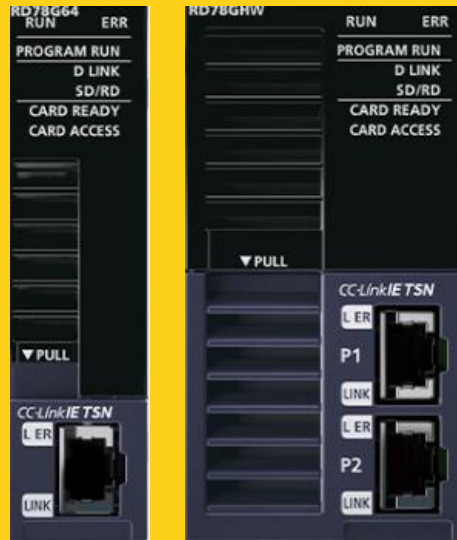




Programmable Controllers
MELSEC iQ-R
series



Ezi-ROBO® CC-Link IE TSN
Precise Actuator System **IGS**

Ezi-SERVO® CC-Link IE TSN
Closed Loop Stepping System **4X**

Connection Guide

MELSEC iQ-R RD78G (S) and

Ezi-ROBO® CC-Link IE TSN - **Ezi-SERVO**® CC-Link IE TSN
Precise Actuator System **IGS** Closed Loop Stepping System **4X**

Mitsubishi Electric Products
RD78G4(S) / RD78G8(S) / RD78G16(S)

FASTECH Products
Ezi-ROBO CC-Link IE TSN IGS
(Ezi-SERVO CC-Link IE TSN 4X)

Before you begin

- Thank you for using our company's products.
- The control unit of the Ezi-ROBO IGS is interfaced with the Ezi-SERVO CC-Link IE TSN 4X. The following connection guide is based on the Ezi-SERVO CC-Link IE TSN 4X.
- The Ezi-SERVO CC-Link IE TSN 4X is a stepping motor unit consisting of a driver equipped with a 32-bit high-performance ARM processor and various motors. It is used as a remote station on a CC-Link IE TSN network.
- The Ezi-SERVO CC-Link IE TSN 4X is an industrial product. Do not use it for any other purpose. Our company shall not be liable for any damages incurred due to non-compliance with this instruction.
- This connection guide provided by our company explains how to connect the Ezi-SERVO CC-Link IE TSN 4X to Mitsubishi Electric's MELSEC iQ-R RD78G(S). It covers CSP+ file registration, system configuration, parameter settings, and programming methods.
- Before writing the PLC program, please be sure to read this connection guide, understand its contents accurately, and use the product correctly.
- This connection guide is subject to change without notice. For the latest version, please refer to our company's CC-Link IE TSN website (<https://cltsn.fastech-motions.com/en>).

Manual Information

- The Ezi-SERVO CC-Link IE TSN 4X manual can be downloaded from the FASTECH website.

<https://cltsn.fastech-motions.com/en/download/quick>

Manual Name	Manual Number
[Manual][CC-Link IE TSN 4X][Ezi-SERVO] Closed Loop Stepping System	
[Connection Guide][MELSEC RD78G(S)] Ezi-ROBO CC-Link IE TSN IGS - Ezi-SERVO 4X	

- The MELSEC iQ-R RD78G(S) manual can be downloaded from the Mitsubishi Electric website.

<https://www.mitsubishielectric.com/fa/index.html>

Manual Name	Manual Number
MELSEC iQ-R Motion Unit User's Manual (Startup Edition)	IB-0300405
MELSEC iQ-R Motion Unit User's Manual (Network Edition)	IB-0300425
MELSEC iQ-R Motion Unit User's Manual (Simple Motion Mode Application Edition)	IB-0300571
MELSEC iQ-R Motion Unit User's Manual (Simple Motion Mode Advanced Synchronous Control Edition)	IB-0300574
GX Works3 Operating Manual	SH-081214

Terminology

- This section covers terms used in the connection guide.

Terminology	Description
CC-Link IE TSN	An open network that adopts 'TSN (Time-Sensitive Networking)', an extension of the standard Ethernet specification, enabling simultaneous processing of real-time control and information from other open networks.
Master station (Manager station)	This station manages the entire network and can perform cyclic and transient transmission with all stations. The MELSEC iQ-R RD78G(S) corresponds to this station.
Remote station	A station that performs cyclic transmission of bit-level I/O signals and word-level I/O data, also capable of transient transmission. The Ezi-SERVO CC-Link IE TSN 4X corresponds to this.
PDO	Abbreviation for Process Data Object. A collection of application objects periodically transmitted between multiple CANopen nodes.
Object	Various data held by device stations corresponding to CANopen.

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[Appendix]

[Appendix 1] Homing Method

1. Overview

1-1. Overview

- **MELSEC iQ-R RD78G(S) and Ezi-SERVO CC-Link IE TSN 4X Connection Guide**

- ◆ **Master station: RD78G(S)4 (4-axis) / RD78G(S)8 (8-axis) / RD78G(S)16 (16-axis)**

- PLCopen® Motion Control FB (Function Block)**

- Control programs can be easily written using the PLCopen Motion Control FB library, an international standard specification.
 - This program allows third parties to easily understand its contents, significantly reducing design and maintenance time.

- ◆ **Engineering software**

- GX Works3: Ver. 1.105K or later
 - Motion control setting function: Ver. 1.055H or later
- ※ For the latest files, please refer to the Mitsubishi Electric website.

(<https://www.mitsubishielectric.com/fa/download/index.html>)

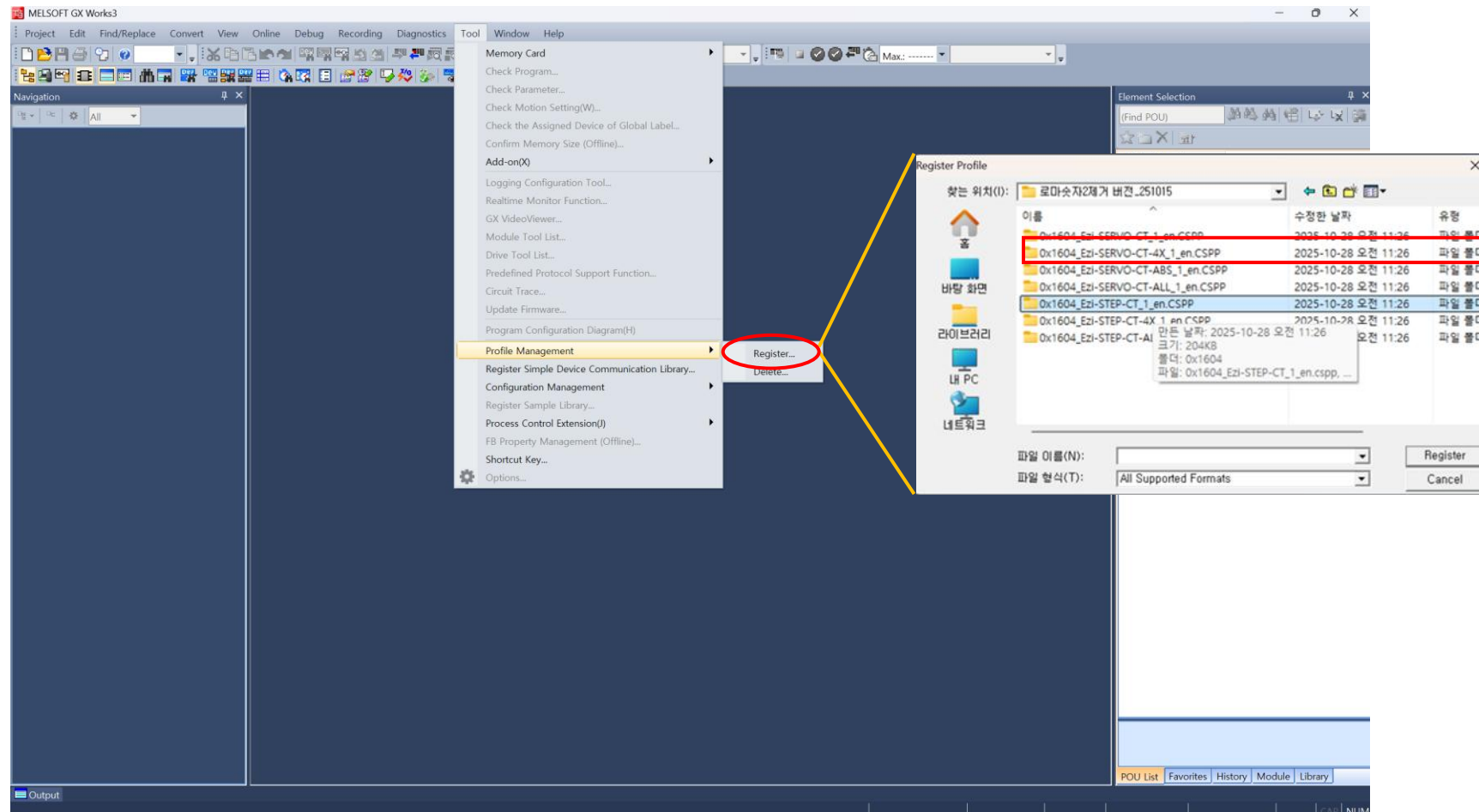
- ◆ **Remote station: Ezi-SERVO CC-Link IE TSN 4X**

- CSP+ File Download address: <https://cltsn.fastech-motions.com/en/download/quick>
 - File name: 0x1604_Ezi-SERVO-CT-4X_1_en_CSPP

1-2. Ezi-SERVO CC-Link IE TSN 4X CSP+ File Registration

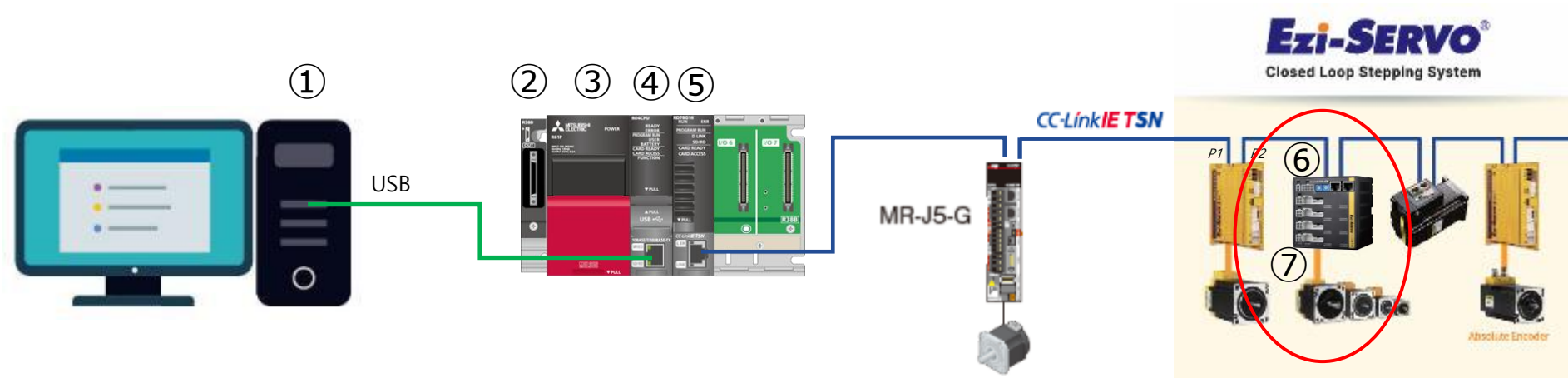
- **CSP+ Registration**

- [GX Works3] Tool / Profile Management / Register ※ Registration is only possible before opening a project.



1-3. CC-Link IE TSN Configuration

- Network Connection



Configuration		Product name	IP address
①	Engineering software	GX Works3	-
②	Main base	R33B	-
③	Power supply module	R61P	-
④	CPU module	iQ-R	
⑤	Motion module	RD78G4(S)	192.168.3.253
⑥	Driver	EzS2-CT-4X	192.168.3.1
⑦	Motor	EzM2-42S-A	-

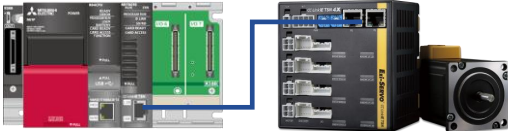
1-3. CC-Link IE TSN Configuration

- **Ezi-SERVO Specifications**

Item		Specifications
Communication protocol		CC-Link IE TSN Class B
Communication speed		1Gbps / 100Mbps
Modes of operation		CiA402 drive profile: cyclic Synchronous position Mode (CSP) / Profile position mode (PP) / Homing mode (HM)
Synchronizat ion method	Time synchronization method	IEEE1588 / IEEE802.1AS
	Communication cycle	Minimum 250 μ s
	Network synchronization communication	Synchronous Communication (CSP, PP, HM) / Asynchronous Communication (PP, HM)
Encoder type		Incremental type

1-4. Setup Sequence

- Ezi-SERVO, RD78G(S) parameter settings

No	Item	Description
1	Ezi-SERVO Settings 	Configure parameters using the driver configuration program (Ezi-CT Manager). Please download the configuration program and its usage guide from the <u>FASTECH Co., Ltd.</u> website. ※ Address: https://cltsn.fastech-motions.com/en/download/quick
2	RD78G(S) Configuration 	Create an RD78G(S) project using GX-Works3, then configure the unit parameters (communication method, connection target) and axis parameters (for motion control).
3	RD78G(S) + Ezi-SERVO Operation Verification 	Write a program to verify that the RD78G(S) and Ezi-SERVO are configured correctly. Manipulate labels to verify the motor operates normally.

