



Programmable Automation Controllers
MELSEC MX Controller



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

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

Connection Guide

MELSEC MX Controller and

Ezi-ROBO® CC-Link IE TSN - **Ezi-SERVO**® CC-Link IE TSN
Precise Actuator System **IGH** Closed Loop Stepping System **ALL**

Mitsubishi Electric Products
MXR300-16 / MXR300-32 / MXR300-64
MXR300-128 / MXR300-256 / MXF100-8
MXF100-16

FASTECH Products
Ezi-ROBO CC-Link IE TSN IGH
(Ezi-SERVO CC-Link IE TSN ALL)

Before you begin

- Thank you for using our company's products.
- The control unit of the Ezi-ROBO IGH is interfaced with the Ezi-SERVO CC-Link IE TSN ALL. The following connection guide is based on the Ezi-SERVO CC-Link IE TSN ALL.
- The Ezi-SERVO CC-Link IE TSN ALL 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 in a CC-Link IE TSN network.
- Ezi-SERVO CC-Link IE TSN ALL is an industrial product. Do not use it for any other purpose. Our company assumes no responsibility 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 ALL to Mitsubishi Electric's MELSEC MX controller. It covers CSP+ file registration, system configuration, parameter settings, and programming methods.
- Before writing the PLC program, 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

- Ezi-SERVO CC-Link IE TSN ALL manuals can be downloaded from the FASTECH website.

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

Manual Name	Manual Number
[Manual][CC-Link IE TSN][Ezi-SERVO ALL]Closed Loop Stepping System	
[Connection Guide][CC-Link IE TSN][MELSEC MX Controller][Ezi-ROBO IGH Ezi-SERVO ALL]	

- The MELSEC MX Controller Manual can be downloaded from the Mitsubishi Electric website.

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

Manual Name	Manual Number
MELSEC MX Controller (MX-R Model) User's Manual	SH-082640
MELSEC MX Controller (MX-R Model) Programming Manual	SH-082643
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)	The station that manages the entire network, capable of performing cyclic and transient transmission with all stations. The MELSEC MX controller corresponds to this role.
Remote station	A station that performs cyclic transmission of bit-level I/O signals and word-level I/O data, and also supports transient transmission. Ezi-SERVO CC-Link IE TSN ALL 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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1. Overview

1-1. Overview

- **MELSEC MX Controller and Ezi-SERVO CC-Link IE TSN ALL Connection Guide**

- ◆ **Master station: MXR300-16 / MXR300-32 / MXR300-64 / MXR300-128 / MXR300-256
MXF100-8 / MXF100-16**

- ◆ **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 higher
 - For the latest files, please refer to the Mitsubishi Electric website.
(<https://www.mitsubishielectric.com/fa/download/index.html>)

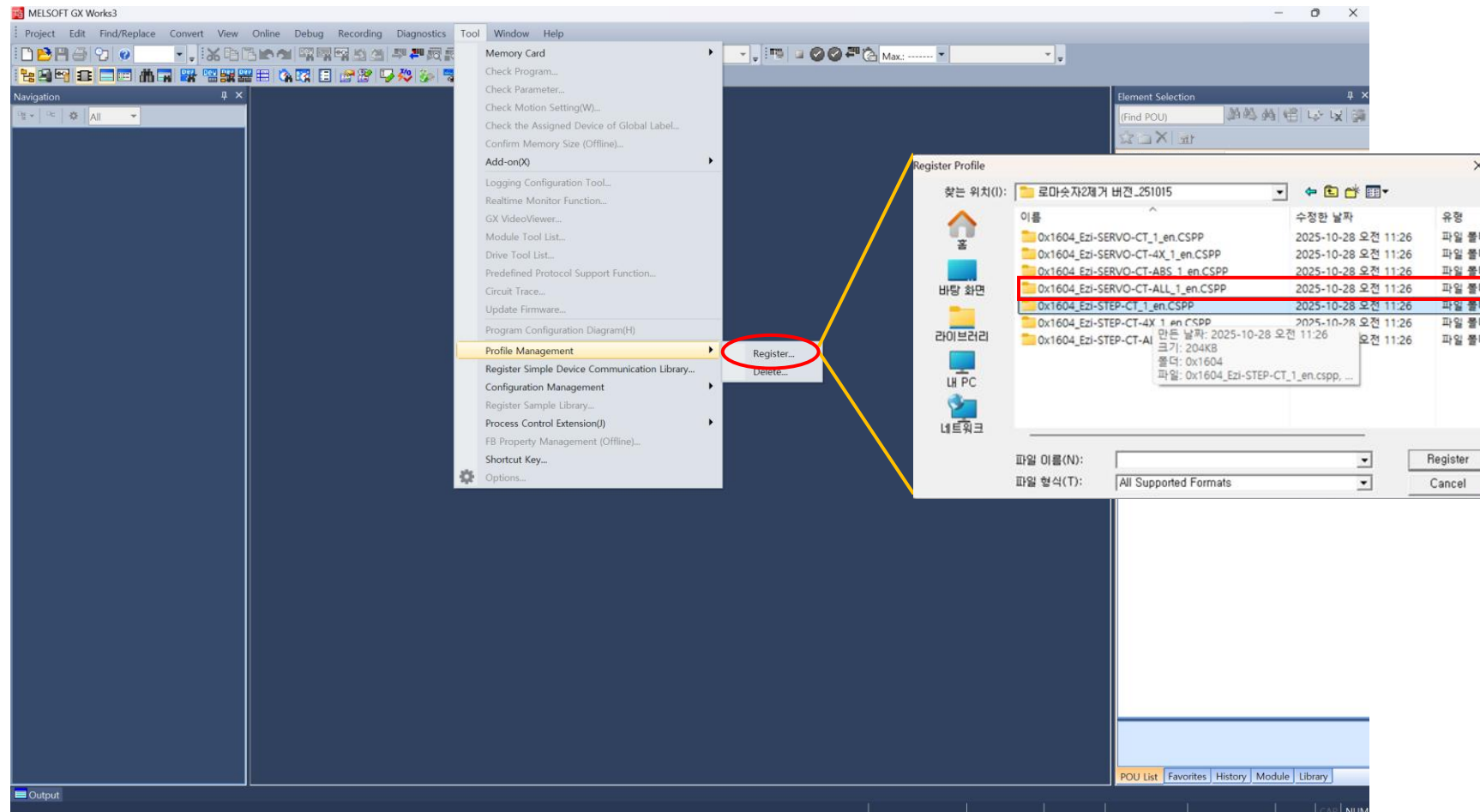
- ◆ **Remote station: Ezi-SERVO CC-Link IE TSN ALL**

- CSP+ File Download address: <https://cltsn.fastech-motions.com/en/download/quick>
File Name: 0x1604_Ezi-SERVO-CT_ALL_1_en_CSPP

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

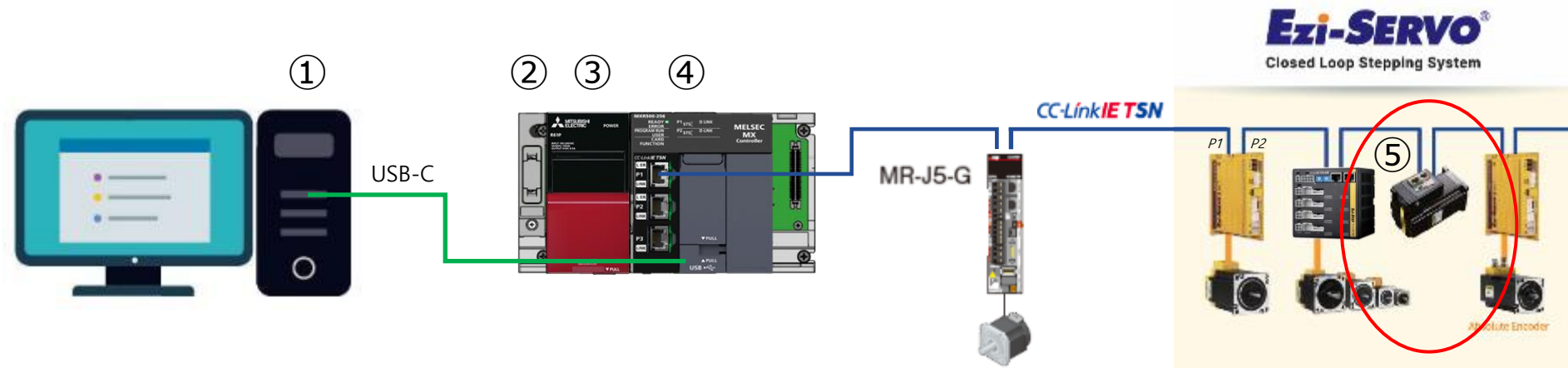
● CSP+ Registration

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



1-3. CC-Link IE TSN Configuration

- System Configuration



Configuration		Product name	IP address
①	Engineering software	GX Works3	-
②	Main base	R33B	-
③	Power supply module	R61P	-
④	Controller	MXR300-16	192.168.3.253
⑤	Driver + Motor	Ezi-SERVO-CT-ALL-42S-A-R	192.168.3.1

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 Flow

- Ezi-SERVO, MX Controller 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	MX Controller Settings 	Create a project for the MX controller using GX-Works3, then configure the unit parameters (communication method, connection target) and axis parameters (for motion control).
3	Verify MX Controller + Ezi-SERVO Operation 	Write a program to verify that the MX Controller and Ezi-SERVO are configured correctly. Manipulate labels to verify the motor operates normally.

1-4. Setup Flow

● 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 Set the homing method (Index: 6098h, Subindex: 00h) - Set homing method: '0' (default) → '33', etc. ※ Refer to [Appendix] 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 Constraints (MX Controller and Ezi-SERVO)

Item	Restriction
Torque limit function	The driver does not support the following object, 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	TPR1 (Touch Probe 1) of the driver cannot be used for [Pr.800: Mark detection signal setting].
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

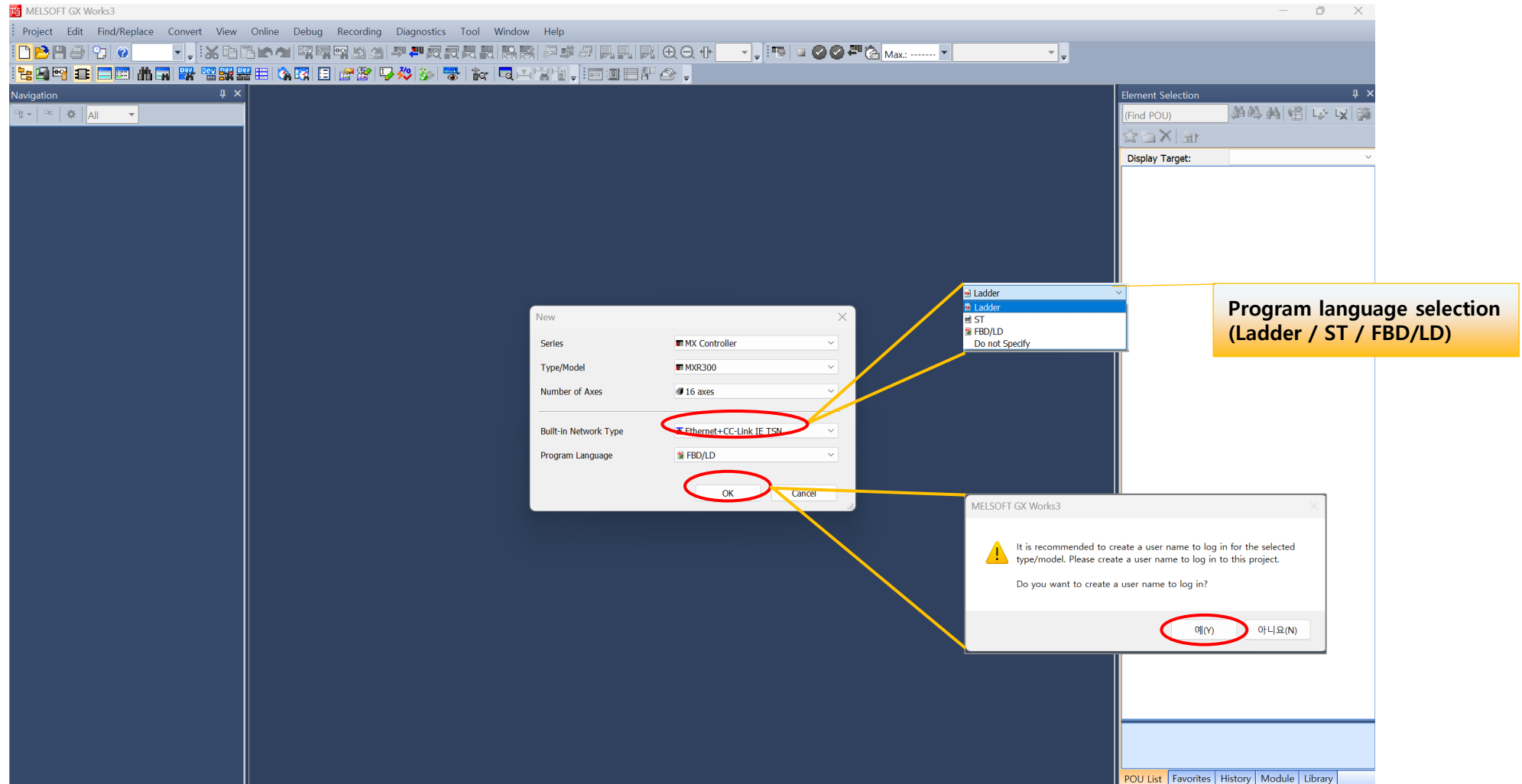
● Motion Control Function Constraints (MX Controller and Ezi-SERVO)

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 responds to this data.
Cd.136: PI-PID switching request	Not supported. Only MELSERVO supports this data.

