setting value" (1552+100n)	"[Cd.101] Torque output setting value" (4352+100n)	
"[Cd.113] New reverse torque value" (1564+100n)	"[Cd.113] New reverse torque value" (4364+100n)	
-	"[Cd.43] Simultaneous starting axis" (4368+100n, 4369+100n)	Refer to 3.2.1.(2) for details.
"[Cd.30] Simultaneous starting axis start data No. (axis 1 start data No.)" (1540+100n)	"[Cd.30] Simultaneous starting own axis start data No." (4340+100n)	
"[Cd.31] Simultaneous starting axis start data No. (axis 2 start data No.)" (1541+100n)	"[Cd.31] Simultaneous starting axis start data No.1" (4341+100n)	
"[Cd.32] Simultaneous starting axis start data No. (axis 3 start data No.)" (1542+100n)	"[Cd.32] Simultaneous starting axis start data No.2" (4342+100n)	
"[Cd.33] Simultaneous starting axis start data No. (axis 4 start data No.)" (1543+100n)	"[Cd.33] Simultaneous starting axis start data No.3" (4343+100n)	
"[Cd.130] Servo parameter write request" (1554+100n)	-	When changing servo parameters with RD78G(S), use the servo transient transmission function.
"[Cd.131] Parameter No. (settings for servo parameters to be changed)" (1555+100n)	-	
"[Cd.132] Change data" (1556+100n, 1557+100n)	-	
"[Cd.147] Speed limit value at continuous operation to torque control mode" (1586+100n, 1587+100n)	"[Cd.147] Speed limit value at continuous operation to torque control mode" (4386+100n, 4387+100n)	The setting value varies as follows depending on the setting value of [Pr. 1]. 0: mm 0 to 2000000000 (× 10 <sup>-2</sup> mm/min) 1: inch 0 to 2000000000 (× 10 <sup>-3</sup> inch/min) 2: degree 0 to 2000000000 (× 10 <sup>-3</sup> degree/min) 3: pulse 0 to 1000000000 (pulse/s)
The axis control data other than above (1500+100n to 1599+100n)	The axis control data other than above (4300+100n to 4399+100n)	Change the buffer memory address by adding 2800.

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Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Cd.47] QD75MH initial value setting request" (1909)	-	The QD75MH initial value setting function has been removed.
"[Cd.137] Amplifier-less operation mode switching request" (1926)	-	The amplifier-less operation mode has been removed in RD78G(S). Use the virtual servo amplifier.
"[Cd.102] SSCNET control command" (1932)	-	The SSCNET control command function has been removed because the servo system network has been changed to CC-Link IE TSN.
The system control data other than above (1900 to 1999)	The system control data other than above (5900 to 5999)	Change the buffer memory address by adding 4000.

## (5) Positioning data area

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
[Da.5] Axis to be interpolated (2000+6000n, 2010+6000n, ..., 2990+6000n)	"[Da.20] Axis to be interpolated No.1" "[Da.21] Axis to be interpolated No.2" "[Da.22] Axis to be interpolated No.3" (71000+1000n, 71001+1000n, ..., 71990+1000n, 71991+1000n)	Refer to 3.2.1.(3) for details.
The positioning data other than above (2000+6000n to 2999+6000n)	The positioning data other than above (6000+1000n to 6999+1000n)	Change the buffer memory address.
Positioning data No. 101 to 600 (3000+6000n to 7999+6000n)	Positioning data No. 101 to 600 (20000+5000n to 204999+5000n)	Change the buffer memory address.
[Da.16] Condition operator (26100+1000n, ..., 26390+1000n)	[Da.16] Condition operator (22100+400n, ..., 22390+400n)	Refer to 3.2.1.(2) for details.
[Da.18] Parameter 1 (26104+1000n, 26105+1000n, ..., 26394+1000n, 26395+1000n)	[Da.18] Parameter 1 (22104+400n, 22105+400n, ..., 22394+400n, 22395+400n)	
[Da.19] Parameter 2 (26106+1000n, 26107+1000n, ..., 26396+1000n, 26397+1000n)	[Da.19] Parameter 2 (22106+400n, 22107+400n, ..., 22396+400n, 22397+400n)	
-	[Da.23] Number of simultaneous starting axes [Da.24] Simultaneous starting axis No.1 [Da.25] Simultaneous starting axis No.2 [Da.26] Simultaneous starting axis No.3 (22108+400n, 22109+400n, ..., 22398+400n, 22399+400n)	
The block start data other than above (26000+1000n to 26397+1000n)	The block start data other than above (22000+400n to 22397+400n)	Change the buffer memory address.
Block start data No.2 to 4 (26400+1000n to 26997+1000n)	Block start data No.2 to 4 (36000+600n to 360599+600n)	Change the buffer memory address.

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## (6) Servo parameter area

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
PA01 to PA18 (30101+200n to 30118+200n)	-	RD78G(S) does not support the servo parameter writing from the buffer memory. Set the parameters with the engineering tool.
PA19 (30932+50n)	-	
PA20 to PA32 (64400+250n to 64412+250n)	-	
PB01 to PB45 (30119+200n to 30163+200n)	-	
PB46 to PB64 (64413+250n to 64431+250n)	-	
PC01 to PC32 (30164+200n to 30195+200n)	-	
PC33 to PC64 (64432+250n to 64463+250n)	-	
PD01 to PD32 (30196+200n to 30227+200n)	-	
PD33 to PD48 (64464+250n to 64479+250n)	-	
PE01 to PE40 (30228+200n to 30267+200n)	-	
PE41 to PE64 (64480+250n to 64503+250n)	-	
PS01 to PS32 (30268+200n to 30299+200n)	-	
PF01 to PF16 (30900+50n to 30915+50n)	-	
PF17 to PF48 (64504+250n to 64535+250n)	-	
Po01 to Po16 (30916+50n to 30931+50n)	-	
Po17 to Po32 (64536+250n to 64551+250n)	-	
PL01 to PL48 (64552+250n to 64599+250n)	-	
PT01 to PT48 (64600+250n to 64647+250n)	-	

n: Axis No. -1

## (7) Synchronous control area

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Pr.320] Synchronous encoder axis type" (34720+20j)	"[Pr.320] Synchronous encoder axis type" (34720+20j)	The setting value "1: Incremental synchronous encoder" has been removed.

j: Synchronous encoder axis No. -1



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## (8) Mark detection area

Buffer memory No.		Change/revision
QD77MS2/QD77MS4	RD78G4(S)	
"[Pr.800] Mark detection signal setting" (54000+20k)	"[Pr.800] Mark detection signal setting" (54000+20k)	Set "[Pr.95] External command signal selection" together with this parameter. [Setting example] When [Pr.95] of axis 4 is set to "101: Axis 1 Dog signal" and [Pr.800] is set to "4: Axis 4 external command signal [D]", the mark detection is executed using the DOG signal of the servo amplifier connecting axis 1.

k: Mark detection setting No. -1

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## (1) External input signals of Simple Motion modules

This section explains the replacement method for external input signals.

The replacement method for FLS/RLS/DOG/STOP signals varies depending on the setting values in "[Pr.80] External input signal selection" of QD77MS\_.

The DI signal must be replaced regardless of the setting values in "[Pr.80] External input signal selection" of QD77MS\_.

### (a) Replacement of FLS/RLS/DOG/STOP

There has been no change in the setting value of the external input signal logic.

#### 1. When "[Pr.80] External input signal selection" is set to "0: External input signal of QD77MS"

→ The external input signals of Simple Motion modules are not available in RD78G(S).

Replace the external signal setting with either of the following cases.

##### (1) Using the external input signal of the servo amplifier (STOP signal cannot be set.)

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 4	[Pr.116] FLS signal selection (116+150n)	0001H
	[Pr.117] RLS signal selection (117+150n)	0001H
	[Pr.118] DOG signal selection (118+150n)	0001H

##### (2) Using the buffer memory of RD78G(S)

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 4	[Pr.116] FLS signal selection (116+150n)	0002H
	[Pr.117] RLS signal selection (117+150n)	0002H
	[Pr.118] DOG signal selection (118+150n)	0002H
	[Pr.119] STOP signal selection (119+150n)	0002H

#### 2. When "[Pr.80] External input signal selection" is set to "1: External input signal of servo amplifier"

→ Set the signals as shown in the table below. STOP signal cannot be set.

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 4	[Pr.116] FLS signal selection (116+150n)	0001H
	[Pr.117] RLS signal selection (117+150n)	0001H
	[Pr.118] DOG signal selection (118+150n)	0001H

#### 3. When "[Pr.80] External input signal selection" is set to "2: Buffer memory of QD77MS"

→ Set the signals as shown in the table below.

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 4	[Pr.116] FLS signal selection (116+150n)	0002H
	[Pr.117] RLS signal selection (117+150n)	0002H
	[Pr.118] DOG signal selection (118+150n)	0002H
	[Pr.119] STOP signal selection (119+150n)	0002H

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## (b) Replacement of DI signal

The DI signal is not available in RD78G(S).

Therefore, assign DOG signals as shown in the table below.

Parameter (buffer memory)	Setting value	Description
[Pr.95] External command signal selection (69+150n)	0	The external command signal is not used.
	101: Dog signal of axis 1	The DOG signal of axis 1 is used as an external command signal.
	102: Dog signal of axis 2	The DOG signal of axis 2 is used as an external command signal.
	103: Dog signal of axis 3	The DOG signal of axis 3 is used as an external command signal.
	104: Dog signal of axis 4	The DOG signal of axis 4 is used as an external command signal.

## (2) Simultaneous start

### (a) Replacement of simultaneous start by block start

In QD77MS, the target axes for simultaneous start are set with "[Da.16] Condition operator".

In RD78G(S), the target axes are set with "[Da.23] Number of simultaneous starting axes", "[Da.24] Simultaneous starting axis No.1", "[Da.25] Simultaneous starting axis No.2", and "[Da.26] Simultaneous starting axis No.3".

		Simultaneous starting axis													
		Axis 1	Axis 2	Axis 3	Axis 4	Axis 1 Axis 2	Axis 1 Axis 3	Axis 2 Axis 3	Axis 1 Axis 4	Axis 2 Axis 4	Axis 3 Axis 4	Axis 1 Axis 2 Axis 3	Axis 1 Axis 2 Axis 4	Axis 1 Axis 3 Axis 4	Axis 2 Axis 3 Axis 4
QD77MS	[Da.16] Condition operator (26100+1000n b8 to 15)	10H	20H	40H	80H	30H	50H	60H	90H	A0H	C0H	70H	B0H	D0H	E0H

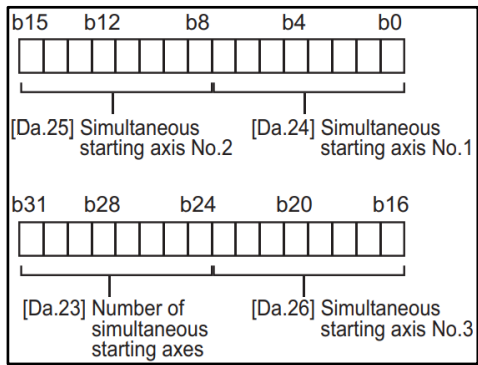


RD78G(S)	[Da.23] Number of simultaneous starting axes (22108+400n b24 to b31)	2				3				4					
	[Da.24] Simultaneous starting axis No.1 (22108+400n b0 to b7)	00H	01H	02H	03H	00H	00H	01H	00H	01H	02H	00H	00H	00H	01H
	[Da.25] Simultaneous starting axis No.2 (22108+400n b8 to b15)					01H	02H	02H	03H	03H	03H	01H	01H	02H	02H
	[Da.26] Simultaneous starting axis No.3 (22108+400n b16 to b23)													02H	03H

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Set the positioning data with "[Da.18] Parameter 1" and "[Da.19] Parameter 2" for the simultaneous starting axes specified with "[Da.24] Simultaneous starting axis No.1", "[Da.25] Simultaneous starting axis No.2", and "[Da.26] Simultaneous starting axis No.3".

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(b) Replacement of simultaneous start by multi-axis simultaneous start control (positioning start No. 9004)

- How to specify the target axis No. for simultaneous start  
 In QD77MS, the target axes for simultaneous start are indirectly specified by setting the start data No. (positioning data No. for each of the simultaneous starting axes).  
 In RD78G(S), set the axis No. directly with "[Cd.43] Simultaneous starting axis".
  
- How to set the start data No.  
 In QD77MS, the buffer memory address of the start data No. is fixed by axis No.  
 In RD78G(S), the start data No. is set with the following parameters.
  - The start data No. of the own axis  
 "[Cd.30] Simultaneous starting own axis start data No."
  - The start data No. of the target axis 1 to 3  
 "[Cd.31] Simultaneous starting axis start data No.1"  
 "[Cd.32] Simultaneous starting axis start data No.2"  
 "[Cd.33] Simultaneous starting axis start data No.3".

2-axis simultaneous start (the following shows some specific examples.)