1-4. Setup Sequence

● Ezi-SERVO Setup Notes

Item	Details
IP address setting	① Set using the driver's rotary switch ② Rotary Switch → Setting value: '00', IP address (Index: 2101h, Subindex: 01~04h)
Driver homing method setting	① Homing method (Index: 6098h, Subindex:00h) setting - Set homing method: '0' (default) → '33', etc. ※ Refer to [Appendix 1] Homing Method ② Home offset (Index: 607Ch, Subindex:00h) → Set to '0' Caution) Setting a value other than 0 may cause rapid acceleration or deceleration upon homing completion.
Limit stop method setting	① Limit stop method (Index:2003h, Subindex:00h) setting - 0: PP, HM → Quick stop / CSP → No stop - 1: PP, HM → Deceleration stop / CSP → Does not stop ② Setting a value other than '0' or '1' may cause '1ED0H: Drive error' when detecting the hardware stroke limit.
In-position range	① In-position range (Index:2B21h, Subindex:00h, Data type:Unsigned32) setting - Register a value within the In-position range (5 to 20000 pulses) considering the operating environment ② If [Md.102: Deviation counter value] is less than the setting value, [Md.108: Servo status 1: In-position] turns ON. As a rule, this object should not be made public. Please configure it using the servo transient transmission function of the FX5 CPU module.

1-5. Restrictions

● Motion Control Function Restrictions (RD78G(S) and Ezi-SERVO)

Item	Restriction
Speed control	Speed control is unavailable because the driver does not support cyclic synchronous speed mode (CSV).
Torque control	Torque control is not available because the driver does not support cyclic synchronous torque mode (CST).
Continuous operation to torque control	Continuous operation to torque control is only supported by MELSERVO, so continuous operation to torque control is not available.
Advanced synchronous control	You cannot set "Synchronous encoder via servo amplifier" in [Pr.320: Synchronous encoder axis type].
Torque limit function	The driver does not support the following objects, so the Torque limit function cannot be used. • Positive torque limit value (Index:60E0h, Subindex:00h) • Negative torque limit value (Index:60E1h, Subindex:00h)
Absolute position system	The encoder is of the Incremental type, so the Absolute position system cannot be used.
Virtual servo amplifier function	Emulated by MR-J5-G.
Mark detection function	[Pr.800: Mark detection signal setting] Driver's TPR1 (Touch Probe 1) cannot be used.
Optional data monitor function	When using the optional data monitor function, set the objects to monitor in [Pr.91~94: Optional data monitor: Data type setting 1~4] and [Pr.591~594: Optional data monitor: Data type expansion setting 1~4]. The default value is "0: Not set". Therefore, [Md.109~112: Optional data monitor output 1~4] will be '0'.

1-5. Restrictions

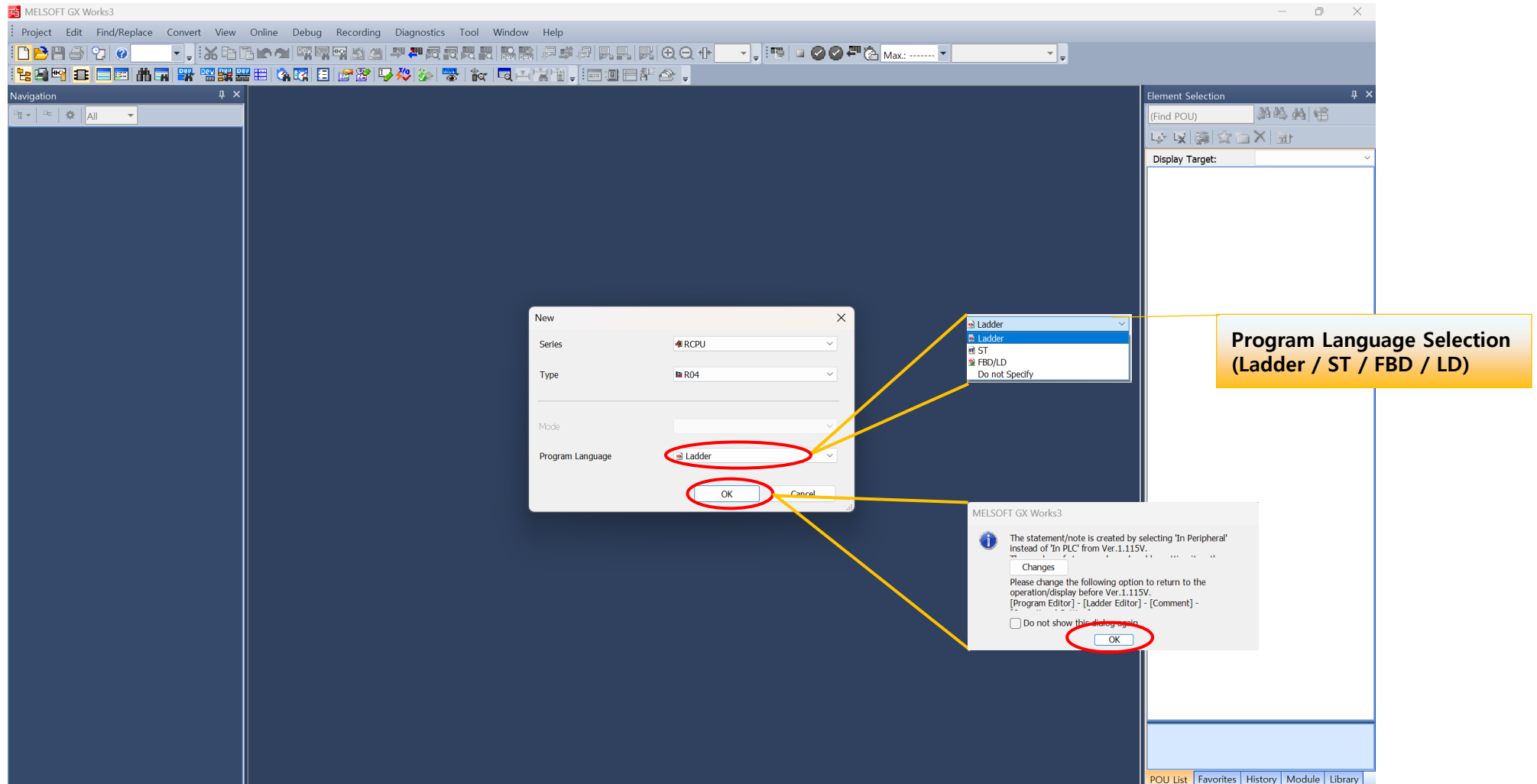
● Motion Control Function Restrictions (RD78G(S) and Ezi-SERVO)

Item	Restriction
Md.103: Motor rotation speed	Since the driver does not support 'SI unit velocity (Index:60A9h, Subindex:00h)', it outputs the motor rotation speed in pulses per second.
Md.104: Motor current value	Since the driver does not support 'Torque actual value (Index:6077h, Subindex:00h)', it always displays "0".
Md.108: Servo status 1	The following bits in the monitor data are always in the 'OFF' state. · Gain switching (b4) · Fully closed control switching (b5) · Torque limit active (b13) · Absolute position lost (b14) · Servo warning (b15)
Md.119: Servo status 2	The following bits in the monitor data are always in the 'OFF' state. · Zero point pass (b0) · Zero speed (b3) · Speed limit active (b4) · PID control active (b8)
Md.115: Servo alarm detail number	Not supported. This monitor data is always displayed as '0'.
Cd.108: Gain switching command flag	Not supported. Only MELSERVO responds to this data.
Cd.133: Semi/Fully closed loop switching request	Not supported. Only MELSERVO supports this data.
Cd.136: PI-PID switching request	Not supported. Only MELSERVO supports this data.

2. RD78G(S) Configuration

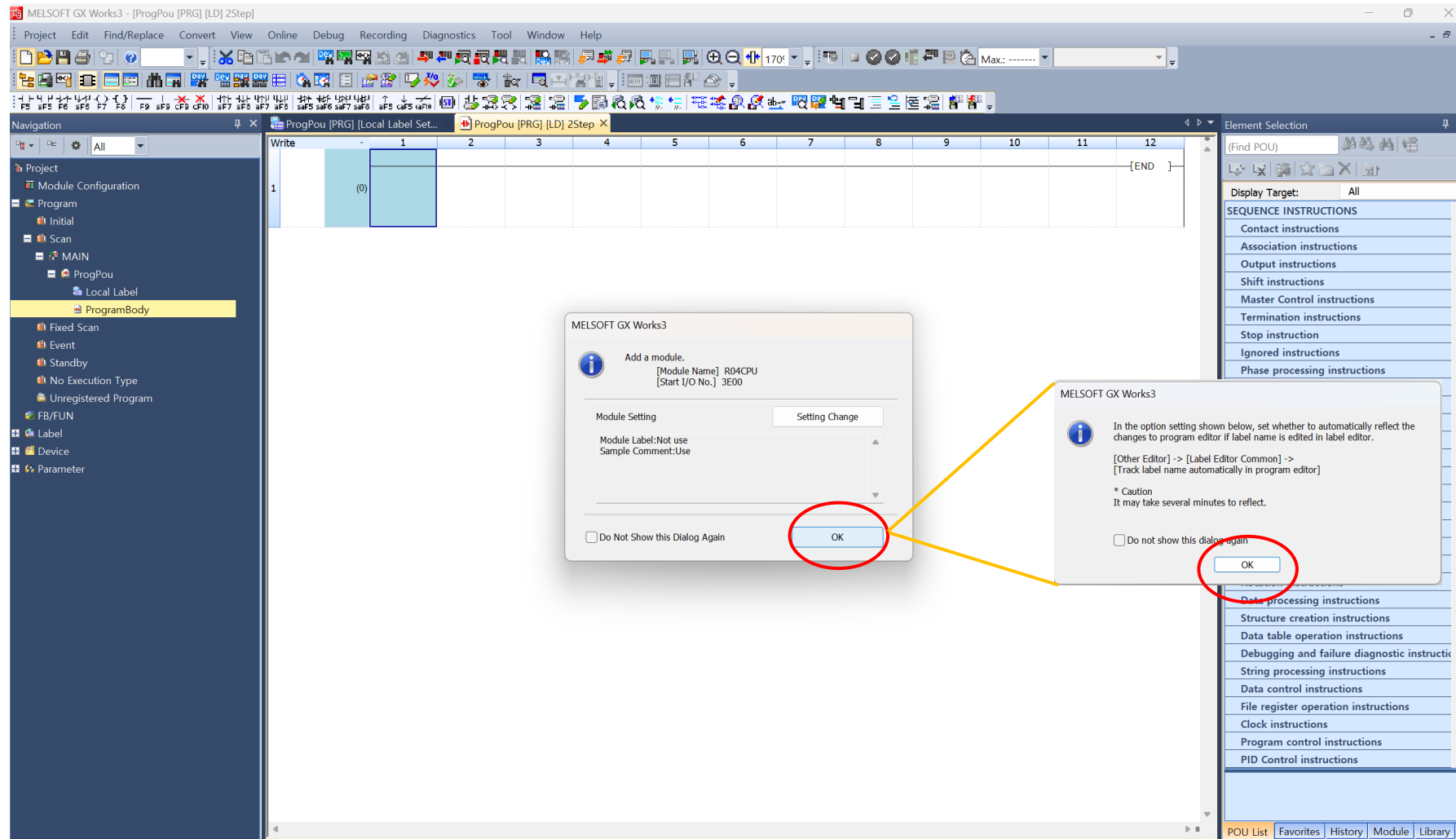
2-1. Project Creation

- When creating a new project, select iQ-R RD78G(S), model name, number of axes used, and program language



2-2. Module Registration

- iQ-R CPU Registration



2-3. Module Configuration – H/W

- Configure the Main Base, CPU Module, and Power Supply by clicking and dragging with the mouse

The screenshot shows the MELSOFT GX Works3 interface for Module Configuration. The left sidebar contains a Project tree with 'Module Configuration' selected. The main workspace is a grid where modules are placed. The right sidebar is the 'Element Selection' pane, showing a list of modules. Five numbered callouts (1-5) indicate the steps for configuration:

- 1. Main Base
- 2. Power Supply
- 3. CPU iQ-R Mounted
- 4. RD78G(S) Installed
- 5. (Unlabeled, pointing to the bottom of the grid)

A legend box in the bottom center explains the steps:

[Click & Drag]
1. Main Base
2. Power Supply
3. CPU iQ-R Mounted
4. RD78G(S) Installed