2. MX Controller Settings

2-1. Project Creation

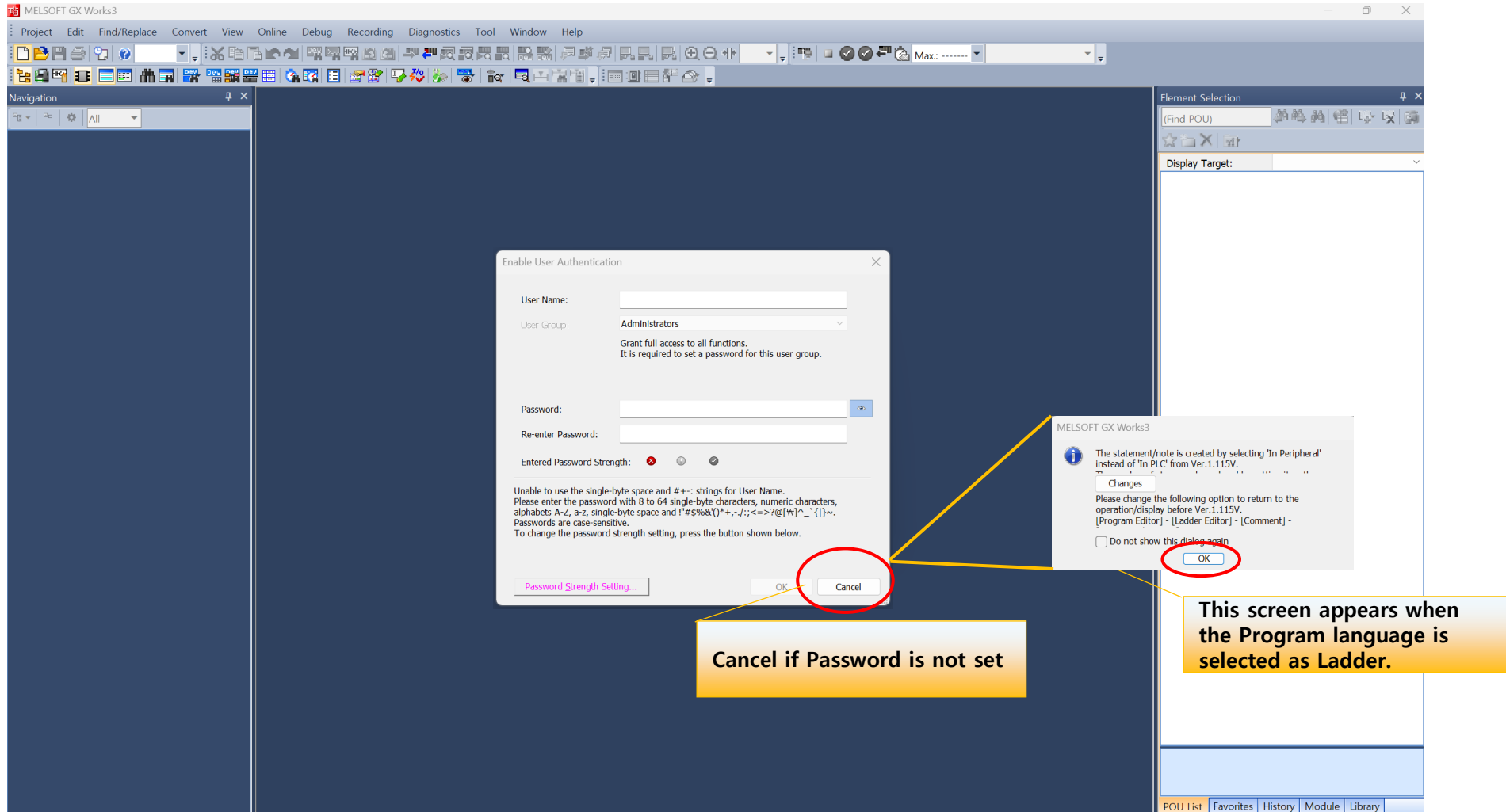
- When creating a new project, select the MX Controller, model name, number of axes used, and programming language.



2-2. User Authentication Settings

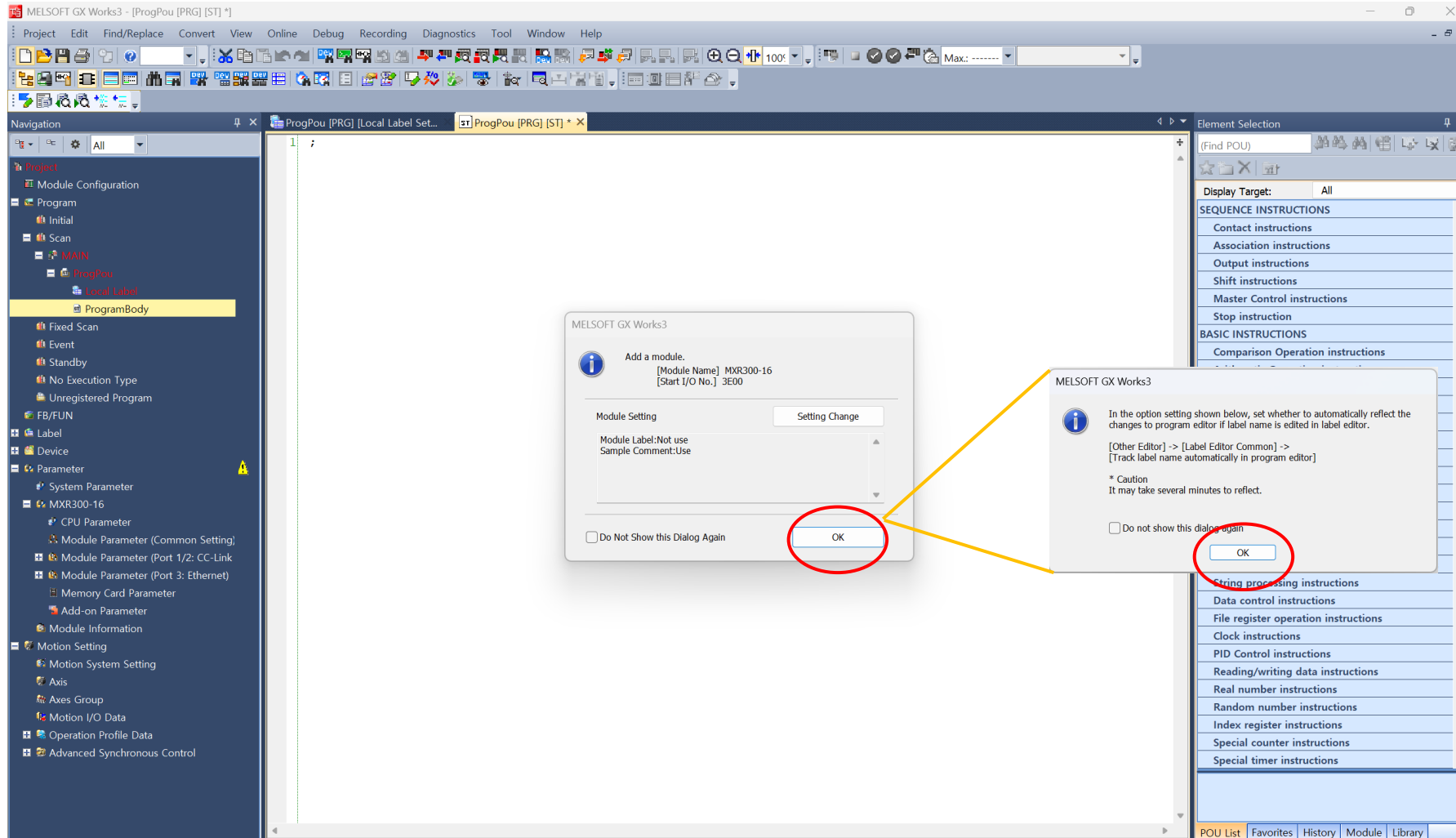
- **Password Setting**

※ In this chapter, Cancel is selected when no password is set.



2-3. Module Registration

- MXR300-xx Registration



2-4. 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 'Module Configuration' tab is active in the left sidebar (callout 1). The main workspace shows a rack configuration with a 'Main Base' (callout 4) and a 'CPU' module. A 'Click & Drag' instruction box (callout 3) lists the steps: 1. Main Base, 2. Power Supply, 3. Install MX Controller. The 'Element Selection' panel on the right shows the 'Main Base' section with 'R32SB' (2 Slots) and 'R33B' (3 Slots) highlighted (callout 2). The 'Power Supply' section shows 'R61P' (6.5A output) highlighted (callout 2). A dialog box in the bottom left corner contains the text: '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.' with an 'OK' button circled in red.

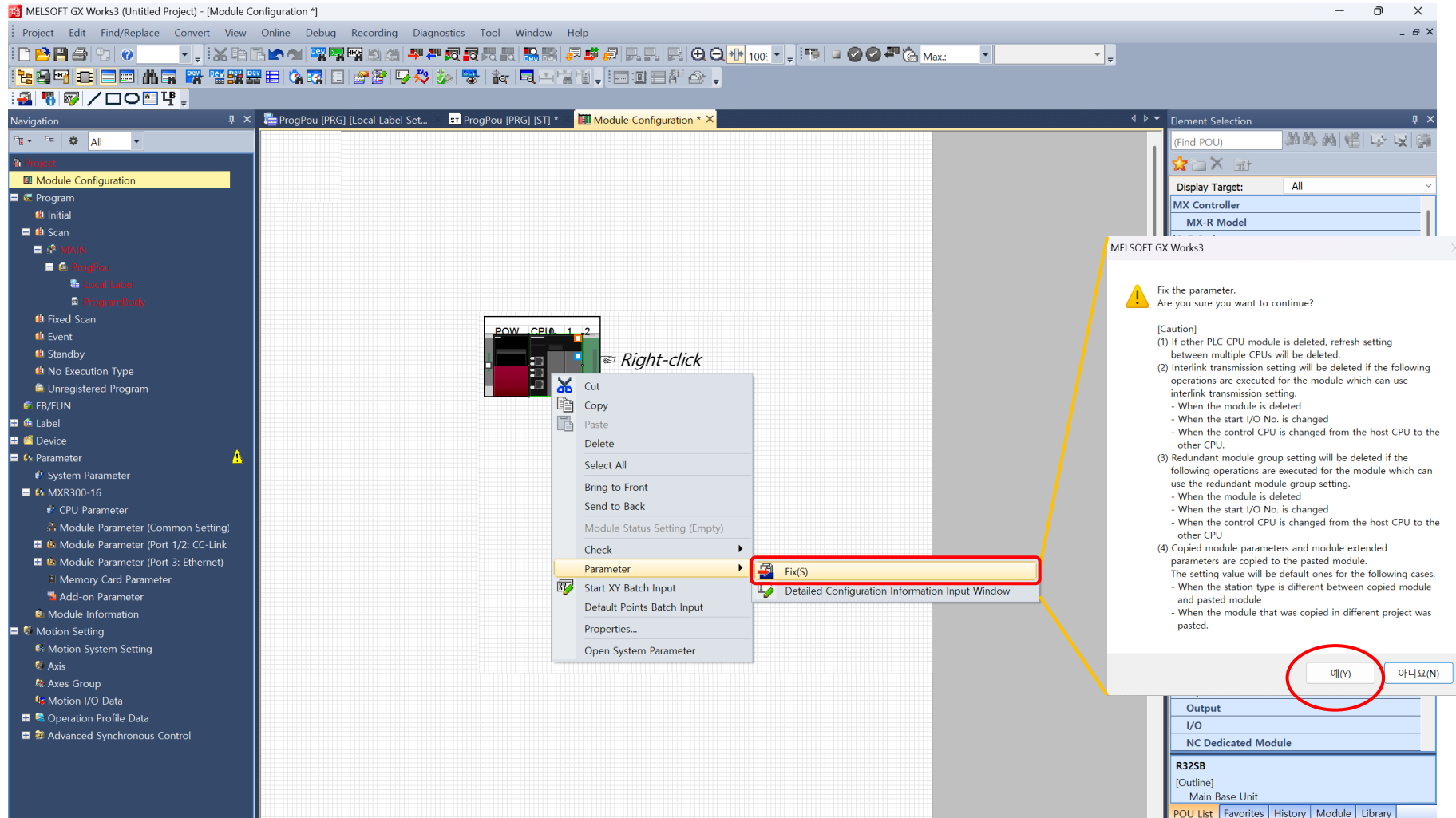
[Click & Drag]
1. Main Base
2. Power Supply
3. Install MX Controller

Element Selection

Display Target:	All
MX Controller	
MX-R Model	
iQ-R Series	
Main Base	
R32SB	2 Slots (Type requiring s
R33B	3 Slots (Type requiring p
R33SB	3 Slots (Type requiring s
R35B	5 Slots (Type requiring p
R35SB	5 Slots (Type requiring s
R38B	8 Slots (Type requiring p
R38RB-HT	8 Slots (Extended temper
R310B-HT	10 Slots (Extended temp
R310RB	10 Slots (Type requiring
R312B	12 Slots (Type requiring
Extension Base	
RQ Extension Base	
PLC CPU	
Process CPU	
SIL2 Process CPU	
Safety CPU	
C Controller	
MELSECWinCPU	
Head Module	
Motion CPU	
NCCPU	
Robot CPU	
Power Supply	
R61SP	2.5A output (Slim type p
R62P	3.5A output
R61P	6.5A output
R63P	6.5A output
R63RP	6.5A output (Redundant
R64P	9.0A output
R64RP	9.0A output (Redundant
R69P	9.0A output
R69RP	9.0A output (Redundant

2-4. Module Configuration – H/W

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



2-5. Module Parameters

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

MELSOFT GX Works3 (Untitled Project) - [MXR300-16 Module Parameter (Port 1/2: CC-Link IE TSN)]

Navigation

Project

Module Configuration

Program

Initial

Scan

MAIN

Program

Local Label

Programbody

Fixed Scan

Event

Standby

No Execution Type

Unregistered Program

FB/FUN

Label

Device

Parameter

System Parameter

MXR300-16

CPU Parameter

Module Parameter (Common Setting)

Module Parameter (Port 1/2: CC-Link)

Module Parameter (CC-Link IE TSN)

Network Label Setting

Module Parameter (Port 3: Ethernet)

Memory Card Parameter

Add-on Parameter

Module Information

Motion Setting

Motion System Setting

Axis

Axis Group

Motion I/O Data

Operation Profile Data

Advanced Synchronous Control

Setting Item List

Input the Setting Item to Search

Required Settings

Station Type

Network No.

Parameter Setting Method

Setting Method of Basic/Application Settings

Station No./IP Address Setting

Station No./IP Address Setting Method

Station No.

IP Address Setting

IP Address

Subnet Mask

Default Gateway

Setting Item

Item	Setting
Station Type	Master Station
Network No.	1
Parameter Setting Method	Parameter Editor
Setting Method of Basic/Application Settings	Parameter Editor
Station No./IP Address Setting	Parameter Editor
Station No.	0
IP Address Setting	192.168.3.253
IP Address	192.168.3.253
Subnet Mask	
Default Gateway	

Element Selection

(Find POU)

Display Target: All

IP Address: 192.168.3.253
※ Note: Ezi-SERVO CC-Link IE TSN ALL
Default IP: 192.168.3.xxx

Explanation

Set the IP address for the own node.
Ensure that the own node and the external device to be communicated with have the same class and subnet address.
Set the IP address to use for CC-Link IE TSN communication.