		Simultaneous start patterns			
		Axis 1 Axis 2 n = 0	Axis 1 Axis 3 n = 0	Axis 1 Axis 4 n = 0	Axis 2 Axis 4 n = 1
QD77MS	[Cd.30] Simultaneous starting axis start data No. (axis 1 start data No.) (1540+100n)	Own axis	Own axis	Own axis	0
	[Cd.31] Simultaneous starting axis start data No. (axis 2 start data No.) (1541+100n)	Target axis	0	0	Own axis
	[Cd.32] Simultaneous starting axis start data No. (axis 3 start data No.) (1542+100n)	0	Target axis	0	0
	[Cd.33] Simultaneous starting axis start data No. (axis 4 start data No.) (1543+100n)	0	0	Target axis	Target axis



RD78G(S)	[Cd.43] Simultaneous starting axis (4368+100n, 4469+100n)	0200H 0001H	0200H 0002H	0200H 0003H	0200H 0003H
	[Cd.30] Simultaneous starting own axis start data No. (4340+100n)	Own axis start data No.			
	[Cd.31] Simultaneous starting axis start data No.1 (4341+100n)	Simultaneous starting axis start data No.			

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3-axis simultaneous start (the following shows some specific examples.)

		Simultaneous start patterns				
		Axis 1 Axis 2 Axis 3 n = 0	Axis 1 Axis 3 Axis 4 n = 0	Axis 2 Axis 3 Axis 4 n = 1	Axis 2 Axis 3 Axis 4 n = 2	Axis 2 Axis 3 Axis 4 n = 3
QD77MS	[Cd.30] Simultaneous starting axis start data No. (axis 1 start data No.) (1540+100n)	Own axis	Own axis	0	0	0
	[Cd.31] Simultaneous starting axis start data No. (axis 2 start data No.) (1541+100n)	Target axis 1	0	Own axis	Target axis 1	Target axis 1
	[Cd.32] Simultaneous starting axis start data No. (axis 3 start data No.) (1542+100n)	Target axis 2	Target axis 1	Target axis 1	Own axis	Target axis 2
	[Cd.33] Simultaneous starting axis start data No. (axis 4 start data No.) (1543+100n)	0	Target axis 2	Target axis 2	Target axis 2	Own axis

↓

RD78G(S)	[Cd.43] Simultaneous starting axis (4368+100n, 4469+100n)	0300H 0201H	0300H 0302H	0300H 0302H	0300H 0301H	0300H 0201H
	[Cd.30] Simultaneous starting own axis start data No. (4340+100n)	Own axis start data No.				
	[Cd.31] Simultaneous starting axis start data No.1 (4341+100n)	Simultaneous starting axis start data No.1				
	[Cd.32] Simultaneous starting axis start data No.2 (4342+100n)	Simultaneous starting axis start data No.2				

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## 4-axis simultaneous start

		Simultaneous start patterns			
		Axis 1 Axis 2 Axis 3 Axis 4 n = 0	Axis 1 Axis 2 Axis 3 Axis 4 n = 1	Axis 1 Axis 2 Axis 3 Axis 4 n = 2	Axis 1 Axis 2 Axis 3 Axis 4 n = 3
QD77MS	[Cd.30] Simultaneous starting axis start data No. (axis 1 start data No.) (1540+100n)	Own axis	Target axis 1	Target axis 1	Target axis 1
	[Cd.31] Simultaneous starting axis start data No. (axis 2 start data No.) (1541+100n)	Target axis 1	Own axis	Target axis 2	Target axis 2
	[Cd.32] Simultaneous starting axis start data No. (axis 3 start data No.) (1542+100n)	Target axis 2	Target axis 2	Own axis	Target axis 3
	[Cd.33] Simultaneous starting axis start data No. (axis 4 start data No.) (1543+100n)	Target axis 3	Target axis 3	Target axis 3	Own axis

↓

RD78G(S)	[Cd.43] Simultaneous starting axis (4368+100n, 4469+100n)	0403H 0201H	0403H 0200H	0403H 0100H	0402H 0100H
	[Cd.30] Simultaneous starting own axis start data No. (4340+100n)	Own axis start data No.			
	[Cd.31] Simultaneous starting axis start data No.1 (4341+100n)	Simultaneous starting axis start data No.1			
	[Cd.32] Simultaneous starting axis start data No.2 (4342+100n)	Simultaneous starting axis start data No.2			
	[Cd.33] Simultaneous starting axis start data No.3 (4343+100n)	Simultaneous starting axis start data No.3			

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [40 / 74]

[Issue No.] SSC-A-0004-A

## (3) Interpolation control replacement

### (a) 2-axis interpolation control replacement

Set "[Da.20] Axis to be interpolated No.1" of RD78G(S) according to the values currently set in "[Da.5] Axis to be interpolated" of QD77MS.

		Interpolation axis No.			
		Axis 1	Axis 2	Axis 3	Axis 4
QD77MS	[Da.5] Axis to be interpolated (2000+6000n b2,b3)	00	01	10	11
↓					
RD78G(S)	[Da.20] Axis to be interpolated No.1 (71000+1000n b0 to b7)	00H	01H	02H	03H

### (b) 3-axis, 4-axis interpolation control replacement

In QD77MS, the axes to be interpolated are fixed by the reference axis.

In RD78G(S), set the axes to be interpolated with "[Da.20] Axis to be interpolated No.1", "[Da.21] Axis to be interpolated No.2", and "[Da.22] Axis to be interpolated No.3".

		Interpolation control settings								
		Reference axis No.	Axis 1	Axis 2	Axis 3	Axis 4	Axis 1	Axis 2	Axis 3	Axis 4
		Interpolation axis No.	Axis 2	Axis 3	Axis 4	Axis 1	Axis 2	Axis 3	Axis 4	Axis 1
QD77MS	[Da.2] Control method (2000+6000n b8 to b15)	3-axis linear interpolation control 3-axis fixed-feed control 3-axis speed control				4-axis linear interpolation control 4-axis fixed-feed control 4-axis speed control				
		↓								
RD78G(S)	[Da.2] Control method (6000+1000n b8 to b15)	3-axis linear interpolation control 3-axis fixed-feed control 3-axis speed control				4-axis linear interpolation control 4-axis fixed-feed control 4-axis speed control				
	[Da.20] Axis to be interpolated No.1 (71000+1000n b0 to b7)	01H	02H	03H	00H	01H	02H	03H	00H	
	[Da.21] Axis to be interpolated No.2 (71000+1000n b8 to b15)	02H	03H	00H	01H	02H	03H	00H	01H	
	[Da.22] Axis to be interpolated No.3 (71000+1000n b16 to b23)					03H	00H	01H	02H	

### (c) Monitoring of axes to be interpolated

The axes to be interpolated specified in (a) and (b) can be monitored with "[Md.47] Positioning data being executed".

"[Da.20] Axis to be interpolated 1" → "[Md.47] Positioning data being executed" (2496 + 100n b0 to b7)

"[Da.21] Axis to be interpolated 2" → "[Md.47] Positioning data being executed" (2496 + 100n b8 to b15)

"[Da.22] Axis to be interpolated 3" → "[Md.47] Positioning data being executed" (2497 + 100n b0 to b7)



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [41 / 74]

[Issue No.] SSC-A-0004-A

## 3.2.2. 16-axis module

### (1) I/O signal

I/O signal		Change/revision
QD77MS16	RD78G16(S)	
"Synchronization flag" (X1)	"Synchronization flag" (X1)	Create an interlock in the program that allows access to the buffer memory after the synchronization flag [X1] is turned on.

### (2) Parameter area

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Pr.22] Input signal logic selection" (31+150n)	"[Pr.22] Input signal logic selection" (31+150n)	Refer to 3.2.2.(1) for details.
"[Pr.89] Manual pulse generator/Incremental synchronous encoder input type selection". (67)	-	The manual pulse generator/incremental synchronous encoder input type selection function has been removed.
"[Pr.24] Manual pulse generator/incremental synchronous encoder input selection" (33)	-	The manual pulse generator/incremental synchronous encoder input selection function has been removed.
"[Pr.43] Home position return method" (70+150n)	"[Pr.43] Home position return method" (70+150n)	The settings of these parameters are as follows because the servo system network has been changed to CC-Link IE TSN.
"[Pr.46] Home position return speed" (74+150n)	"[Pr.46] Home position return speed" (74+150n, 75+150n)	<ul style="list-style-type: none"> <li>· Home position return method 8: Driver home position return method</li> <li>· Home position return speed The high-speed home position return is executed with the home position return speed.</li> <li>· Home position return acceleration time selection and home position return deceleration time selection These parameters are valid only when the high-speed home position return is executed.</li> </ul>
"[Pr.51] Home position return acceleration time selection" (82+150n)	"[Pr.51] Home position return acceleration time selection" (82+150n)	
"[Pr.52] Home position return deceleration time selection" (83+150n)	"[Pr.52] Home position return deceleration time selection" (83+150n)	
"[Pr.47] Creep speed" (76+150n, 77+150n)	-	The settings of these parameters are not necessary because only "8: Driver home position return method" is selectable for "[Pr.43] Home position return method".
"[Pr.48] Home position return retry" (78+150n)	-	
"[Pr.50] Setting for the movement amount after proximity dog ON" (80+150n, 81+150n)	-	
"[Pr.53] Home position shift amount" (84+150n, 85+150n)	-	
"[Pr.54] Home position return torque limit value" (83+150n)	-	
"[Pr.56] Speed designation during home position shift" (88+150n)	-	
"[Pr.57] Dwell time during home position return retry" (89+150n)	-	
"[Pr.97] SSCNET setting" (106)	-	The setting of this parameter is not necessary because the servo system network has been changed to CC-Link IE TSN.
"[Pr.82] Forced stop valid/invalid selection" (35)	"[Pr.82] Forced stop valid/invalid selection" (35+150n)	The setting value "0: Valid (external input signal)" has been removed in RD78G(S).

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [42 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Pr.87] Pulse conversion unit: Waiting time after clear signal output" (91+150n)	-	The waiting time after the pulse conversion unit clear signal output function has been removed.
"[Pr.86] Pulse conversion unit: Home position return request setting" (90+150n)	-	The pulse conversion unit home position return request setting function has been removed.
"[Pr.80] External input signal selection" (32+150n)	"[Pr.116] FLS signal selection" "[Pr.117] RLS signal selection" "[Pr.118] DOG signal selection" "[Pr.119] STOP signal selection" (116+150n, 117+150n, 118+150n, 119+150n)	Refer to 3.2.2.(1) for details.
"[Pr.95] External command signal selection" (69+150n)	"[Pr.95] External command signal selection" (69+150n)	Refer to 3.2.2.(1) for details.
"[Pr.17] Torque limit setting value" (26+150n)	"[Pr.17] Torque limit setting value" (26+150n)	The unit for the torque limit value has been changed. Multiply the setting value by 10. QD77MS: [%] RD78G(S): [0.1 %] In addition, the initial value has been changed. QD77MS: 300 [%] RD78G(S): 3000 [0.1 %] [Example] 100 % ("100" is set in the buffer memory.) → 100.0 % (set "1000" in the buffer memory.)