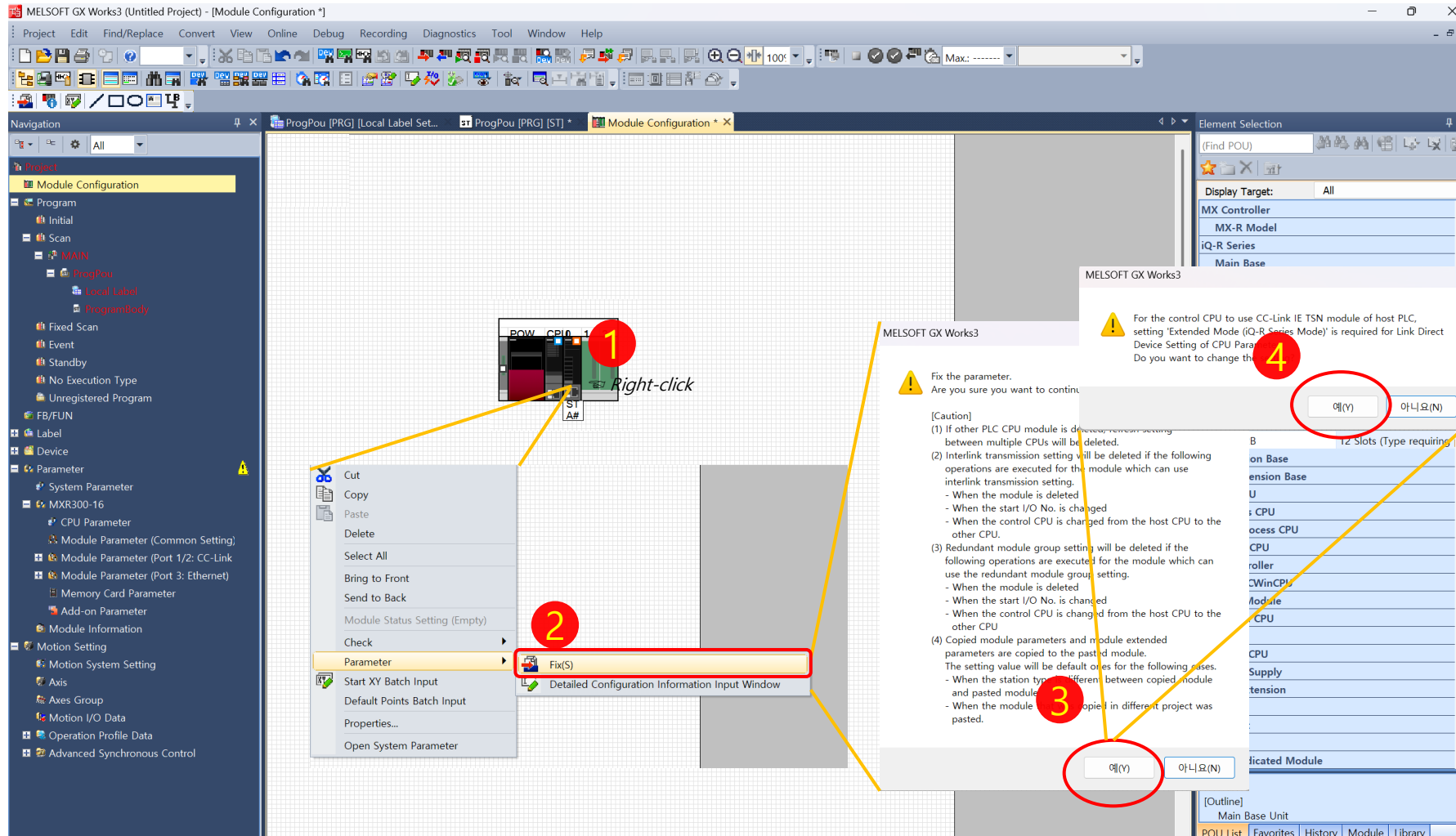
A dialog box on the left states: 'When you finish editing Module Configuration, fix the parameters to reflect to their respective functions. Do not show this dialog again. You are able to change this setting through the Options menu.' The 'OK' button is circled.

The 'Element Selection' pane on the right shows the following modules:

Module	Slots (Type requiring)
Main Base	
R32SB	2 Slots (Type requiring)
R33B	3 Slots (Type requiring)
R33SB	3 Slots (Type requiring)
R35B	5 Slots (Type requiring)
SIL2 Process CPU	
Safety CPU	
C Controller	
MELSECWinCPU	
Head Module	
Motion CPU	
NCCPU	
Robot CPU	
Power Supply	
R61SP	2.5A output (Slim type)
R62P	3.5A output
R61P	6.5A output
R63P	6.5A output
NC Dedicated Module	
Sensor Control	
Analog Input	
Analog Output	
Temperature Input	
Temperature Control Module	
Motion Module	
RD78G4	4 axes CC-Link IE TSN
RD78G4(S)	4 axes CC-Link IE TSN
RD78G8	8 axes CC-Link IE TSN
RD78G8(S)	8 axes CC-Link IE TSN
Network Module	
Blank Cover	

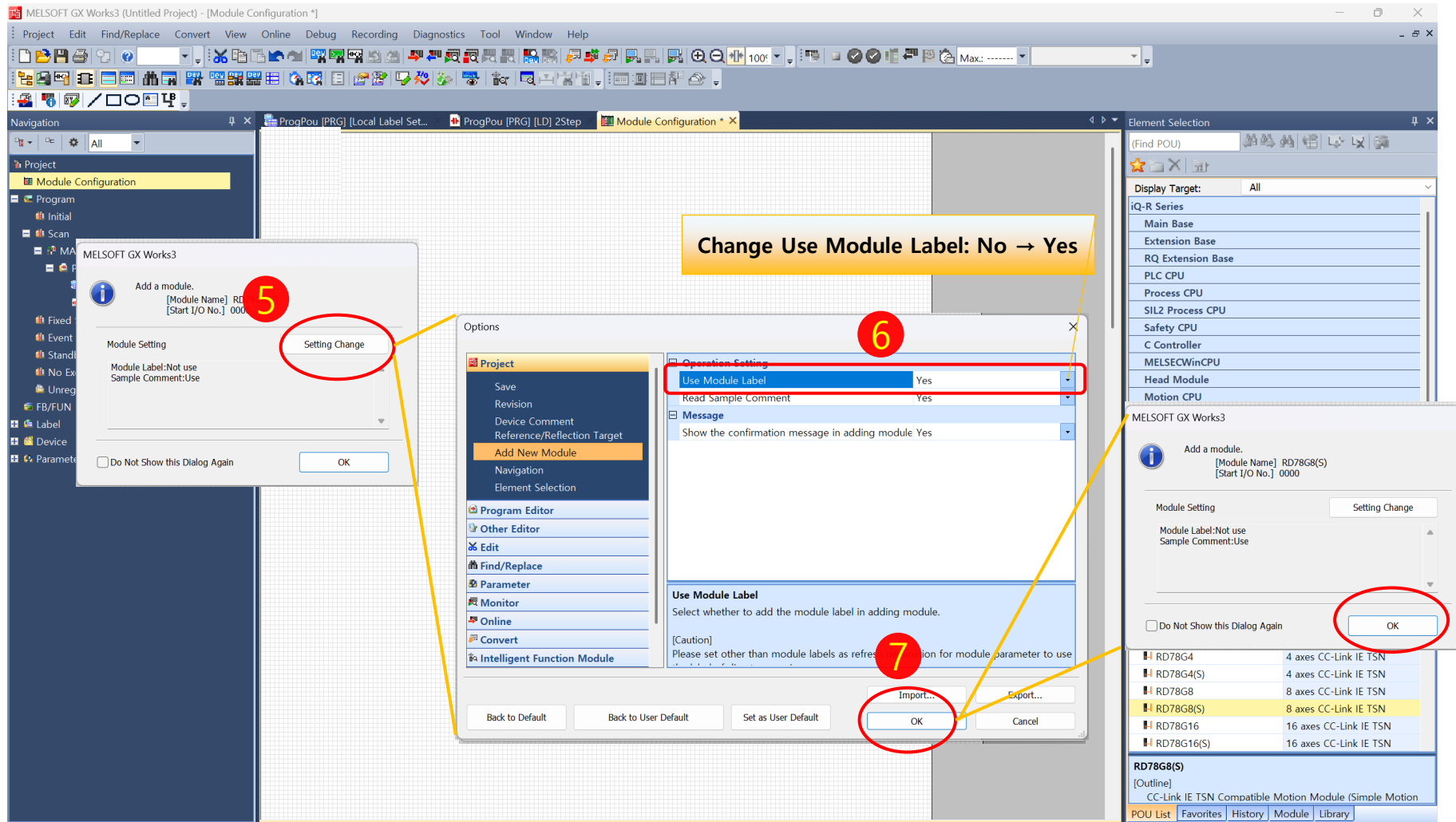
2-3. Module Configuration – H/W

- Right-click the mouse and select Fix(S) to complete module configuration (1/2)



2-3. Module Configuration – H/W

- Right-click the mouse and select Fix(S) to complete module configuration (2/2)



2-4. Parameter / Module Information / 0000:RD78G4(S)

- Station No./IP Address Setting : e.g.) IP Address → 192.168.3.253

The screenshot displays the MELSOFT GX Works3 interface for configuring a 0000:RD78G4 module. The navigation tree on the left (labeled 1) shows the 'Module Parameter (Network)' option selected. The central settings area (labeled 2) contains a table for 'Station No./IP Address Setting' with the following values:

Item	Setting
Station Type	Master Station
Network No.	1
Station No.	0
IP Address	192 . 168 . 3 . 253
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	

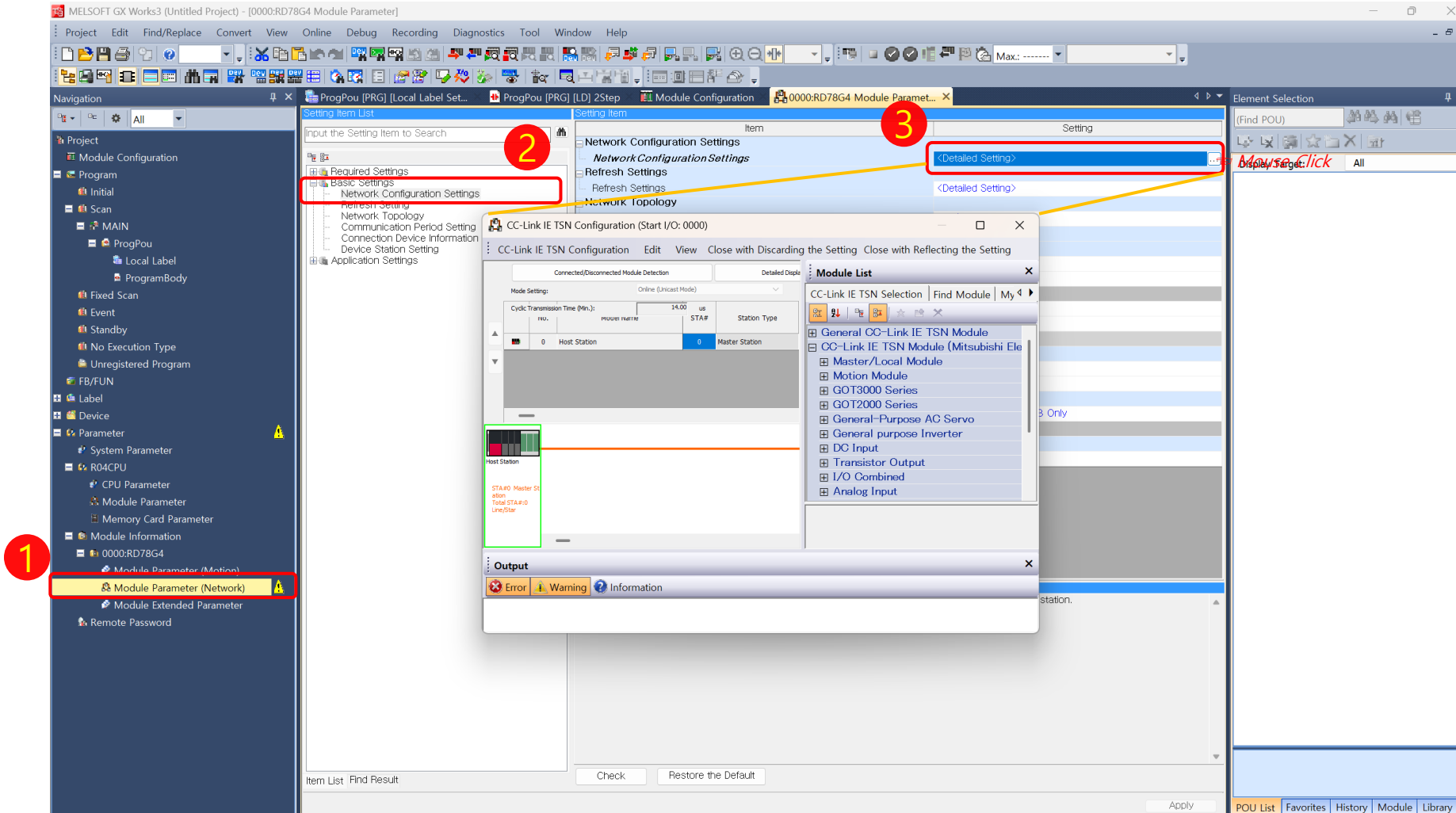
A yellow callout box (labeled 3) provides the following information:

- IP Address: 192.168.3.253
- Subnet Mask: 255.255.255.0
- ※ Note: Ezi-SERVO Default IP is 192.168.3.xxx

The 'Apply' button is located at the bottom right of the interface.

