



Programmable Controllers
MELSEC iQ-F
series



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

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

접속 가이드

MELSEC iQ-F series and

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

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

미쓰비시 전기 제품
FX5-40SSC-G(S), FX5-80SSC-G(S)

파스텍 제품
Ezi-ROBO CC-Link IE TSN CLA
(Ezi-SERVO CC-Link IE TSN 4X)

시작하기 전에

- 저희 회사의 제품을 이용해 주셔서 감사합니다.
- Ezi-ROBO CLA의 제어부는 Ezi-SERVO CC-Link IE TSN 4X으로 이하 연결 가이드 설명은 Ezi-SERVO CC-Link IE TSN 4X으로 합니다.
- Ezi-SERVO CC-Link IE TSN 4X는 32비트 고성능 ARM 프로세서를 탑재한 드라이브와 다양한 모터로 구성된 스테핑모터 유닛으로, CC-Link IE TSN 네트워크에서 리모트국으로 사용됩니다.
- Ezi-SERVO CC-Link IE TSN 4X는 산업용 제품입니다. 다른 용도로는 사용하지 말아 주십시오. 이를 준수하지 않아 손해가 발생한 경우에 저희 회사에서는 어떠한 책임도 지지 않습니다.
- 저희 회사에서 제공하는 이 접속 가이드는 미쓰비시 전기의 MELSEC iQ-F FX5-SSC-G에 Ezi-SERVO CC-Link IE TSN 4X를 연결하는 방법을 안내하는 자료로, CSP+ 파일 등록과 시스템 구성, 파라미터 설정, 프로그램 방법 등을 설명합니다.
- PLC 프로그램을 작성하기 전에 이 접속 가이드를 반드시 읽고, 내용을 정확히 이해하신 후 제품을 올바르게 사용하시기 바랍니다.
- 이 접속 가이드는 예고 없이 변경될 수 있습니다. 최신 버전이 필요하신 경우에는 저희 회사의 CC-Link IE TSN 홈페이지 (cltsn.fastech-motions.com)를 참고하시기 바랍니다.

매뉴얼 정보

- Ezi-SERVO CC-Link IE TSN 4X 매뉴얼은 파스텍 홈페이지에서 다운로드할 수 있습니다.

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

매뉴얼 명칭	매뉴얼 번호
[매뉴얼][CC-Link IE TSN][Ezi-SERVO 4X] Closed Loop Stepping System	
[접속가이드][CC-Link IE TSN][MELSEC FX5-SSG-G][Ezi-ROBO CLA Ezi-SERVO 4X]	

- MELSEC iQ-F FX5-SSC-G 매뉴얼은 미쓰비시 전기 홈페이지에서 다운로드할 수 있습니다.

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

매뉴얼 명칭	매뉴얼 번호
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

용어

- 접속 가이드에서 사용되는 용어와 관련된 내용입니다.

용어	내용
CC-Link IE TSN	표준 이더넷 규격을 확장한 'TSN(Time-Sensitive Networking)'을 채택하여, 실시간성을 확보한 제어와 다른 오픈 네트워크의 정보를 동시에 처리할 수 있는 오픈 네트워크입니다.
마스터국(매니저국)	네트워크 전체를 관리하는 국으로, 모든 국과 사이클릭 전송 및 트랜지언트 전송을 할 수 있습니다. MELSEC iQ-F FX5 모션 모듈이 이에 해당합니다.
리모트국	비트 단위의 입출력 신호와 워드 단위의 입출력 데이터를 사이클릭 전송하는 국으로, 트랜지언트 전송도 가능합니다. Ezi-SERVO CC-Link IE TSN 4X가 이에 해당합니다.
PDO	Process Data Object의 약칭입니다. 여러 CANopen 노드 간에 주기적으로 전송되는 애플리케이션 오브젝트의 집합체입니다.
오브젝트	CANopen에 대응하는 디바이스국이 보유한 다양한 데이터입니다.

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[부록]

[부록1] 원점복귀 방법

1. 개 요

1-1. 개요

- MELSEC iQ-F FX5-SSC-G와 Ezi-SERVO CC-Link IE TSN 4X 접속 가이드

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

- PLCopen®Motion Control FB(Function Block)

- 국제 표준 규격인 PLCopen Motion Control FB 라이브러리를 사용하여 제어 프로그램을 쉽게 작성할 수 있습니다.
 - 이 프로그램은 제3자도 내용을 쉽게 파악할 수 있기 때문에 설계 및 유지보수 시간을 크게 단축할 수 있습니다.