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [43 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Pr.90] Operation setting for speed-torque control mode" (68+150n)	"[Pr.90] Operation setting for speed-torque control mode" (68+150n)	<p>The setting value "b12 to b15: Condition selection at mode switching" has been changed as follows.</p> <ul style="list-style-type: none"> <li>· 0: Check the switching conditions in Simple Motion module.</li> <li>· 1: According to the servo amplifier specification</li> </ul> <p>[Additional information]            When this parameter is set to "0: Check the switching conditions in Simple Motion module.", and the mode switching condition is not satisfied, a warning occurs and the mode switching is disabled.            When this parameter is set to "1: According to the servo amplifier specification", the mode switching condition is judged following the parameter [PC76] of the servo amplifier (refer to [PC76] of the servo amplifier.).</p> <p>[When switching the control mode without waiting for the motor stop]            Set "b12 to b15: Condition selection at mode switching" of "[Pr.90] Operation setting for speed-torque control mode" to "1: According to the servo amplifier specification". When using MR-J4-GF and MR-J5-G, set "ZSP disabled selection at control switching" of "Function selection C-E (PC76)" to "Disabled".            * With the setting above, note that the mode switching may cause vibrations and shock.</p>
"[Pr.91] Optional data monitor: Data type setting 1" (100+150n)	"[Pr.91] Optional data monitor: Data type setting 1" (100+150n)	Set the index of the corresponding object of the slave device in "Optional data monitor: Data type setting".
	"[Pr.591] Optional data monitor: Data type expansion setting 1" (92+150n)	Set the sub index and size of the corresponding object of the slave device in "Optional data monitor: Data type expansion setting".
"[Pr.92] Optional data monitor: Data type setting 2" (101+150n)	"[Pr.92] Optional data monitor: Data type setting 2" (101+150n)	Refer to the manuals of the slave devices to be used for details.
	"[Pr.592] Optional data monitor: Data type expansion setting 2" (93+150n)	
"[Pr.93] Optional data monitor: Data type setting 3" (102+150n)	"[Pr.93] Optional data monitor: Data type setting 3" (102+150n)	
	"[Pr.593] Optional data monitor: Data type expansion setting 3" (94+150n)	
"[Pr.94] Optional data monitor: Data type setting 4" (103+150n)	"[Pr.94] Optional data monitor: Data type setting 4" (103+150n)	
	"[Pr.594] Optional data monitor: Data type expansion setting 4" (95+150n)	

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [44 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Pr.96] Operation cycle setting" (105)	-	In RD78G(S), the operation cycle is set as the network communication cycle. The following shows the settable communication cycle. Communications cycle: 0.25 ms 0.5 ms 1 ms 2 ms 4 ms
"[Pr.114] External command signal compensation valid/invalid setting" (114)	-	The external command signal compensation valid/invalid setting function has been removed. (Always valid)
"[Pr.320] Synchronous encoder axis type" (34720+20n)	"[Pr.320] Synchronous encoder axis type" (34720+20n)	The setting value "1: Incremental synchronous encoder" has been removed.
"[Pr.800] Mark detection signal setting" (54000+20n)	"[Pr.800] Mark detection signal setting" (54000+20n)	Set "[Pr.95] External command signal selection" together with this parameter. [Setting example] When [Pr.95] of axis 8 is set to "101: Axis 1 Dog signal" and [Pr.800] is set to "8: Axis 8 external command signal [DI]", the mark detection is executed using the DOG signal of the servo amplifier connecting axis 1.
"[Pr.100] Connected device" (28400+100n)	"[Pr.141] IP address (the third and fourth octets), (the first and second octets)" (58024+150n, 58025+150n)	The setting has been changed as follows because the servo system network has been changed to CC-Link IE TSN. The setting of "[Pr.100] Connected device" is not necessary. Set "[Pr.141] IP address" and "[Pr.142] Multidrop number".  [Additional information] <ul style="list-style-type: none"> <li>· "[Pr.141] IP address": the IP address of the real servo amplifier to be used</li> <li>· "[Pr.142] Multidrop number": the identification No. for each servo motor connected to a multi-axis servo amplifier</li> </ul>
	"[Pr.142] Multidrop number" (58028+150n)	

### (3) Monitor data area

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Md.47] Positioning data being executed: Axis to be interpolated" (2441+100n)	"[Md.47] Positioning data being executed: Axis to be interpolated" (2496+100n, 2497+100n)	Refer to 3.2.2.(4) for details.
"[Md.35] Torque limit stored value/forward torque limit stored value" (2426+100n)	"[Md.35] Torque limit stored value/forward torque limit stored value" (2426+100n)	This monitor data has been changed as follows. (1) Note that the unit for the torque limit value has been changed. QD77MS: [%] RD78G(S): [0.1 %] [Example] 100 % ("100" is set in the buffer memory.) → 100.0 % (set "1000" in the buffer memory.)  (2) "[Pr.54] Home position return torque limit value" is not stored.  (3) "[Pr.17] Torque limit setting value" or "[Cd.101] Torque output setting value" is not stored when a home position return is executed.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [45 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Md.120] Reverse torque limit stored value" (2491+100n)	"[Md.120] Reverse torque limit stored value" (2491+100n)	This monitor data has been changed as follows. <ul style="list-style-type: none"> <li>"[Pr.54] Home position return torque limit value" is not stored.</li> <li>"[Pr.17] Torque limit setting value" or "[Cd.101] Torque output setting value" is not stored when a home position return is executed.</li> </ul>
"[Md.103] Motor rotation speed" (2454+100n, 2455+100n)	"[Md.103] Motor rotation speed" (2454+100n, 2455+100n)	Note that the unit for the motor rotation speed has been changed. QD77MS: [0.1 r/min] RD78G(S): [0.01 r/min] [Example] 60.0 r/min ("600" is stored in the buffer memory.) → 60.00 r/min ("6000" is stored in the buffer memory.)  [Additional information] The unit is "pulse/s" when the servo parameter PT01.1 (speed/acceleration/deceleration unit selection) is set to "1: Command unit/s". (The same applies to linear servo motors.)
"[Md.107] Parameter error No." (2470+100n)	-	The parameter error No. monitor function has been removed.
"[Md.109] Regenerative load ratio/Optional data monitor output 1" (2478+100n)	"[Md.109] Regenerative load ratio/Optional data monitor output 1" (2478+100n)	This monitor data has been changed as follows. <ul style="list-style-type: none"> <li>The contents set in "[Pr.91] Optional data monitor: Data type setting 1" and "[Pr.591] Optional data monitor: Data type expansion setting 1" are stored.</li> </ul>
"[Md.110] Effective load torque/Optional data monitor output 2" (2479+100n)	"[Md.110] Effective load torque/Optional data monitor output 2" (2479+100n)	This monitor data has been changed as follows. <ul style="list-style-type: none"> <li>The contents set in "[Pr.92] Optional data monitor: Data type setting 2" and "[Pr.592] Optional data monitor: Data type expansion setting 2" are stored.</li> </ul>
"[Md.111] Peak torque ratio/Optional data monitor output 3" (2480+100n)	"[Md.111] Peak torque ratio/Optional data monitor output 3" (2480+100n)	This monitor data has been changed as follows. <ul style="list-style-type: none"> <li>The contents set in "[Pr.93] Optional data monitor: Data type setting 3" and "[Pr.593] Optional data monitor: Data type expansion setting 3" are stored.</li> </ul>
"[Md.112] Optional data monitor output 4" (2481+100n)	"[Md.112] Optional data monitor output 4" (2481+100n)	This monitor data has been changed as follows. <ul style="list-style-type: none"> <li>The contents set in "[Pr.94] Optional data monitor: Data type setting 4" and "[Pr.594] Optional data monitor: Data type expansion setting 4" are stored.</li> </ul>
"[Md.502] Driver operation alarm No." (59302+100n)	-	The driver alarm No. monitor function has been removed.
"[Md.8] Start history pointer" (4092) "[Md.3] Start information" "[Md.4] Start No." "[Md.5] Start Day: hour" "[Md.6] Start Minute: second" "[Md.7] Error judgment" "[Md.54] Start Year: month" (4012+5p, 4013+5p, 4014+5p, 4015+5p, 4016+5p, 4240+1p)	"[Md.8] Start history pointer" (87000) "[Md.3] Start information" "[Md.4] Start No." "[Md.5] Start Day: hour" "[Md.6] Start Minute: second" "[Md.7] Error judgment" "[Md.54] Start Year: month" (87010+10p, 87011+10p, 87013+10p, 87014+10p, 87016+10p, 87012+10p)	(1) Change the buffer memory address. (2) The storage range has been changed since the number of records has been expanded from 16 to 64. QD77MS: 0 to 15 RD78G(S): 0 to 63
"[Md.51] Amplifier-less operation mode status" (4232)	-	The amplifier-less mode status monitor function has been removed.
"[Md.53] SSCNET control status" (4233)	-	The SSCNET control status monitor function has been removed.

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [46 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Md.52] Communication between amplifiers axes searching flag" (4234)	-	The communication between amplifiers axes searching flag monitor function has been removed.
"[Md.132] Operation cycle setting" (4238)	"[Md.132] Operation cycle setting" (4238)	In RD78G(S), the operation cycle is set as the network communication cycle. The following shows the settable communication cycle. Communications cycle: 0.25 ms 0.5 ms 1 ms 2 ms 4 ms
Error history/warning history (4093 to 4222, 4256 to 4287, 31300 to 31331)	-	The error and warning histories have been integrated into the event history. A buffer memory address is not assigned to the event history.

## (4) Control data area

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Cd.13] Positioning operation speed override" (4313+100n)	"[Cd.13] Positioning operation speed override" (4313+100n)	This control data has been changed as follows. Setting range: 0 to 300 [%] When "0" is set, no warning occurs after the speed becomes zero and the speed change 0 flag turns on. The override function is invalid during the driver home position return.
"[Cd.14] New speed value" (4314+100n, 4315+100n)	"[Cd.14] New speed value" (4314+100n, 4315+100n)	The speed change function is invalid during the driver home position return.
"[Cd.22] New torque value/ forward new torque value" (4325+100n)	"[Cd.22] New torque value/ forward new torque value" (4325+100n)	The unit for the torque limit value has been changed. Multiply the setting value by 10. QD77MS: [%] RD78G(S): [0.1 %] [Example] 100 % ("100" is set in the buffer memory.) → 100.0 % (set "1000" in the buffer memory.)
"[Cd.101] Torque output setting value" (4352+100n)	"[Cd.101] Torque output setting value" (4352+100n)	
"[Cd.113] New reverse torque value" (4364+100n)	"[Cd.113] New reverse torque value" (4364+100n)	
"[Cd.43] Simultaneous starting axis" (4339+100n)	"[Cd.43] Simultaneous starting axis" (4368+100n, 4369+100n)	Refer to 3.2.2.(2) for details.
"[Cd.30] Simultaneous starting axis start data No. (axis 1 start data No.)" (4340+100n)	"[Cd.30] Simultaneous starting own axis start data No." (4340+100n)	
"[Cd.31] Simultaneous starting axis start data No. (axis 2 start data No.)" (4341+100n)	"[Cd.31] Simultaneous starting axis start data No.1" (4341+100n)	
"[Cd.32] Simultaneous starting axis start data No. (axis 3 start data No.)" (4342+100n)	"[Cd.32] Simultaneous starting axis start data No.2 (4342+100n)	
"[Cd.33] Simultaneous starting axis start data No. (axis 4 start data No.)" (4343+100n)	"[Cd.33] Simultaneous starting axis start data No.3 (4343+100n)	

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [47 / 74]

[Issue No.] SSC-A-0004-A

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Cd.147] Speed limit value at continuous operation to torque control mode" (4386+100n, 4387+100n)	"[Cd.147] Speed limit value at continuous operation to torque control mode" (4386+100n, 4387+100n)	The setting value varies as follows depending on the setting value of [Pr. 1]  0: mm      0 to 2000000000 1: inch    0 to 2000000000 2: degree 0 to 2000000000 3: pulse   0 to 1000000000
"[Cd.130] Servo parameter write request" (4354+100n)	-	When changing servo parameters with RD78G(S), use the servo transient transmission function.
"[Cd.131] Parameter No. (settings for servo parameters to be changed)" (4355+100n)	-	
"[Cd.132] Change data" (4356+100n, 4357+100n)	-	
"[Cd.47] QD75MH initial value setting request" (5909)	-	The QD75MH initial value setting function has been removed.
"[Cd.137] Amplifier-less operation mode switching request" (5926)	-	The amplifier-less operation mode switching request function has been removed.
"[Cd.102] SSCNET control command" (5932)	-	The SSCNET control command function has been removed because the servo system network has been changed to CC-Link IE TSN.

## (5) Positioning data area

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Da.20] Axis to be interpolated No.1" "[Da.21] Axis to be interpolated No.2" "[Da.22] Axis to be interpolated No.3" (6003+1000n, ..., 6993+1000n)	"[Da.20] Axis to be interpolated No.1" "[Da.21] Axis to be interpolated No.2" "[Da.22] Axis to be interpolated No.3" (71000+1000n, 71001+1000n, ..., 71990+1000n, 71991+1000n)	Refer to 3.2.2.(3) for details.
[Da.23] Number of simultaneous starting axes [Da.24] Simultaneous starting axis No.1 [Da.25] Simultaneous starting axis No.2 [Da.26] Simultaneous starting axis No.3 (22101+400n, ..., 22391+400n)	[Da.23] Number of simultaneous starting axes [Da.24] Simultaneous starting axis No.1 [Da.25] Simultaneous starting axis No.2 [Da.26] Simultaneous starting axis No.3 (22108+400n, 22109+400n, ..., 22398+400n, 22399+400n)	Refer to 3.2.2.(2) for details.

## (6) Servo parameter area

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
Servo parameter (28401+100n to 28495+100n, 64400+70n to 64463+70n)	-	RD78G(S) does not support the servo parameter writing from the buffer memory. Set the parameters with the engineering tool.

# **SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [48 / 74]**

[Issue No.] SSC-A-0004-A

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## (7) Synchronous control area

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Pr.320] Synchronous encoder axis type" (34720+20j)	"[Pr.320] Synchronous encoder axis type" (34720+20j)	The setting value "1: Incremental synchronous encoder" has been removed.

j: Synchronous encoder axis No. -1

## (8) Mark detection area

Buffer memory No.		Change/revision
QD77MS16	RD78G16(S)	
"[Pr.800] Mark detection signal setting" (54000+20k)	"[Pr.800] Mark detection signal setting" (54000+20k)	Set "[Pr.95] External command signal selection" together with this parameter. [Setting example] When [Pr.95] of axis 8 is set to "101: Axis 1 Dog signal" and [Pr.800] is set to "8: Axis 8 external command signal [DI]", the mark detection is executed using the DOG signal of the servo amplifier connecting axis 1.

k: Mark detection setting No. -1



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [49 / 74]

[Issue No.] SSC-A-0004-A

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## (1) External input signals of Simple Motion modules

This section explains the replacement method for external input signals.