[Setting Range]
0.0.0.1 to 223.255.255.254 (00.00.00.01 to FF.FF.FF.FE)

Item List Find Result

Check Restore the Default

Apply

POU List Favorites History Module Library

2-5. Module Parameter – Network Configuration

● Network Configuration Settings

The screenshot displays the MELSOFT GX Works3 interface for configuring the MXR300-16 module. The main window is titled 'MXR300-16 Module Parameter (Port 1/2: CC-Link IE TSN)'. The left navigation pane shows the project structure, with 'Module Parameter (Port 1/2: CC-Link)' selected. The main area shows the 'Setting Item List' with 'Basic Settings' highlighted. The 'Detailed Setting' window for 'Network Configuration Settings (CC-Link IE TSN Configuration)' is open, showing various configuration options. A 'Module List' window is also visible, showing the selected module.

1 Select 'Module Parameter (Port 1/2: CC-Link)' in the navigation pane.

2 Select 'Basic Settings' in the 'Setting Item List'.

3 Click '<Detailed Setting>' for 'Network Configuration Settings (CC-Link IE TSN Configuration)'.

The detailed configuration window shows the following settings:

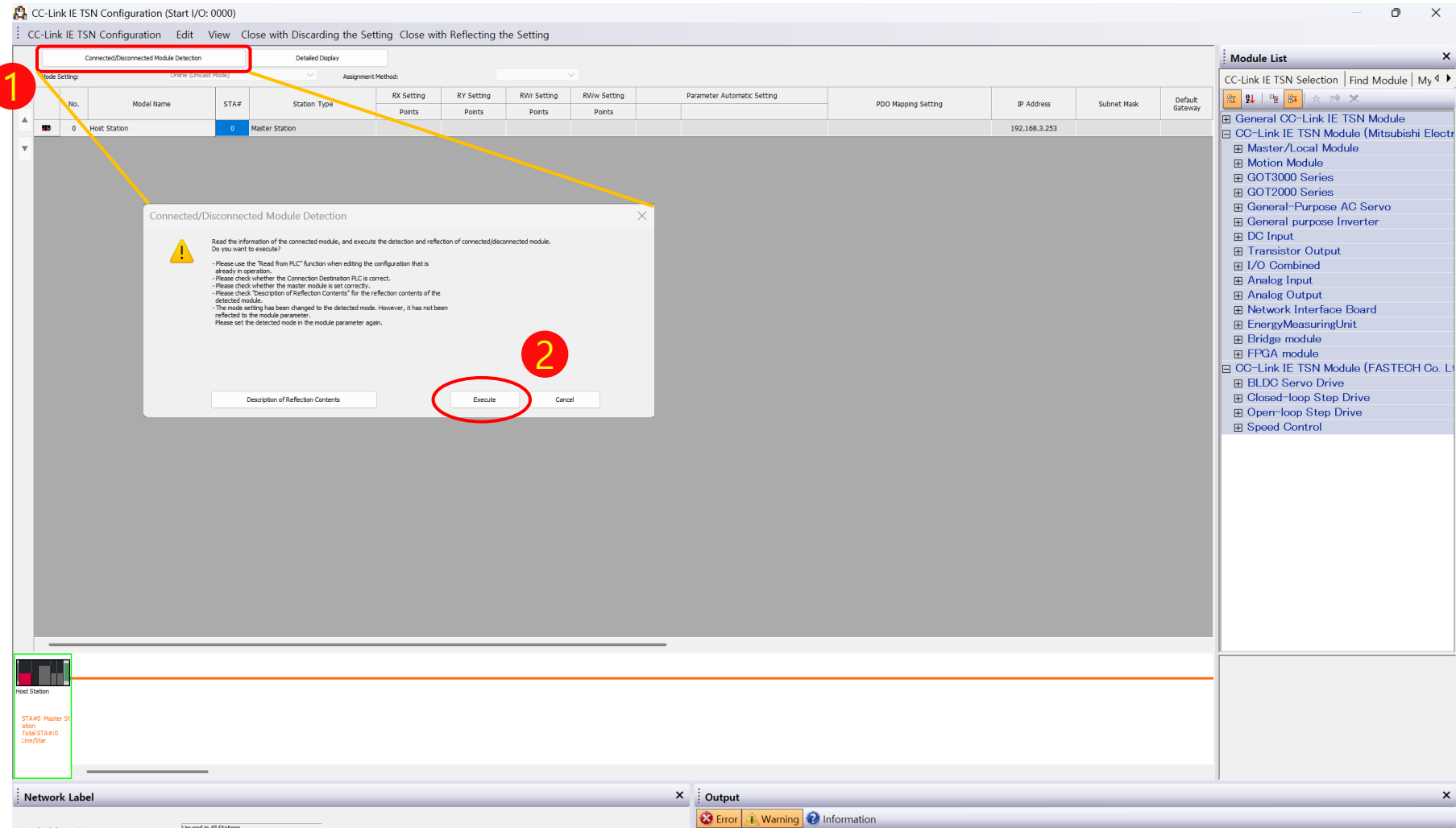
- Network Configuration Settings (CC-Link IE TSN Configuration)**
 - Refresh Settings
 - Refresh Settings: <Detailed Setting>
 - Network Topology
 - Network Topology: <Detailed Setting>
 - Communication Period Setting
 - Basic Period Setting
 - Setting in Units of 1us: Not Set
 - Communication Period Interval Setting (Do not Set it in Units of 1us): 2000.00 us
 - Communication Period Interval Setting (Set it in Units of 1us): 20.00 us
 - Cyclic Transmission Time: 1000.00 us
 - Transient Transmission Time: 980.00 us
 - Multiple Period Setting
 - Normal-Speed: x4
 - Low-Speed: x16
 - Connection Device Information
 - CC-Link IE TSN Class Setting: CC-Link IE TSN Class B Only
 - CC-Link IE TSN Class A Group Send Upper Limit Size Setting: 2K bytes
 - TSN HUB Setting: Not to Use TSN HUB
 - Device Station Setting
 - Disconnection Detection Setting: 4 times

The 'Module List' window shows the selected module: CC-Link IE TSN Module (Mitsubishi Ele).

The 'Network Label' window shows the network label status: Unused in All Stations.

2-5. Module Parameter – CC-Link IE TSN Configuration

- **Network Connected Status:** Automatically detects and configures the CC-Link IE TSN Module



2-5. Module Parameter – CC-Link IE TSN Configuration

- **Network-connected state:** Automatically detects and configures the CC-Link IE TSN Module with Ezi-SERVO CC-Link IE TSN ALL

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

Connected/Disconnected Module Detection Detailed Display

Mode Setting: Online (Unicast Mode) Assignment Method:

No.	Model Name	STA#	Station Type	RX Setting Points	RY Setting Points	RWr Setting Points	RWw Setting Points	Parameter Automatic Setting	PDO Mapping Setting	IP Address	Subnet Mask	Default Gateway
0	Host Station	0	Master Station							192.168.3.253		
1	Ezi-SERVO-ALL-CT	1	Remote Station			16	16		<Detail Setting>	192.168.3.1		
2	Ezi-SERVO-ALL-CT	3	Remote Station			16	16		<Detail Setting>	192.168.3.18		
3	Ezi-SERVO-ALL-CT	6	Remote Station			16	16		<Detail Setting>	192.168.3.19		

Module List

CC-Link IE TSN Selection Find Module My

- General CC-Link IE TSN Module
- CC-Link IE TSN Module (Mitsubishi Electric)
- 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

MELSOFT GX Works3

Connected/Disconnected Module Detection is completed.
Please execute Write to PLC if necessary.

- Please execute system configuration check because the system configuration is changed.

확인

Automatically Found Module

Host Station

STA#0 Master Station
Total STA#13
LineStar

Ezi-SERVO-CT-ALL Ezi-SERVO-CT-ALL Ezi-SERVO-CT-ALL

Network Label

Output

Error Warning Information

[Example of Ezi-SERVO CC-Link IE TSN ALL 3-axis configuration]
[IP Address Set in Ezi-SERVO CC-Link IE TSN ALL Driver]

1. 192.168.3.1

2-5. Module Parameter – CC-Link IE TSN Configuration

- **N/W Not Connected:** **Manually** configure the CC-Link IE TSN Module (**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:

No.	Model Name	STA#	Station Type	RX Setting	RY Setting	RW Setting	RWw Setting	Parameter Automatic Setting	PDO Mapping Setting	IP Address	Subnet Mask	Default Gateway
0	Host Station	0	Master Station							192.168.3.253		
1	Ezi-SERVO-ALL-CT	1	Remote Station			16	16		<Detail Setting>	192.168.3.1		
2	Ezi-SERVO-ALL-CT	2	Remote Station			16	16		<Detail Setting>	192.168.3.2		
3	Ezi-SERVO-ALL-CT	3	Remote Station			16	16		<Detail Setting>	192.168.3.3		

Created upon registration

2

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

1. 192.168.3.1
2. 192.168.3.2
3. 192.168.3.3

※ Power reset is required after changing the IP address

1

Mouse click & drag (repeated)

[Note] Ezi-SERVO CC-Link IE TSN ALL IP Address Settings Hexadecimal Rotary Switch

(x16) (x1)

[Station Type]
Remote Station

Network Label

Output

Error Warning Information

2-5. Module Parameter – CC-Link IE TSN Configuration

- CC-Link IE TSN Module PDO Mapping Setting (Per-Axis Setting)

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

Connected/Disconnected Module Detection Detailed Display

Mode Setting: Online (Unicast Mode) Assignment Method:

No.	Model Name	STA#	Station Type	RX Setting Points	RY Setting Points	RW Setting Points	RWw Setting Points	Parameter Automatic Setting	PDO Mapping Setting	IP Address	Subnet Mask	Default Gateway
0	Host Station	0	Master Station							192.168.3.253		
1	Esi-SERVO-ALL-CT	1	Remote Station			16	16		<Detail Setting>	192.168.3.17		
2	Esi-SERVO-ALL-CT	2	Remote Station			16	16		<Detail Setting>	192.168.3.18		
3	Esi-SERVO-ALL-CT	3	Remote Station			16	16		<Detail Setting>	192.168.3.19		

Generated upon registration

PDO Mapping Setting

Link Device Points

PDO Mapping Parameter

PDO Mapping Pattern Selection (1/2)

Please select the TPDO mapping pattern assigned in link device (RW).

Link Device (RW) Points: 16

No.	Pattern Name	Used Points
1	1st TPDO (CSP Mode)	8 Points
2	2nd TPDO (ProfilePosition Mode)	10 Points

Back Next Cancel

PDO Mapping Pattern Selection (2/2)

Please select the RPDO mapping pattern assigned in link device (RW).

Link Device (RW) Points: 16

No.	Pattern Name	Used Points
1	1st RPDO (CSP Mode)	7 Points
2	2nd RPDO (ProfilePosition Mode)	13 Points

Back OK Cancel

PDO Mapping Pattern Selection...

OK Cancel

[Outline]
Step Drive
[Specification]
Closed-Loop Step Drive
Motor: Max. NEMA 24
Mode: Homing, CSP, PP
CC-Link IE TSN Class B
[Manufacturer Name]
FASTECH Co. Ltd
[Station Type]
Remote Station

Network Label

Output

Error:0 Warning:0 Information:0

2-5. Module Parameter – CC-Link IE TSN Configuration

- CC-Link IE TSN Module PDO Mapping Setting (Per-Axis Setting)

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:

No.	Model Name	STA#	Station Type	RX Setting	RY Setting	RW Setting	RWw Setting	Parameter Automatic Setting	PDO Mapping Setting	IP Address	Subnet Mask	Default Gateway
				Points	Points	Points	Points					
0	Host Station	0	Master Station							192.168.3.253		
1	Ezi-SERVO-ALL-CT	1	Remote Station			16	16		<Detail Setting>	192.168.3.17		
2	Ezi-SERVO-ALL-CT	2	Remote Station			16	16		<Detail Setting>	192.168.3.18		
3	Ezi-SERVO-ALL-CT	3	Remote Station			16	16		<Detail Setting>	192.168.3.19		

Generated upon registration

PDO Mapping Setting

Link Device Points: 16

PDO Mapping Parameter

Link Device	Index [Hexadecimal]	Sub-Index [Hexadecimal]	Entry Name	Comment	Data Type
RW0000	1402	01	Watchdog counter UL 1		UNSIGNED16
RW0001	6041	00	Statusword		UNSIGNED16
RW0002	6061	00	Modes of operation display		INTEGER8
RW0003	603F	00	Error code		UNSIGNED16
RW0004	6064	00	Position actual value		INTEGER32
RW0005	6064	00	Position actual value		INTEGER32
RW0006	60F2	00	Digital Inputs		UNSIGNED32
RW0007	60F2	00	Digital Inputs		UNSIGNED32
RW0008					
RW0009					
RW000a					
RW000b					
RW000c					
RW000d					
RW000e					
RW000f					

PDO Mapping Pattern Selection...

