



Programmable Controllers
MELSEC iQ-F
series



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



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

Connection Guide

MELSEC iQ-F
series and

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

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

Mitsubishi Electric Products
FX5-40SSC-G(S), FX5-80SSC-G(S)

FASTECH Products
Ezi-ROBO CC-Link IE TSN VZR
(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 VZR is interfaced through the Ezi-SERVO CC-Link IE TSN 4X. The subsequent connection guide is described 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. Please 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-F FX5-SSC-G. 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][Ezi-SERVO 4X] Closed Loop Stepping System	
[Connection Guide][CC-Link IE TSN][MELSEC FX5-SSG-G][Ezi-ROBO VZR Ezi-SERVO 4X]	

- The MELSEC iQ-F FX5-SSC-G manual can be downloaded from the Mitsubishi Electric website.

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

Manual Name	Manual Number
MELSEC iQ-F FX5 Motion Unit / Simple Motion Unit User's Manual (Startup Edition)	IB-0300250
MELSEC iQ-F FX5 Motion Unit/Simple Motion Unit User's Manual (Application Edition)	IB-0300252
MELSEC iQ-F FX5 Motion Unit/Simple Motion Unit User's Manual (Advanced Synchronous Control Edition)	IB-0300254
MELSEC iQ-F FX5 Motion Unit User's Manual (CC-Link IE TSN Edition)	IB-0300567
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-F FX5 Motion Module 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 1] Homing Method

1. Overview

1-1. Overview

● MELSEC iQ-F FX5-SSC-G and Ezi-SERVO CC-Link IE TSN 4X Connection Guide

◆ Master station: FX5-40SSC-G(S) / FX5-80SSC-G(S)

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>)

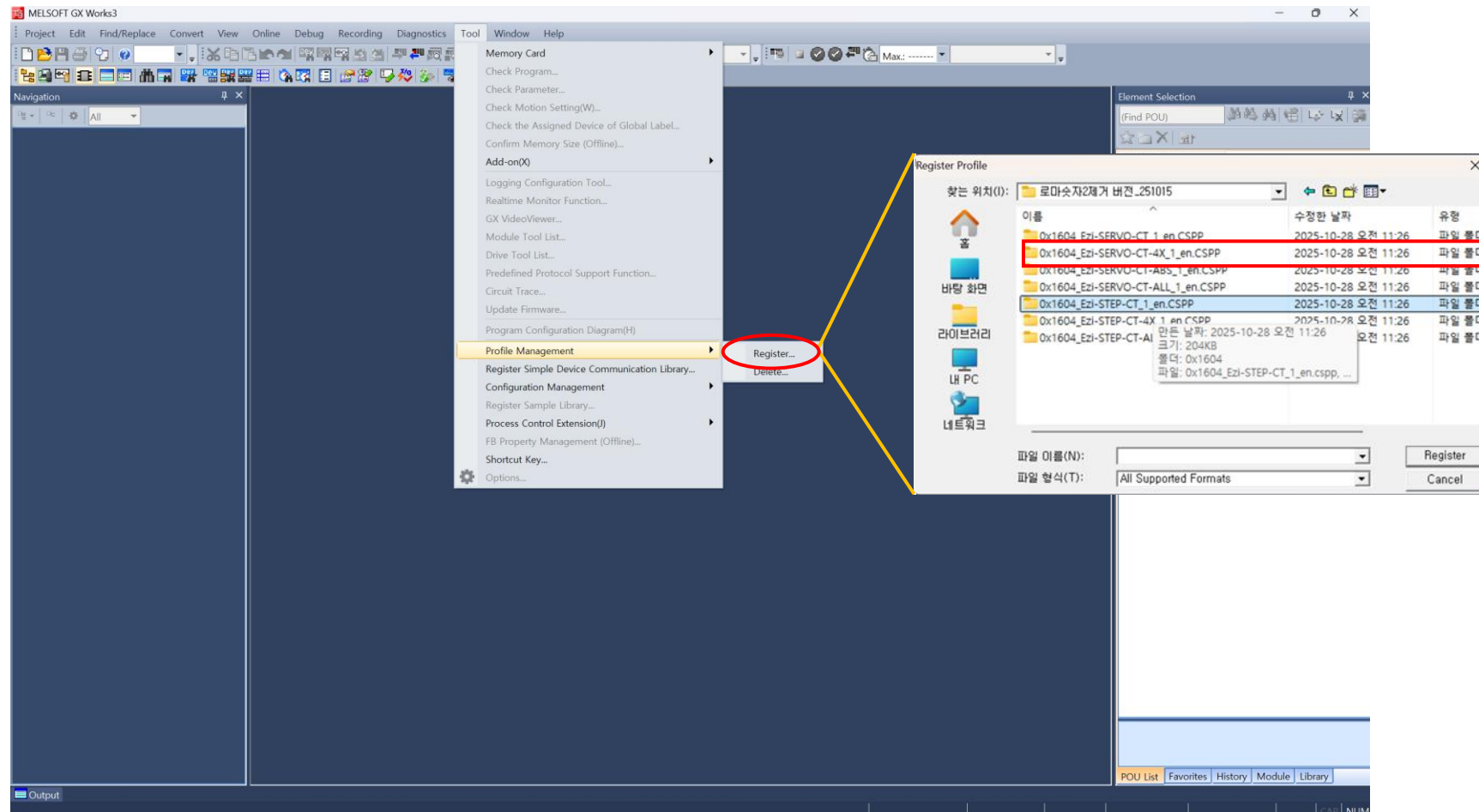
◆ Remote station: Ezi-SERVO CC-Link IE TSN 4X

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

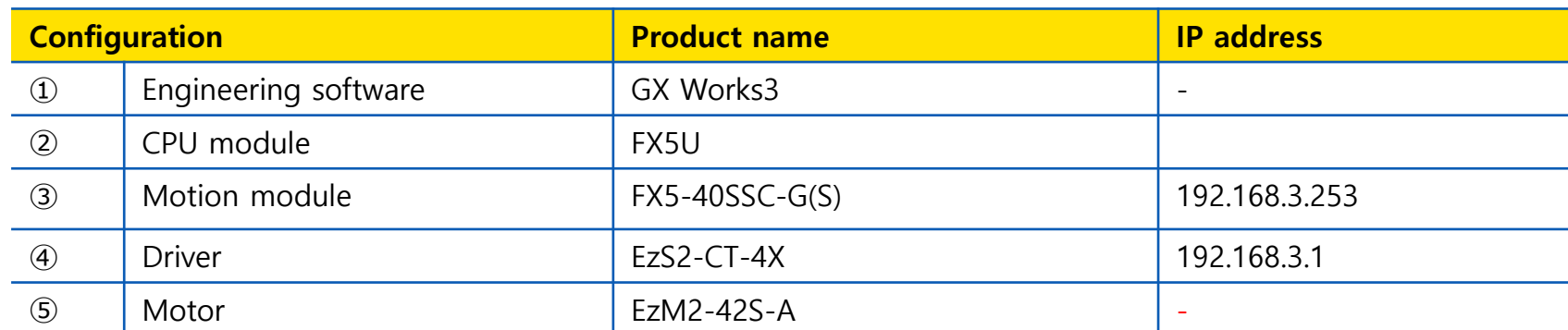
1-2. Ezi-SERVO CC-Link IE TSN 4X CSP+ File Registration

● CSP+ Registration

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



- **Network Connection**



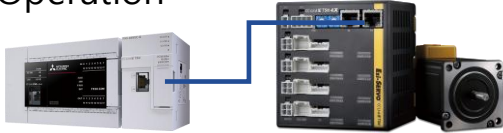
1-3. CC-Link IE TSN Configuration

- **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, FX5 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	PLC FX5 CPU Configuration 	Create a project for the FX5 CPU module using GX-Works3, then configure the unit parameters (communication method, connection target) and axis parameters (for motion control).
3	Verify FX5 + Ezi-SERVO Operation 	Write a program to verify that the FX5 CPU module and Ezi-SERVO are configured correctly. Manipulate labels to verify the motor operates normally.