- ◆ 엔지니어링 소프트웨어

- GX Works3 : Ver. 1.105K 이상
 - 모션 제어 설정 기능 : Ver. 1.055H 이상

- ※ 최신 파일은 미쓰비시 전기 홈페이지를 참조하시기 바랍니다.

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

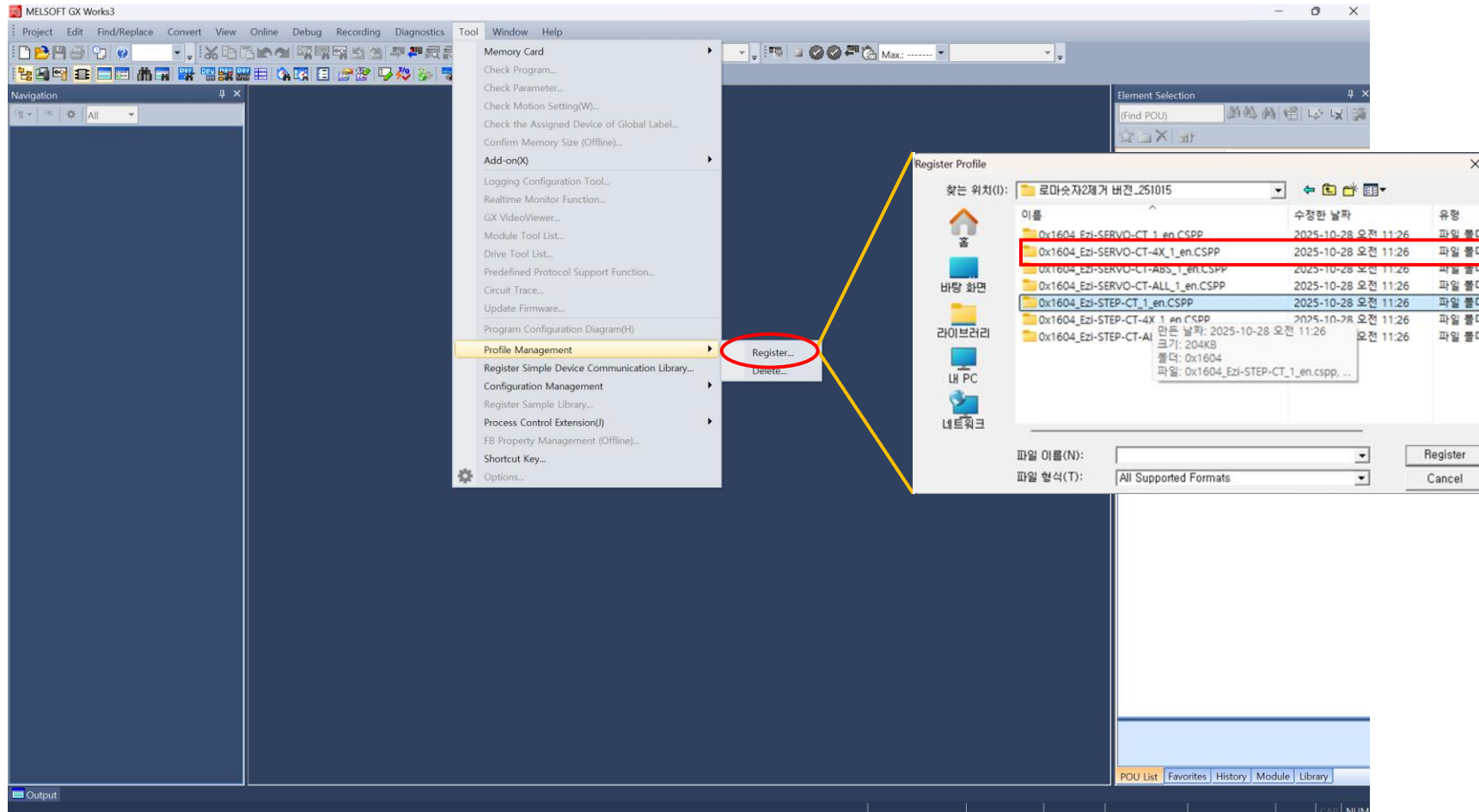
- ◆ 리모트국: Ezi-SERVO CC-Link IE TSN 4X

- CSP+ 파일 다운로드 주소 : <https://cltsn.fastech-motions.com/download/quick>
 - 파일명 : 0x1604_Ezi-SERVO-CT-4X_1_en_CSPP