OK Cancel

Turns black when PDO setting is complete
<Detail Setting> → <Detail Setting>
Repeat for all axis PDO settings

Module List

CC-Link IE TSN Selection Find Module My 4

- General CC-Link IE TSN Module
- CC-Link IE TSN Module (Mitsubishi Electr
- Master/Local Module
- Motion Module
- GOT3000 Series

CC-Link IE TSN Module (FASTECH Co. L

- BLDG Servo Drive
- Closed-loop Step Drive
- Ezi-SERVO-CT Closed-Loop
- Ezi-SERVO-CT-4X Closed-Loop
- Ezi-SERVO-CT-APC Closed-Loop
- Ezi-SERVO-CT-ALL Closed-Loop
- Open-loop Step Drive
- Speed Control

[Outline]
Step Drive
[Specification]
Closed-Loop Step Drive
Motor: Max. NEMA 24
Mode: Homing, CSP, PP
CC-Link IE TSN Class B
[Manufacturer Name]
FASTECH Co. Ltd
[Station Type]
Remote Station

Network Label

Output

Error:0 Warning:0 Information:0

2-5. Module Parameter – CC-Link IE TSN Configuration

- CC-Link IE TSN Module Setting Applied

The screenshot displays the 'CC-Link IE TSN Configuration' software window. The main table lists the configuration for three stations:

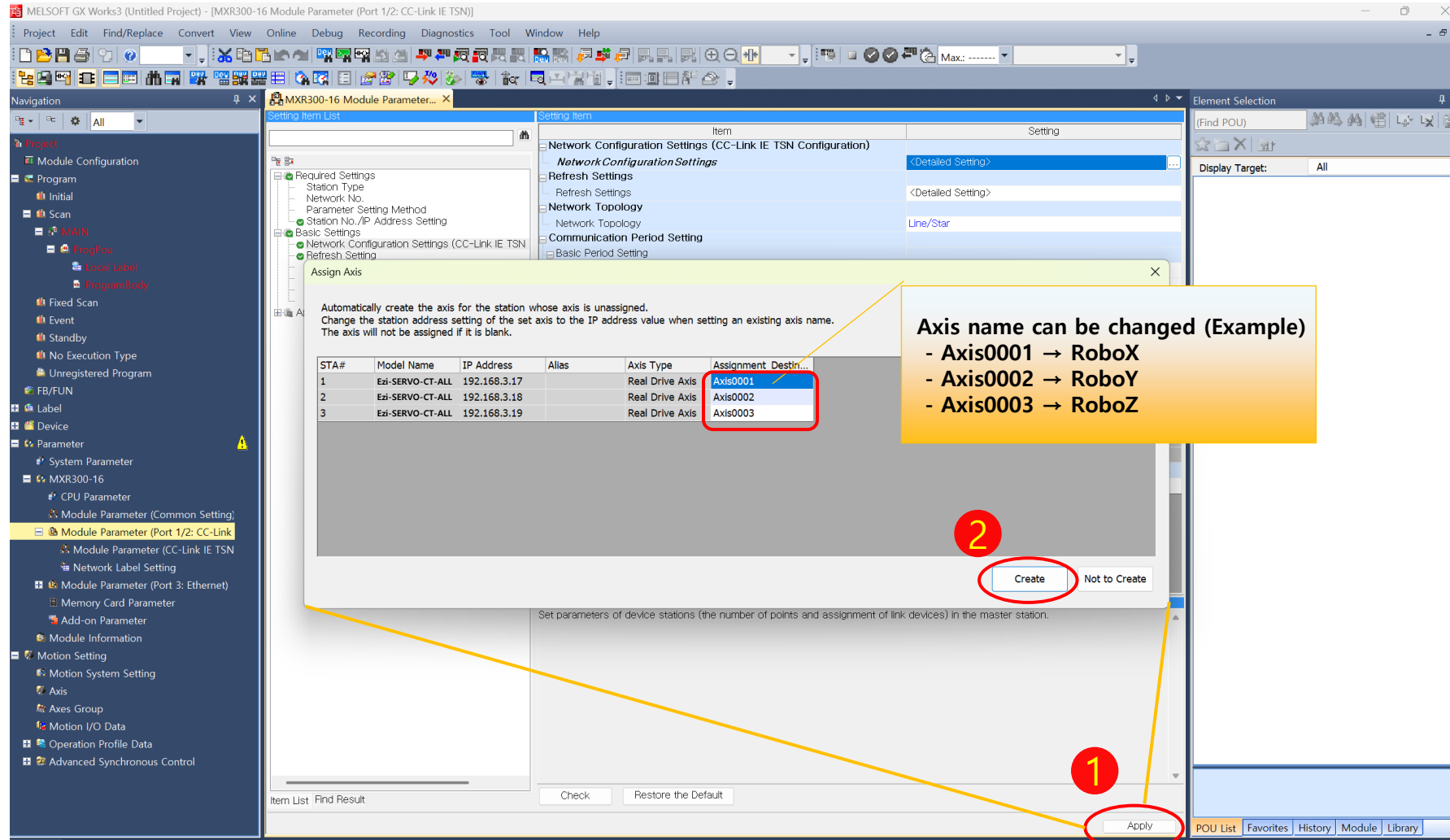
No.	Model Name	Station Type	RX Setting	RY Setting	RWr Setting	RWv Setting	Parameter Automatic Setting	PDO Mapping Setting	IP Address	Subnet Mask	Default Gateway
0	Host Station	Master Station							192.168.3.253		
1	Ezi-SERVO-ALL-CT	Remote Station				16		<Detail Setting>	192.168.3.17		
2	Ezi-SERVO-ALL-CT	Remote Station				16		<Detail Setting>	192.168.3.18		
3	Ezi-SERVO-ALL-CT	Remote Station				16		<Detail Setting>	192.168.3.19		

A warning dialog box from MELSOFT GX Works3 is overlaid on the screen, asking: "Warning(s) in the CC-Link IE TSN Configuration. Are you sure you want to close the CC-Link IE TSN Configuration window?". The '예(Y)' (Yes) button is circled in red. A red circle also highlights the 'Close with Reflecting the Setting' option in the software's menu bar.

At the bottom left, a network diagram shows the connection between the Host Station and three Remote Stations (STA#1, STA#2, STA#3). The bottom right panel shows the 'Output' status with 'Error:0', 'Warning:0', and 'Information:0'.

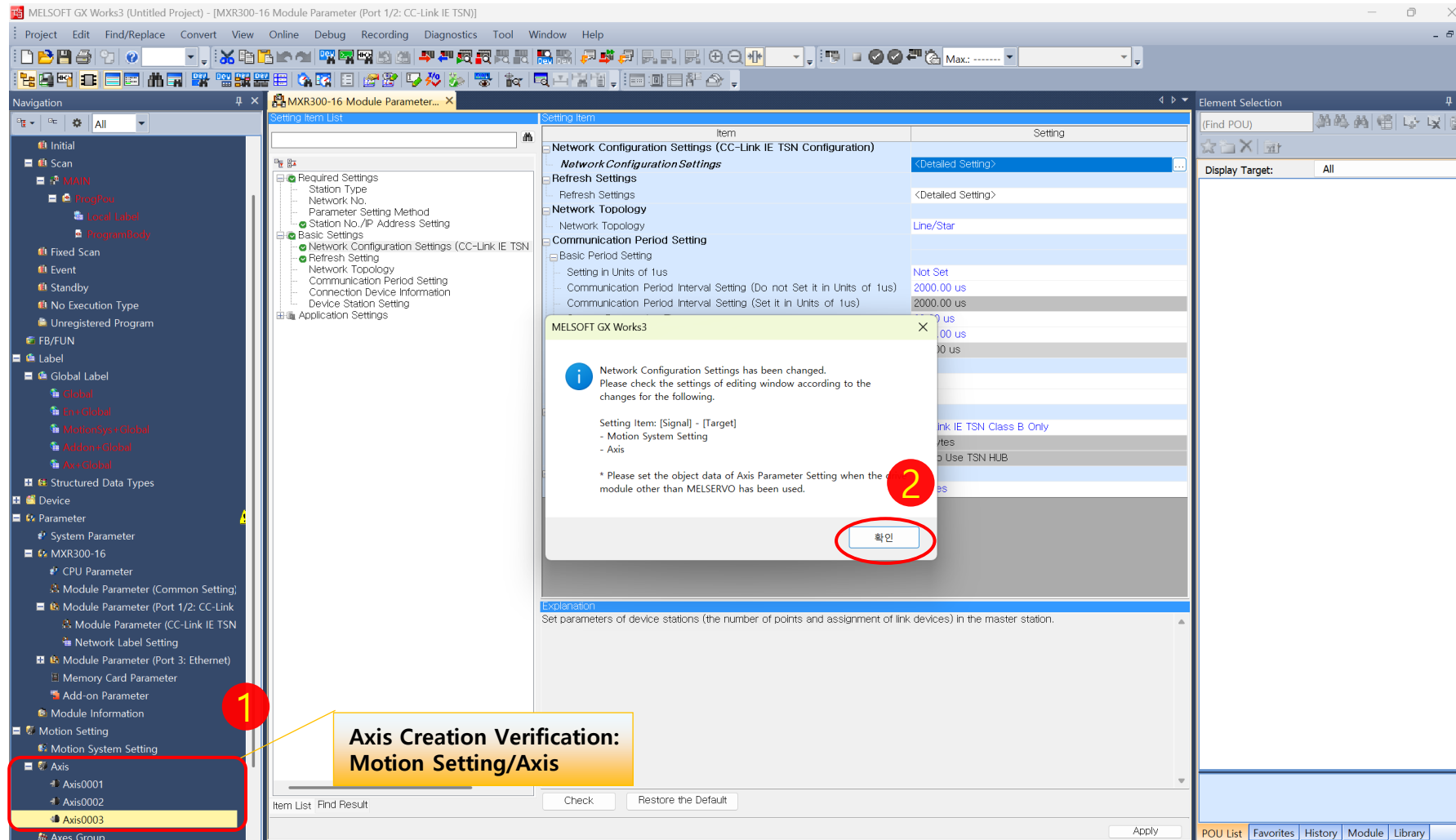
2-5. Module Parameter – CC-Link IE TSN Configuration

● Axis Creation



2-5. Module Parameter – CC-Link IE TSN Configuration

- Confirming axis creation



2-5. Module Parameter – CC-Link IE TSN Configuration

● Network Label Setting – Channel-Specific Digital Input/Output Settings

The screenshot displays the MELSOFT GX Works3 interface for Network Label Setting. The main table lists parameters for three channels (1, 2, and 3) with columns for IP Address, Model Name, Device Label/Structure, Data Type, Labeling Target, Arranged Target, Label Data Type, Label Name, and English Display. Red circles and numbers 1, 2, and 3 highlight specific areas:

- 1**: Points to the 'Labeling Target' column, which contains checkboxes for selecting digital input/output labels.
- 2**: Points to the 'Create Label' button at the bottom of the window.
- 3**: Points to a confirmation dialog box titled 'Start creating the label on the basis of the editing content. Are you sure you want to continue?' with '예(Y)' (Yes) and '아니요(N)' (No) buttons.

Additional annotations include:

- Digital Output Label Settings**: A yellow box highlighting the 'Label Name' and 'English Display' columns for digital output labels.
- Digital Input Label Setting - Limit +/-, ORG, Input**: A yellow box highlighting the 'Label Name' and 'English Display' columns for digital input labels.

The 'Explanation' section at the bottom provides details about the label creation process:

The I/O data exchanged between the device stations of built-in CC-Link IE TSN and the CPU module by cyclic communication can be registered. If 'Create Label' is executed, the label selected in 'Labeling Target' will be registered to the global label list (NW+Global).

[Caution]

- If 'Create Label' is executed, the all labels/structured data types created from this window last time will be deleted and new labels/structured data types will be created.
- The background of 'No.' in the window will be displayed in yellow for the device for which addition/change exists in the network configuration.
- 'Create Label' again if necessary.
- If 'Create Label' is not executed, the edited content in this window will not be saved in the project.

2-5. Module Parameter – CC-Link IE TSN Configuration

- Network Label Setting – Digital In/Output Enable per Axis
*Limit SW, ORG SW, DIO Enable Settings

MELSOFT GX Works3 C:\Work\테스트샘플\connectionGuide.gx3 - [NW+Global1 [Global Label Setting]]

Navigation: Project, Module Configuration, Program, FB/FUN, Label, Global Label, En+Global, MotionSys+Global, Addon+Global, Ax+Global, NW+Global1, Structured Data Types, Device, Parameter, System Parameter, MXR300-16, Module Information, Motion Setting, Motion System Setting, Axis, Axis0001, Axis0002, Axis0003, Axes Group, Motion I/O Data, Operation Profile Data, Advanced Synchronous Control.

Label Name	Data Type	English(Display Target)	Check
1. Ezi-SERVO_CT_001_PhysicalOutputs	Double Word (Unsigned) Bit String (32bit)	RWw5	☒
2. Ezi-SERVO_CT_001_DigitalInputs	Double Word (Unsigned) Bit String (32bit)	RWw5	☒
3. Ezi-SERVO_CT_002_PhysicalOutputs	Double Word (Unsigned) Bit String (32bit)	RWw5	☒
4. Ezi-SERVO_CT_002_DigitalInputs	Double Word (Unsigned) Bit String (32bit)	RWw5	☒
5. Ezi-SERVO_CT_003_PhysicalOutputs	Double Word (Unsigned) Bit String (32bit)	RWw5	☒
6. Ezi-SERVO_CT_003_DigitalInputs	Double Word (Unsigned) Bit String (32bit)	RWw5	☒

Element Selection: (Find POU), Display Target: All

POU List | Favorites | History | Module | Library

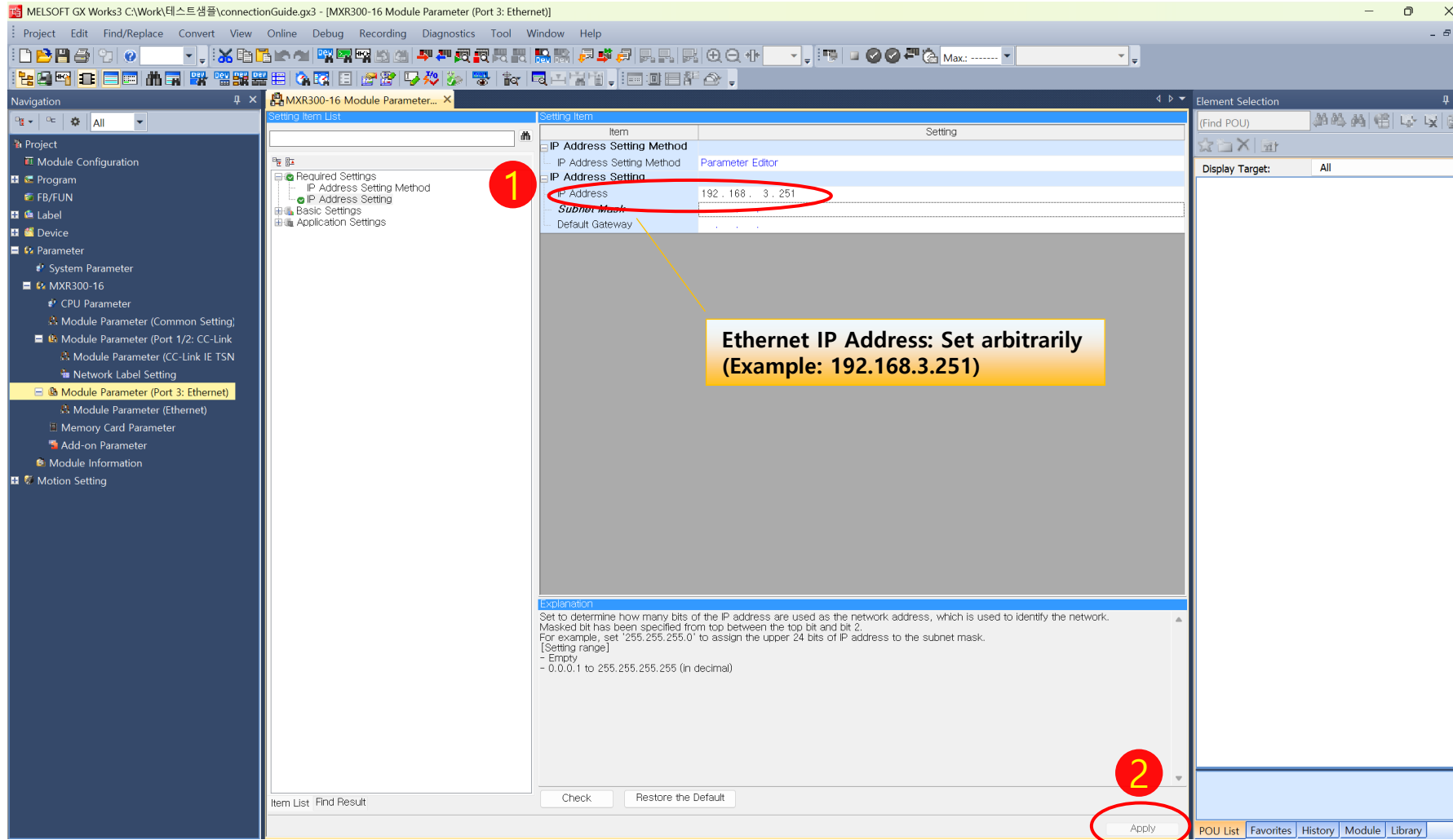
Extended Display: Do Not Show Always

Output

Ezi-SERVO CC-Link IE TSN ALL DIO Enabled Check
(Limit SW, ORG, DIO Enable)