1-4. Setup Sequence

● Ezi-SERVO Settings

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. ※ See [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 (FX5 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 unavailable.
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

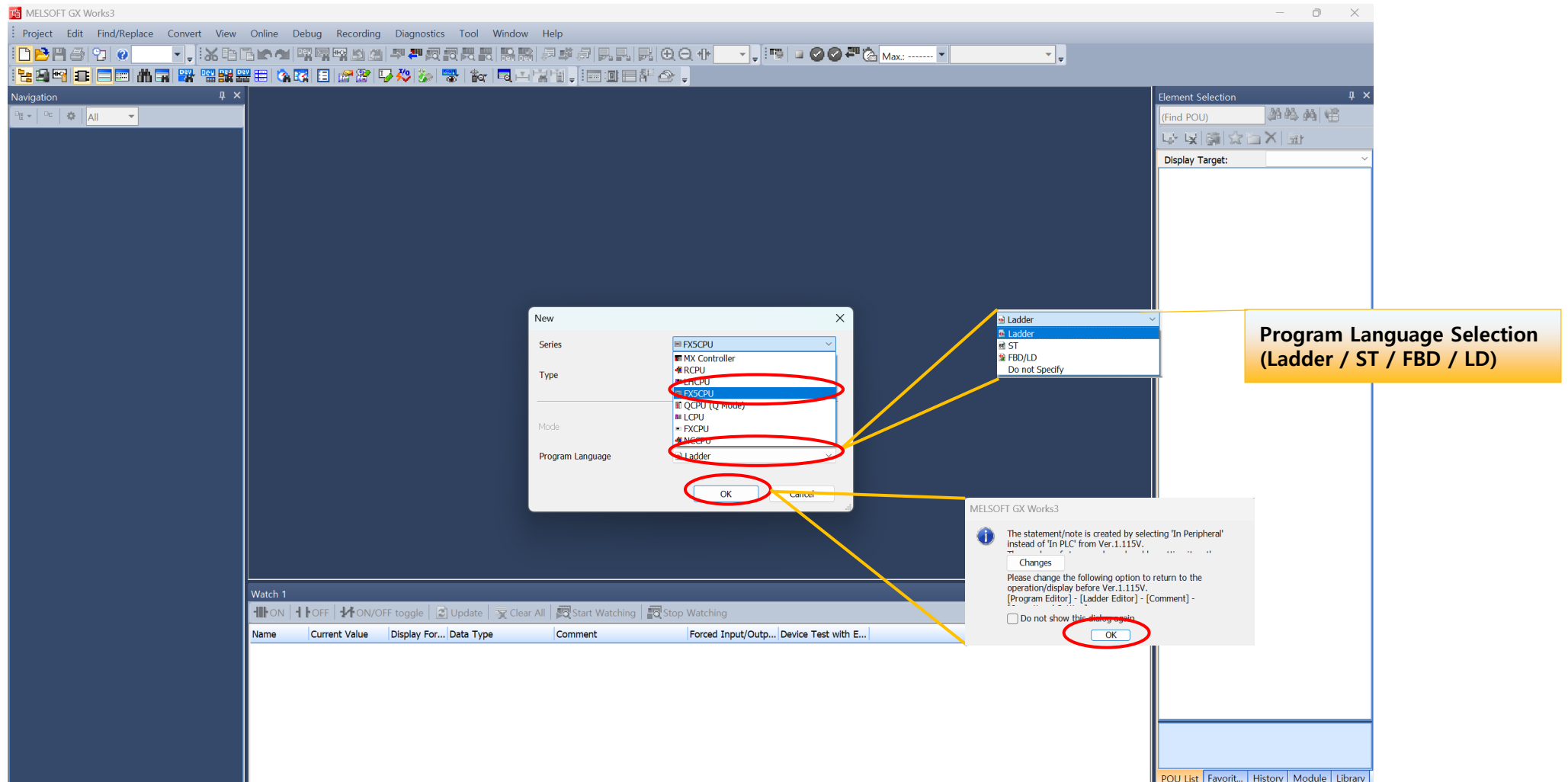
● Motion Control Function Restrictions (FX5 and Ezi-SERVO)

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 is always displayed as "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. FX5-40SSC-G(S) Settings