1-2. Ezi-SERVO CC-Link IE TSN 4X CSP+ 파일 등록

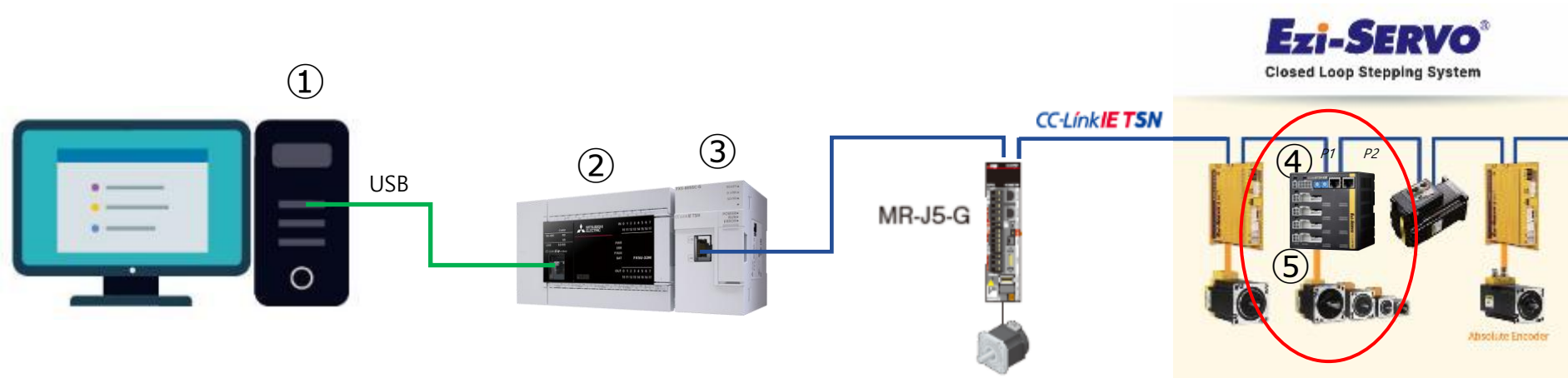
● CSP+ 등록

- [GX Works3] Tool / Profile Management / Register ※ Project를 열기 전에만 등록할 수 있습니다.



1-3. CC-Link IE TSN 구성

- 네트워크 연결



구성		품명	IP 주소
①	엔지니어링 소프트웨어	GX Works3	-
②	CPU 모듈	FX5U	
③	모션 모듈	FX5-40SSC-G(S)	192.168.3.253
④	드라이브	EzS2-CT-4X	192.168.3.1
⑤	모터	EzM2-42S-A	-

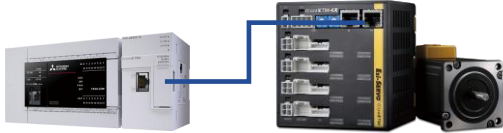
1-3. CC-Link IE TSN 구성

- Ezi-SERVO 규격

항목		규격
통신 프로토콜		CC-Link IE TSN Class B
통신 속도		1Gbps / 100Mbps
동작 모드		CiA402 드라이브 프로파일 : 사이클릭 동기 위치 모드 (CSP) / 프로파일 위치 모드 (PP) / 원점복귀 모드 (HM)
동기 방식	시각 동기 방식	IEEE1588 / IEEE802.1AS
	통신 주기	최소 250 μ s
	네트워크 동기 통신	동기 통신 (CSP, PP, HM) / 비동기 통신 (PP, HM)
인코더 타입		인크리멘탈 타입

1-4. 설정 순서

● Ezi-SERVO, FX5 파라미터 설정

No.	항목	내용
1	Ezi-SERVO 설정 	드라이브 설정 프로그램(Ezi-CT Manager)을 이용하여 파라미터를 설정합니다. 설정 프로그램과 사용 방법은 (주)파스텍 홈페이지에서 다운로드하시기 바랍니다. ※ 주소: https://cltsn.fastech-motions.com/download/quick
2	PLC FX5 CPU 설정 	GX-Works3를 사용해 FX5 CPU 모듈의 프로젝트를 만든 다음, 유닛 파라미터(통신 방식, 접속 대상)와 축 파라미터(모션 제어용)를 설정합니다.
3	FX5 + Ezi-SERVO 동작 확인 	FX5 CPU 모듈과 Ezi-SERVO가 올바르게 설정되어 있는지 확인하기 위한 프로그램을 작성합니다. 라벨을 조작해 모터가 정상적으로 작동하는지 확인합니다