2-5. Module Parameter – Port 3: Ethernet

- Ethernet IP Address Setting



2-6. Motion Setting – Basic Parameter

- Real Drive Axis / Basic Parameter / Object Data Settings (1/3)
*Ezi-SERVO CC-Link IE TSN ALL Object Data Registration

1 Axis0001

2 Object Data

3 Control Word

4 Restore the Default

5 Set default data. Are you sure you want to continue?

6 예(Y)

Ezi-SERVO CC-Link IE TSN ALL Object Data

MELSOFT GX Works3

The specified station address refers to a non-MELSERVO device. Do you want to set to generic default values?

Yes: Set to generic default values
No: Set to default values for MELSERVO

예(Y) 아니요(N) 취소

2-6. Motion Setting – Basic Parameter

- Real Drive Axis / Basic Parameter / Object Data Settings (2/3)
*Ezi-SERVO CC-Link IE TSN ALL Object Data Registration

The screenshot shows the MELSOFT GX Works3 interface with the 'Axis Parameter Setting' dialog open for 'Axis0002'. The 'ControlWord' section is highlighted, showing various parameters like 'Controlword', 'Encoder increments', and 'Following error actual value'. A yellow callout box labeled '7' points to the 'ControlWord' section, and another yellow callout box labeled '8' points to the 'OK' button. A yellow arrow points from the 'ControlWord' section to a separate window titled '[OBJ] Review Changes'.

[OBJ] Review Changes

2-6. Motion Setting – Basic Parameter

- Real Drive Axis / Basic Parameter / Object Data Settings (3/3)
*Ezi-SERVO CC-Link IE TSN ALL Object Data Registration

MELSOFT GX Works3 C:\Work\테스트샘플\connectionGuide.gx3 - [Axis Parameter Setting]

Project Edit Find/Replace Convert View Online Debug Recording Diagnostics Tool Window Help

Navigation: Project, Module Configuration, Program, FB/FUN, Label, Device, Parameter, System Parameter, MXR300-16, CPU Parameter, Module Parameter (Common Setting), Module Parameter (Port 1/2: CC-Link), Module Parameter (CC-Link IE TSN), Network Label Setting, Module Parameter (Port 3: Ethernet), Memory Card Parameter, Add-on Parameter, Module Information, Motion Setting, Motion System Setting, Axis, Axis0001, Axis0002, Axis0003, Axis Group, Motion I/O Data, Operation Profile Data, Advanced Synchronous Control

Setting Item List: Input the Setting Item to Search, Select Folder, Display All Data

Setting Item Table:

Item	Axis0001	Axis0002	Axis0003
Axis Information	Set Axis Information		
Axis No.	1	2	3
Basic Parameter	Set Basic Parameter		
Station Address Setting	192.168.3.17	192.168.3.18	192.168.3.19
Axis Type Setting	0:Real Drive Axis	0:Real Drive Axis	0:Real Drive Axis
Axis Emulation Enabled	0:Disabled	0:Disabled	0:Disabled
Control Cycle Setting	0:Automatic setting	0:Automatic setting	0:Automatic setting
Object Data	[OBJ]0x6040001 [OBJ]0x6040001 [OBJ]0x6040001		
ControlWord	[OBJ]0x607C002 [OBJ]0x607C002 [OBJ]0x607C002		
EncoderIncrements	[OBJ]0x6080002 [OBJ]0x6080002 [OBJ]0x6080002		
FollowingErrActualValue	[OBJ]0x608F012 [OBJ]0x608F012 [OBJ]0x608F012		
GearRatioMotorRevolutions	[OBJ]0x60F4002 [OBJ]0x60F4002 [OBJ]0x60F4002		
HomeOffset	[OBJ]0x607C002 [OBJ]0x607C002 [OBJ]0x607C002		
MaxMotorSpeed	[OBJ]0x6080002 [OBJ]0x6080002 [OBJ]0x6080002		
MaxTorque	[OBJ]0x6072001 [OBJ]0x6072001 [OBJ]0x6072001		
ModesOfOp	[OBJ]0x6060000 [OBJ]0x6060000 [OBJ]0x6060000		
ModesOfOpDisp	[OBJ]0x6061000 [OBJ]0x6061000 [OBJ]0x6061000		
NegativeTorqueLimitValue	[OBJ]0x60E1001 [OBJ]0x60E1001 [OBJ]0x60E1001		
Polarity	[OBJ]0x607E000 [OBJ]0x607E000 [OBJ]0x607E000		
PosActualValue	[OBJ]0x6064002 [OBJ]0x6064002 [OBJ]0x6064002		
PosEncoderResolution	[OBJ]0x608F000 [OBJ]0x608F000 [OBJ]0x608F000		
PosEncoderResolutionMotorRevolutions	[OBJ]0x608F022 [OBJ]0x608F022 [OBJ]0x608F022		
Request the drive unit to switch status.	[OBJ]0x60E0001 [OBJ]0x60E0001 [OBJ]0x60E0001		
Request the drive unit to switch status.	[OBJ]0x60A8002 [OBJ]0x60A8002 [OBJ]0x60A8002		
Request the drive unit to switch status.	[OBJ]0x60A9002 [OBJ]0x60A9002 [OBJ]0x60A9002		
Request the drive unit to switch status.	[OBJ]0x6041001 [OBJ]0x6041001 [OBJ]0x6041001		
Request the drive unit to switch status.	[OBJ]0x6502002 [OBJ]0x6502002 [OBJ]0x6502002		

Element Selection: (Find POU), Display Target: All

Item List Find Result: Restore the Defa

Apply

POU List Favorites History Module Library

Ezi-SERVO CC-Link IE TSN ALL Axes [OBJ] Verify Changes

2-6. Motion Setting – Basic Parameter

- Real Drive Axis / Basic Parameter / Absolute Position Control Setting - Disable selected

MELSOFT GX Works3 C:\Work\테스트샘플\connectionGuide.gx3 - [Axis Parameter Setting]

Navigation: Project, Module Configuration, Program, FB/FUN, Label, Device, Parameter, System Parameter, MXR300-16, CPU Parameter, Module Parameter (Common Setting), Module Parameter (Port 1/2: CC-Link), Module Parameter (CC-Link IE TSN), Network Label Setting, Module Parameter (Port 3: Ethernet), Memory Card Parameter, Add-on Parameter, Module Information, Motion Setting, Motion System Setting, Axis.

Axis0001, Axis0002, Axis0003

Setting Item List: Real Drive Axis, Axis Information, Basic Parameter, Station Address Setting, Axis Type Setting, Axis Emulation Enabled, Control Cycle Setting, Object Data, Absolute Position Control Setting, Current Position Restore Reference, Ring Counter Enabled Selection, Ring Counter Upper Limit Value, Ring Counter Lower Limit Value, Position Command Unit, Position Command Unit String, Velocity Command Unit, Velocity Bias Value, Driver Unit Conversion Numerator, Driver Unit Conversion Denominator, Limit Parameter, Velocity Limit, Homing, Stop, Stroke Limit, Driver, Other, Real Encoder Axis, Virtual Drive Axis, Virtual Encoder Axis.

Setting Item: Select Folder, Display All Data

Item	Axis0001	Axis0002	Axis0003
Axis Information	Set Axis Information		
Axis No.	1	2	3
Station Address Setting	192.168.3.17	192.168.3.18	192.168.3.19
Axis Type Setting	0:Real Drive Axis	0:Real Drive Axis	0:Real Drive Axis
Axis Emulation Enabled	0:Disabled	0:Disabled	0:Disabled
Control Cycle Setting	0:Automatic Set	0:Automatic Set	0:Automatic Set
Object Data	0:Disable Absc	-1:Automatic Set	-1:Automatic Set
Current Position Restore Reference	0:Disable Absolute Position System		
Ring Counter Enabled Selection	1:Enable Absolute Position System		
Ring Counter Upper Limit Value	-1:Automatic Setting (Acquire from Connected Device)		
Ring Counter Lower Limit Value	-10000000000.0	-10000000000.0	-10000000000.0
Position Command Unit	pulse	pulse	pulse
Position Command Unit String	U/s	U/s	U/s
Velocity Command Unit	0.0 pulse/s	0.0 pulse/s	0.0 pulse/s
Velocity Bias Value	1 pulse	1 pulse	1 pulse
Driver Unit Conversion Numerator	1 pulse	1 pulse	1 pulse
Driver Unit Conversion Denominator	1 pulse	1 pulse	1 pulse
Limit Parameter	Set Limit Parameter		
Torque Limit Maximum Value	1000.0 %	1000.0 %	1000.0 %
Negative Direction Torque Limit Initial Value	300.0 %	300.0 %	300.0 %
Value	300.0 %	300.0 %	300.0 %
0:Detection at TRL	0:Detection at TRL	0:Detection at TRL	0:Detection at TRL
0.0 s	0.0 s	0.0 s	0.0 s

Explanation: <Axis Parameter Constant> Axis.PrConst.PosRestoration_AbsPosEnable Set the absolute position control setting. [Setting Range] 0:Disable Absolute Position System 1:Enable Absolute Position System -1:Automatic Setting (Acquire from Connected Device)

Item List Find Result Restore the Defa

Apply

POU List Favorites History Module Library

2-6. Motion Setting – Basic Parameter

- Real Drive Axis / Basic Parameter / Position Command Unit Settings (Ezi-SERVO CC-Link IE TSN ALL Encoder 10,000 ppr)

Ezi-SERVO CC-Link IE TSN ALL Encoder Resolution Setting Range is 10,000pulse/rev

The gear ratio setting method is the same as the existing method

1. Select the machine components, and enter the machine data to automatically set the axis parameters (position command unit, driver unit conversion numerator and driver unit conversion denominator).

2. Position Command Unit: degree

3. One Revolution: 360.0000 [degree]

4. Encoder Resolution: 10000 [pulse/rev]

5. Calculate Axis Parameters

Calculation Result

Axis Parameters: position Command Unit: degree, driver Unit Conversion Numerator: 1, Driver Unit Conversion Denominator: 3

As a result of calculation, no error occurs in the movement amount. Applying the calculation result above, the error for rev is 0.0 [degree] (movement amount) you perform is a

Click OK to reflect to the axis parameters.

MELSOFT GX Works3

Reflects the calculation result to the axis parameters.

Values currently set will be deleted and updated to the values of calculation result.

Are you sure?

예(Y) 아니요(N)

2-6. Motion Setting – Basic Parameter

- Real Drive Axis / Basic Parameter / Position Command Unit Settings (Ezi-SERVO CC-Link IE TSN ALL Encoder 10,000 ppr)

The screenshot shows the MELSOFT GX Works3 interface with the 'Axis Parameter Setting' window open for Axis0001. The 'Position Command Unit' section is highlighted with a red box, showing the following values:

Item	Axis0001	Axis0002	Axis0003
Position Command Unit	degree	mm	mm
Driver Unit Conversion Numerator	10000 pulse	10000 pulse	10000 pulse
Driver Unit Conversion Denominator	360 degree	5 mm	10 mm

Yellow callout boxes provide the following instructions:

- Select Robot or Stage Movement Unit
- Ezi-SERVO CC-Link IE TSN ALL Encoder 10,000pulse/rev
- Set Movement Distance/Angle per Motor Revolution

The 'Apply' button at the bottom right is circled in red.