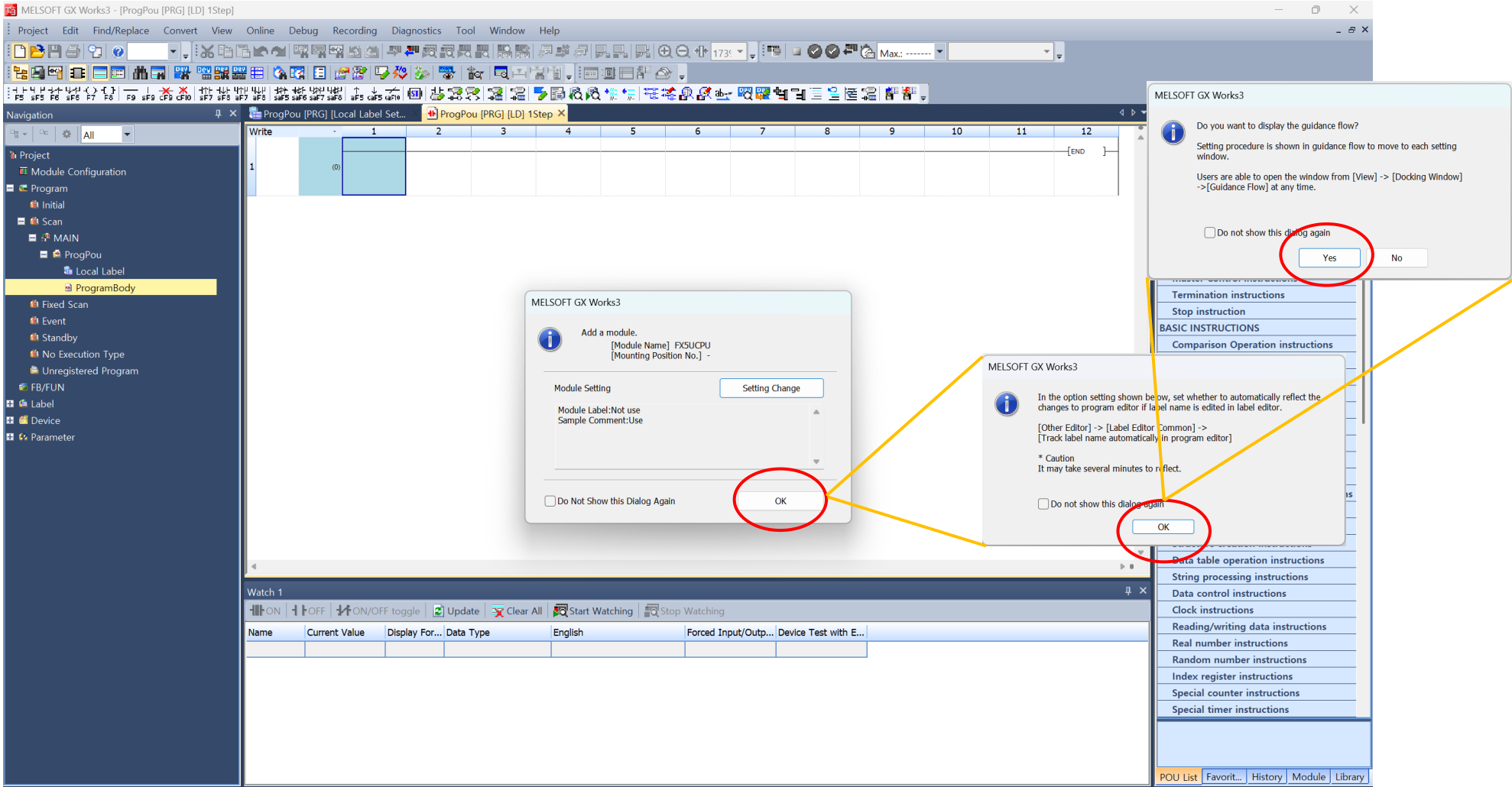
2-1. Project Creation

- When creating a new project, select iQ-F FX5, model name, number of axes used, and programming language



2-2. Module Registration

- FX5U CPU Registration



2-3. Module Configuration – H/W

- Click and drag with the mouse to install FX5-40SSC-G(S)

The screenshot shows the MELSOFT GX Works3 interface with the 'Module Configuration' window open. The 'Project' tree on the left shows the 'Module Configuration' folder selected, indicated by a red box and a yellow arrow labeled '1'. The main workspace shows a CPU module (FX5U) and a slot for the FX5-40SSC-G(S) module, indicated by a red box and a yellow arrow labeled '2'. A yellow callout box contains the text: '[Click & Drag] 1. FX5U CPU created. 2. FX5-40SSC-G(S)'. The 'Element Selection' panel on the right shows the 'FX5 Series' list, with 'FX5-40SSC-G(S) 4 axes CC-Link IE TSN' selected, indicated by a red box. A dialog box in the bottom left corner provides instructions on how to finish editing the module configuration.

MELSOFT GX Works3 (Untitled Project) - [Module Configuration *]

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

Navigation

Project

- Module Configuration
- Program
- Initial
- Scan
- MAIN
- ProgPou
- Local Label
- ProgramBody
- Fixed Scan
- Event

Type

Program

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.

OK

[Click & Drag]
1. FX5U CPU created.
2. FX5-40SSC-G(S)

Element Selection

(Find POU)

Display Target: All

FX5 Series

- Communication Adapter
- Analog Adapter
- Extension Power Supply Module
- Input
- Output
- I/O
- Analog Input
- Analog Output
- Temperature Control
- Multiple Input
- Motion Module
- FX5-40SSC-G(S) 4 axes CC-Link IE TSN
- FX5-80SSC-G(S) 8 axes CC-Link IE TSN
- Simple Motion
- Pulse I/O, Positioning
- Information Module
- Network Module
- FX5/FX Bus Conversion Module
- Safety Extension Module
- General Module
- FX5 Series General Module
- Configuration Module
- Figure

Watch 1

ON OFF ON/OFF toggle Update Clear All Start Watching Stop Watching

Name	Current Value	Display For...	Data Type	English	Forced Input/Outp...	Device Test with E...

FX5-40SSC-G(S)

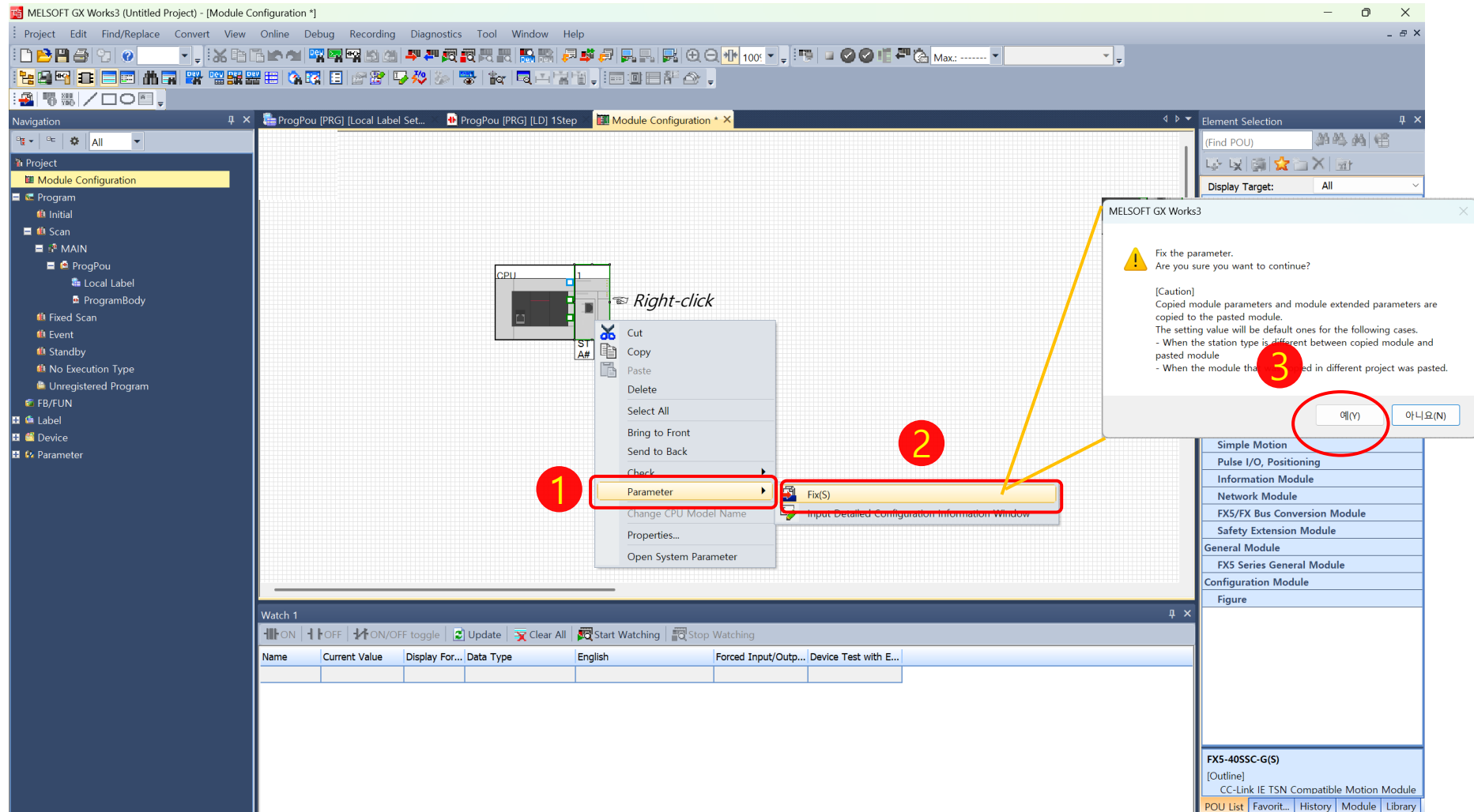
[Outline]