The replacement method for FLS/RLS/DOG/STOP signals varies depending on the setting values in "[Pr.80] External input signal selection" of QD77MS\_.

The DI signal must be replaced regardless of the setting values in "[Pr.80] External input signal selection" of QD77MS\_.

### (a) Replacement of FLS/RLS/DOG/STOP

There has been no change in the setting value of the external input signal logic.

#### 1. When "[Pr.80] External input signal selection" is set to "0: External input signal of QD77MS"

→ The external input signals of Simple Motion modules are not available in RD78G(S).

Replace the external signal setting with either of the following cases.

##### (1) Using the external input signal of the servo amplifier (STOP signal cannot be set.)

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 16	[Pr.116] FLS signal selection (116+150n)	0001H
	[Pr.117] RLS signal selection (117+150n)	0001H
	[Pr.118] DOG signal selection (118+150n)	0001H

##### (2) Using the buffer memory of RD78G(S)

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 16	[Pr.116] FLS signal selection (116+150n)	0002H
	[Pr.117] RLS signal selection (117+150n)	0002H
	[Pr.118] DOG signal selection (118+150n)	0002H
	[Pr.119] STOP signal selection (119+150n)	0002H

#### 2. When "[Pr.80] External input signal selection" is set to "1: External input signal of servo amplifier"

→ Set the signals as shown in the table below. STOP signal cannot be set.

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 16	[Pr.116] FLS signal selection (116+150n)	0001H
	[Pr.117] RLS signal selection (117+150n)	0001H
	[Pr.118] DOG signal selection (118+150n)	0001H

#### 3. When "[Pr.80] External input signal selection" is set to "2: Buffer memory of QD77MS"

→ Set the signals as shown in the table below.

Axis No.	Parameter (buffer memory)	Setting value
Axis 1 to Axis 16	[Pr.116] FLS signal selection (116+150n)	0002H
	[Pr.117] RLS signal selection (117+150n)	0002H
	[Pr.118] DOG signal selection (118+150n)	0002H
	[Pr.119] STOP signal selection (119+150n)	0002H

# **SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [50 / 74]**

[Issue No.] SSC-A-0004-A

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(b) Replacement of DI signal

The DI signal is not available in RD78G(S).

Therefore, assign DOG signals as shown in the table below.

Parameter (buffer memory)	Setting value	Description
[Pr.95] External command signal selection (69+150n)	0	An external command signal is not used.
	101: Dog signal of axis 1	The DOG signal of axis 1 is used as an external command signal.
	102: Dog signal of axis 2	The DOG signal of axis 2 is used as an external command signal.
	103: Dog signal of axis 3	The DOG signal of axis 3 is used as an external command signal.
	104: Dog signal of axis 4	The DOG signal of axis 4 is used as an external command signal.
	105: Dog signal of axis 5	The DOG signal of axis 5 is used as an external command signal.
	106: Dog signal of axis 6	The DOG signal of axis 6 is used as an external command signal.
	107: Dog signal of axis 7	The DOG signal of axis 7 is used as an external command signal.
	108: Dog signal of axis 8	The DOG signal of axis 8 is used as an external command signal.
	109: Dog signal of axis 9	The DOG signal of axis 9 is used as an external command signal.
	110: Dog signal of axis 10	The DOG signal of axis 10 is used as an external command signal.
	111: Dog signal of axis 11	The DOG signal of axis 11 is used as an external command signal.
	112: Dog signal of axis 12	The DOG signal of axis 12 is used as an external command signal.
	113: Dog signal of axis 13	The DOG signal of axis 13 is used as an external command signal.
	114: Dog signal of axis 14	The DOG signal of axis 14 is used as an external command signal.
	115: Dog signal of axis 15	The DOG signal of axis 15 is used as an external command signal.
116: Dog signal of axis 16	The DOG signal of axis 16 is used as an external command signal.	

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [51 / 74]

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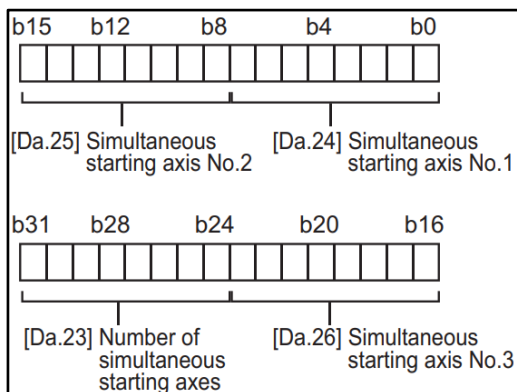
(2) Replacement of the simultaneous starting axes specification method,  
Replacement of the simultaneous starting axes start data No.

(a) Replacement of simultaneous start by block start

In QD77MS, the following parameters are set with 4 bits: [Da.23] Number of simultaneous starting axes, [Da.24] Simultaneous starting axis No.1, [Da.25] Simultaneous starting axis No.2, and [Da.26] Simultaneous starting axis No.3. In RD78G(S), set these parameters with 8 bits, whose high-order bits are zero. The setting values of 00 to 0F are for axis 1 to 16.

		The number of simultaneous starting axes		
		2	3	4
QD77MS	[Da.23] Number of simultaneous starting axes (22101+400n b12 to b15)	2H	3H	4H
↓				
RD78G(S)	[Da.23] Number of simultaneous starting axes (22108+400n b24 to b31)	02H	03H	04H

		Simultaneous starting axis No.			
		Axis 1	Axis 2	...	Axis 16
QD77MS	[Da.24] Simultaneous starting axis No.1 (22101+400n b0 to b3)	0H	1H	...	FH
	[Da.25] Simultaneous starting axis No.2 (22101+400n b4 to b7)	0H	1H	...	FH
	[Da.26] Simultaneous starting axis No.3 (22101+400n b8 to b11)	0H	1H	...	FH
↓					
RD78G(S)	[Da.24] Simultaneous starting axis No.1 (22108+400n b0 to b7)	00H	01H	...	0FH
	[Da.25] Simultaneous starting axis No.2 (22108+400n b8 to b15)	00H	01H	...	0FH
	[Da.26] Simultaneous starting axis No.3 (22108+400n b16 to b23)	00H	01H	...	0FH



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [52 / 74]

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(b) Replacement of simultaneous start by multi-axis simultaneous start control (positioning start No. 9004)  
 "[Cd.43] Simultaneous starting axis" has been changed to a 2-word data in the buffer memory.  
 In QD77MS, "[Cd.43] Simultaneous starting axis" is set with 4 bits for each axis. In RD78G(S), set these parameters with 8 bits, whose high-order bits are zero.  
 The setting values of 00 to 0F are for axis 1 to 16.

		The number of simultaneous starting axes		
		2	3	4
QD77MS	[Cd.43] Simultaneous starting axis (4339+100n b12 to b15)	2H	3H	4H
↓				
RD78G(S)	[Cd.43] Simultaneous starting axis (4368+100n b24 to b31)	02H	03H	04H

		Simultaneous starting axis No.			
		Axis 1	Axis 2	...	Axis 16
QD77MS	[Cd.43] Simultaneous starting axis (4339+100n b0 to b3)	0H	1H	...	FH
	[Cd.43] Simultaneous starting axis (4339+100n b4 to b7)	0H	1H	...	FH
	[Cd.43] Simultaneous starting axis (4339+100n b8 to b11)	0H	1H	...	FH
↓					
RD78G(S)	[Cd.43] Simultaneous starting axis (4368+100n b0 to b7)	00H	01H	...	0FH
	[Cd.43] Simultaneous starting axis (4368+100n b8 to b15)	00H	01H	...	0FH
	[Cd.43] Simultaneous starting axis (4368+100n b16 to b23)	00H	01H	...	0FH

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [53 / 74]

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## (3) Replacement of specification method of axes to be interpolated

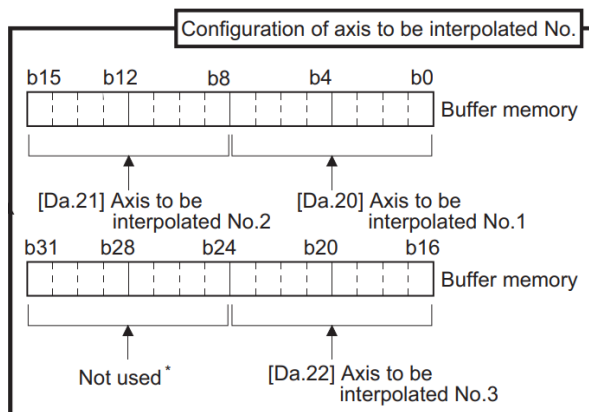
In QD77MS, the following parameters are set with 4 bits: "[Da.20] Axis to be interpolated No.1", "[Da.21] Axis to be interpolated No.2", and "[Da.22] Axis to be interpolated No.3". In RD78G(S), set these parameters with 8 bits, whose high-order bits are zero.

The setting values of 00 to 0F are for axis 1 to 16.

		Axis to be interpolated No.			
		Axis 1	Axis 2	...	Axis 16
QD77MS	[Da.20] Axis to be interpolated No.1 (6003+1000n b0 to b3)	0H	1H	...	FH
	[Da.21] Axis to be interpolated No.2 (6003+1000n b4 to b7)	0H	1H	...	FH
	[Da.22] Axis to be interpolated No.3 (6003+1000n b8 to b11)	0H	1H	...	FH

↓

RD78G(S)	[Da.20] Axis to be interpolated No.1 (71000+1000n b0 to b7)	00H	01H	...	0FH
	[Da.21] Axis to be interpolated No.2 (71000+1000n b8 to b15)	00H	01H	...	0FH
	[Da.22] Axis to be interpolated No.3 (71000+1000n b16 to b23)	00H	01H	...	0FH



\*Always "0" is set to the part not used.

"[Md.47] Positioning data being executed" is monitored using 8 bits.

"[Da.20] Axis to be interpolated 1" → "[Md.47] Positioning data being executed" (2496 + 100n b0 to b7)

"[Da.21] Axis to be interpolated 2" → "[Md.47] Positioning data being executed" (2496 + 100n b8 to b15)

"[Da.22] Axis to be interpolated 3" → "[Md.47] Positioning data being executed" (2497 + 100n b0 to b7)

# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [54 / 74]

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## 3.3. External Dimensions/Mass/Installation

Item	QD77MS	RD78G
External dimensions		
External dimensions [mm]	98.0[H] × 27.4[W] × 90.0[D]	106.0[H] × 27.8[W] × 110.0[D]
Mass [kg]	0.15 (MS2), 0.16 (MS4/MS16)	0.26
Internal current consumption (5 VDC) [A]	0.60	1.93

Standard base unit dimensions (H×W×D [mm])

series	_33B	_35B	_38B	_312B
MELSEC-Q	98.0×189×44.1	98.0×245×44.1	98.0×328×44.1	98.0×439×44.1
MELSEC iQ-R	101×189×32.5	101×245×32.5	101×328×32.5	101×439×32.5



- RD78G is equipped with a module fixing screw on its case. Tighten the module fixing screw to fix the module on the base unit.
- Select the power supply module after estimating the system current consumption.
- RD78G has larger current consumption than QD77MS, and therefore the number of modules connected per power supply module is fewer.
- If the current capacity of the power supply module becomes insufficient as a result of migration, separate the system by using the extension base unit (R6\_B).
- Refer to the latest version of "Alternative model lists and project conversion procedure for the replacement of MELSEC-Q series models with MELSEC iQ-R series" (FA-A-0239) for details of the alternative models.
- When the new and existing base units have the same number of slots, the screw mounting holes are located at the same position.  
Refer to the "MELSEC iQ-R Module Configuration Manual" (SH-081262ENG) for details on the installation method.  
When the machine should comply with the EMC and Low Voltage Directives, refer to Appendix 7 "EMC and Low Voltage Directives".

## **4. PROJECT CREATION PROCEDURE**

### **4.1. Project Conversion Procedure by an Engineering Environment**

The following shows how to convert the existing project.

#### **4.1.1. How to convert an existing project for the PLC CPU by MELSOFT GX Works3**

A project created in MELSOFT GX Works2 can be converted into the one that can be used in MELSOFT GX Works3.

For the models other than the following, note that the PLC type needs to be changed to a universal model.