2-4. Parameter / Module Information / 0000:RD78G4(S)

● Network Configuration Settings



2-4. Parameter / Module Information / 0000:RD78G4(S)

- Configure the CC-Link IE TSN Module **manually (click & drag)**

CC-Link IE TSN Configuration (Start I/O: 0000)

CC-Link IE TSN Configuration Edit View Close with Discarding the Setting Close with Reflecting the Setting

Mode Setting: Online (Unicast Mode) Assignment Method: Detailed Display

Cycle Transmission Time (Min.)	IP Address	Subnet Mask	Station Type	Communication Period Interval (Min.)	Points	R/Wr Setting	R/Ww Setting	Parameter Automatic Setting	PDO Mapping Setting
17.00 us <td>192.168.3.253</td> <td>255.255.255.0</td> <td>Master Station</td> <td>250.00 us</td> <td></td> <td></td> <td></td> <td></td> <td></td>	192.168.3.253	255.255.255.0	Master Station	250.00 us					
0	192.168.3.1	255.255.255.0	Remote Station			16	16		<Detail Setting>

2

[Ezi-SERVO CC-Link IE TSN IP Address arbitrarily modified]

1. 192.168.3.1
2. 192.168.3.2
3. 192.168.3.3
4. 192.168.3.4

※ Power reset is required after changing the IP address

1

Mouse Click & Drag (Repeat)

Module List

- CC-Link IE TSN Selection Find Module My
- General CC-Link IE TSN Module
- CC-Link IE TSN Module (Mitsubishi Electr
- Master/Local Module
- Motion Module
- GOT3000 Series
- GOT2000 Series
- General-Purpose AC Servo
- General purpose Inverter
- DC Input
- Transistor Output
- I/O Combined
- Analog Input
- Analog Output
- EnergyMeasuringUnit
- Bridge module
- FPGA module
- CC-Link IE TSN Module (FASTECH Co. L
- BLDC Servo Drive
- Closed-loop Step Drive
- Ezi-SERVO-CT Closed-Loop
- Ezi-SERVO-CT-4X Closed-Loop
- Ezi-SERVO-CT-ABS Closed-Loop
- Ezi-SERVO-CT-ALL Closed-Loop
- Open-loop Step Drive
- Speed Control

Host Station

STA#0 Master St
Total STA#1
Line/Star

Ezi-SERVO-CT-4X

[Note] Ezi-SERVO CC-Link IE TSN 4X IP Address Configuration Hexadecimal Rotary Switch

P2 P1 X16 X1

FASTTECH Co., Ltd
[Station Type]
Remote Station

2-4. Parameter / Module Information / 0000:RD78G4(S)

- PDO Mapping Settings are automatically assigned and configured as follows.

■ TPDO

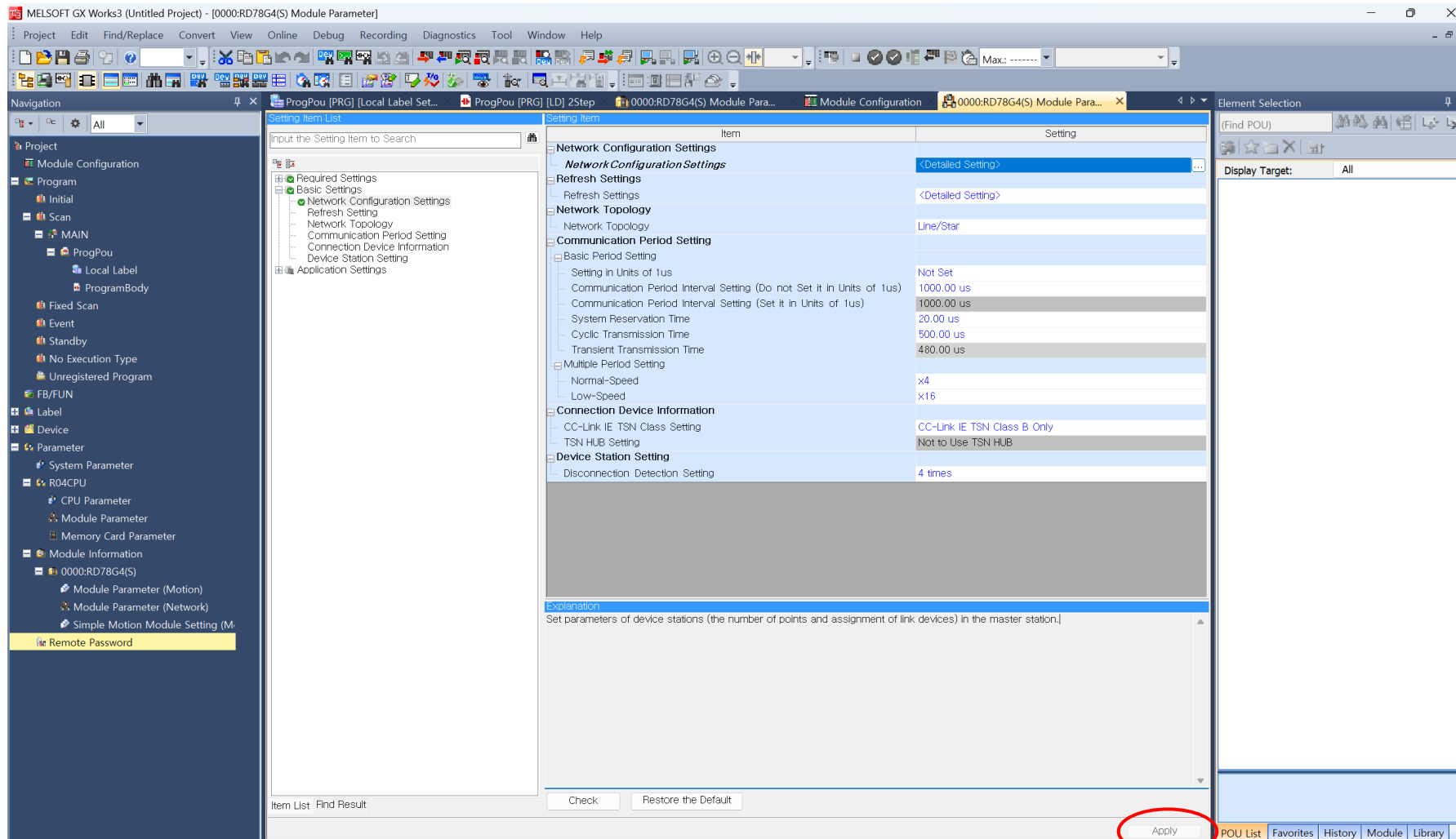
Index	Sub index	Data Type	Content
1D02	01	U16	Watchdog counter UL 1
6061	00	I8	Modes of operation display
0000	00	U8	GAP
6064	00	I32	Position Actual Value
60F4	00	I32	Following error actual value
6041	00	U16	Status word
2B12	00	U16	Status DO 1
603F	00	U16	Error code
60FD	00	U32	Digital inputs
0000	00	U32	GAP
0000	00	U32	GAP

■ RPDO

Index	Sub index	Data Type	Content
1D01	01	U16	Watchdog counter DL 1
6060	00	I8	Modes of operation
0000	00	U8	GAP
607A	00	I32	Target position
6040	00	U16	Controlword
2B02	00	U16	Control DI 5
0000	00	U32	GAP
0000	00	U32	GAP
0000	00	U32	GAP
0000	00	U32	GAP

2-4. Parameter / Module Information / 0000:RD78G4(S)

- Apply Network Configuration Settings



2-4. Parameter / Module Information / 0000:RD78G4(S)

- Running the Simple Motion Module Setting Program

1

The screenshot displays the MELSOFT GX Works3 interface. On the left, the 'Navigation' pane shows a tree structure under '0000:RD78G4(S)' with 'Simple Motion Module Setting (M)' highlighted. A yellow arrow points from this item to the 'Simple Motion Module Setting Function' window. The window has a 'Display Filter' set to 'Display All' and shows a table of parameters for 'Electronic Gear Setting'. The table has columns for 'Item', 'Axis #1', 'Axis #2', 'Axis #3', and 'Axis #4'. The parameters are categorized into 'Common parameters', 'Servo network composition parameters', and 'Basic parameters 1'. The 'Common parameters' section includes 'Pr. 82: Forced stop valid/invalid selection' (set to 1: Invalid) and 'Pr. 152: Maximum number of control axes' (set to 0). The 'Servo network composition parameters' section includes 'Connected device' (No Setting), 'Pr. 141: IP address' (No Setting), 'Pr. 142: Multidrop number' (0), and 'Pr. 101: Virtual servo amplifier setting' (0: Use Real Servo Amplifier). The 'Basic parameters 1' section includes 'Set according to the machine and applicable motor when system is started up (It will be valid according to PLC ready signal)'.

Item	Axis #1	Axis #2	Axis #3	Axis #4
Common parameters The parameter does not rely on axis and relate to the whole system.				
Pr. 82: Forced stop valid/invalid selection	1: Invalid			
Pr. 152: Maximum number of control axes	0			
Pr. 156: Manual pulse generator smoothing time constant	0 ms			
Servo network composition parameters Set the device to be used and the network according to the system configuration. (It will be valid after the power supply ON or PLC CPU reset.)				
Connected device	No Setting	No Setting	No Setting	No Setting
Pr. 141: IP address	No Setting	No Setting	No Setting	No Setting
Pr. 142: Multidrop number	0	0	0	0
Pr. 101: Virtual servo amplifier setting	0: Use Real Servo Amplifier	0: Use Real Servo Amplifier	0: Use Real Servo Amplifier	0: Use Real Servo Amplifier
Basic parameters 1 Set according to the machine and applicable motor when system is started up (It will be valid according to PLC ready signal).				

2-5. Simple Motion Module Setting

- Parameter / Servo network composition parameters / Pr.141: IP address setting

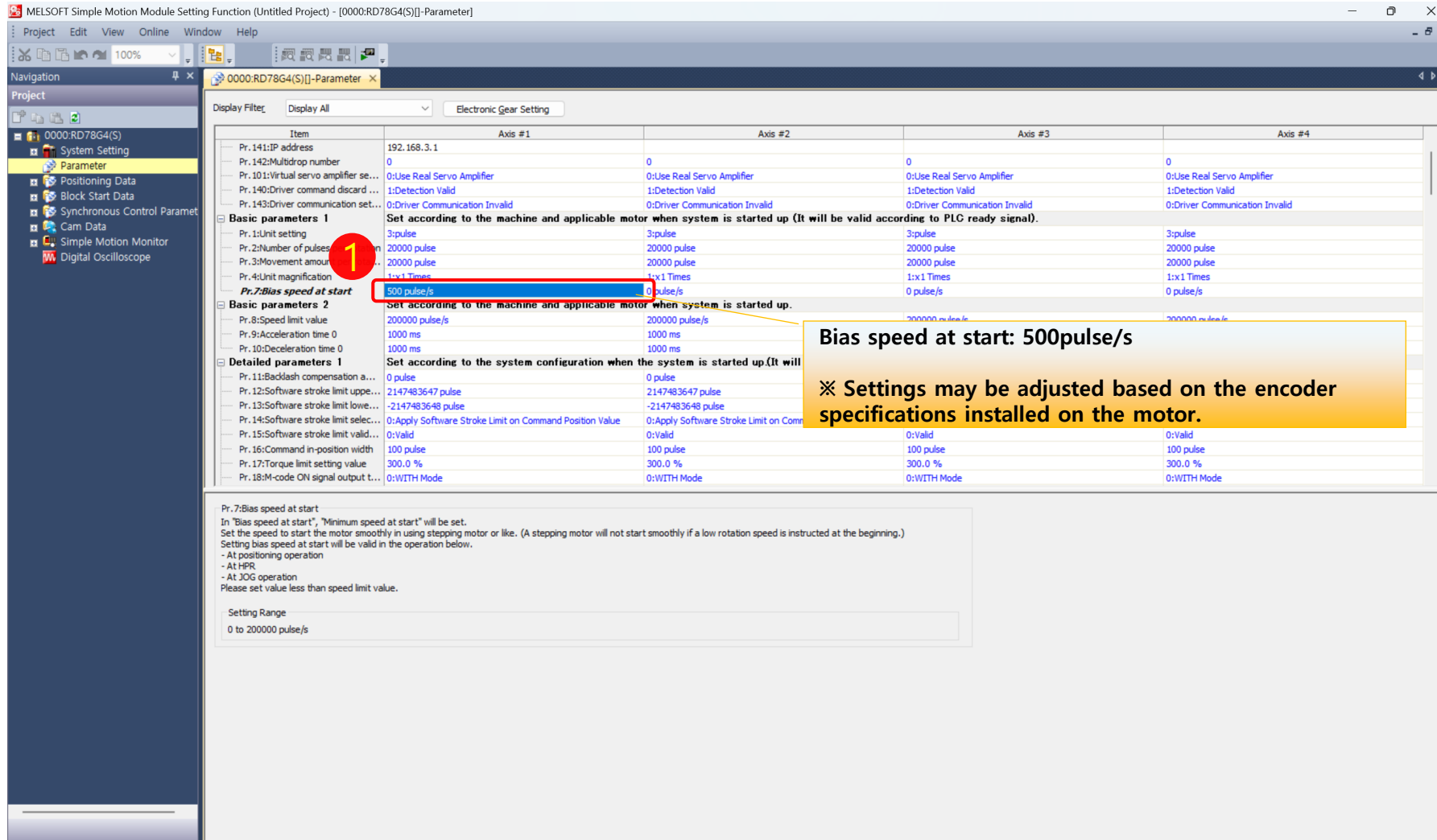
The screenshot displays the MELSOFT Simple Motion Module Setting Function interface. The left sidebar shows the project structure, with 'Parameter' selected under '0000:RD78G4(S)'. The main window shows the 'Servo network composition parameters' section, which includes a table for setting parameters for Axis #1, Axis #2, Axis #3, and Axis #4. A red box highlights 'Pr.141:IP address' in the left sidebar. A yellow arrow points from this box to a 'Station Address Setting' dialog box. In the dialog box, the 'IP Address' field is highlighted with a red box and contains the value '192.168.3.1'. The 'OK' button is also circled in red.