CC-Link IE TSN Compatible Motion Module

POU List Favorit... History Module Library

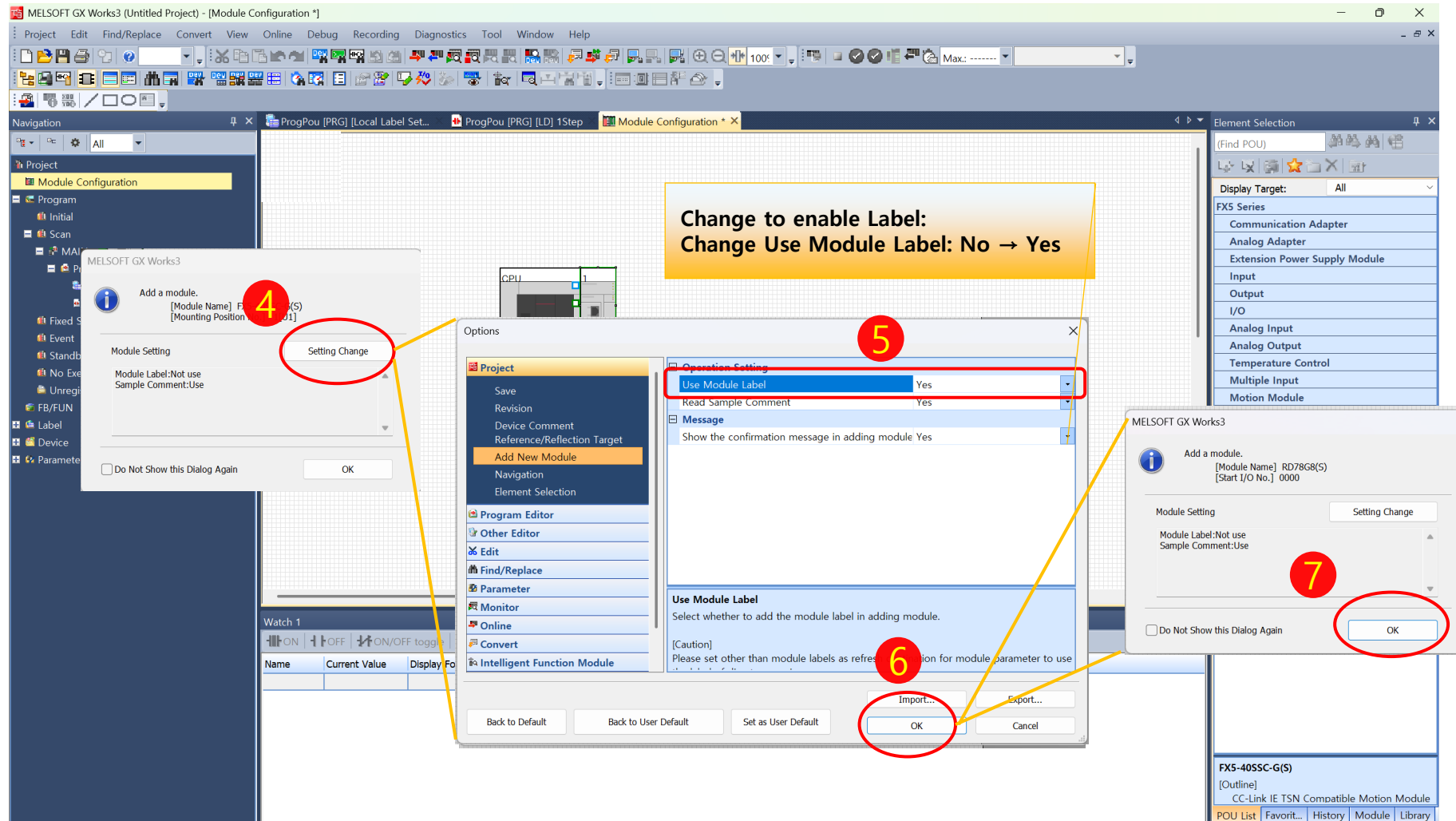
2-3. Module Configuration – H/W

- 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 / 1[U1]:FX5-40SSC-G(S)

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

1 Module Information / 1[U1]:FX5-40SSC-G(S)

2 Network Station No.: 1

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

Apply

Explanation
Set to determine how many bits of the IP address are used as the network address, which is used to identify the network. Masked bit has been specified from top between the top bit and bit 2.
For example, set '255.255.255.0 (FF.FF.FF.0)' to assign the upper 24 bits of IP address to the subnet mask.

[Setting range]
- Empty
- 0.0.0.1 to 255.255.255.255 (00.00.00.01 to FF.FF.FF.FF)

Name	Current Value	Display For...	Data Type	English	Forced Input/Outp...	Device Test with E...

POU List | Favorit... | History | Module | Library

2-4. Parameter / Module Information / 1[U1]:FX5-40SSC-G(S)

● Network Configuration Settings

The screenshot displays the MELSOFT GX Works3 software interface for configuring a 1[U1]:FX5-40SSC-G(S) module. The interface is divided into several panes:

- Project Tree (Left):** Shows the project structure. The 'Module Information' section is expanded, and the '1[U1]:FX5-40SSC-G(S)' module is selected (indicated by a red circle 1).
- Setting Item List (Center):** Lists the available settings for the selected module. 'Network Configuration Settings' is highlighted (indicated by a red circle 2).
- Configuration Window (Right):** Displays the 'Network Configuration Settings' for the selected module. The 'CC-Link IE TSN Configuration' tab is active. The 'Detailed Setting' button is highlighted (indicated by a red circle 3).

The 'CC-Link IE TSN Configuration' window shows the following settings:

- Mode Setting: Online (Unicast Mode)
- Cyclic Transmission Time (Min.): 50.00 us
- Module List: CC-Link IE TSN Selection, Find Module, My 4
- Module List Items: General CC-Link IE TSN Module, CC-Link IE TSN Module (Mitsubishi Ele), GOT3000 Series, GOT2000 Series, General-Purpose AC Servo, General purpose Inverter, DC Input, Transistor Output, I/O Combined, Analog Input, Analog Output, EnergyMeasuringUnit

The 'Output' pane at the bottom shows the 'Error' status.

2-4. Parameter / Module Information / 1[U1]:FX5-40SSC-G(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:

No.	Model Name	STA#	Station Type	RX Setting Points	RY Setting Points	RWr Setting Points	RWv 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-CT-4X	1	Remote Station			16	16		<Detail Setting>	192.168.3.17		
2	Ezi-SERVO-CT-4X	2	Remote Station			16	16		<Detail Setting>	192.168.3.18		
3	Ezi-SERVO-CT-4X	3	Remote Station			16	16		<Detail Setting>	192.168.3.19		
4	Ezi-SERVO-CT-4X	4	Remote Station			16	16		<Detail Setting>	192.168.3.20		

[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
- Network Interface Board
- 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

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

(x16) (x1)

[Station Type]
Remote Station

Network Label

Output
Error Warning Information

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2-4. Parameter / Module Information / 1[U1]:FX5-40SSC-G(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 / 1[U1]:FX5-40SSC-G(S)

- Select CC-Link IE TSN Module as Motion Control Station and Synchronous

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-CT-4X	1	Remote Station			16	16		<Detail Setting>	192.168.3.17		
2	Ezi-SERVO-CT-4X	2	Remote Station			16	16		<Detail Setting>	192.168.3.18		
3	Ezi-SERVO-CT-4X	3	Remote Station			16	16		<Detail Setting>	192.168.3.19		
4	Ezi-SERVO-CT-4X	4	Remote Station			16	16		<Detail Setting>	192.168.3.20		

Changes take effect immediately upon clicking

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
- Network Interface Board
- 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