- Universal model QCPU
- Universal model high-speed type QCPU
- Universal model process CPU

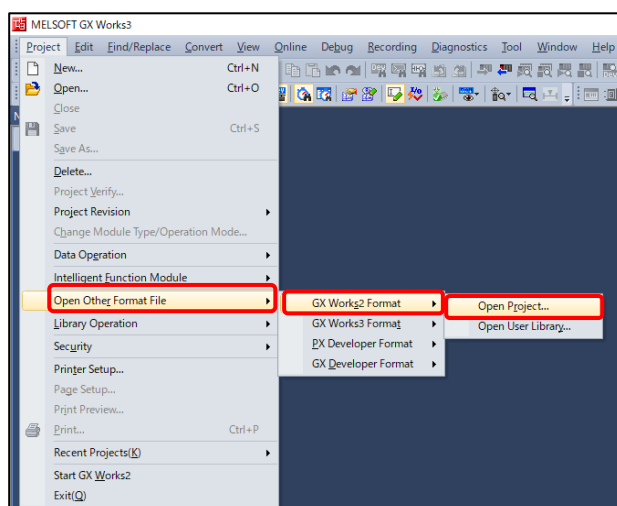
Refer to "GX Works2 Version 1 Operating Manual (Common)" for the restrictions on changing the PLC type. For details on changing the PLC type, refer to the following technical bulletins as well.

- Method of replacing Basic model QCPU with Universal model QCPU (FA-A-0054-E)
- Method of replacing Process CPU with Universal model Process CPU (FA-A-0155-A)
- Method of replacing High Performance model QCPU with Universal model QCPU (Introduction) (FA-A-0209-C)
- Method of replacing High Performance model QCPU with Universal model QCPU (FA-A-0001-N)

[How to convert a GX Works2 project, whose PLC type has been changed to the universal model QCPU, into a MELSOFT GX Works3 project]

Refer to "GX Works3 Operating Manual" for details on converting a GX Works2 project to a GX Works3 project.

- 1) Start MELSOFT GX Works3, and select "Open Other Format File" → "GX Works2 Format" → "Open Project" from the "Project" menu.

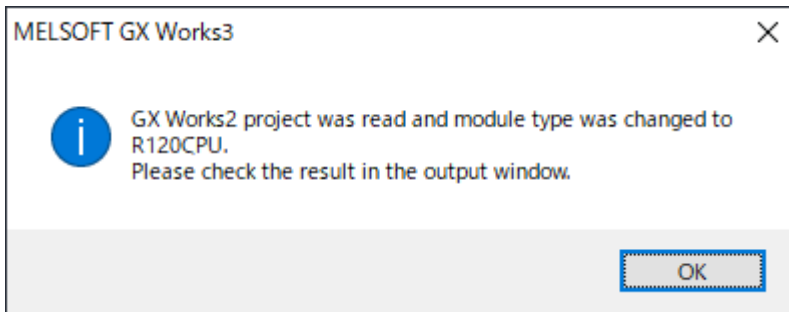


# **SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [56 / 74]**

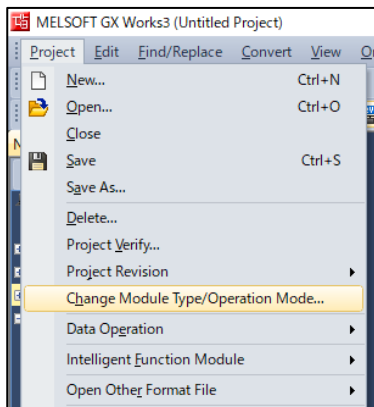
[Issue No.] SSC-A-0004-A

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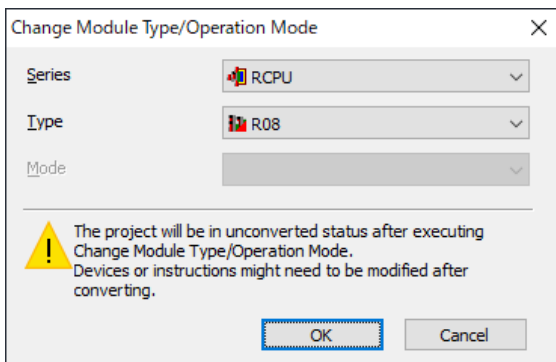
- 2) Select the target project to be opened on the "Open GX Works2 Format Project" screen, and click "Open".
- 3) Read the precautions when converting a project, and click "OK".
- 4) When the reading of the MELSOFT GX Works2 format project is completed, click "OK".  
(Check the model change result in the output window.)



- 5) Select "Change Module Type/Operation Mode" from the "Project" menu to open the model change screen.



- 6) Select RCPU for "Series" and the PLC CPU module model to be used (the setting example: R08CPU) for "Type". Click "OK".





# **SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [57 / 74]**

[Issue No.] SSC-A-0004-A

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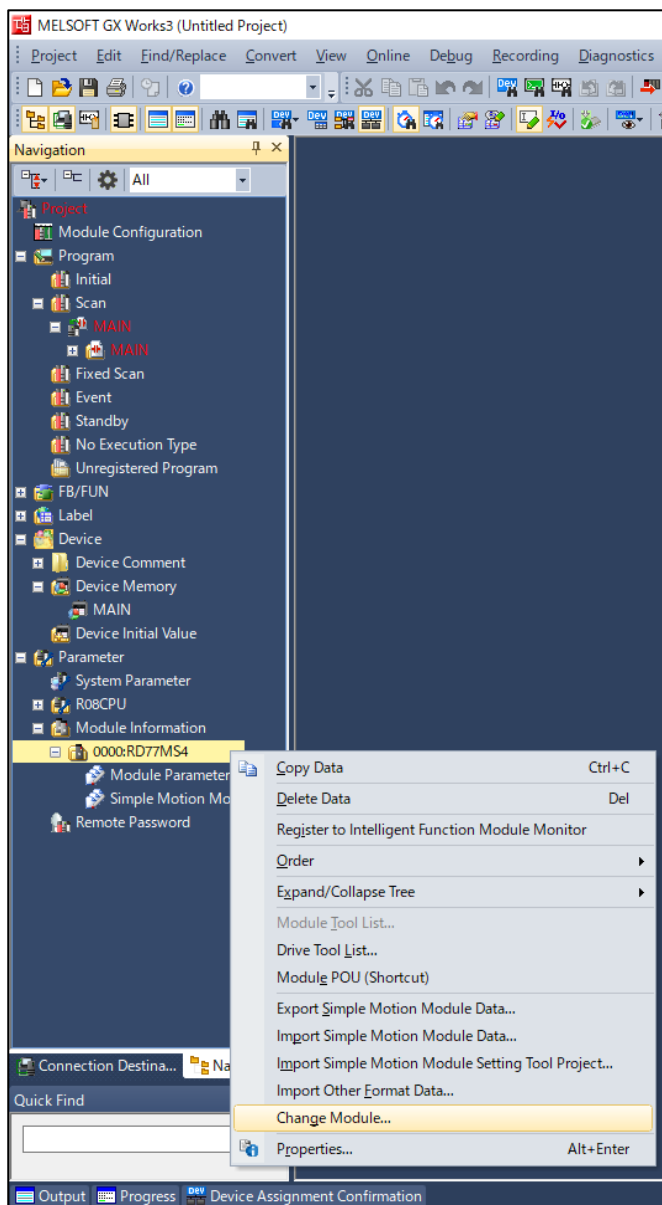
- 7) Read the precautions when changing a model, and click "OK".  
The details of the model change will be displayed in the output window of MELSOFT GX Works3.  
(Check the model change result in the output window)

When "QD77MS" is set in a MELSOFT GX Works2 project, it is automatically converted to "RD77MS" that can control the same number of axes.

Change "RD77MS" to "RD78G(S)" manually.

The procedure for changing RD77MS to RD78G(S) is explained in 8) and later.

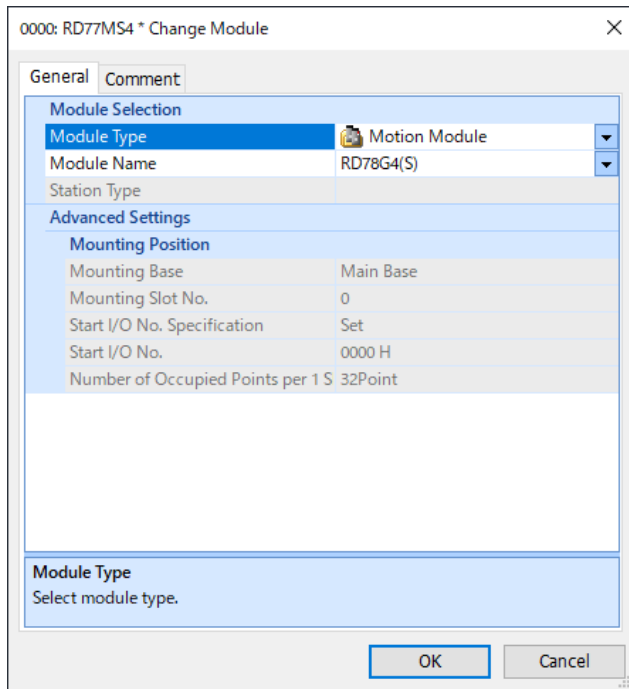
- 8) Select and right-click "RD77MS" (the setting example: RD77MS4) in the navigation tree.  
Select "Change Module" from the context menu to open the "Change Module" screen.



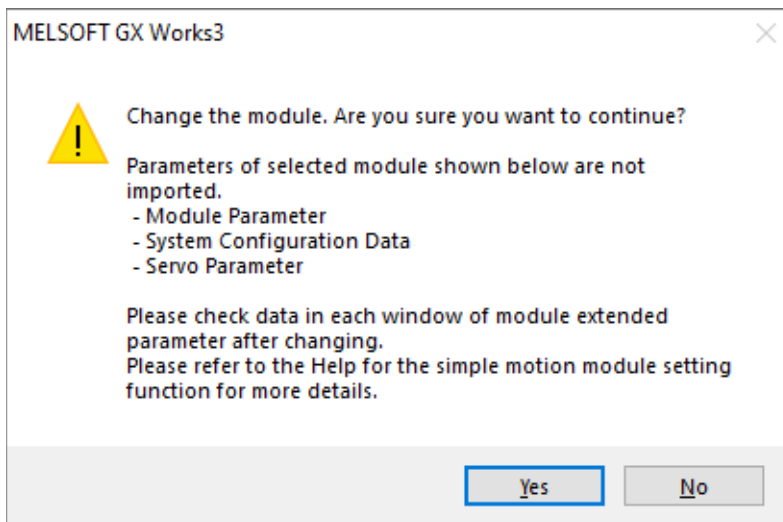
# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [58 / 74]

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- 9) Select the Motion Module for "Module Type" and the Motion module model to be used (setting example: RD78G4(S)) for "Module Name" on the "Change Module" screen. Click "OK".



- 10) Read the precautions when changing the module, and click "OK".  
After changing the module, check the data on each screen of the extended parameters.

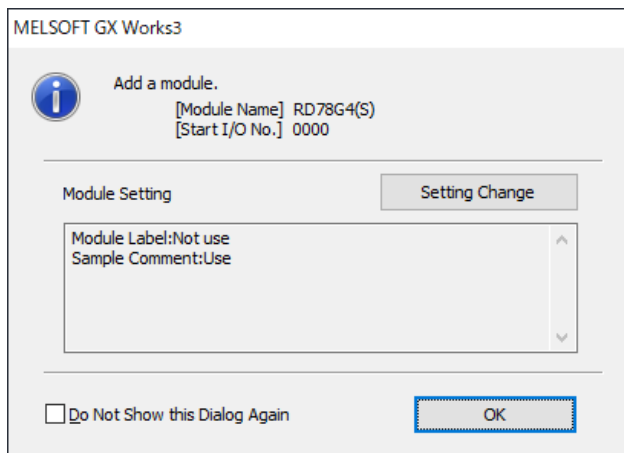


# **SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [59 / 74]**

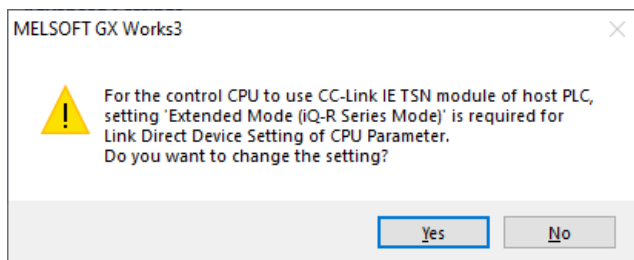
[Issue No.] SSC-A-0004-A

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- 11) When the confirmation screen of the module label setting appears, click "OK".



- 12) When the confirmation screen of changing the link direct device setting of a CPU parameter appears, click "Yes".



The conversion of the project for the PLC CPU is completed.