Item	Axis #1	Axis #2	Axis #3	Axis #4
Common parameters	The parameter does not rely on axis and relate to the whole system.			
Pr.82:Forced stop valid/invalid selection	1:Invalid			
Pr.152:Maximum number of control axes	0			
Pr.156:Manual pulse generator smoothing time constant	0 ms			
Servo network composition parameters	Set the device to be used and the network according to the system configuration. (It will be valid after the power supply ON or PLC CPU reset.)			
Connected device	No Setting	No Setting	No Setting	No Setting
Pr.141:IP address				
Pr.142:Port number	0			
Pr.101:Virtual servo amplifier setting	0:Use Real Servo			
Pr.140:Driver command discard detection setting	1:Detection Valid			
Pr.143:Driver communication setting	0:Driver Commun			
Basic parameters 1	Set according			
Pr.1:Unit setting	3:pulse			
Pr.2:Number of pulses per rotation	20000 pulse			
Pr.3:Movement amount per rotation	20000 pulse			
Pr.4:Unit magnification	1x1 Times			
Pr.7:Bias speed at start	0 pulse/s			
Basic parameters 2	Set according			
Pr.8:Speed limit value	200000 pulse/s			

Pr.141:IP address
Set the network address of device station by string.
Describe it in the format of XXX.XXX.XXX.XXX in decimal.
[Setting Range]
0.0.0.1 to 223.255.255.254

2-5. Simple Motion Module Setting

- Parameter / Basic parameters 1 / Pr.7:Bias speed at start(500pulse/s) Setting



MELSOFT Simple Motion Module Setting Function (Untitled Project) - [0000:RD78G4(S)]-Parameter

Project Edit View Online Window Help

Navigation 100%

Project

- 0000:RD78G4(S)
- System Setting
- Parameter
- Positioning Data
- Block Start Data
- Synchronous Control Parameter
- Cam Data
- Simple Motion Monitor
- Digital Oscilloscope

Display Filter Display All Electronic Gear Setting

Item	Axis #1	Axis #2	Axis #3	Axis #4
Pr. 141:IP address	192.168.3.1			
Pr. 142:Multidrop number	0	0	0	0
Pr. 101:Virtual servo amplifier se...	0:Use Real Servo Amplifier	0:Use Real Servo Amplifier	0:Use Real Servo Amplifier	0:Use Real Servo Amplifier
Pr. 140:Driver command discard ...	1:Detection Valid	1:Detection Valid	1:Detection Valid	1:Detection Valid
Pr. 143:Driver communication set...	0:Driver Communication Invalid	0:Driver Communication Invalid	0:Driver Communication Invalid	0:Driver Communication Invalid
Basic parameters 1	Set according to the machine and applicable motor when system is started up (It will be valid according to PLC ready signal).			
Pr. 1:Unit setting	3:pulse	3:pulse	3:pulse	3:pulse
Pr. 2:Number of pulses	20000 pulse	20000 pulse	20000 pulse	20000 pulse
Pr. 3:Movement amount	20000 pulse	20000 pulse	20000 pulse	20000 pulse
Pr. 4:Unit magnification	1:x1 Times	1:x1 Times	1:x1 Times	1:x1 Times
Pr. 7:Bias speed at start	500 pulse/s	0 pulse/s	0 pulse/s	0 pulse/s
Basic parameters 2	Set according to the machine and applicable motor when system is started up.			
Pr. 8:Speed limit value	200000 pulse/s	200000 pulse/s	200000 pulse/s	200000 pulse/s
Pr. 9:Acceleration time 0	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 10:Deceleration time 0	1000 ms	1000 ms	1000 ms	1000 ms
Detailed parameters 1	Set according to the system configuration when the system is started up.(It will be valid according to PLC ready signal).			
Pr. 11:Backlash compensation a...	0 pulse	0 pulse	0 pulse	0 pulse
Pr. 12:Software stroke limituppe...	2147483647 pulse	2147483647 pulse	2147483647 pulse	2147483647 pulse
Pr. 13:Software stroke limit lowe...	-2147483648 pulse	-2147483648 pulse	-2147483648 pulse	-2147483648 pulse
Pr. 14:Software stroke limit selec...	0:Apply Software Stroke Limit on Command Position Value	0:Apply Software Stroke Limit on Command Position Value	0:Apply Software Stroke Limit on Command Position Value	0:Apply Software Stroke Limit on Command Position Value
Pr. 15:Software stroke limit valid...	0:Valid	0:Valid	0:Valid	0:Valid
Pr. 16:Command in-position width	100 pulse	100 pulse	100 pulse	100 pulse
Pr. 17:Torque limit setting value	300.0 %	300.0 %	300.0 %	300.0 %
Pr. 18:M-code ON signal output t...	0:WITH Mode	0:WITH Mode	0:WITH Mode	0:WITH Mode

Pr. 7:Bias speed at start
In "Bias speed at start", "Minimum speed at start" will be set.
Set the speed to start the motor smoothly in using stepping motor or like. (A stepping motor will not start smoothly if a low rotation speed is instructed at the beginning.)
Setting bias speed at start will be valid in the operation below.
- At positioning operation
- At HPR
- At JOG operation
Please set value less than speed limit value.

Setting Range
0 to 200000 pulse/s

Bias speed at start: 500pulse/s

※ Settings may be adjusted based on the encoder specifications installed on the motor.

2-5. Simple Motion Module Setting

- Parameter / HPR parameters / Pr.46:HPR speed (500 pulses/s) setting

MELSOFT Simple Motion Module Setting Function (Untitled Project) - [0000:RD78G4(S)]-Parameter

Navigation: Project, Edit, View, Online, Window, Help

Display Filter: Display All | Electronic Gear Setting

Item	Axis #1	Axis #2	Axis #3	Axis #4
Pr.41:Allowable circular interpol...	100 pulse	100 pulse	100 pulse	100 pulse
Pr.42:External command functio...	0:External Positioning Start	0:External Positioning Start	0:External Positioning Start	0:External Positioning Start
Pr.83:Speed control 10x multipl...	0:Invalid	0:Invalid	0:Invalid	0:Invalid
Pr.84:Restart allowable range w...	0 pulse	0 pulse	0 pulse	0 pulse
Pr.90:Operation setting for SPD...	0:Command Torque	0:Command Torque	0:Command Torque	0:Command Torque
Pr.90:Operation setting for SPD...	0:Command Speed	0:Command Speed	0:Command Speed	0:Command Speed
Pr.90:Operation setting for SPD...	0:Check the Switching Conditions on the Simple Motion Module	0:Check the Switching Conditions on the Simple Motion Module	0:Check the Switching Conditions on the Simple Motion Module	0:Check the Switching Conditions on the Simple Motion Module
Pr.127:Speed limit value input s...	0:Input Enable	0:Input Enable	0:Input Enable	0:Input Enable
Pr.95:External command signal s...	0:Not Used	0:Not Used	0:Not Used	0:Not Used
Pr.112:Servo OFF command val...	0:Servo OFF Command Invalid	0:Servo OFF Command Invalid	0:Servo OFF Command Invalid	0:Servo OFF Command Invalid
Pr.122:Manual pulse generator ...	0:Do Not Execute Speed Limit	0:Do Not Execute Speed Limit	0:Do Not Execute Speed Limit	0:Do Not Execute Speed Limit
Pr.123:Manual pulse generator ...	20000 pulse/s	20000 pulse/s	20000 pulse/s	20000 pulse/s
HPR parameters	Set the parameters required for HPR, which are not set on the driver (servo amplifier) side (Valid when the PLC ready signal is ON).			
Pr.44:HPR direction	0:Forward Direction (Address Increase Direction)	0:Forward Direction (Address Increase Direction)	0:Forward Direction (Address Increase Direction)	0:Forward Direction (Address Increase Direction)
Pr.45:HP address	0 pulse	0 pulse	0 pulse	0 pulse
Pr.46:HPR speed	500 pulse/s	1 pulse/s	1 pulse/s	1 pulse/s
Pr.51:HPR acceleration time sele...	0:1000	0:1000	0:1000	0:1000
Pr.52:HPR deceleration time sel...	0:1000	0:1000	0:1000	0:1000
Pr.55:Operation setting for inco...	0:Positioning Control is Not Executed	0:Positioning Control is Not Executed	0:Positioning Control is Not Executed	0:Positioning Control is Not Executed
External input signal assign...	Set the link device to assign external input signal.			
Forced stop signal	Set the link device to assign forced stop signal.			
Pr.900:Type	00h:Invalid			
Pr.901:Start No.	H0000			
Pr.902:Bit specification	H0			

Pr.46:HPR speed
Set the speed at high-speed home position return.
The speed at machine home position return depends on the servo amplifier setting.

Setting Range
1 to 200000 pulse/s

HPR speed: 500pulse/s

※ If the HPR speed (Pr.46) value is greater than the Bias speed (Pr.7) value, (1C15H: Homing Speed Error) will occur.

2-5. Simple Motion Module Setting

- Parameter / Basic parameters 1 / Number of pulses per rotation

The screenshot displays the MELSOFT Simple Motion Module Setting Function (Untitled Project) - [0000:RD78G8(S)]-Parameter window. The left sidebar shows the project tree with 'Parameter' selected. The main window is divided into two panes: 'Common parameters' and 'Electronic Gear Setting - Axis #1'.

Common parameters:

- Pr. 1: Unit setting: 3:pulse
- Pr. 2: Number of pulses per rotation: 10000 pulse (highlighted with a red box and a red circle with the number 1)
- Pr. 3: Movement amount per rotation: 10000 pulse
- Pr. 4: Unit magnification: 1x1 Times
- Pr. 7: Bias speed at start: 500 pulse/s
- Pr. 8: Speed limit value: 200000 pulse/s
- Pr. 9: Acceleration time: 1000 ms
- Pr. 10: Deceleration time: 1000 ms
- Pr. 11: Backlash compensation amount: 0 pulse
- Pr. 12: Software stroke limit upper limit value: 2147483647 pulse
- Pr. 13: Software stroke limit lower limit value: -2147483648 pulse
- Pr. 14: Software stroke limit selection: 0:Apply Software Stroke Limit on Command Position Value
- Pr. 15: Software stroke limit valid/invalid setting: 0:Valid
- Pr. 16: Command in-position width: 100 pulse
- Pr. 17: Torque limit setting value: 300.0 %
- Pr. 18: M-code ON signal output timing: 0:WITH Mode
- Pr. 19: Speed switching mode: 0:Standard Speed Switching Mode
- Pr. 20: Interpolation speed designation method: 0:Vector Speed
- Pr. 21: Command position value during speed control: 0:Not Update of Command Position Value
- Pr. 22: Inout signal logic selection: 0:Negative Logic

Electronic Gear Setting - Axis #1:

The 'Entry' tab is selected. The 'Machine Components' dropdown is set to 'Others'. The 'Unit Setting' is '3:pulse'. The 'Movement Amount per Load Rotation (dSL)' is '10000 [pulse]' (highlighted with a red circle with the number 2). The 'Encoder Resolution' is '10000 [pulse]' (highlighted with a red circle with the number 3). The 'Reduction Ratio (NL/NM)' is '1 / 1'. The 'Calculate Electronic Gear' button is highlighted with a red circle with the number 4.

Calculation Result:

* Basic Parameters 1	Unit Setting
Unit Setting	3:pulse
Number of Pulses per Rotation	10000 pulse
Movement Amount per Rotation	10000 pulse
Unit Magnification	1x1 Times

The 'Movement Amount per Pulse' is calculated as 1.0000 pulse. The 'Error Calculation' is 0 [pulse]. The 'OK' button is highlighted with a red circle with the number 5.