1-4. 설정 순서

● Ezi-SERVO 설정 내용

항목	내용
IP 주소 설정	① 드라이브의 로터리 스위치로 설정 ② 로터리 스위치 → '00', IP address (Index: 2101h, Subindex: 01~04h) 값으로 설정
드라이브 원점복귀 방법 설정	① Homing method (Index: 6098h, Subindex:00h) 설정 - '0'(초깃값) → '33' 등 원점복귀 방법 설정 ※ [부록1] 원점복귀 방법 참조 ② Home offset (Index: 607Ch, Subindex:00h) → '0' 설정 필요 주의) 0이 아닌 값을 설정하면, 원점복귀가 완료될 때 급가속하거나 급감속하는 경우가 있습니다.
리미트 정지 방법 설정	① Limit stop method (Index:2003h, Subindex:00h) 설정 - 0: PP, HM → 급정지 / CSP → 정지하지 않음 - 1: PP, HM → 감속 정지 / CSP → 정지하지 않음 ② '0' 또는 '1'이 아닌 값을 설정하면, 하드웨어 스트로크 리미트를 감지할 때 '1ED0H: 드라이브 오류'가 발생할 수 있습니다
인포지션 범위	① In-position range (Index:2B21h, Subindex:00h, Data type:Unsigned32) 설정 - 사용 환경을 고려하여 인포지션 범위(5~20000 pulse) 내의 값을 등록 ② [Md.102: 편차 카운터 값]이 이 설정값보다 작을 경우, [Md.108: 서보 상태 1: 인포지션]이 ON됩니다. 이 오브젝트는 공개하지 않는 것이 원칙이므로 FX5 CPU 모듈의 서보 트랜지언트 전송 기능을 이용하여 설정해 주십시오.

1-5. 제약 사항

● 모션 제어 기능 제약 사항 (FX5와 Ezi-SERVO)

항목	제약 사항
속도 제어	드라이브가 사이클릭 동기 속도 모드(CSV)를 지원하지 않으므로 속도 제어를 사용할 수 없습니다.
토크 제어	드라이브가 사이클릭 동기 토크 모드(CST)를 지원하지 않으므로 토크 제어를 사용할 수 없습니다.
정압 제어	MELSERVO만 정압 제어를 지원하므로, 정압 제어를 사용할 수 없습니다.
어드밴스트 동기 제어	[Pr.320 : 동기 인코더 축 종류]에 '서보 앰프 경유 동기 인코더'를 설정할 수 없습니다.
토크 제한 기능	드라이브가 아래 오브젝트를 지원하지 않아 토크 제한 기능을 사용할 수 없습니다. • Positive torque limit value (Index:60E0h, Subindex:00h) • Negative torque limit value (Index:60E1h, Subindex:00h)
절대 위치 시스템	인코더가 인크리멘탈 타입이기 때문에 절대 위치 시스템을 사용할 수 없습니다.
가상 서보 앰프 기능	MR-J5-G로 에뮬레이트됩니다.
마크 검출 기능	[Pr.800: 마크 검출 신호 설정]에 드라이브의 TPR1(터치 프로브 1)을 사용할 수 없습니다.
임의 데이터 모니터 기능	임의 데이터 모니터 기능을 사용할 경우, [Pr.91~94: 임의 데이터 모니터 데이터 종류 설정 1~4]와 [Pr.591~594: 임의 데이터 모니터 데이터 종류 확장 설정 1~4]에 모니터링할 오브젝트를 설정해 주십시오. 초깃값은 "0: 미설정"입니다. 따라서 [Md.109~112: 임의 데이터 모니터 출력 1~4]는 '0'이 됩니다.