# **SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [60 / 74]**

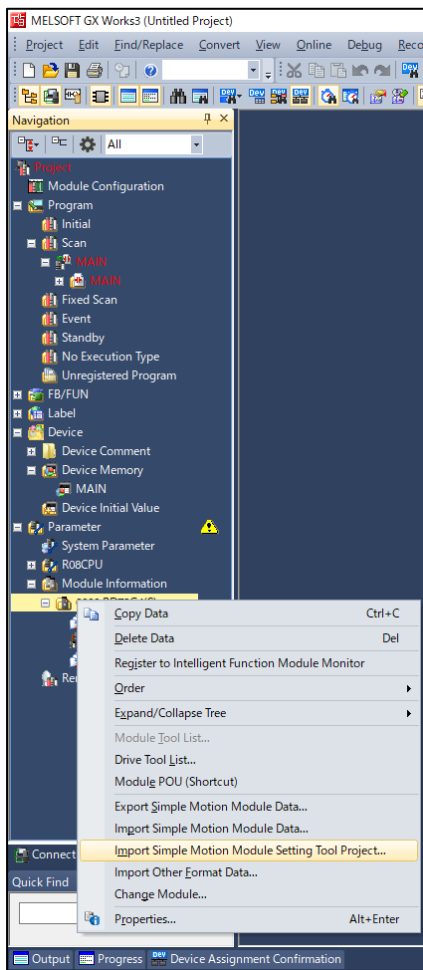
[Issue No.] SSC-A-0004-A

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## **4.1.2. How to import QD77MS format data**

The following shows how to import the Simple Motion module setting tool format data to RD78G(S).

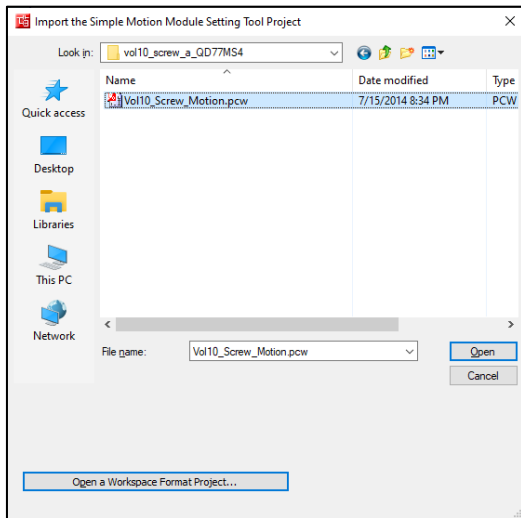
- 1) Start MELSOFT GX Works3, and open the project data converted in "4.1.1 How to convert an existing project for the PLC CPU by MELSOFT GX Works3".
- 2) Select and right-click RD78G(S) in "Module Information" in the navigation tree.  
Select "Import Simple Motion Module Setting Tool Project" from the context menu to open the "Import Simple Motion Module Setting Tool Project" screen.



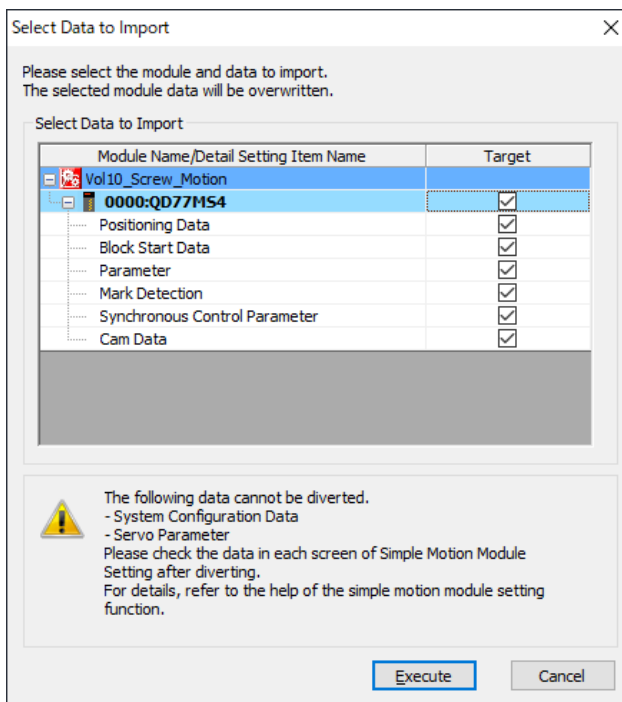
# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [61 / 74]

[Issue No.] SSC-A-0004-A

- 3) Select the QD77MS project data created in the MELSOFT Simple Motion module setting tool, and click "Open".



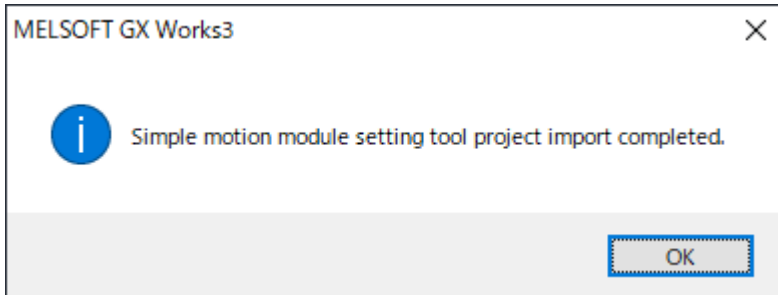
- 4) The import data selection window appears. Select the target module and data to be imported, and click "Execute".



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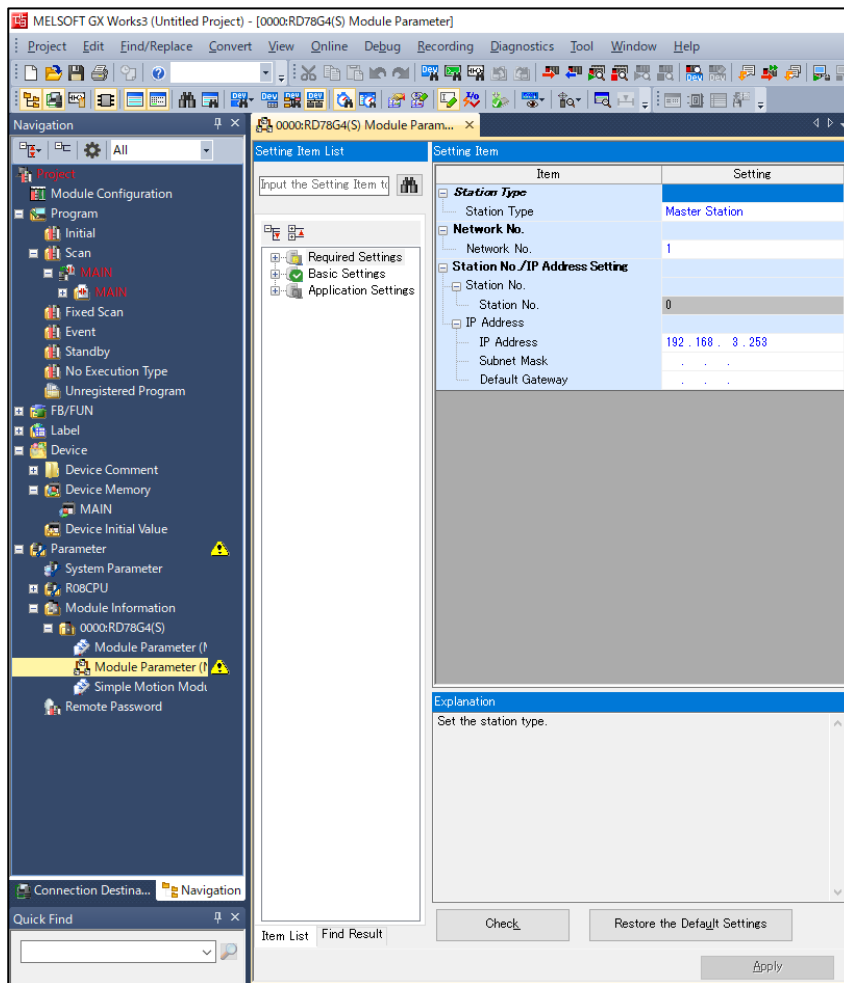
- 5) Click "OK" when the import completion message appears.



## 4.1.3. How to migrate the servo amplifier system configuration and servo parameters

The settings of the servo amplifier system configuration and servo parameters are not automatically migrated. Set them manually.

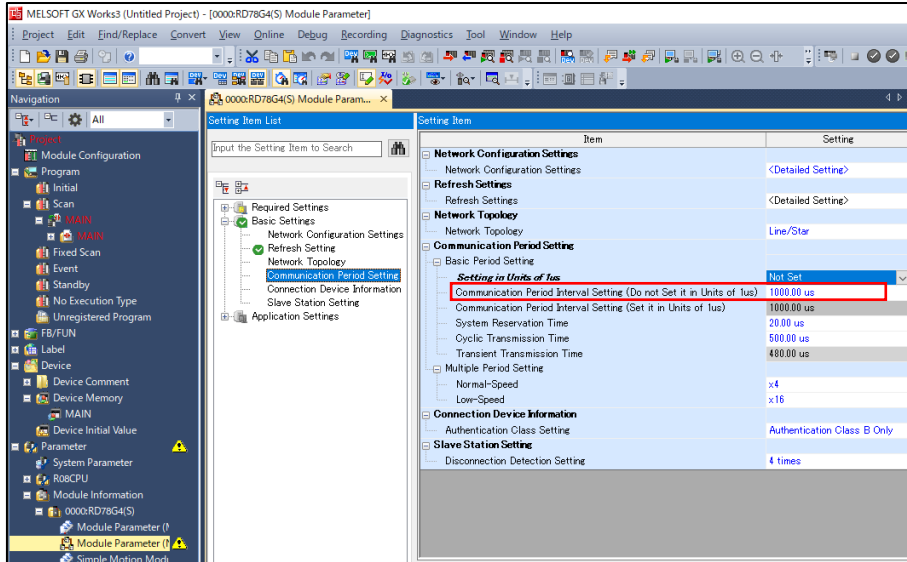
- 1) Double-click "Module Parameter (Network)" of RD78G(S) to open the module parameters related to the network.



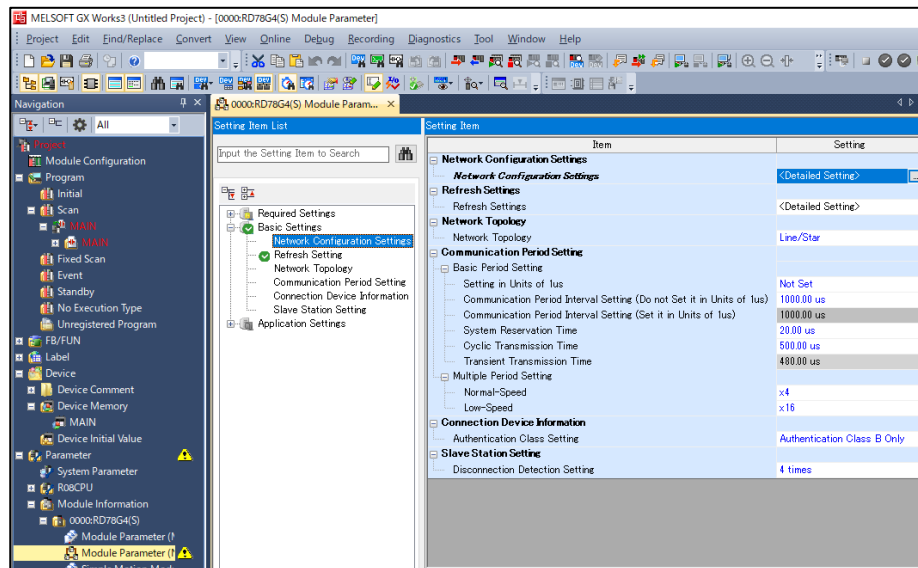
# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [63 / 74]

[Issue No.] SSC-A-0004-A

- 2) In RD78G(S), the operation cycle is set as the network communication cycle. Set the communication cycle according to your system in the Communication Period Interval Setting. Refer to 3.2 "Replacement of I/O Signals and Buffer Memory" for the setting values.



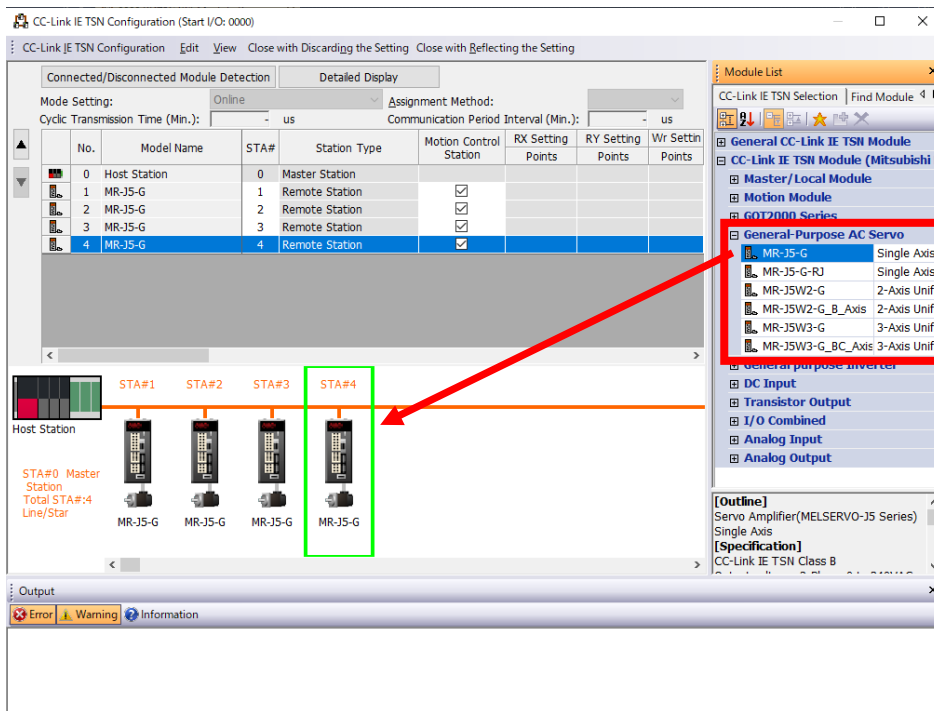
- 3) In the module parameter setting window, double-click "<Detailed Setting>" of "Network Configuration Settings" in "Basic Settings" to open the CC-Link IE TSN configuration.