Annotations:

- 1: Pr. 2: Number of pulses per rotation
- 2: Movement Amount per Load Rotation (dSL): 10,000pulse
- 3: Encoder Resolution: 10,000 pulses
- 4: Calculate Electronic Gear
- 5: OK button

Checklist:

- ✓ Movement Amount per Load Rotation (dSL): 10,000pulse
- ✓ Encoder Resolution: 10,000 pulses

2-5. Simple Motion Module Setting

- Parameter / HPR parameters / Pr.46:HPR speed (500 pulses/s) setting

The screenshot shows the MELSOFT Simple Motion Module Setting Function software. The 'Parameter' window is open, displaying the 'Basic parameters 1' section. A red circle highlights 'Pr.2: Number of pulses per rotation' with the value '10000 pulse'. The 'Electronic Gear Setting' window is also open, showing the 'Entry' tab. It displays 'Machine Components: Others', 'Unit Setting: 3:pulse', 'Movement Amount per Load Rotation (dSL): 10000 [pulse]', and 'Reduction Ratio (NL/NM): 1 / 1'. A yellow callout box points to the 'Reduction Ratio' field with the text: 'HPR speed: 500pulse/s. ※ If the HPR speed (Pr.46) value is greater than the Bias speed (Pr.7) value, (1C15H: Homing Speed Error) will occur.' The 'Calculate Electronic Gear' button is visible, and the 'Calculation Result' section shows the calculated values.

Pr.2: Number of pulses per rotation
Set the number of pulses required for a complete rotation of the motor shaft.
Set it taking the electronic gear of the servo amplifier into consideration.
Number of pulses per rotation (AP) = Encoder resolution x Electronic gear denominator / Electronic gear numerator

When the encoder resolution is 67108864 pulses, the electronic gear (numerator / denominator) of the servo amplifier is rewritten with 16/1 inside RD78G(S).
Therefore, set the number of pulses per rotation (AP) as 4194304 pulses in such a case.

"Electronic gear function" coordinates the output pulses calculated from the values set as the pulses per rotation and the movement amount per rotation with the actual movement amount of a machine.
Using the electronic gear setting allows users to configure the electronic gear easily.

Setting Range
1 to 200000000 pulse

Electronic Gear Setting - Axis #1
Entry
Select the machine components, and enter the machine data to automatically set the basic parameters 1 (unit setting, number of pulses per rotation, movement amount per rotation and unit magnification).

Machine Components: Others
Unit Setting: 3:pulse
Movement Amount per Load Rotation (dSL): 10000 [pulse]
Reduction Ratio (NL/NM): 1 / 1

☐ Calculate reduction ratio by teeth or diameters Reduction Ratio Setting
Encoder Resolution: 10000 [pulse/rev]
Setting Range

When the encoder resolution is 67108864 pulses, the electronic gear (numerator / denominator) of the servo amplifier is rewritten with 16/1.
Therefore, set the encoder resolution as 4194304 pulses.

Calculation Result

* Basic Parameters 1	Unit Setting	3:pulse
Number of Pulses per Rotation	10000 pulse	
Movement Amount per Rotation	10000 pulse	
Unit Magnification	1x1 Times	

Movement Amount per Pulse

As a result of calculation, no error occurs in the movement amount.
Applying the calculation result above,
you want to perform is about 0 [pulse] the error for the movement amount 0 [pulse] Error Calculation

Click OK to reflect to the basic parameters 1.

OK Cancel

2-5. Simple Motion Module Setting

- Parameter / Basic parameters 2 / Speed limit value, Acceleration time 0, Deceleration time 0

MELSOFT Simple Motion Module Setting Function (Untitled Project) - [0000:RD78G8(S)]-Parameter

Navigation: Project, Edit, View, Online, Window, Help

Display Filter: Display All | Electronic Gear Setting

Project: 0000:RD78G8(S) | 0000:RD78G8(S)]-Parameter | 0000:RD78G8(S)]-Axis #1 Posit...

Common parameters
The parameter does not rely on axis and relate to the whole system.
Pr.82: Forced stop valid/invalid selection: 1: Invalid
Pr.152: Maximum number of control axes: 0
Pr.156: Manual pulse generator smoothing time constant: 0 ms

Servo network composition parameters
Set the device to be used and the network according to the system configuration. (It will be valid after the power supply ON or PLC CPU reset.)
Connected device: Ezi-SERVO-CT | Ezi-SERVO-CT
Pr.141: IP address: 192.168.3.1 | 192.168.3.50
Pr.142: Multidrop number: 0
Pr.101: Virtual servo amplifier setting: 0: Use Real Servo Amplifier | 0: Use Real Servo Amplifier
Pr.140: Driver command discard detection setting: 1: Detection Valid | 1: Detection Valid
Pr.143: Driver communication setting: 0: Driver Communication Invalid | 0: Driver Communication Invalid

Basic parameters 1
Set according to the machine and applicable motor when system is started up.
Pr.1: Unit setting: 3: pulse
Pr.2: Number of pulses per rotation: 10000 pulse | 20000 pulse
Pr.3: Movement amount per rotation: 10000 pulse | 20000 pulse
Pr.4: Unit magnification: 1: x1 Times | 1: x1 Times
Pr.7: Bias speed at start: 500 pulse/s | 500 pulse/s

Basic parameters 2
Set according to the machine and applicable motor when system is started up.
Pr.8: Speed limit value: 500000 pulse/s
Pr.9: Acceleration time 0: 200 ms
Pr.10: Deceleration time 0: 200 ms

Detained parameters 1
Set according to the system configuration when the system is started up. (It will be valid according to PLC ready signal)
Pr.11: Backlash compensation amount: 0 pulse
Pr.12: Software stroke limit upper limit value: 2147483647 pulse
Pr.13: Software stroke limit lower limit value: -2147483648 pulse
Pr.14: Software stroke limit selection: 0: Apply Software Stroke Limit on Command Position Value | 0: Apply Software Stroke Limit on Command Position Value
Pr.15: Software stroke limit valid/invalid setting: 0: Valid | 0: Valid
Pr.16: Command in-position width: 100 pulse
Pr.17: Torque limit setting value: 300.0 %
Pr.18: M-code ON signal output timing: 0: WITH Mode
Pr.19: Speed switching mode: 0: Standard Speed Switching Mode
Pr.20: Interpolation speed designation method: 0: Vector Speed
Pr.21: Command position value during speed control: 0: Not Update of Command Position Value
Pr.22: Inout signal logic selection: Lower limit: 0: Neactive Logic

Pr.8: Speed limit value
Set the maximum speed during positioning, HPR, and speed/torque operations.
Setting Range: 1 to 1000000000 pulse/s

Speed limit value graph
The graph shows Speed vs Time. It illustrates the acceleration phase (Acceleration time 0) and the deceleration phase (Deceleration time 0). The speed limit value is indicated by a horizontal line.

- ✓ Pr8 : Speed limit value → 500,000 (For encoders with 10,000 pulses)
- ✓ Pr9 : Acceleration time 0 → 200ms (Ezi-SERVO also supports 100ms)
- ✓ Pr10: Deceleration time 0 → 200ms (Ezi-SERVO also supports 100ms)

2-5. Simple Motion Module Setting

- Convert / Rebuild All

MELSOFT Simple Motion Module Setting Function (Untitled Project) - [0000:RD78G8(S)]-Parameter

Project Edit View Online Window Help

Navigation 100%

Project

- 0000:RD78G8(S)
- System Setting
- Parameter
- Positioning Data
 - Axis #1 Positioning Data
 - Axis #2 Positioning Data
 - Axis #3 Positioning Data
 - Axis #4 Positioning Data
 - Axis #5 Positioning Data
 - Axis #6 Positioning Data
 - Axis #7 Positioning Data
 - Axis #8 Positioning Data
- Block Start Data
- Synchronous Control Parameter
- Cam Data
- Simple Motion Monitor
- Digital Oscilloscope

Display Filter Display All Electronic Gear Setting

Item	Axis #1	Axis #2	Axis #3	Axis #4
Pr. 13:Software stroke limit lower limit value	-2147483648 pulse	-2147483648 pulse	-2147483648 pulse	-2147483648 pulse
Pr. 14:Software stroke limit selection	0:Apply Software Stroke Limit on Command Position Value	0:Apply Software Stroke Limit on Command Position Value	0:Apply Software Stroke Limit on Command Position Value	0:Apply Software Stroke Limit on Command Position Value
Pr. 15:Software stroke limit valid/invalid setting	0:Valid	0:Valid	0:Valid	0:Valid
Pr. 16:Command in-position width	100 pulse	100 pulse	100 pulse	100 pulse
Pr. 17:Torque limit setting value	300.0 %	300.0 %	300.0 %	300.0 %
Pr. 18:M-code ON signal output timing	0:WITH Mode	0:WITH Mode	0:WITH Mode	0:WITH Mode
Pr. 19:Speed switching mode	0:Standard Speed Switching Mode	0:Standard Speed Switching Mode	0:Standard Speed Switching Mode	0:Standard Speed Switching Mode
Pr. 20:Interpolation speed designation method	0:Vector Speed	0:Vector Speed	0:Vector Speed	0:Vector Speed
Pr. 21:Command position value during speed control	0:Not Update of Command Position Value	0:Not Update of Command Position Value	0:Not Update of Command Position Value	0:Not Update of Command Position Value
Pr. 22:Input signal logic selection : Lower limit	0:Negative Logic	0:Negative Logic	0:Negative Logic	0:Negative Logic
Pr. 22:Input signal logic selection : Upper limit	0:Negative Logic	0:Negative Logic	0:Negative Logic	0:Negative Logic
Pr. 22:Input signal logic selection : Stop signal	0:Negative Logic	0:Negative Logic	0:Negative Logic	0:Negative Logic
Pr. 22:Input signal logic selection : External command/switching signal	0:Negative Logic	0:Negative Logic	0:Negative Logic	0:Negative Logic
Pr. 22:Input signal logic selection : Proximity dog signal	0:Negative Logic	0:Negative Logic	0:Negative Logic	0:Negative Logic
Pr. 81:Speed-position function selection	0:Speed-position Switching Control (PMC Mode)	0:Speed-position Switching Control (PMC Mode)	0:Speed-position Switching Control (PMC Mode)	0:Speed-position Switching Control (PMC Mode)
Pr. 116:FLS signal selection : Input type	15:Invalid	15:Invalid	1:Servo Amplifier	1:Servo Amplifier
Pr. 117:RLS signal selection : Input type	15:Invalid	15:Invalid	1:Servo Amplifier	1:Servo Amplifier
Pr. 118:DOG signal selection : Input type	15:Invalid	15:Invalid	1:Servo Amplifier	1:Servo Amplifier
Pr. 119:STOP signal selection : Input type	2:Buffer Memory	2:Buffer Memory	2:Buffer Memory	2:Buffer Memory
Detailed parameters 2	Set according to the system configuration when the system is started up(Set as required).			
Pr. 25:Acceleration time 1	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 26:Acceleration time 2	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 27:Acceleration time 3	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 28:Deceleration time 1	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 29:Deceleration time 2	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 30:Deceleration time 3	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 31:JOG speed limit value	20000 pulse/s	20000 pulse/s	20000 pulse/s	20000 pulse/s
Pr. 32:JOG operation acceleration time selection	0:200	0:200	0:1000	0:1000
Pr. 33:JOG operation deceleration time selection	0:200	0:200	0:1000	0:1000
Pr. 34:Acceleration/deceleration process selection	0:Trapezoidal Acceleration/Deceleration Process	0:Trapezoidal Acceleration/Deceleration Process	0:Trapezoidal Acceleration/Deceleration Process	0:Trapezoidal Acceleration/Deceleration Process
Pr. 35:S-curve ratio	100 %	100 %	100 %	100 %
Pr. 36:Rapid stop deceleration time	1000 ms	1000 ms	1000 ms	1000 ms
Pr. 37:Stop group 1 rapid stop selection	0:Normal Deceleration Stop	0:Normal Deceleration Stop	0:Normal Deceleration Stop	0:Normal Deceleration Stop
Pr. 38:Stop group 2 rapid stop selection	0:Normal Deceleration Stop	0:Normal Deceleration Stop	0:Normal Deceleration Stop	0:Normal Deceleration Stop
Pr. 39:Stop group 3 rapid stop selection	0:Normal Deceleration Stop	0:Normal Deceleration Stop	0:Normal Deceleration Stop	0:Normal Deceleration Stop