2-6. Motion Setting – Basic Parameter

- Real Drive Axis / Basic Parameter / Limit Parameter

MELSOFT GX Works3 C:\Work\테스트샘플\connectionGuide.gx3 - [Axis Parameter Setting]

Navigation

- Project
 - Module Configuration
 - Program
 - FB/FUN
 - Label
 - Global Label
 - Global
 - En+Global
 - MotionSys+Global
 - Addon+Global
 - Ax+Global
 - NW+Global1
 - Structured Data Types
 - Device
 - Parameter
 - System Parameter
 - MXR300-16
 - Module Information
 - Motion Setting
 - Motion System Setting
 - Axis
 - Axis0001
 - Axis0002
 - Axis0003
 - Axis Group
 - Motion I/O Data
 - Operation Profile Data
 - Advanced Synchronous Control

Setting Item List

- Real Drive Axis
 - Axis Information
 - Axis No.
 - Basic Parameter
 - Station Address Setting
 - Axis Type Setting
 - Axis Emulation Enabled
 - Control Cycle Setting
 - Object Data
 - Absolute Position Control Setting
 - Current Position Restore Reference Position
 - Ring Counter Enabled Selection
 - Ring Counter Upper Limit Value
 - Ring Counter Lower Limit Value
 - Position Command Unit
 - Position Command Unit String
 - Velocity Command Unit
 - Velocity Bias Value
 - Driver Unit Conversion Numerator
 - Driver Unit Conversion Denominator
 - Limit Parameter
 - Torque Limit Maximum Value
 - Negative Direction Torque Limit Initial Value
 - Positive Direction Torque Limit Initial Value
 - Upper Limit Signal
 - Signal
 - Target
 - Lower Limit Signal
 - Signal
 - Target
 - Signal Detection Method
 - Compensation Time
 - Filter Time
 - Velocity Limit
 - Positive Direction Velocity Limit Value
 - Homing
 - Stroke Limit
 - Driver
 - Other
 - Virtual Drive Axis
 - Virtual Encoder Axis
 - Virtual Linked Axis

Setting Item

Item	Axis0001	Axis0002	A
Ring Counter Enabled Selection	0:Disabled	0:Disabled	0:Dis
Ring Counter Upper Limit Value	10000000000.0 degree	10000000000.0 m	10000
Ring Counter Lower Limit Value	-10000000000.0 degree	-10000000000.0	-10000
Position Command Unit	mm	mm	mm
Position Command Unit String			
Velocity Command Unit	U/s	U/s	U/s
Velocity Bias Value	0.0 degree/s	0.0 mm/s	0.0 m
Driver Unit Conversion Numerator	10000 pulse	10000 pulse	10000
Driver Unit Conversion Denominator	360 degree	5 mm	10 m
Limit Parameter	Set Limit Parameter		
Torque Limit Maximum Value	1000.0 %	1000.0 %	1000.0
Negative Direction Torque Limit Initial Value	300.0 %	300.0 %	300.0
Positive Direction Torque Limit Initial Value	300.0 %	300.0 %	300.0
Upper Limit Signal			
Signal	[VAR](BOOL)Ezi_SERVO_CT_001_DigitalInputs.1		
Target			
Signal Detection Method	0:Detection at TRUE	0:Detection at TRUE	0:Detection at TRUE
Compensation Time	0.0 s	0.0 s	0.0 s
Filter Time	0.0 s	0.0 s	0.0 s
Lower Limit Signal			
Signal	[VAR](BOOL)Ezi_SERVO_CT_001_DigitalInputs.0		
Target			
Signal Detection Method	0:Detection at TRUE	0:Detection at TRUE	0:Detection at TRUE
Compensation Time	0.0 s	0.0 s	0.0 s
Filter Time	0.0 s	0.0 s	0.0 s
Velocity Limit	Set Velocity Limit		
Positive Direction Velocity Limit Value	2500000000.0 degree/s		

Explanation

Specify the logic of the signal.
The selectable setting values are different depending on the function. Check the Manual of each function.

[Setting Range]
0:Detection at TRUE
1:Detection at FALSE
2:Detection at FALSE -> TRUE (Rising Edge)
3:Detection at TRUE -> FALSE (Falling Edge)
4:Detection at Rising Edge/Falling Edge

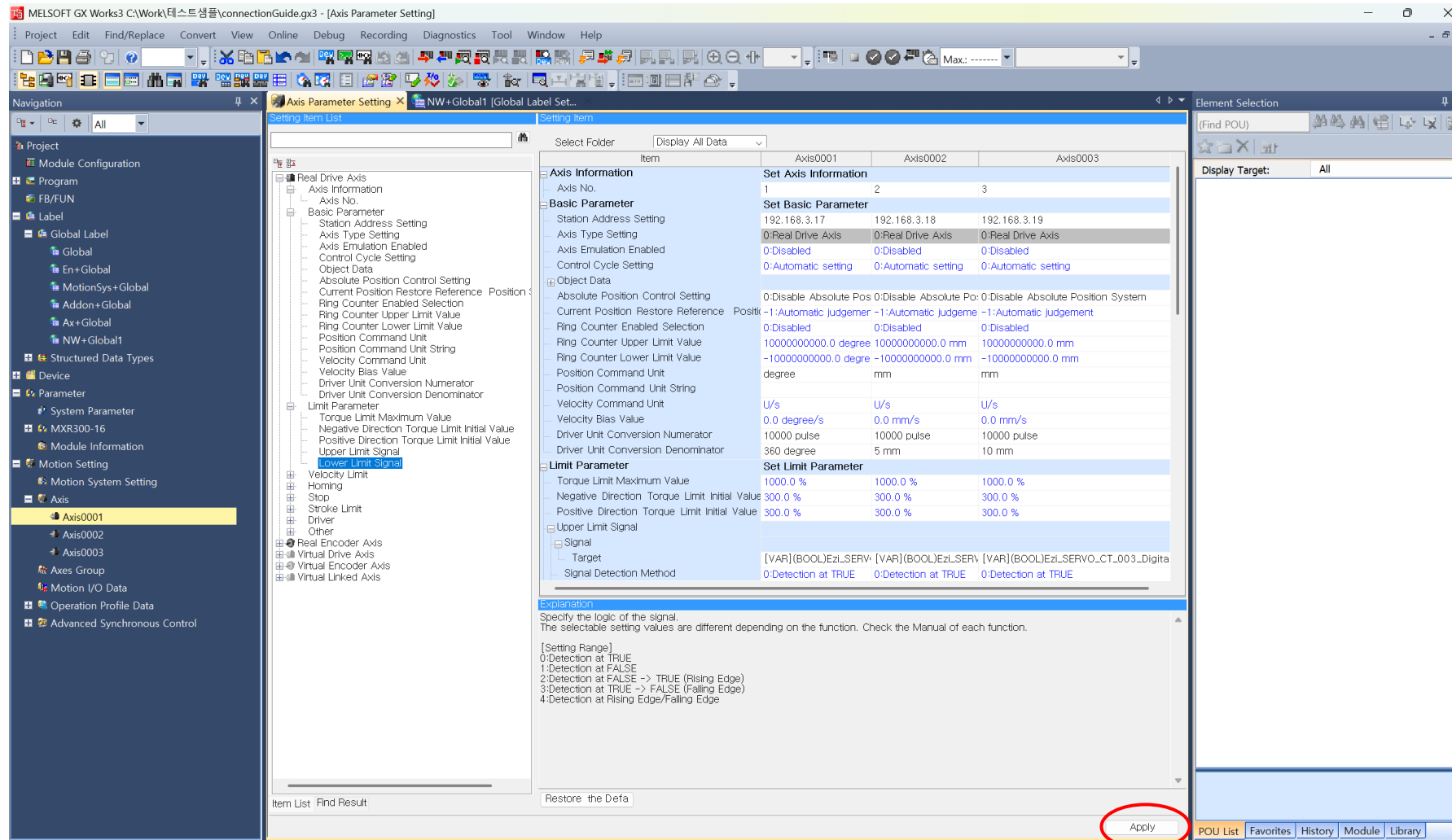
Apply

POU List Favorites History Module Library

Note) If the label setting for Ezi_SERVO_CT_xxx_DigitalInputs.x fails,
1. Check PDO Mapping Setting (pages 16-17)
2. Verify Network Label Setting (pages 21-22)

2-6. Motion Setting – Parameter Registration

- Complete Motion Setting by registering parameters



2-7. Convert

- Regarding parameter settings, etc., "Create Execution Programs after Conversion"

The screenshot shows the MELSOFT GX Works3 interface with the 'Convert' menu open. The 'Rebuild All' option is highlighted with a red box and a red circle labeled '1'. The 'Rebuild All' dialog box is displayed in the foreground, showing the 'Create Execution Programs' section with the 'Create Execution Programs after Conversion' radio button selected, circled with a red circle and labeled '2'. The 'OK' button is circled with a red circle and labeled '3'. An orange callout box with the text 'MX Controller must Create Execution Programs after Conversion' is overlaid on the dialog. The background shows the 'Setting Item' table with columns for Axis0001, Axis0002, and Axis0003, and rows for Axis Information, Basic Parameter, and Conversion Setting.

Item	Axis0001	Axis0002	Axis0003
Axis Information	Set Axis Information		
Axis No.	1	2	3
Station Address Setting	192.168.3.17	192.168.3.18	192.168.3.19
Axis Type Setting	0:Real Drive Axis	0:Real Drive Axis	0:Real Drive Axis
Axis Emulation Enabled	0:Disabled	0:Disabled	0:Disabled
Basic Parameter	Set Basic Parameter		
Station Address Setting	192.168.3.17	192.168.3.18	192.168.3.19
Axis Type Setting	0:Real Drive Axis	0:Real Drive Axis	0:Real Drive Axis
Axis Emulation Enabled	0:Disabled	0:Disabled	0:Disabled
Conversion Setting	0:Automatic setting	0:Automatic setting	0:Automatic setting
Absolute Pos.	0:Disable	0:Disable	0:Disable
Absolute Position System	0:Automatic judgement	0:Automatic judgement	0:Automatic judgement
Absolute Judgement	0:Automatic judgement	0:Automatic judgement	0:Automatic judgement
Velocity Limit	U/s	0.0 mm/s	10000 pulse
Stop	1000.0 %	300.0 %	300.0 %
Stroke Limit	1000.0 %	300.0 %	300.0 %
Driver	0:Detection at TRUE	0:Detection at TRUE	0:Detection at TRUE
Other	0:Detection at TRUE	0:Detection at TRUE	0:Detection at TRUE

Rebuild All

Rebuild all programs in the Project.

The next time you Rebuild after writing data to PLC, last execution information of device/label and risk will be initialized.

Create Execution Programs

☐ Conversion Only

☒ Create Execution Programs after Conversion

Create an execution program after executing the Rebuild All.

Compared to not creating, the required time will be increased.

Conversion Setting

Execute rebuild with the following settings. Please check details in Options.

Do Not Use the Same Label Name in Global Label

Options

OK Cancel

MX Controller must Create Execution Programs after Conversion

Signal Detection Method

0:Detection at TRUE 0:Detection at TRUE 0:Detection at TRUE

Explanation

Specify the logic of the signal. The selectable setting values are different depending on the function. Check the Manual of each function.

[Setting Range]

0:Detection at TRUE

1:Detection at FALSE

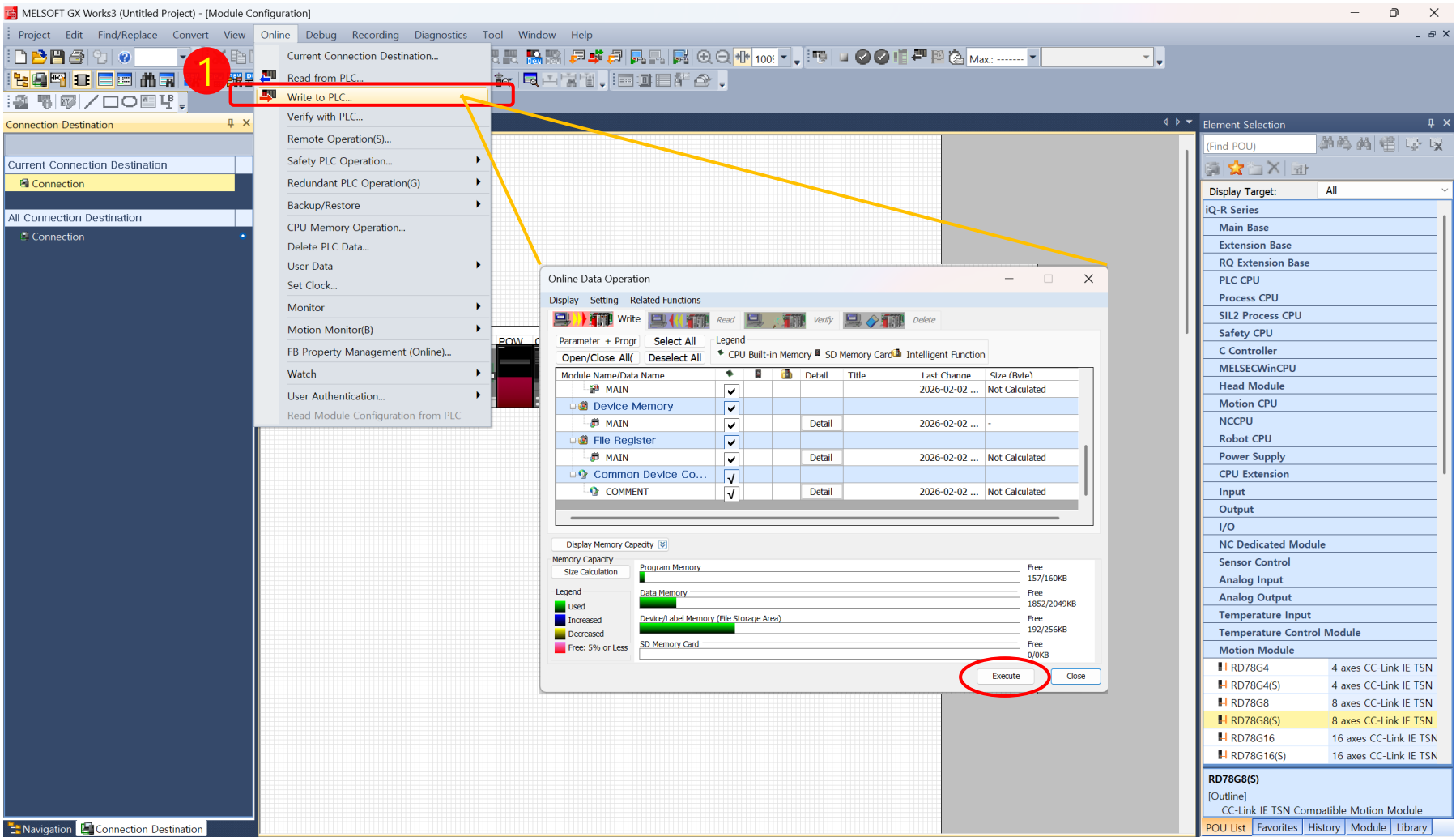
2:Detection at FALSE -> TRUE (Rising Edge)

3:Detection at TRUE -> FALSE (Falling Edge)

4:Detection at Rising Edge/Falling Edge

2-8. Write to PLC

- Online Data Operation



3. Follow the Program

3-1. Exploring Motion Control Commands

- Motion Control Function/Function Block Commands – Element Selection (Left Menu)

The screenshot displays the MELSOFT GX Works3 interface. On the left, the 'Project' tree shows the 'ProgramBody' folder selected. The main workspace shows a ladder logic diagram with a 'MC_Power 1 (MC_Power)' block. A yellow dotted arrow points from the 'MC_Power' block to the 'Motion Control Function/Function Block' selection menu on the right. The menu is titled 'Motion Control Function/Function Block' and lists various commands under 'Administrative' and 'General FB' categories. A red box highlights the 'Motion Control Function/Function Block' section, and a yellow box highlights the 'MC_Power' block in the menu. The text 'Mouse Click & Drag' is overlaid on the menu.