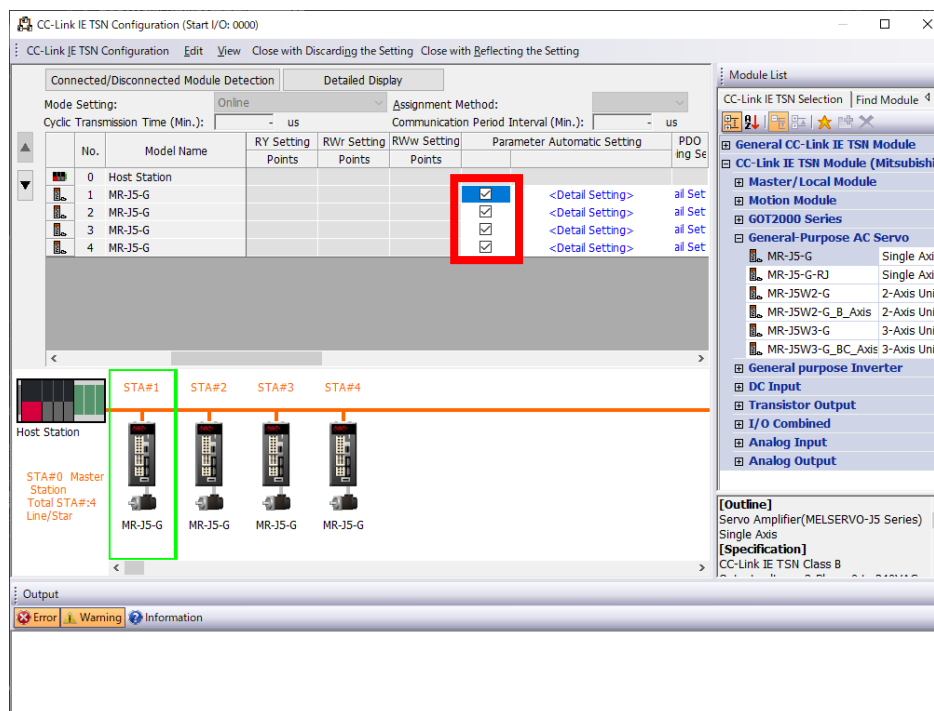
# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [64 / 74]

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- 4) Set the servo amplifier to be used according to your system configuration, such as "MR-J5-G", from "General-Purpose AC Servo" in the CC-Link IE TSN configuration setting window.



- 5) When managing the servo parameters by the PLC CPU/RD78G(S) and distributing the servo parameters to the servo amplifiers, check the box of "Parameter Automatic Setting".

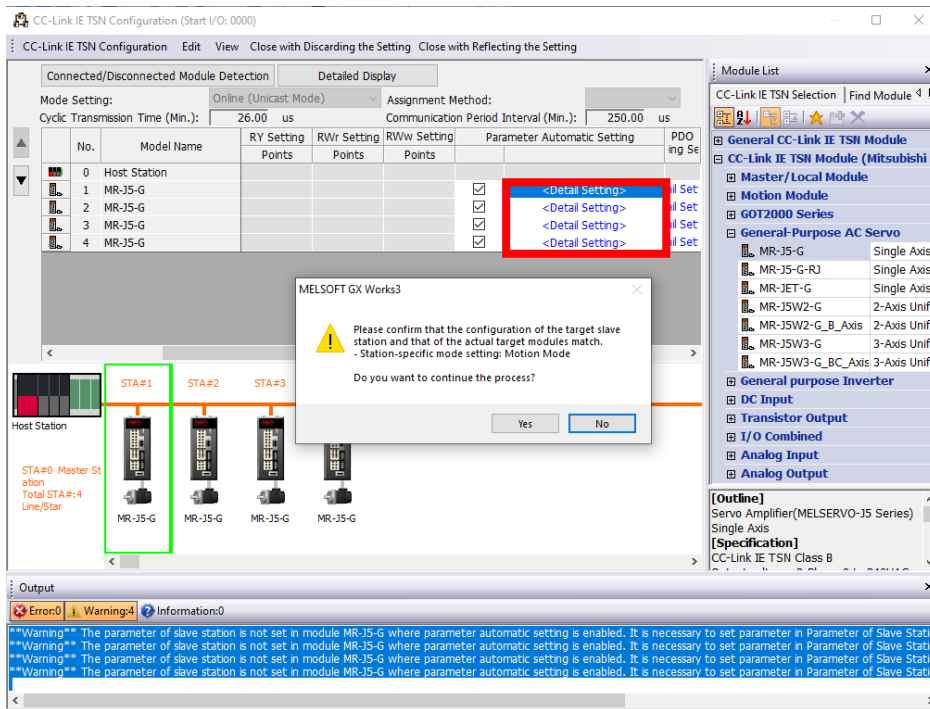




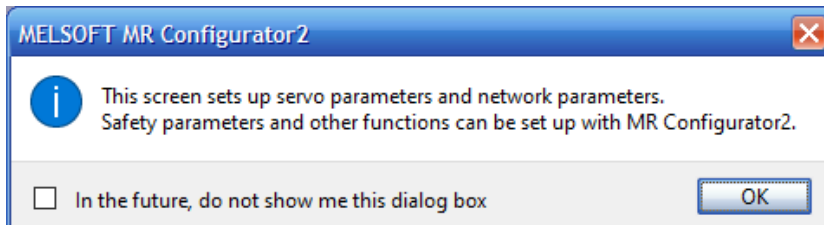
# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [65 / 74]

[Issue No.] SSC-A-0004-A

- 6) Double-click "<Detailed Setting>" of the "Parameter Automatic Setting" column. Check the station-specific mode is correctly set, and click "Yes".



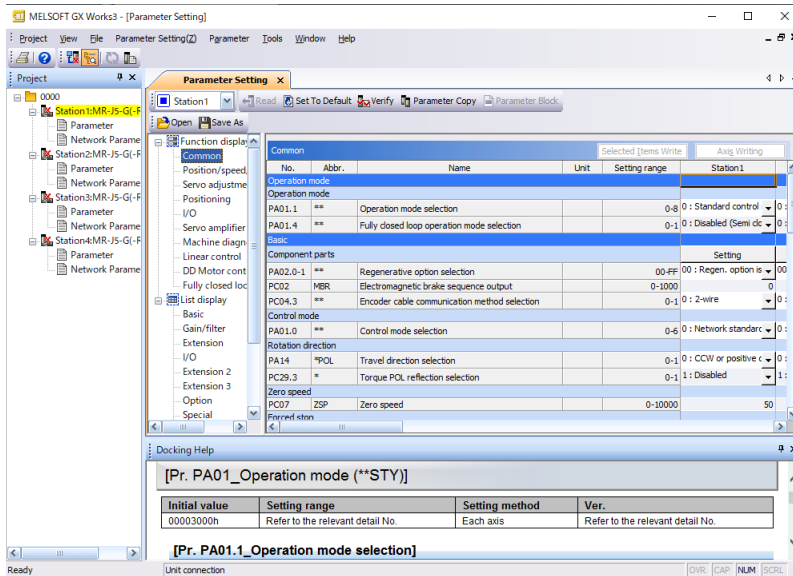
- 7) When the message regarding parameter settings of MR Configurator2 appears, click "OK".



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [66 / 74]

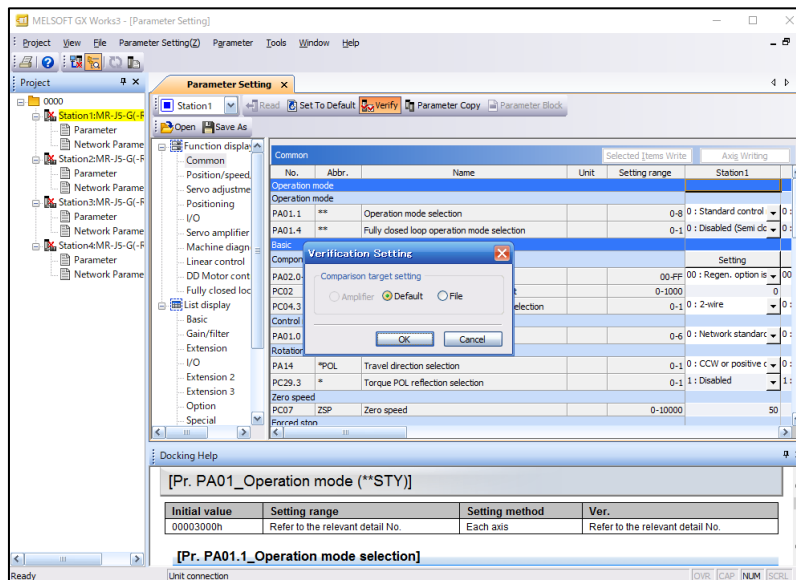
[Issue No.] SSC-A-0004-A

- 8) In the parameter setting window, set the servo parameters by referring to the setting values of the servo parameters of the QD77MS project created in the Simple Motion module setting tool.



## Point

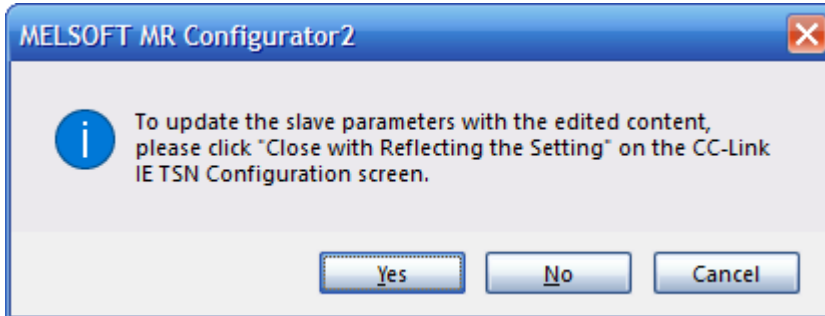
You can refer to the parameters of a QD77MS project that have been changed from the default value in MELSOFT Simple Motion module setting tool. On the servo parameter setting screen, click "Verify" for each selected axis, and select "Default".



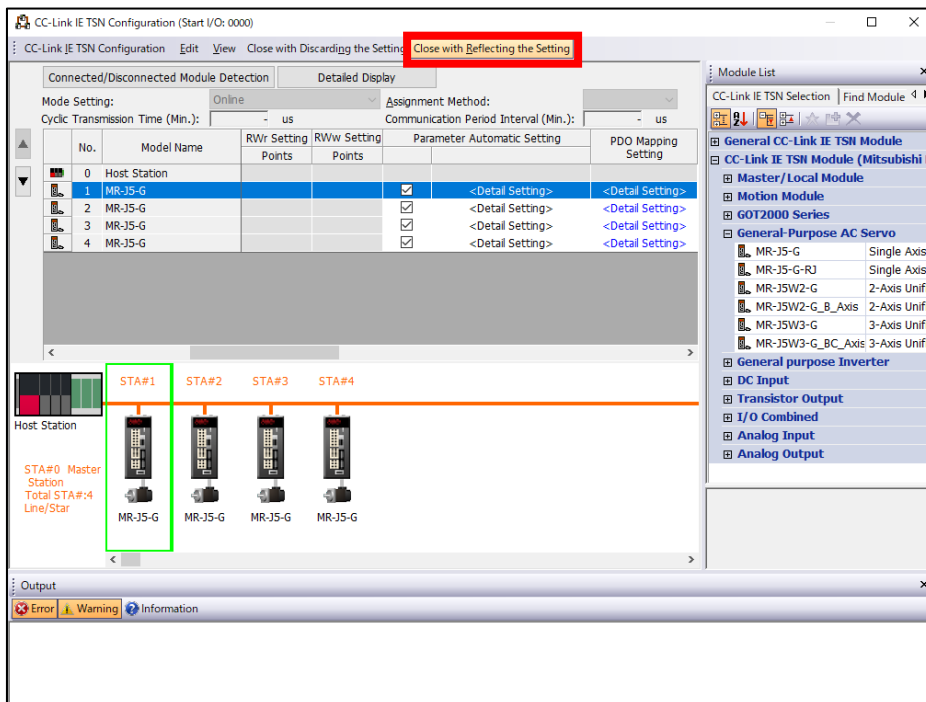
# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [67 / 74]

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- 9) When the servo parameter setting is completed, close the "Parameter Setting" screen of the servo parameter.
- 10) Read the displayed message, and click "Yes".