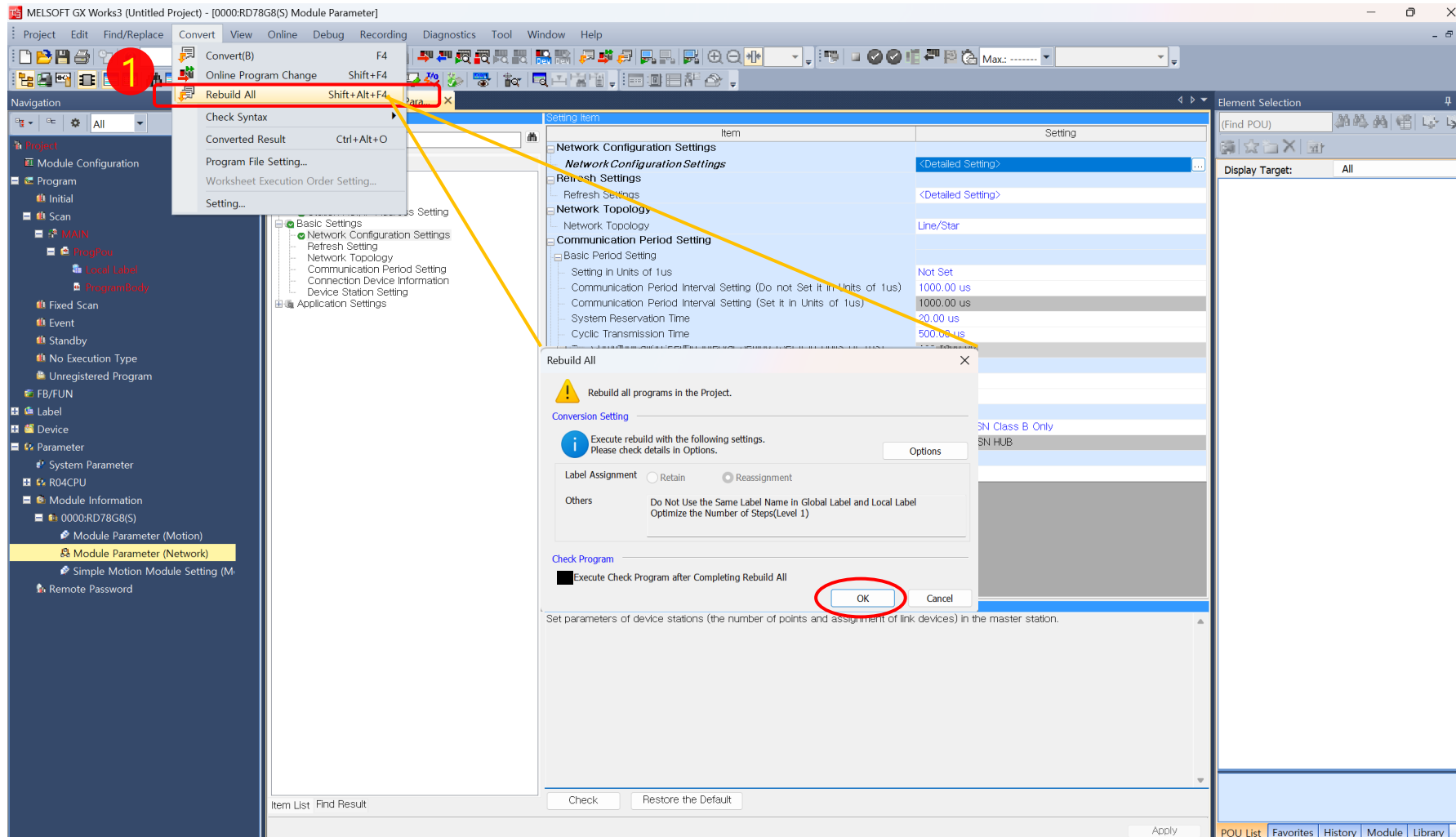
Basic parameters 1
Set according to the machine and applicable motor when system is started up (It will be valid according to PLC ready signal).

After setting is complete, close the window to apply the setting values

To test Ezi-SERVO operation without connecting the Limit Sensor, set Pr.116, Pr.117, and Pr.118 all to Invalid.

2-6. Convert

- Convert / Rebuild All



2-7. Write to PLC

- Online Data Operation

The screenshot shows the MELSOFT GX Works3 interface. The 'Online' menu is open, and the 'Write to PLC...' option is selected. The 'Online Data Operation' dialog box is displayed, showing the 'Module Name/Data Name' list. The 'Common Device Co...' option is highlighted with a red circle. A yellow callout box points to this option with the text: 'Common Device Co... Checking this may cause a transmission error, so send without checking.'

The 'Online Data Operation' dialog box also shows the 'Memory Capacity' section with the following data:

Memory Capacity	Size Calculation	Free
Program Memory		157/160KB
Data Memory		1852/2049KB
Device/Label Memory (File Storage Area)		192/256KB
SD Memory Card		0/0KB

The 'Execute' button is also circled in red.

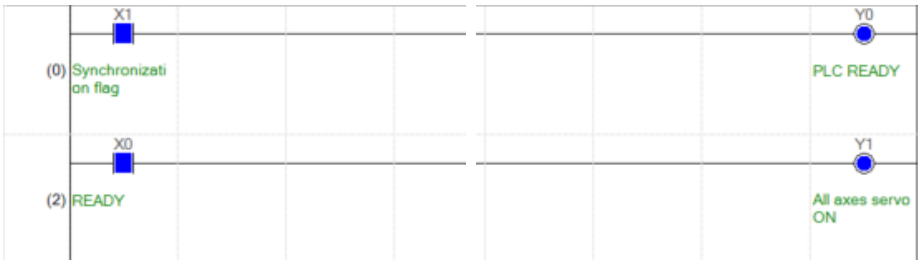
3. Verify Operation

3-1. Program Development

- PLC Motion Module: Ready / STEP On

Memory Map Method

[Ladder Program]



Simple Motion supports two types of programs

No	Item	Signal Transmission	Memory Map	Label
1	RD78G(S) Synchronization On	RD78G(S) → iQ-R CPU	X1	RD78G(S)_1.bSynchronizationFlag_D
2	RD78G(S) ON Instruction	iQ-R CPU → RD78G(S)	Y0	RD78G(S)_1.bPLC_Ready_D
3	RD78G(S) Ready	RD78G(S) → iQ-R CPU	X0	RD78G(S)_1.bReady_D
4	All Axis STEP On	iQ-R CPU → RD78G(S)	Y1	RD78G(S)_1.bAllAxisStepOn_D

Label (Variable) Method

[Ladder Program]



[ST Program]

```
ProgPou [PRG] [Local Label Set... ProgPou [PRG] [LD] 2Step Module Conf
1 IF SM400 & RD78GS_1.bSynchronizationFlag_D THEN
2   RD78GS_1.bPLC_Ready_D := TRUE;
3 END_IF;
4
5 IF RD78GS_1.bReady_D THEN
6   RD78GS_1.bAllAxisServoOn_D := TRUE;
7 END_IF;
```

3-1. Program Development

- Jog Settings: Speed, Limit Speed, Acceleration Time, Deceleration Time

The screenshot displays the MELSOFT GX Works3 interface for a project named '0000:RD78G8(S) Module Parameter'. The main window shows a ladder logic program with 12 steps. The program is configured for the 'ProgPou [PRG] [LD] 43Step'.

Program Steps:

- Step 1: (0) R W PLC READY(Direct) → RD78G(S): a6SysMtr2_D bPLC_Ready_D
- Step 2: (6) R READY(Direct) → RD78G(S): a6SysMtr2_D bReady_D
- Step 3: (12) bSetJogParam → DMOV K5000 RD78G(S): a6JogCtrl_D(0) udJOG_Speed_D (RW JOG speed(Direct))
- Step 4: DMOV K50000 RD78G(S): a6JogCtrl_D(0) udJogSpeedLimit_D (RW JOG speed limit value(Direct))
- Step 5: DMOV K200 RD78G(S): a6AccPm_D(0) udAccelerationTime_D (RW Acceleration time(Direct))
- Step 6: DMOV K200 RD78G(S): a6DecPm_D(0) udDecelerationTime_D (RW Deceleration time(Direct))
- Step 7: (42) [END]

Element Selection Panel:

- Module Label: RD78G(S)
- Module FB:
 - M+ RD78G(_SetPositioningData_) Positioning data set
 - M+ RD78G(_StartPositioning_01A) Positioning start FB
 - M+ RD78G(_JOG_01A) JOG/inching operat
 - M+ RD78G(_MPG_01A) Manual pulse gener
 - M+ RD78G(_ChangeSpeed_01A) Speed change FB
 - M+ RD78G(_ChangeAccDecTime_) Acc./dec. time sv c
 - M+ RD78G(_ChangePosition_01A) Target position cha
 - M+ RD78G(_Restart_01A) Restart FB
 - M+ RD78G(_OperateError_01A) Error operation FB
 - M+ RD78G(_InitializeParameter_0) Parameter Initializati
 - M+ RD78G(_WriteFlash_00A) Flash ROM writing f
 - M+ RD78G(_ChangeTorqueContr_) Torque control moc
 - M+ RD78G(_ChangeSpeedContr_) Speed control mod
 - M+ RD78G(_ChangePositionCont_) Position control mo
 - M+ RD78G(_ChangeContinuousTr_) Continuous torque)
 - M+ RD78G(_Sync_01A) Starting/ending syn
 - M+ RD78G(_ChangeSyncEncoder_) Sync encoder positi
 - M+ RD78G(_DisableSyncEncoder_) Sync encoder coun
 - M+ RD78G(_EnableSyncEncoder_) Sync encoder coun
 - M+ RD78G(_ResetSyncEncoderEr_) Sync encoder error
 - M+ RD78G(_ConnectSyncEncode_) Sync encoder Conn
 - M+ RD78G(_MoveCamReference_) Cam reference posi
 - M+ RD78G(_ChangeCamPosition_) Cam position per c
 - M+ RD78G(_ChangeMainShaftGe_) MG Positon per cyc
 - M+ RD78G(_ChangeAuxiliaryShaft_) AG position per cyc
 - M+ RD78G(_MoveCamPositionPe_) Cam position per c
 - M+ RD78G(_MakeRotaryCutterCa_) Cam for rotary cutt
 - M+ RD78G(_CalcCamCommandP_) Cam command pos
 - M+ RD78G(_CalcCamPositionPer_) Cam position per c

Module FB Details:

- M+RD78G(_JOG_01A)
[Japanese]
JOG運転 / インチング運転を行います。

Page-Footer: 40/47

3-1. Program Development

- Jog Operation Program: Module FB (Click & Drag MRD78G(S)_JOG_01A1)

The screenshot displays the MELSOFT GX Works3 interface for a project named "0000:RD78G8(S) Module Parameter". The main workspace shows a ladder logic program with a network containing a call to the "RD78G(S)_JOG_01A1" function block. A red box highlights the "FB Instance Name" dialog box, which shows the instance name "RD78G(S)_JOG_01A1" and the option "Register a FB instance at the last row." checked. A red circle with the number "1" is placed over the "JOG_01A1" part of the instance name. A yellow callout box with a checkmark and the text "✓ JOG Operation FB Creation: OK" is positioned below the dialog box. On the right side, the "Element Selection" pane is open, showing a list of module functions. The "RD78G(S)" module is selected, and the "JOG_01A1" function is highlighted with a red box. The bottom of the screen shows the "POU List" tab with the "JOG_01A1" function listed.

FB Instance Name

Local Label (ProgPou)

RD78G(S)_JOG_01A1

Register a FB instance at the last row.

✓ JOG Operation FB Creation: OK

1

RD78G(S)

M+ RD78G(_SetPositioningData_ Positioning data set

M+ RD78G(_StartPositioning_01A Positioning start FB

M+ RD78G(_JOG_01A JOG/inching operat

M+ RD78G(_MPG_01A Manual pulse gener

M+ RD78G(_ChangeSpeed_01A Speed change FB

M+ RD78G(_ChangeAccDecTime Acc./dec. time SV c

M+ RD78G(_ChangePosition_01A Target position cha

M+ RD78G(_Restart_01A Restart FB

M+ RD78G(_OperateError_01A Error operation FB

M+ RD78G(_InitializeParameter_0 Parameter Initializati

M+ RD78G(_WriteFlash_00A Flash ROM writing f

M+ RD78G(_ChangeTorqueContr Torque control moc

M+ RD78G(_ChangeSpeedContrc Speed control mod

M+ RD78G(_ChangePositionConti Position control mo

M+ RD78G(_ChangeContinuousTr Continuous torque

M+ RD78G(_Sync_01A Starting/ending syn

M+ RD78G(_ChangeSyncEncoder Sync encoder positi

M+ RD78G(_DisableSyncEncoder Sync encoder coun

M+ RD78G(_EnableSyncEncoder_ Sync encoder coun

M+ RD78G(_ResetSyncEncoderEr Sync encoder error

M+ RD78G(_ConnectSyncEncode Sync encoder Conn

M+ RD78G(_MoveCamReference Cam reference posi

M+ RD78G(_ChangeCamPositionl Cam position per c

M+ RD78G(_ChangeMainShaftGe MG Positon per cyc

M+ RD78G(_ChangeAuxiliaryShafl AG position per cyc

M+ RD78G(_MoveCamPositionPe Cam position per c

M+ RD78G(_MakeRotaryCutterCa Cam for rotary cutt

M+ RD78G(_CalcCamCommandP Cam command pos

M+ RD78G(_CalcCamPositionPerl Cam position per c

M+RD78G(_JOG_01A

[Japanese]