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

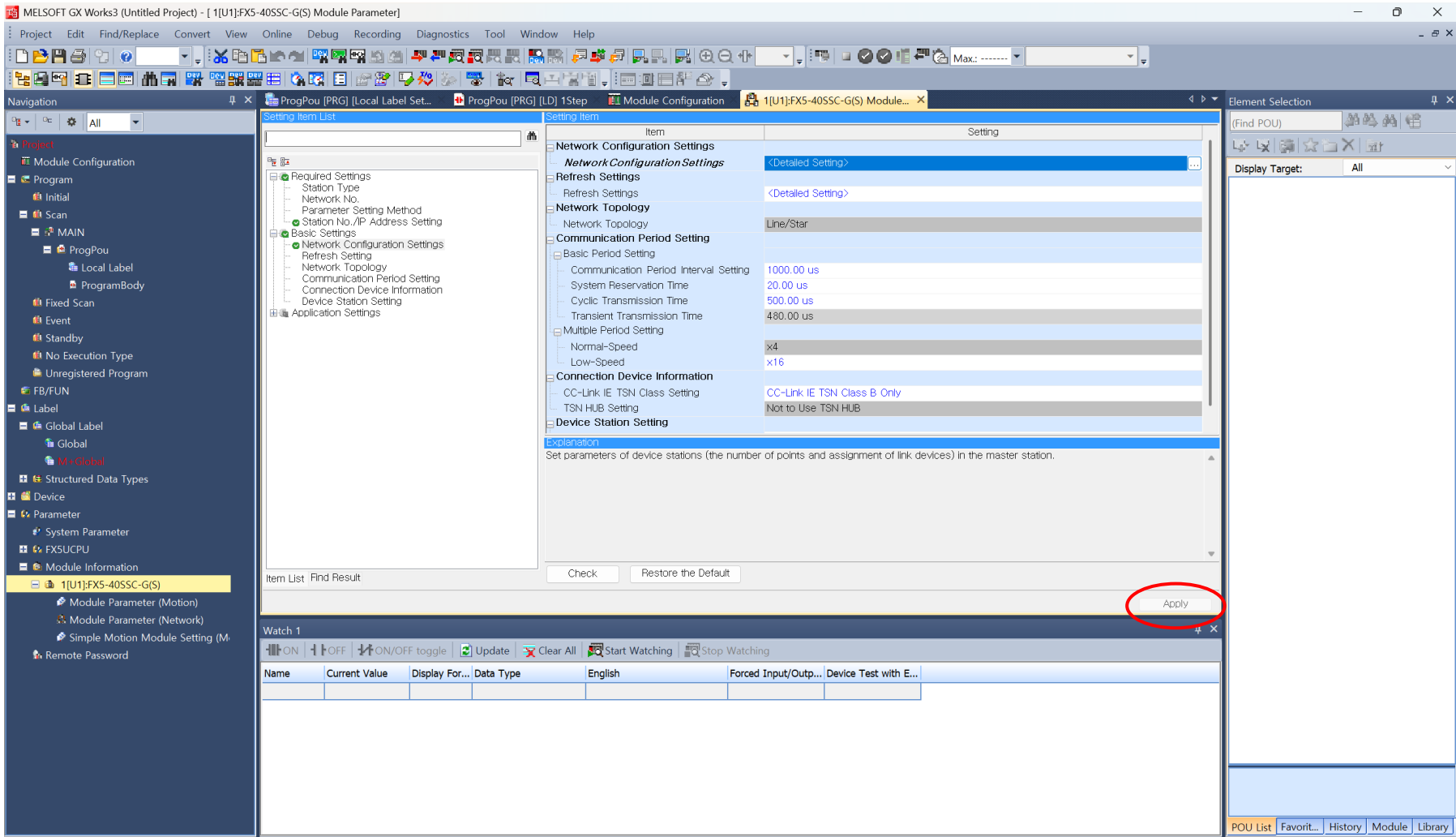
Network Label

Output

Error Warning Information

2-4. Parameter / Module Information / 1[U1]:FX5-40SSC-G(S)

- Applying Network Configuration Settings



2-4. Parameter / Module Information / 1[U1]:FX5-40SSC-G(S)

- Running the Simple Motion Module Setting Program

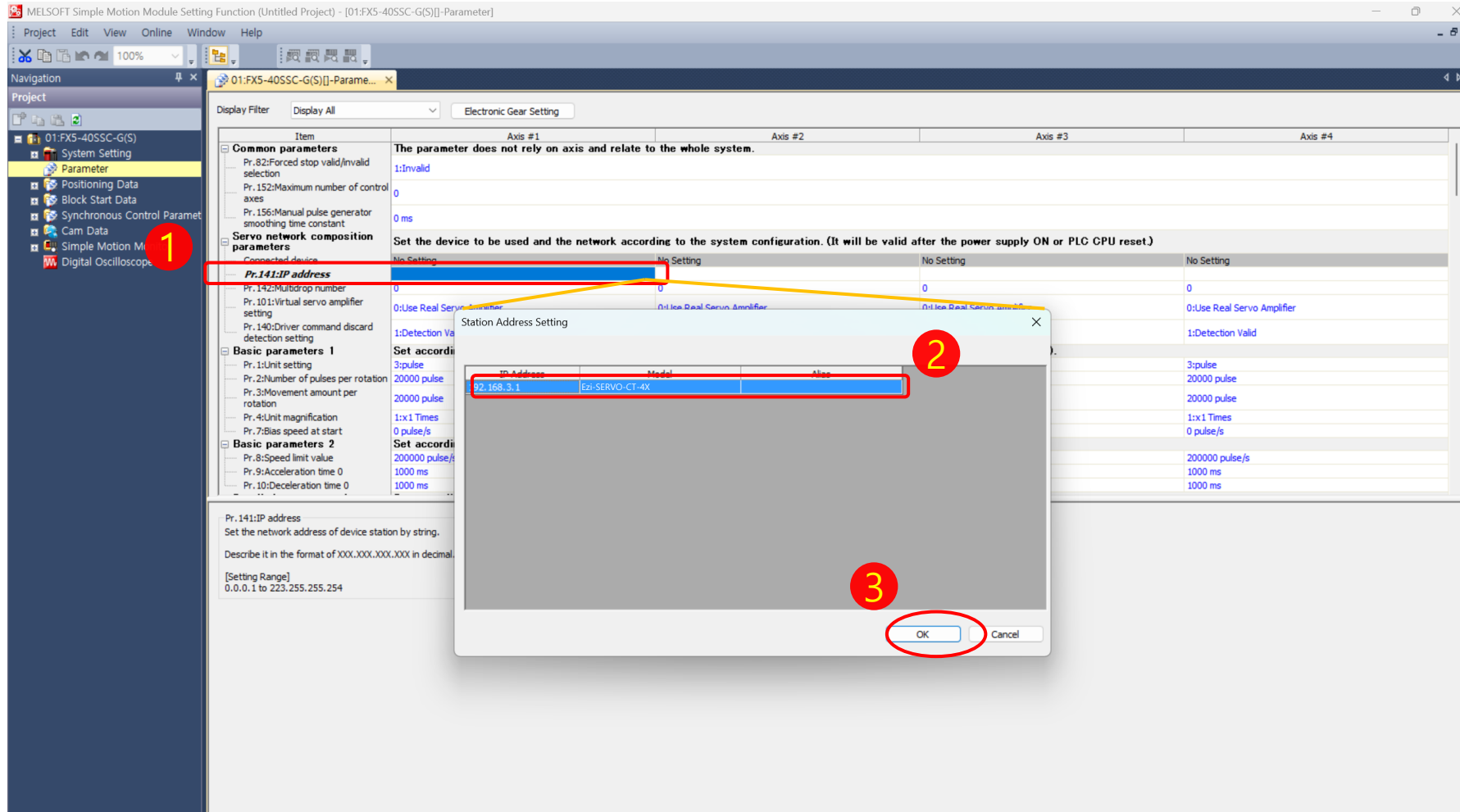
1

The screenshot displays the MELSOFT GX Works3 software interface. The left sidebar shows the project tree with the 'Simple Motion Module Setting (M)' option highlighted under the 'Parameter' folder. The main window shows the 'Simple Motion Module Setting Function' dialog box. The 'Display Filter' is set to 'Electronic Gear Setting'. 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' (0), 'Pr. 142: Multidrop number' (0), and 'Pr. 101: Virtual servo amplifier' (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	0	0	0	0
Pr. 142: Multidrop number	0: Use Real Servo Amplifier	0: Use Real Servo Amplifier	0: Use Real Servo Amplifier	0: Use Real Servo Amplifier
Pr. 101: Virtual servo amplifier	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