Mouse Click & Drag

Motion Control Function/Function Block

Command	Description
MC_AbortTrigger	Touch Probe Disabled
MC_CamTableSelect	Cam Table Selection
MC_DigitalCamSwitch	Outputs the digital ca
MC_GroupDisable	Axes Group Disabled
MC_GroupEnable	Axes Group Enabled
MC_GroupReset	Axes Group Error Resi
MC_GroupSetOverri	Axes Group Override
MC_Power	Operation Available
MC_ReadParameter	Parameter Read
MC_Reset	Axis Error Reset
MC_SetOverride	Override Value Setting
MC_SetPosition	Current Position Chan
MC_TouchProbe	Touch Probe Enabled
MC_WriteParameter	Parameter Write
MCv_AdvCamSetPos	Advanced Synchron
MCv_AdvPositionPe	Advanced Synchron
MCv_AllPower	All Axes Operation Av
MCv_ChangeCycle	Current Value Change
MCv_MotionErrorRe	Motion Error Reset
MCv_SetTorqueLimi	Torque Limit Value
MCv_SyncOperation	Control Operation Cyc

General FB

MC_AbortTrigger

[Version]
00A

POU List Favorites History Module Library

3-2. [Ladder] SERVO Enable, SERVO ON

- Ezi-SERVO CC-Link IE TSN ALL Enable/SERVO ON Program

The screenshot displays the MELSOFT GX Works3 interface for a ladder logic program. The main workspace shows a ladder logic diagram with the following steps:

- Step 1: Read Mtr (0)
- Step 2: DUT: Axis (Axis001.A)
- Step 3: B: Enable (bAx1SrvEnbl)
- Step 4: B: ServoON (bAx1SrvOn)
- Step 5: MC_Power 1 (MC_Power)
- Step 6: Axis: DUT (Axis: DUT)
- Step 7: Status: B (ReadyStat: B)
- Step 8: Busy: B (Error: B)
- Step 9: ErrorID: UW
- Step 10: END

A callout box highlights the following information:

SERVO ON/OFF FB: 2 types

- Individual On/Off: MC_Power
- Batch On/Off: MCv_AllPower

The right-hand pane shows the Element Selection window, which lists various Motion Control Function/Function Block elements. The 'MC_Power' element is highlighted in the list.

3-3. [Ladder] Specifying the homing method

- Specifying the homing method (MC_WriteParameter, 33: Homing in

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

Homing Parameter Address: H60980008

Homing Method: 33 (Homing index pulse (negative direction))

FB: MC_WriteParameter

MC_WriteParameter_1 (MC_001)

Parameter	Value
Homing Parameter Address	H60980008
Homing Method	33.0

Comparison	Time Data Type
Single Numeric Variable	
Selection	
String	
Bit Shift	
Edge Detection	
Counter	
Timer	
Bistable	
Motion Control Function/Function Block	
Administrative	
MC_AbortTrigger	Touch Probe Disabled
MC_CamTableSelect	Cam Table Selection
MC_DigitalCamSwitc	Outputs the digital ca
MC_GroupDisable	Axes Group Disabled
MC_GroupEnable	Axes Group Enabled
MC_GroupReset	Axes Group Error Rese
MC_GroupSetOverri	Axes Group Override
MC_Power	Operation Available
MC_ReadParameter	Parameter Read
MC_Reset	Axis Error Reset
MC_SetOverride	Override Value Setting
MC_SetPosition	Current Position Chan
MC_TouchProbe	Touch Probe Enabled
MC_WriteParameter	Parameter Write

MC_WriteParameter

[Version]

00A

POU List Favorites History Module Libra

3-4. [Ladder] Execute Ezi-SERVO homing

- Execute Homing (MC_Home)

The screenshot displays the MELSOFT GX Works3 interface with a ladder logic program for executing Ezi-SERVO homing. The program is organized into a sequence of steps (12 to 29) across 12 rungs. The left sidebar shows the project structure, including the 'ProgramBody' and 'Motion Setting' sections. The right sidebar lists various function blocks and parameters, with 'MC_Home' selected under the 'Motion Control Function/Function Block' category.

Program Details:

- Step 12:** Initial setup, including writing parameters (bAx1WParam) and setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 13:** Execution of the homing routine (bAx1Home).
- Step 14:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 15:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 16:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 17:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 18:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 19:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 20:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 21:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 22:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 23:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 24:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 25:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 26:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 27:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 28:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).
- Step 29:** Setting the homing routine (bAx1HomeSL, bAx1HomeDo).

MC_Home Function Block:

Parameter	Value
MC_CamIn	Cam Operation Start
MC_CombineAxes	Addition/Subtraction I
MC_GearIn	Gear Operation Start
MC_GroupStop	Group Forced Stop
MC_Home	OPR
MC_MoveAbsolute	Absolute Value Positio
MC_MoveRelative	Relative Value Positio
MC_MoveVelocity	Speed Control
MC_Stop	Forced Stop
MC_TorqueControl	Torque Control
MCv_AdvancedSync	Advanced Synchronou
MCv_BacklashComp	Backlash Compensatic
MCv_CyclicPosition	Motion Cyclic Positio

MC_Home [Version] 00A

3-5. [Ladder] Execute Ezi-SERVO Operation

- Execute Move Operation (MC_MoveAbsolute)

Move to Arbitrary Position

- bAx1PosPos1 ON → 3600.0
- bAx1PosPos1 ON → 0.0
- ※ 3,600 – 10 revolutions

The screenshot shows the MELSOFT GX Works3 interface with a ladder logic program for MC_MoveAbsolute. The program is organized into steps (1-18) with various logic elements. A red circle highlights the EDMOV instruction in step 11, which is set to 3600.0 and edAx1Pos1. A yellow callout box provides additional information about the move operation.

MC_MoveAbsolute

Parameter	Value	Unit	Comment
DUT: Axis	Axis : DUT		
B: Execute	Done	B	
B: Continuou...	Busy	B	
L: Position	Active	B	
L: Velocity	Command	B	
L: Accelerati...	Error	B	
L: Decelerati...	ErrorID	UD	
L: Jerk			
W: Direction	K3		
W: BufferMo...			
UD: Options			

MC_MoveAbsolute

Version	00A
POU List	Favorites
History	Module
Library	

3-6. [Ladder] Ezi-SERVO DIO Operation

- Digital Input, Output Operation Execution

The screenshot displays the MELSOFT GX Works3 interface for a ladder logic program. The main workspace shows a ladder logic diagram with the following components:

- Parameters:**
 - 180000.0 L: Decelerati...
 - 0.0 L: Jerk
 - K3 W: Direction
 - W: BufferMode
 - UD: Options
- Ladder Logic:**
 - SM400 (30) connected to DMOV Ezi_SERVO...
 - D1.4 (32) connected to bAx1h[0]
 - D1.5 (34) connected to bAx1h[1]
 - D1.6 (36) connected to bAx1h[2]
 - D1.7 (38) connected to bAx1h[3]
 - D1.8 (40) connected to bAx1h[4]
 - D1.9 (42) connected to bAx1h[5]
 - bAx1Out[0] (44) connected to D3.1
 - bAx1Out[1] (46) connected to D3.2
 - bAx1Out[2] (48) connected to D3.3
 - bAx1Out[3] (50) connected to D3.4
 - bAx1Out[4] (52) connected to D3.5
 - SM400 (54) connected to DMOV D2 Ezi_SERVO...

The right panel shows the 'Ezi_SERVO_CT_001_DigitalInputs' and 'Ezi_SERVO_CT_001_PhysicalOutputs' sections. The 'Ezi_SERVO_CT_001_DigitalInputs' section lists various file operation instructions, including CC-Link IE TSN Network module, Add-on instructions, Standard Function/Function Block, Bit Type Boolean, Type Conversion, Arithmetic Operation, Comparison, Time Data Type, Single Numeric Variable, Selection, String, Bit Shift, Edge Detection, Counter, Timer, Bistable, and Motion Control Function/Function Block. The 'Ezi_SERVO_CT_001_PhysicalOutputs' section lists MC_MoveAbsolute and MC_MoveRelative instructions.

3-6. [Ladder] Ezi-SERVO DIO Map - Reference

- Digital Inputs

Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
-	Motor Power	TQOFF2	TQOFF1	-	-	User input 6	User input 5
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
User input 4	User input 3	User input 2	User input 1	Reserved	Reserved	Reserved	
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
-	-	-	-	-	-	-	-
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	-	Origin switch	Positive limit switch	Negative limit switch

- Physical Outputs

Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
-	-	-	-	-	-	-	-
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
-	-	-	User output 5	User output 4	User output 3	User output 2	User output 1
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
-	-	-	-	-	-	-	-
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	-	-	-	Set brake

Appendix

[Operation Verification] Axis Monitor

- Monitor the status, position, homing, and error of each axis.

The screenshot shows the MELSOFT GX Works3 interface with the Axis Monitor window open. The window displays a table of axis parameters for five axes (Axis #1 to Axis #5). The 'Homing Request' row is highlighted in green, indicating it is active. The 'Motion Common Monitor' panel on the right shows various motion parameters and error codes.

Axis Name	Axis #1	Axis #2	Axis #3	Axis #4	Axis #5
Axis Status	4:Standstill	4:Standstill	4:Standstill	4:Standstill	4:Standstill
Control Cycle	1	1	1	1	1
Position Command Unit Display	degree	degree	degree	degree	degree
Velocity Command Unit Display	degree/s	degree/s	degree/s	degree/s	degree/s
Set Position	0.10058283805847 d...	0.0 degree	0.0 degree	0.0 degree	0.0 degree
Actual Position	0.1003303527832 de...	0.0 degree	0.0 degree	0.0 degree	0.0 degree
Commanded Position	0.0 degree	0.0 degree	0.0 degree	0.0 degree	0.0 degree
Set Velocity	0.0 degree/s	0.0 degree/s	0.0 degree/s	0.0 degree/s	0.0 degree/s
Actual Velocity	-0.31650066375732 d...	0.0 degree/s	0.0 degree/s	0.0 degree/s	0.0 degree/s
Commanded Velocity	0.0 degree/s	0.0 degree/s	0.0 degree/s	0.0 degree/s	0.0 degree/s
Negative Direction Velocity Limit Value	2500000000.0 degree/s	2500000000.0 degree/s	2500000000.0 degree/s	2500000000.0 degree/s	2500000000.0 degree/s
Positive Direction Velocity Limit Value	2500000000.0 degree/s	2500000000.0 degree/s	2500000000.0 degree/s	2500000000.0 degree/s	2500000000.0 degree/s
Automatically Decelerating Command In-position	FALSE	FALSE	FALSE	FALSE	FALSE
Negative Direction Torque Limit Value	300.0 %	300.0 %	300.0 %	300.0 %	300.0 %
Positive Direction Torque Limit Value	300.0 %	300.0 %	300.0 %	300.0 %	300.0 %
Execution Profile ID No.	0	0	0	0	0
Homing Completed	FALSE	FALSE	FALSE	FALSE	FALSE
Homing Request	TRUE	TRUE	TRUE	TRUE	TRUE
Start Permission at Homing Uncompleted	FALSE	FALSE	FALSE	FALSE	FALSE
Upper Limit Signal Status	FALSE	FALSE	FALSE	FALSE	FALSE
Lower Limit Signal Status	FALSE	FALSE	FALSE	FALSE	FALSE
Forced Stop Cancelling	TRUE	TRUE	TRUE	TRUE	TRUE
Axis Error Detection	FALSE	FALSE	FALSE	FALSE	FALSE
Axis Error Code	H0000	H0000	H0000	H0000	H0000
Axis Warning Detection	FALSE	FALSE	FALSE	FALSE	FALSE
Axis Warning Code	H0000	H0000	H0000	H0000	H0000
Driver Ready On Status	TRUE	TRUE	TRUE	TRUE	TRUE
Driver Servo On Status	TRUE	TRUE	TRUE	TRUE	TRUE
Driver Status	6:Operation Enable	6:Operation Enable	6:Operation Enable	6:Operation Enable	6:Operation Enable
Drive Unit Error Detection	FALSE	FALSE	FALSE	FALSE	FALSE
Drive Unit Error Code	H0000	H0000	H0000	H0000	H0000
Drive Unit Error Detail Code	H0000	H0000	H0000	H0000	H0000

The 'Motion Common Monitor' panel on the right shows various motion parameters and error codes. The 'Ready' status is indicated by a green checkmark. The 'Synchronization flag' is also shown. The 'Operation Cycle Monitor' section displays processing times and setting cycles for various motion operations.