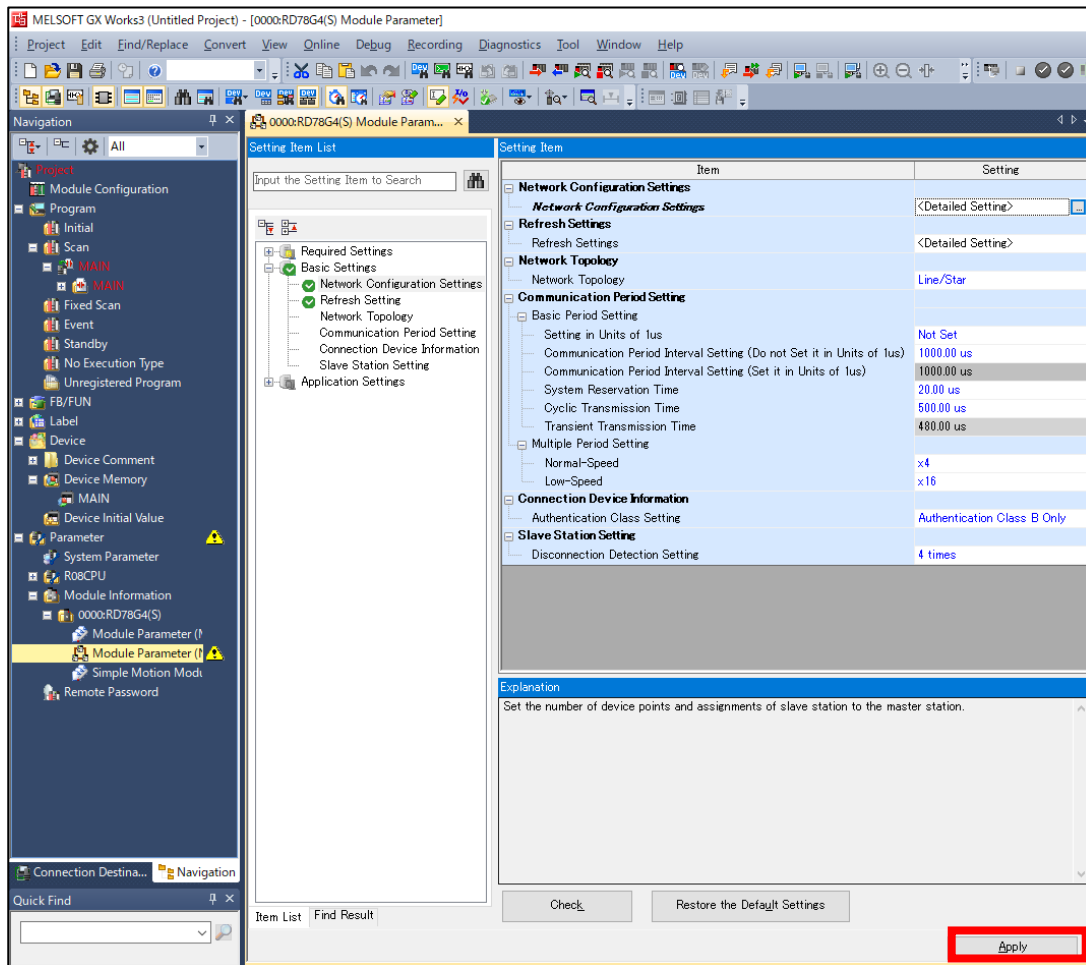
- 11) Click "Close with Reflecting the Setting" on the CC-Link IE TSN configuration screen. Read the displayed message, and click "Yes".



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [68 / 74]

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12) Click "Apply" on the module parameter setting screen.



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The following table shows the conversion details of a QD77MS project data in MELSOFT Simple Motion module setting tool.

Data name		Conversion status	Description
Item	Sub item		
System settings	System configuration	×	Refer to this section.
	Mark detection	○*1	
Parameters	Basic parameters1	○	RD78G(S) uses the driver home position return. Set the home position return method with servo parameters. Refer to this section.
	Basic parameters2	○	
	Detailed parameters1	○*1	
	Detailed parameters2	○	
	Home position return basic parameters	△	
	Home position return detailed parameters	△	
Extended parameters	△		
Servo parameter data		×	
Positioning data		○*1	
Block start data		○*1	
Synchronous control data	Servo input axis	○	
	Synchronous encoder axis	○*1	
	Main input axis	○*1	
	Sub input axis	○*1	
	Composite main shaft gear	○	
	Main shaft gear	○	
	Main shaft clutch	○*1	
	Auxiliary shaft	○*1	
	Composite auxiliary shaft gear	○	
	Auxiliary shaft gear	○	
Auxiliary shaft clutch	○*1		
Cam data		○	

○: Convertible, △: Partially convertible, ×: Not convertible

\*1. Some items will be out of the range after conversion.

The conversion is completed.

Confirm that there is no problem in the converted project.

# ***SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [70 / 74]***

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## **4.2. Setting Value Replacement**

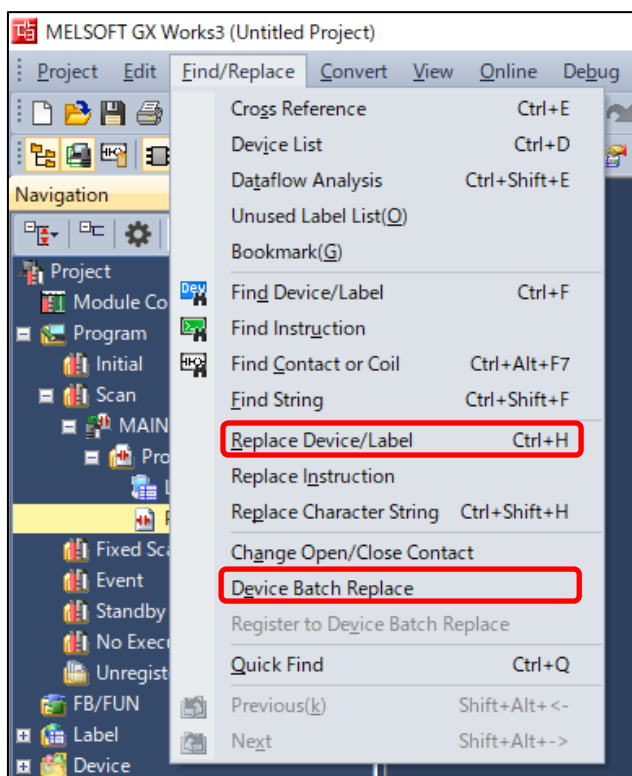
### **4.2.1. Replacement of buffer memory No./input and output signals in sequence programs**

Use the device replacement function of MELSOFT GX Works3 for replacing the buffer memory No. and I/O signals in sequence programs.

The following shows the replacement procedure.

How to replace the buffer memory No. and I/O signals

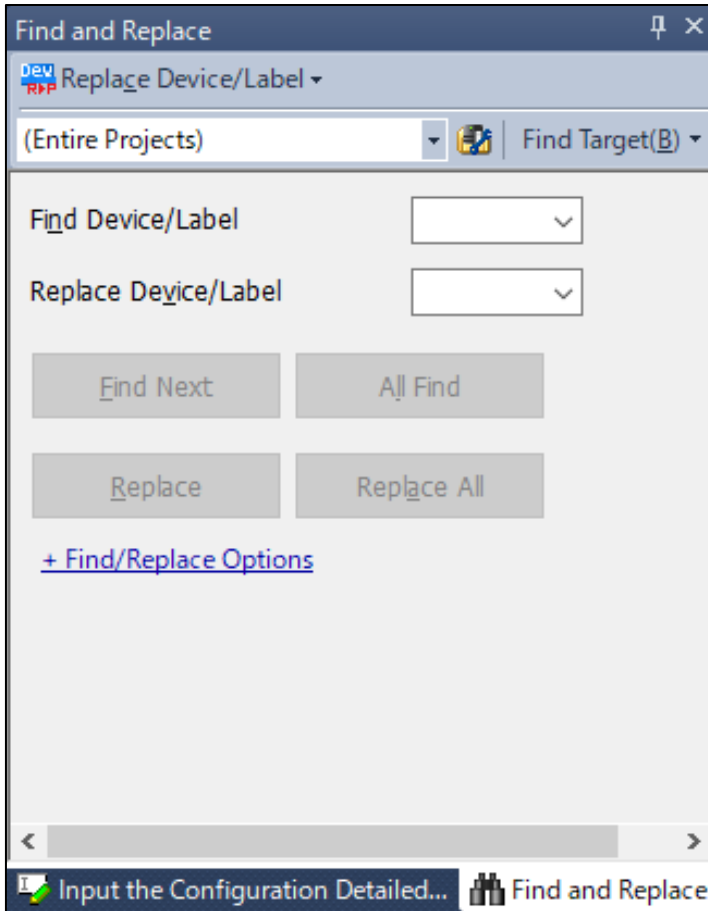
- 1) Start MELSOFT GX Works3, and read the target project data.
- 2) Select "Replace Device/Label" or "Device Batch Replace" from the "Find/Replace" menu.



# SERVO SYSTEM CONTROLLER TECHNICAL BULLETIN [71 / 74]

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3) Set the search location, "Find Device/Label", and "Replace Device Label".



(a) Comparison of buffer memory

Item	QD77MS2/QD77MS4	RD78G(S)
Axis monitor data (from Md.20)	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 4399+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)	3000+6000n to 7999+6000n	200000+5000n to 204999+5000n
Block start area (No.7000, 7001)	Block start data	22000+400n to 22399+400n
	Condition data	
Block start area (No.7002 to 7004)	Block start data	360000+600n to 360599+600n
	Condition data	

n: Axis No. -1

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(b) Comparison of I/O signals

(i) Signal direction: Simple Motion module/Motion module → PLC CPU

Device No.	QD77MS2/QD77MS4	RD78G(S)		
	Signal name			
X0	READY	READY		
X1	Synchronization flag			
X2	Use prohibited <sup>*2</sup>			
X3			Use prohibited	
X4			Axis 1	
X5			Axis 2	
X6			Axis 3	
X7			Axis 4	
X8			Axis 1	
X9			Axis 2	
XA			Axis 3	
XB			Axis 4	
XC			Axis 1	
XD			Axis 2	
XE			Axis 3	
XF			Axis 4	
X10			Axis 1	Axis 1
X11			Axis 2	Axis 2
X12	Axis 3	Axis 3		
X13	Axis 4	Axis 4		
X14	Axis 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	

\*1: These signals are in "[Md.31] Status" in RD78G(S).

\*2: When QD77MS is replaced with RD78G(S), some devices are changed to "Use prohibited". The "use prohibited" devices are used by the system and cannot be used by a customer. If these devices are used, the operation will not be guaranteed.

RD78G(S) 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



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(ii) Signal direction: PLC CPU→ Simple Motion module/Motion module

Device No.	QD77MS2/QD77MS4	RD78G(S)	
Signal name			
Y0	PLC READY		
Y1	All axis servo ON		
Y2	Use prohibited		
Y3	Use prohibited		
Y4	Axis 1	Axis stop *1	
Y5	Axis 2		
Y6	Axis 3		
Y7	Axis 4		
Y8	Axis 1	Forward run JOG start signal *1	
Y9		Reverse run JOG start signal *1	
YA	Axis 2	Forward run JOG start signal *1	
YB		Reverse run JOG start signal *1	
YC	Axis 3	Forward run JOG start signal *1	
YD		Reverse run JOG start signal *1	
YE	Axis 4	Forward run JOG start signal *1	
YF		Reverse run JOG start signal *1	
Y10	Axis 1	Positioning start	Axis 1
Y11	Axis 2		Axis 2
Y12	Axis 3		Axis 3
Y13	Axis 4		Axis 4
Y14	Axis 1	Execution prohibition flag *1	Axis 5
Y15	Axis 2		Axis 6
Y16	Axis 3		Axis 7
Y17	Axis 4		Axis 8
Y18	Use prohibited	Use prohibited *2	Axis 9
Y19			Axis 10
Y1A			Axis 11
Y1B			Axis 12
Y1C			Axis 13
Y1D			Axis 14
Y1E			Axis 15
Y1F			Axis 16

\*1: In RD78G(S), these signals are in "[Cd.180] to [Cd.183]" in the buffer memory.

\*2: When QD77MS is replaced with RD78G(S), some devices are changed to be "Use prohibited". The "use prohibited" devices are used by the system and cannot be used by a customer. If these devices are used, the operation will not be guaranteed.

RD78G(S) buffer memory [Cd.180] to [Cd.183]	
Buffer memory address	Signal name
30100+10n	Axis stop
30101+10n	Forward run JOG start signal
30102+10n	Reverse run JOG start signal
30103+10n	Execution prohibition flag

n: Axis No. -1

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## **5. REVISIONS**

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<b>Version</b>	<b>Revision date</b>	<b>Description</b>
A	October 2021	First edition

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