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) - [01:FX5-40SSC-G(S)]-Parameter

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

Project: 01:FX5-40SSC-G(S) > System Setting > Parameter

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) - [01:FX5-40SSC-G(S)]-Parameter

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

Project: 01:FX5-40SSC-G(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.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) - [01:FX5-40SSC-G(S)]-Parameter window. The left sidebar shows the navigation tree with 'Parameter' selected. The main window shows the 'Electronic Gear Setting' tab for Axis #1. The 'Basic parameters 1' section is expanded, and 'Pr.2: Number of pulses per rotation' is highlighted with a red circle and arrow labeled 1. The 'Electronic Gear Setting - Axis #1' dialog box is open, showing the 'Entry' tab. The 'Machine Components' dropdown is set to 'Others'. The 'Unit Setting' is set to '3:pulse'. The 'Movement Amount per Load Rotation (dSL)' is set to 10000 [pulse], highlighted with a red circle and arrow labeled 2. The 'Encoder Resolution' is set to 10000 [pulse], highlighted with a red circle and arrow labeled 3. The 'Calculate Electronic Gear' button is highlighted with a red circle and arrow labeled 4. The 'Calculation Result' dialog box is open, showing the calculated values: Unit Setting (3:pulse), Number of Pulses per Rotation (10000 pulse), Movement Amount per Rotation (10000 pulse), and Unit Magnification (1x1 Times). The 'OK' button is highlighted with a red circle and arrow labeled 5.

✓ 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

MELSOFT Simple Motion Module Setting Function (Untitled Project) - [01:FX5-40SSC-G(S)]-Parameter

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

Display Filter: Display All, Electronic Gear Setting

Item: Common parameters, Servo network composition, Basic parameters 1, Basic parameters 2, Detailed parameters 1

Axis #1: The parameter does not rely on axis and relate to...

Pr.2: Number of pulses per rotation (10000 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: 1 to 2000000000 pulse

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.

Calculate Electronic Gear

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

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 2000000000 pulse

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) - [01:FX5-40SSC-G(S)]-Parameter

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

Project: 01:FX5-40SSC-G(S) > System Setting > Parameter

Display Filter: Display All | Electronic Gear Setting

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	Ezi-SERVO-CT	Ezi-SERVO-CT		
Pr.141: IP address	192.168.3.1	192.168.3.50		
Pr.142: Multidrop number	0	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	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: 1 Times	1: 1 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	20000 pulse/s	200000 pulse/s	200000 pulse/s
Pr.9: Acceleration time 0	200 ms	1000 ms	1000 ms	1000 ms
Pr.10: Deceleration time 0	200 ms	1000 ms	1000 ms	1000 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	0 pulse		
Pr.12: Software stroke limit upper limit value	2147483647 pulse	2147483647 pulse	2147483647 pulse	2147483647 pulse
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		
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		
Pr.19: 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		
Pr.21: Command position value during speed control	0: Not Update of Command Position Value	0: Not Update of Command Position Value		
Pr.22: Inout signal logic selection : Lower limit	0: Neactive Logic	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 showing Speed vs Time. The graph shows a trapezoidal profile with acceleration time 0 and 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

- Parameter/Detailed parameters 1/FLS, RLS, DOG Signal selection: Input type : Invalid (Temporary)

MELSOFT Simple Motion Module Setting Function (Untitled Project) - [01:FX5-40SSC-G(S)]-Parameter

Project Edit View Online Window Help

Navigation 100%

Project

- 01:FX5-40SSC-G(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).	Set according to the system configuration when the system is started up(Set as required).	Set according to the system configuration when the system is started up(Set as required).	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

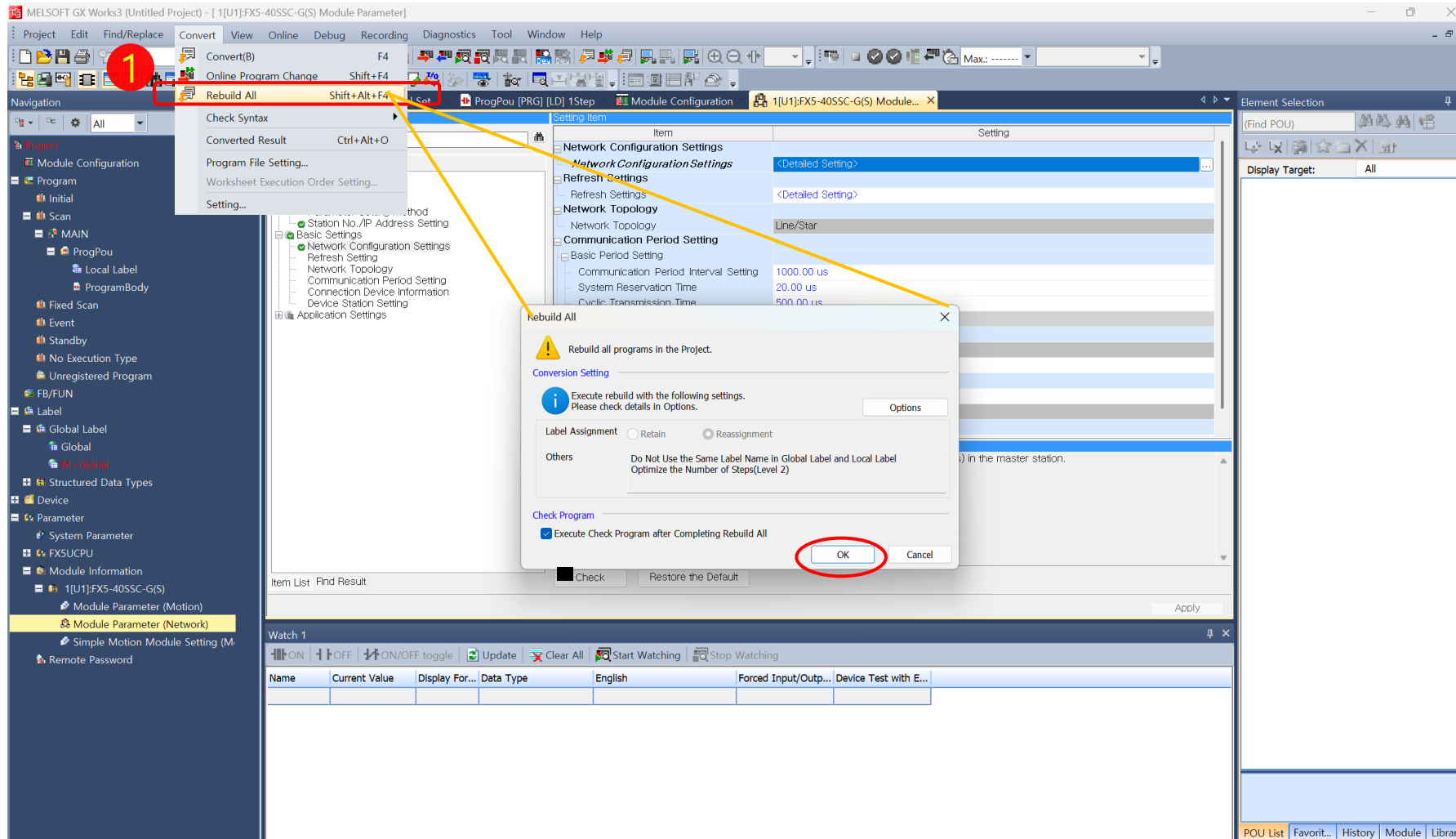
Basic parameters 1
Set according to the machine and applicable motor when system is started up (It will be valid according to PLC ready signal).