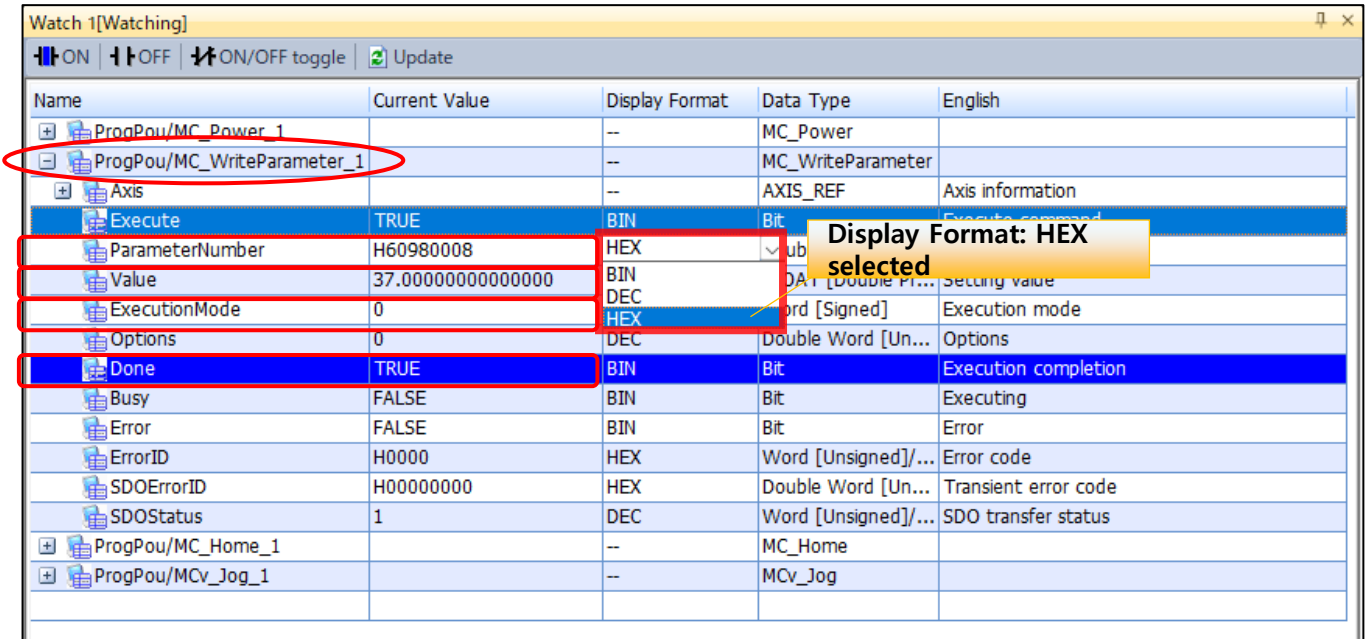
[Operation Verification] Changing the Homing Method

- Change the homing method using Motion Control FB

- ① Specify Parameter Number: H60980008
- ② Value (Homing Method) Specified: 33.0
- ③ Execution Mode: TRUE (Write)
- ④ Done: Becomes TRUE

The homing method is classified as follows based on the setting value for 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

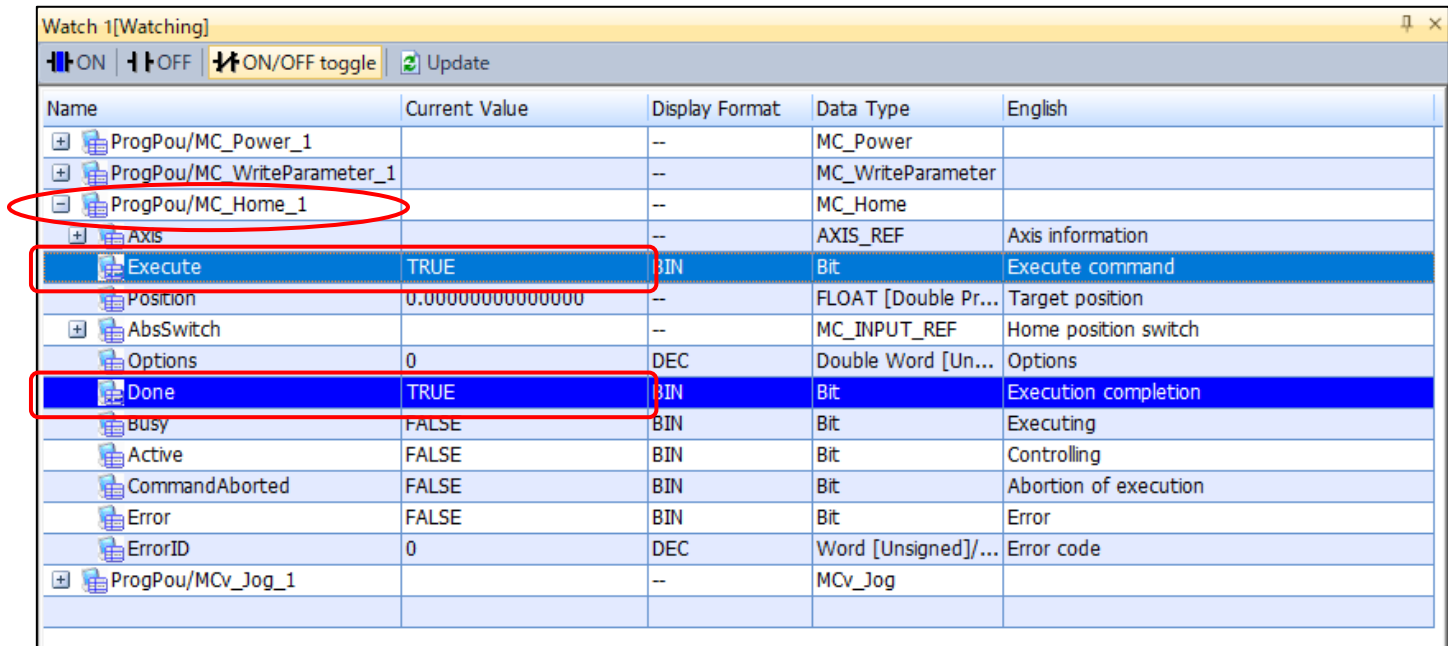


Name	Current Value	Display Format	Data Type	English
ProgPou/MC_Power_1		--	MC_Power	
ProgPou/MC_WriteParameter_1		--	MC_WriteParameter	
Axis		--	AXIS_REF	Axis information
Execute	TRUE	BIN	Bit	Execute command
ParameterNumber	H60980008	HEX	Word [Unsigned]/...	Setting value
Value	37.00000000000000	BIN	Double Word [Un...	Setting value
ExecutionMode	0	DEC	Word [Signed]	Execution mode
Options	0	DEC	Double Word [Un...	Options
Done	TRUE	BIN	Bit	Execution completion
Busy	FALSE	BIN	Bit	Executing
Error	FALSE	BIN	Bit	Error
ErrorID	H0000	HEX	Word [Unsigned]/...	Error code
SDOErrorID	H00000000	HEX	Double Word [Un...	Transient error code
SDOStatus	1	DEC	Word [Unsigned]/...	SDO transfer status
ProgPou/MC_Home_1		--	MC_Home	
ProgPou/MCv_Jog_1		--	MCv_Jog	

[Operation Verification] Homing

- Execute homing using motion control FB

- ① Execute → TRUE (Write)
- ② Done → Becomes TRUE



Name	Current Value	Display Format	Data Type	English
ProgPou/MC_Power_1		--	MC_Power	
ProgPou/MC_WriteParameter_1		--	MC_WriteParameter	
ProgPou/MC_Home_1		--	MC_Home	
Axis		--	AXIS_REF	Axis information
Execute	TRUE	BIN	Bit	Execute command
Position	0.0000000000000000	--	FLOAT [Double Pr...	Target position
AbsSwitch		--	MC_INPUT_REF	Home position switch
Options	0	DEC	Double Word [Un...	Options
Done	TRUE	BIN	Bit	Execution completion
Busy	FALSE	BIN	Bit	Executing
Active	FALSE	BIN	Bit	Controlling
CommandAborted	FALSE	BIN	Bit	Abortion of execution
Error	FALSE	BIN	Bit	Error
ErrorID	0	DEC	Word [Unsigned]/...	Error code
ProgPou/MCv_Jog_1		--	MCv_Jog	

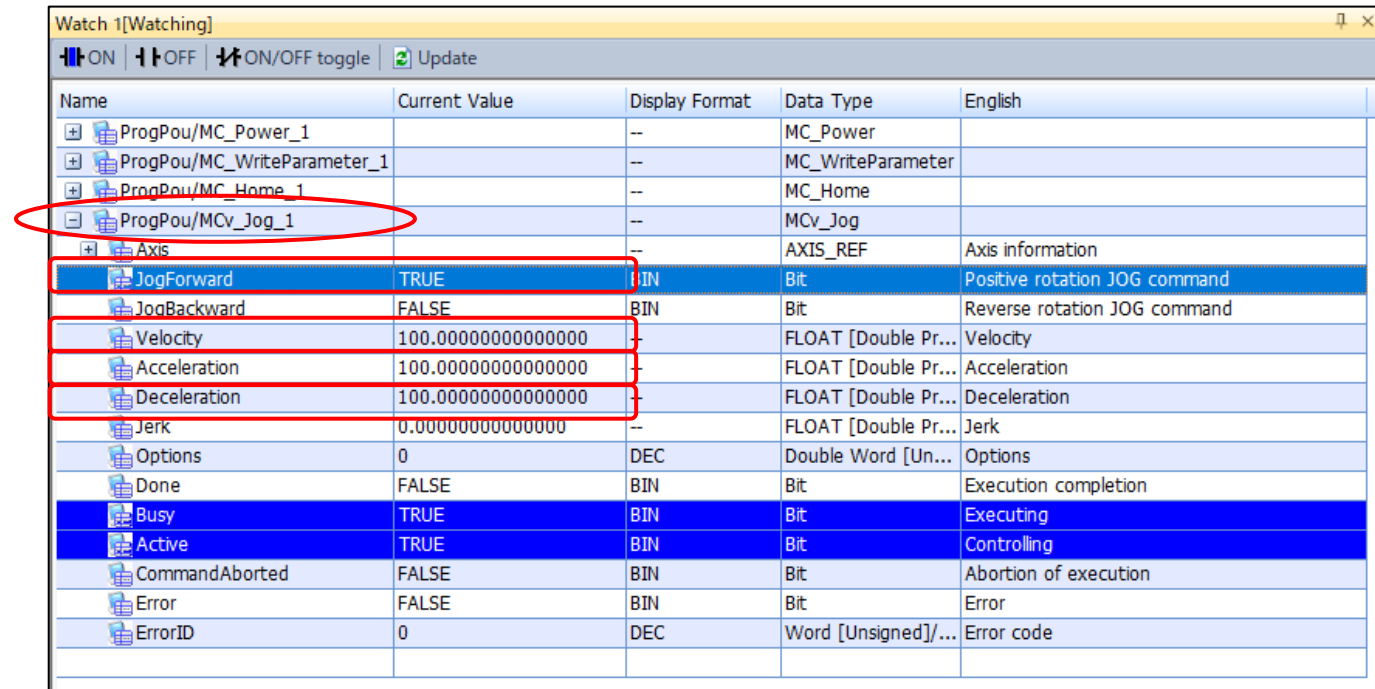
- When using the LIMIT+ / LIMIT- signals of Ezi-SERVO CC-Link IE TSN ALL as hardware stroke limits, set the following axis control data before startup (start).

[AxisName.Cd.HwStrokeLimit_Override] → 'DISABLE'

[Operation Verification] Jog Operation

- Execute Jog operation using Motion Control FB

- ① Velocity → 100.0
- ② Acceleration → 100.0
- ③ Deceleration → 100.0
- ④ JogForward → TRUE (Write)



Name	Current Value	Display Format	Data Type	English
ProgPou/MC_Power_1		--	MC_Power	
ProgPou/MC_WriteParameter_1		--	MC_WriteParameter	
ProgPou/MC_Home_1		--	MC_Home	
ProgPou/MCv_Jog_1		--	MCv_Jog	
Axis		--	AXIS_REF	Axis information
JogForward	TRUE	BIN	Bit	Positive rotation JOG command
JogBackward	FALSE	BIN	Bit	Reverse rotation JOG command
Velocity	100.00000000000000		FLOAT [Double Pr...	Velocity
Acceleration	100.00000000000000		FLOAT [Double Pr...	Acceleration
Deceleration	100.00000000000000		FLOAT [Double Pr...	Deceleration
Jerk	0.0000000000000000	--	FLOAT [Double Pr...	Jerk
Options	0	DEC	Double Word [Un...	Options
Done	FALSE	BIN	Bit	Execution completion
Busy	TRUE	BIN	Bit	Executing
Active	TRUE	BIN	Bit	Controlling
CommandAborted	FALSE	BIN	Bit	Abortion of execution
Error	FALSE	BIN	Bit	Error
ErrorID	0	DEC	Word [Unsigned]/...	Error code

[Operation Verification] Troubleshooting

- When an error occurs, check the cause in the Event History (log)

① [Online] -> [Motion Monitor] -> [Event History]

The screenshot shows the 'Motion Control Setting Function (Untitled Project)' software. The 'Motion Monitor' menu is open, and 'Event History' is selected. The 'Event History: [0000RD78G64]' window is displayed, showing a list of events. The 'Detailed Information' tab is active, showing details for event 000001.

Event History: [0000RD78G64]

Events to Exclude: All First (F) All Last (L)

Filter: ☒ Match all the conditions ☐ Match any one of the conditions

1. Event Type: Including Mask:

2.

3.

☐ Exclude program starts (Allow jumping)

Start Filter: Clear Filter Conditions

No.	Occurrence Date	Event Type	Status	Event Code	Description
000001	2024/10/15 15:15:57.552561336	System	OK	000001	Homing Request (H- to OK)
000002	2024/10/15 15:15:57.557015512	System	OK	000002	Current Position Extension Completion
000003	2024/10/15 15:15:57.557855334	System	OK	000003	servo System Extension Start
000004	2024/10/15 15:15:58.650189398	Operation	OK	207710	Follow-up Motion Execution
...	...	...	...	...	...

Legend: Warning Error Information

Detailed Information

Axis No. Information

Axis Type: Dual Drive Axis

Event Occurrence: 000001/000002/000003

Event Code: 000001

000001

Homing request was OK.

- Absolute position error in driver side was detected. (Base drive side only) (Detail Code: 000001)
- An absolute position error in the driver side was detected. (Detail Code: 000002)
- The axis type was changed. (Detail Code: 000003)
- Slave object: 'Polarity (007701)' b7 position polarity was changed. (Detail Code: 000004)
- Change of the drive of motion encoder was detected. (Detail Code: 000005)
- Machine homing was detected. (Detail Code: 000006)
- Driver unit connection (frictionless connection) of the axis was detected. (Detail Code: 000007)
- Machine homing has been detected after the system started. (Detail Code: 000008)

Create File...

Review the event in detail

[Operation Verification] Troubleshooting

- If **"SLMP Communication Error" (1C43h)** occurs
→ Please set the object data by referring to the axis parameters.
- If the **"Warning: Connection setting error for drive unit other than MELSERVO" (0D4Ch)** occurs
→ Refer to the axis parameters and disable the Absolute position system.
- If **"Control Mode Switching Error" (1A1Dh)** occurs when **starting MC_Home**
→ In the network configuration settings (add driver),
Set Network Synchronous Communication to ****"Synchronous"****.
- When starting MC_Home using the driver's **LIMIT+ / –** signals, it detects upper/lower limit signals and stops
→ Set [AxisName.Cd.HwStrokeLimit_Override] to 'DISABLE' and configure the axis control data in the program, etc.

[Parameter] Homing Parameter Settings

- Various settings related to homing are performed on the following object
 - Use MC_WriteParameter to write the setting values.
 - For detailed information on each object, refer to the Ezi-SERVO CC-Link IE TSN ALL manual.

Object Name	Index: Subindex	Setting Details
Home Offset	Obj.607C: 00h	Difference between the zero position of the machine coordinate system and the homing position
Homing method	Obj.6098: 00h	Homing method
Homing speeds	Obj.6099: 01h	Homing speeds
Homing speeds	Obj.6099: 02h	Cliff speed during homing
Homing acceleration	Obj.609A: 00h	Acceleration during homing



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