JOG運転 / インチング運転を行います。

POU List Favorites History Module Library

3-1. Program Development

● Jog Operation Program: Module FB Settings / Operation / Results

✓ **JOG Operation Execution Command**

✓ **Jog Forward Command**

✓ **Jog Reverse Command**

✓ **Jog Speed Command**

✓ **Jog Result Output**

Module FB Settings (RD78G(S))

- M+ RD78G(_SetPositioningData) Positioning data set
- M+ RD78G(_StartPositioning_01A) Positioning start FB
- M+ RD78G(_JOG_01A) JOG/inching operation
- M+ RD78G(_MPG_01A) Manual pulse generator
- M+ RD78G(_ChangeSpeed_01A) Speed change FB
- M+ RD78G(_ChangeAccDecTime) Acc./dec. time SV change
- M+ RD78G(_ChangePosition_01A) Target position change
- M+ RD78G(_Restart_01A) Restart FB
- M+ RD78G(_OperateError_01A) Error operation FB
- M+ RD78G(_InitializeParameter_0) Parameter initialization
- M+ RD78G(_WriteFlash_00A) Flash ROM writing function
- M+ RD78G(_ChangeTorqueControl) Torque control mode
- M+ RD78G(_ChangeSpeedControl) Speed control mode
- M+ RD78G(_ChangePositionControl) Position control mode
- M+ RD78G(_ChangeContinuousTorque) Continuous torque
- M+ RD78G(_Sync_01A) Starting/ending sync
- M+ RD78G(_ChangeSyncEncoder) Sync encoder position
- M+ RD78G(_DisableSyncEncoder) Sync encoder count
- M+ RD78G(_EnableSyncEncoder) Sync encoder count
- M+ RD78G(_ResetSyncEncoderError) Sync encoder error
- M+ RD78G(_ConnectSyncEncoder) Sync encoder connection
- M+ RD78G(_MoveCamReference) Cam reference position
- M+ RD78G(_ChangeCamPosition) Cam position per cycle
- M+ RD78G(_ChangeMainShaftGear) MG Position per cycle
- M+ RD78G(_ChangeAuxiliaryShaftGear) AG position per cycle
- M+ RD78G(_MoveCamPositionPerCycle) Cam position per cycle
- M+ RD78G(_MakeRotaryCutterCam) Cam for rotary cutter
- M+ RD78G(_CalcCamCommandPosition) Cam command position
- M+ RD78G(_CalcCamPositionPerCycle) Cam position per cycle

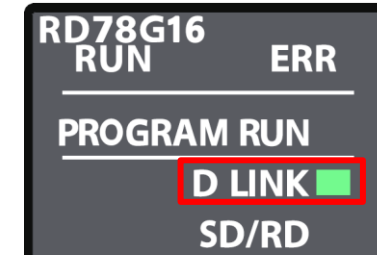
M+RD78G(_JOG_01A)

[Japanese]
JOG運転 / インチング運転を行います。

POU List | Favorites | History | Module | Library

3-2. Axis Monitoring

- RD78G(S) PROGRAM RUN: D LINK Green LED lit
- Axis Monitor



1. MELSOFT GX Works3 - Project Browser

2. Axis Monitor - Monitoring Data Table

Item	Value
Md.20:Command position value	0 pulse
Md.21:Machine feed value	0 pulse
Md.23:Axis error No.	-
Md.24:Axis warning No.	-
Md.26:Axis operation status	Waiting
Md.28:Axis speed command	0 pulse/s
Md.44:Positioning data No. being executed	-
Md.47:Positioning data being executed : Operation pattern	Positioning Complete
Md.47:Positioning data being executed : Control method	-
Md.47:Positioning data being executed : Acceleration time No.	0:200
Md.47:Positioning data being executed : Deceleration time No.	0:200
Md.47:Positioning data being executed : Axis to be interpolated	-
Md.47:Positioning data being executed : M-code	-
Md.102:Deviation counter	0 pulse
Md.103:Motor rotation speed	0 pulse/s
Md.104:Motor current value	0.0 %
Md.108:Servo status 1 : Servo alarm	OFF
Md.108:Servo status 1 : Servo warning	OFF
Md.114:Servo alarm	-

3. Module Information List - READY(X0) Status

READY(X0) ON

[Operation Check: Green when ON]

- ✓ Synchronization flag (X1): Connection status between CPU and Motion Module
- ✓ PLC Ready (Y0): Motion Module activation instruction
- ✓ READY(X0): Motion Module is in a controllable state
- ✓ All axes STEP ON(Y1): All axes STEP ON command

3-3. Axis Operation Verification

● Jog Operation – Setting and Movement

Program Mode (Ladder, Label)

✓ **bSetJogSpeed, bSetJogSpeedLimit, bSetJogAccel, bSetJogDecel**
Set value using ON/OFF

✓ **Jog Operation Verification**
bJogMoveCW : ON → CW rotation, OFF → Stop
bJogMoveCCW : ON → CCW rotation, OFF → Stop

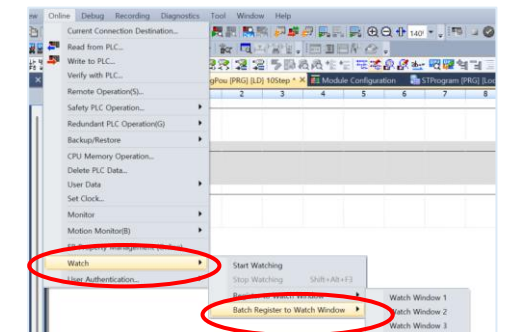
Instruction	Address	Comment
DMOV	K5000	RD78GS_1.stnAxCtrl1_D[0].udJOG_Speed_D RW:JOG speed(Direct)
DMOV	K50000	RD78GS_1.stnAxPrm_D[0].udJogSpeedLimit_D RW:JOG speed limit value(Direct)
DMOV	K200	RD78GS_1.stnAxPrm_D[0].udAccelerationTime0_D RW:Acceleration time 0(Direct)
DMOV	K200	RD78GS_1.stnAxPrm_D[0].udDecelerationTime0_D RW:Deceleration time 0(Direct)
MOV	K1	RD78GS_1.stnAxCtrl2_D[0].uStartForwardJOG_D RW:Forward run JOG start(Direct)
MOV	K0	RD78GS_1.stnAxCtrl2_D[0].uStartForwardJOG_D RW:Forward run JOG start(Direct)
MOV	K1	RD78GS_1.stnAxCtrl2_D[0].uStartReverseJOG_D RW:Reverse run JOG start(Direct)
MOV	K0	RD78GS_1.stnAxCtrl2_D[0].uStartReverseJOG_D RW:Reverse run JOG start(Direct)

Watch Mode

Watch 1[Watching]		
ON OFF ON/OFF toggle Update Clear All		
Name	Current Value	English
RD78GS_1.bPLC_Ready_D	TRUE	RW:PLC READY(Direct)
RD78GS_1.bAllAxisServoOn_D	TRUE	RW:All axis servo ON(Direct)
RD78GS_1.stnAxCtrl1_D[0].udJOG_Speed_D	5,000	RW:JOG speed(Direct)
RD78GS_1.stnAxPrm_D[0].udJogSpeedLimit_D	50,000	RW:JOG speed limit value(Di...
RD78GS_1.stnAxPrm_D[0].udAccelerationTime0_D	200	RW:Acceleration time 0(Direct)
RD78GS_1.stnAxPrm_D[0].udDecelerationTime0_D	200	RW:Deceleration time 0(Direct)
RD78GS_1.stnAxCtrl2_D[0].uStartForwardJOG_D	0	RW:Forward run JOG start(D...
RD78GS_1.stnAxCtrl2_D[0].uStartReverseJOG_D	0	RW:Reverse run JOG start(Di...

[Operation Verification]

- ✓ Enter the following values for Jog Speed/SpeedLimit/Accel/Decel
- ✓ Jog Operation Verification
...uStartForwardJOG_D : 1 → CW rotation, 0 → Stop
...uStartReverseJOG_D : 1 → CCW rotation, 0 → Stop



3-3. Axis Operation Verification

● Jog Operation: Stop → Move

0000:RD78G8(S) - Axis Monitor

Axis Moni Monitor Type: Axis (Output Axis) Font Size: 9pt Select Monitor Item Select Monitor Axis

(*) Please check the Event History function of GX Works3 for the Error History/Warning History.

	Axis #1
Md.20:Command position value	256494 pulse
Md.21:Machine feed value	256494 pulse
Md.23:Axis error No.	-
Md.24:Axis warning No.	-
Md.26:Axis operation status	Waiting
Md.28:Axis speed command	0 pulse/s
Md.44:Positioning data No. being executed	-
Md.47:Positioning data being executed : Operation pattern	Positioning Complete
Md.47:Positioning data being executed : Control method	-
Md.47:Positioning data being executed : Acceleration time No.	0:200
Md.47:Positioning data being executed : Deceleration time No.	0:200
Md.47:Positioning data being executed : Axis to be interpolated	-
Md.47:Positioning data being executed : M-code	-
Md.102:Deviation counter	0 pulse
Md.103:Motor rotation speed	0 pulse/s
Md.104:Motor current value	0.0 %
Md.108:Servo status 1 : Servo alarm	OFF
Md.108:Servo status 1 : Servo warning	OFF
Md.114:Servo alarm	-

Module Information List

- PLC ready(Y0)
- READY(X0)
- Synchronization flag(X1)
- All axes servo ON(Y1)
- Md.108:Servo status 1 : READY ON
- Axis No. 1 2 3 4 5 6 7 8
- Md.108:Servo status 1 : Servo ON
- Axis No. 1 2 3 4 5 6 7 8
- Md.50:Forced stop input(U0#G4231)
- BUSY
- Axis No. 1 2 3 4 5 6 7 8
- Md.31:Status : Error detection
- Axis No. 1 2 3 4 5 6 7 8
- Md.31:Status : Axis warning detection
- Axis No. 1 2 3 4 5 6 7 8
- Md.1:In test mode flag(U0#G4000)
- Md.133:Operation cycle over flag(U0#G4239)
- Md.64:Network error No.(U0#G31504)
- Md.132:Operation cycle setting(U0#G4238)
- 1006h:1.000ms
- Md.134:Operation time(U0#G4008)
- 149 μs
- Md.135:Maximum operation time(U0#G4009)
- 171 μs
- Md.19:Number of write accesses to flash ROM(U0#G4010)
- 0 times
- Md.52:Communication between amplifiers axes se...
- Communication between set amplif...
- Md.131:Digital OSC. running flag(U0#G4011)
- Stopped

0000:RD78G8(S) - Axis Monitor

Axis Moni Monitor Type: Axis (Output Axis) Font Size: 9pt Select Monitor Item Select Monitor Axis

(*) Please check the Event History function of GX Works3 for the Error History/Warning History.

	Axis #1
Md.20:Command position value	277881 pulse
Md.21:Machine feed value	277881 pulse
Md.23:Axis error No.	-
Md.24:Axis warning No.	-
Md.26:Axis operation status	JOG Operation
Md.28:Axis speed command	5000 pulse/s
Md.44:Positioning data No. being executed	-
Md.47:Positioning data being executed : Operation pattern	Positioning Complete
Md.47:Positioning data being executed : Control method	-
Md.47:Positioning data being executed : Acceleration time No.	0:200
Md.47:Positioning data being executed : Deceleration time No.	0:200
Md.47:Positioning data being executed : Axis to be interpolated	-
Md.47:Positioning data being executed : M-code	-
Md.102:Deviation counter	17 pulse
Md.103:Motor rotation speed	4600 pulse/s
Md.104:Motor current value	0.0 %
Md.108:Servo status 1 : Servo alarm	OFF
Md.108:Servo status 1 : Servo warning	OFF
Md.114:Servo alarm	-

Module Information List

- PLC ready(Y0)
- READY(X0)
- Synchronization flag(X1)
- All axes servo ON(Y1)
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- Axis No. 1 2 3 4 5 6 7 8
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- BUSY
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- Communication between set amplif...
- Md.131:Digital OSC. running flag(U0#G4011)
- Stopped

JOG
Operation

Appendix

[Appendix 1] Homing Methods

The homing method is classified as follows based on the setting value for the homing method (6098h).

설정값	내용
1	Homing on negative limit switch and index pulse
2	Homing on positive limit switch and index pulse
7	Homing on home switch (positive direction, negative edge) and index pulse
10	Homing on home switch (positive direction, positive edge) and index pulse
11	Homing on home switch (negative direction, positive edge) and index pulse
14	Homing on home switch (negative direction, negative edge) and index pulse
17	Homing on negative limit switch
18	Homing on positive limit switch
24	Homing on home switch (positive direction, negative edge)
25	Homing on home switch (positive direction, positive edge)
28	Homing on home switch (negative direction, positive edge)
29	Homing on home switch (negative direction, negative edge)
33	Homing index pulse (negative direction)
34	Homing index pulse (positive direction)
35	Set the current position origin
37	Set the current position origin and reset current position
-3	Homing on negative mechanical limit
-4	Homing on positive mechanical limit
-5	Homing on negative mechanical limit and index pulse
-6	Homing on positive mechanical limit and index pulse



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