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 'Write to PLC...' is selected. The 'Online Data Operation' dialog box is displayed, showing a table of memory areas. The 'Common Device Co...' option is circled in red. 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.'

Online Data Operation

Display Setting Related Functions

Parameter + Progr Select All Legend
Open/Close All/ Deselect All CPU Built-in Memory SD Memory Card Intelligent Function

Module Name/Data Name	Detail	Title
MAIN		20
Device Memory		
MAIN		20
File Register		
MAIN		20
Common Device Co...		20
COMMENT		20

Display Memory Capacity

Memory Capacity Size Calculation

Legend

- Used
- Increased
- Decreased
- Free: 5% or Less

Program Memory Free 157/160KB

Data Memory Free 1852/2049KB

Device/Label Memory (File Storage Area) Free 192/256KB

SD Memory Card Free 0/0KB

Execute Close

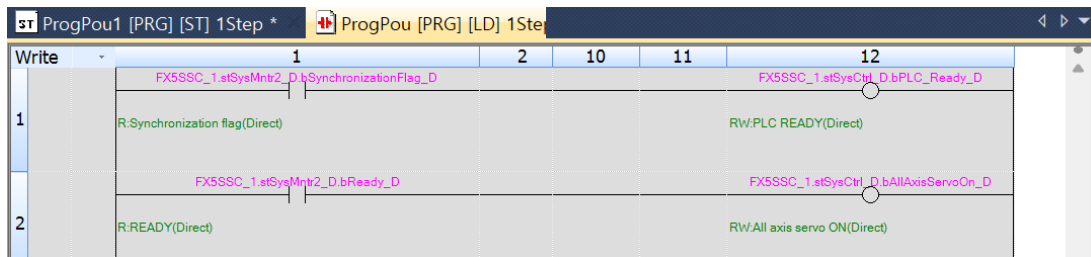
3. Verify Operation

3.1 Program Development

● PLC Motion Module: Ready / Servo On

Label (Variable) Method

[Ladder Program]



- ① Sequence Ready Signal (FX5SSC_1.stSysCtrl_D.bPLC_Ready_D): When ON
- ② Synchronization Flag (FX5SSC_1.stSysMntr2_D.bSynchronizationFlag_D): Requires ON
- ③ Ready Signal (FX5SSC_1.stSysMntr2_D.bReady_D): When ON
- ④ All-Axis Servo (FX5SSC_1.stSysCtrl_D.bAllAxisServoOn_D): ON required

Label (Variable) Method

[ST Program]

```
1 IF SM400 & FX5SSC_1.stSysMntr2_D.bSynchronizationFlag_D THEN
2   FX5SSC_1.stSysCtrl_D.bPLC_Ready_D := TRUE;
3 END_IF;
4
5 IF FX5SSC_1.stSysMntr2_D.bReady_D THEN
6   FX5SSC_1.stSysCtrl_D.bAllAxisServoOn_D := TRUE;
7 END_IF;
8
```

3.1 Program Development

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

The screenshot displays the MELSOFT GX Works3 interface for a ladder logic program. The main workspace shows a sequence of steps (1-12) with various logic elements and data moves. The left sidebar shows the project structure, and the right sidebar shows the element selection list.

Program Details:

- Step 1:** FX5S5C_1 atbSrvCtrl_D.bPLC_Ready_D (R/PLC READY(Direct))
- Step 2:** FX5S5C_1 atbSrvCtrl_D.bReady_D (R/READY(Direct))
- Step 3:** bSettingParam (12)
- Step 4:** DMOV K5000 FX5S5C_1 atbSrvCtrl_D.bJOG_Speed_D (RW/JOG speed(Direct))
- Step 5:** DMOV K50000 FX5S5C_1 atbSrvCtrl_D.bJOG_SpeedLimit_D (RW/JOG speed limit value(Direct))
- Step 6:** DMOV K200 FX5S5C_1 atbSrvCtrl_D.bJOG_AccTime_D (RW/JOG acceleration time(Direct))
- Step 7:** DMOV K200 FX5S5C_1 atbSrvCtrl_D.bJOG_DecTime_D (RW/JOG deceleration time(Direct))
- Step 12:** FX5S5C_1 atbSrvCtrl_D.bSynchronizationFlag_D (R/Synchronization flag(Direct))

Element Selection List:

- FX5-40SSC-G(S)
- M+FX5S5C_SetPositioningData_01A Positioning data set
- M+FX5S5C_StartPositioning_01A Positioning start FB
- M+FX5S5C_JOG_01A JOG/inching operation
- M+FX5S5C_MPG_01A Manual pulse generator
- M+FX5S5C_ChangeSpeed_01A Speed change FB
- M+FX5S5C_ChangeAccDecTime_01A Acc./dec. time SV change
- M+FX5S5C_ChangePosition_01A Target position change
- M+FX5S5C_Restart_01A Restart FB
- M+FX5S5C_OperateError_01A Error operation FB
- M+FX5S5C_InitializeParameter_01A Parameter initialization
- M+FX5S5C_WriteFlash_00A Flash ROM writing
- M+FX5S5C_ChangeTorqueControl_01A Torque control mode
- M+FX5S5C_ChangeSpeedControl_01A Speed control mode
- M+FX5S5C_ChangePositionControl_01A Position control mode
- M+FX5S5C_ChangeContinuousTorque_01A Continuous torque
- M+FX5S5C_Sync_01A Starting/ending synchronization
- M+FX5S5C_ChangeSyncEncoder_01A Sync encoder position
- M+FX5S5C_DisableSyncEncoder_01A Sync encoder counter
- M+FX5S5C_EnableSyncEncoder_01A Sync encoder counter
- M+FX5S5C_ResetSyncEncoderError_01A Sync encoder error
- M+FX5S5C_ConnectSyncEncoder_01A Sync encoder connection
- M+FX5S5C_MoveCamReference_01A Cam reference position
- M+FX5S5C_ChangeCamPosition_01A Cam position per cycle
- M+FX5S5C_ChangeMainShaftGear_01A MG Position per cycle
- M+FX5S5C_ChangeAuxiliaryShaftGear_01A AG position per cycle
- M+FX5S5C_MoveCamPositionPerCycle_01A Cam position per cycle
- M+FX5S5C_MakeRotaryCutterCam_01A Cam for rotary cutter
- M+FX5S5C_CalcCamCommandPerCycle_01A Cam command per cycle
- M+FX5S5C_CalcCamPositionPerCycle_01A Cam position per cycle

Module Label:

- M+FX5S5C_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 (MFX5SSC_JOG_01A1 Click & Drag)

The screenshot displays the MELSOFT GX Works3 software interface. The main workspace shows a ladder logic program with a network containing a DMOV instruction. A red box highlights the 'FB Instance Name' dialog box, which is open over the DMOV instruction. The dialog box shows 'Local Label (ProgPou)' as the source and 'MFX5SSC_JOG_01A1' as the instance name. A red circle with the number '1' is placed over the 'MFX5SSC_JOG_01A1' entry in the 'Element Selection' pane on the right. A yellow callout box with a checkmark and the text '✓ JOG Operation FB Creation: OK' is positioned below the dialog box. The 'Element Selection' pane on the right lists various modules, with 'MFX5SSC_JOG_01A1' highlighted. The bottom of the pane shows the details for 'MFX5SSC_JOG_01A1', including its Japanese description 'JOG運転 / インチング運転を行います。' and tabs for 'POU List', 'Favorites', 'History', 'Module', and 'Library'.

FB Instance Name

Local Label (ProgPou)

MFX5SSC_JOG_01A1

Register a FB instance at the last row.

✓ JOG Operation FB Creation: OK

1

MFX5SSC_JOG_01A1

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 Configuration / Operation / Results

✓ JOG Operation Execution Command

✓ Jog Forward Command

✓ Jog Reverse Command

✓ Jog Speed Command

✓ Jog Result Output

The screenshot displays the MELSOFT GX Works3 software interface for developing a Jog Operation Program. The main window shows a ladder logic diagram with steps 1 through 12. Step 1 is labeled 'JOG Operation Execution Command'. Step 2 is labeled 'Jog Forward Command'. Step 3 is labeled 'Jog Reverse Command'. Step 4 is labeled 'Jog Speed Command'. Step 5 is labeled 'Jog Result Output'. The right-hand pane shows the 'Module FB' configuration for 'FX5-40SSC-G(S)', listing various functions like 'M+FX5SSC_SetPositioningData', 'M+FX5SSC_StartPositioning_01A', 'M+FX5SSC_JOG_01A', etc. The 'JOG_01A' function is highlighted, showing its parameters and status. The 'Jog Result Output' section shows the status of the jog operation, including 'Jog OK', 'Jog Error', and 'Jog End'.

3.2 Axis Monitoring

- FX5-40SSC-G(S) PROGRAM RUN: D LINK Green LED lit
- Axis Monitor

FX5-40SSC-G

READY ●

D LINK ●

SD/RD ●

Axis Monitor

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	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	-

Module Information List

- PLC ready(Y0)
- READY(X0)
- Synchronization flag(X1)
- All axes servo ON(Y1)
- Md.108:Servo status 1 : READY ON
- Md.108:Servo status 1 : Servo ON
- Md.50:Forced stop input(U0WG4231)
- BUSY
- Md.31:Status : Error detection
- Md.31:Status : Axis warning detection
- Md.1:In test mode flag(U0WG4000)
- Md.133:Operation cycle over flag(U0WG4239)
- Md.64:Network error No.(U0WG31504)
- Md.132:Operation cycle setting(U0WG4238)
- Md.134:Operation time(U0WG4008)
- Md.135:Maximum operation time(U0WG4009)
- Md.19:Number of write accesses to flash ROM(U0WG...
- Md.52:Communication between amplifiers axes search...
- Md.131:Digital OSC. running flag(U0WG4011)

[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 control enabled
- ✓ All axes servo ON(Y1): All axes servo ON instruction

3.3 Axis Operation Verification

- **Jog Operation – Setup and Movement** (Verify Jog Operation Capability:
FX5SSC_1.stnAxMntr_D[0].uServoStatus1_D.1 → TRUE)

Program Mode (Ladder, Label)

✓ **bSetJogSpeed, bSetJogSpeedLimit, bSetJogAccel, bSetJogDesel**
Set value via ON/OFF

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

Instruction	Address	Comment
DMOV	K5000	FX5SSC_1.stnAxCtrl1_D[0].udJOG_Speed_D RW:JOG speed(Direct)
DMOV	K50000	FX5SSC_1.stnAxPrm_D[0].udJogSpeedLimit_D RW:JOG speed limit value(Direct)
DMOV	K200	FX5SSC_1.stnAxPrm_D[0].udAccelerationTime0_D RW:Acceleration time 0(Direct)
DMOV	K200	FX5SSC_1.stnAxPrm_D[0].udDecelerationTime0_D RW:Deceleration time 0(Direct)
MOV	K1	FX5SSC_1.stnAxCtrl2_D[0].uStartForwardJOG_D RW:Forward run JOG start(Direct)
MOV	K0	FX5SSC_1.stnAxCtrl2_D[0].uStartForwardJOG_D RW:Forward run JOG start(Direct)
MOV	K1	FX5SSC_1.stnAxCtrl2_D[0].uStartReverseJOG_D RW:Reverse run JOG start(Direct)
MOV	K0	FX5SSC_1.stnAxCtrl2_D[0].uStartReverseJOG_D RW:Reverse run JOG start(Direct)

Watch Mode

Watch 1[Watching]

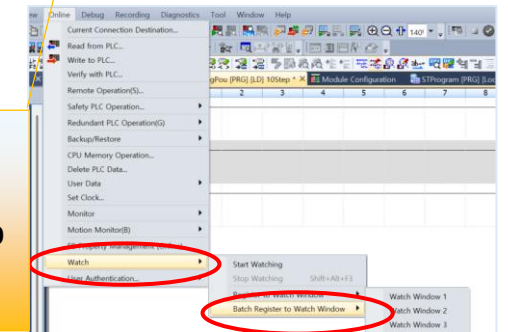
ON OFF ON/OFF toggle Update Clear All

Name	Current Value	English
FX5SSC_1.stSysCtrl_D.bPLC_Ready_D	TRUE	RW:PLC READY(Direct)
FX5SSC_1.stSysCtrl_D.bAllAxisServoOn_D	TRUE	RW:All axis servo ON(Direct)
FX5SSC_1.stnAxCtrl1_D[0].udJOG_Speed_D	5,000	RW:JOG speed(Direct)
FX5SSC_1.stnAxPrm_D[0].udJogSpeedLimit_D	50,000	RW:JOG speed limit value(Di...
FX5SSC_1.stnAxPrm_D[0].udAccelerationTime0_D	200	RW:Acceleration time 0(Direct)
FX5SSC_1.stnAxPrm_D[0].udDecelerationTime0_D	200	RW:Deceleration time 0(Direct)
FX5SSC_1.stnAxCtrl2_D[0].uStartForwardJOG_D	0	RW:Forward run JOG start(D...
FX5SSC_1.stnAxCtrl2_D[0].uStartReverseJOG_D	0	RW:Reverse run JOG start(Di...

- ✓ **Registering labels for jog operation**

[Operation Check]

- ✓ Key in the values as shown above for Jog Speed/SpeedLimit/Accel/Decel.
- ✓ Jog Operation Verification
...uStartForwardJOG_D : 1 → Clockwise rotation, 0 → Stop
...uStartReverseJOG_D : 1 → Counterclockwise rotation, 0 → Stop



3.3 Axis Operation Verification

● Jog Operation: Stop → Move

1[U1]:FX5-40SSC-G(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)
- 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

1[U1]:FX5-40SSC-G(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)
- 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)
- 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)
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- Md.64:Network error No.(U0#G31504)
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- 150 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

JOG
Operation

Appendix

[Appendix 1] Homing Method

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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