1-5. 제약 사항

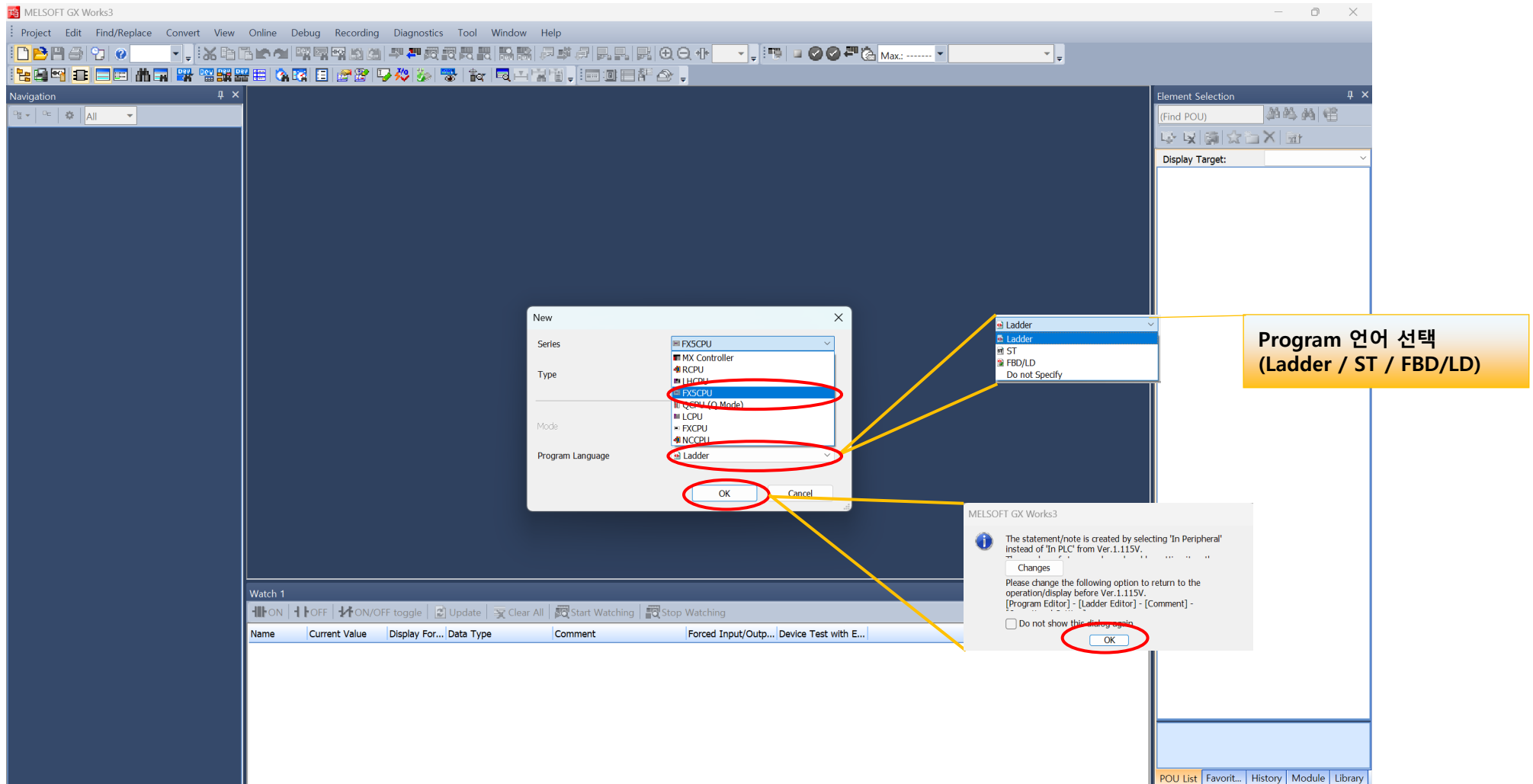
● 모션 제어 기능 제약 사항 (FX5와 Ezi-SERVO)

항목	제약 사항
Md.103: 모터 회전수	드라이브가 'SI unit velocity (Index:60A9h, Subindex:00h)'를 지원하지 않기 때문에 pulse/s 단위로 모터 회전수를 출력합니다.
Md.104: 모터 전류값	드라이브가 'Torque actual value (Index:6077h, Subindex:00h)'를 지원하지 않기 때문에 항상 "0"으로 표시됩니다.
Md.108: 서보 상태 1	모니터 데이터 중 아래 비트는 항상 'OFF' 상태입니다. · 게인 전환 중 (b4) · 풀 클로즈드 제어 전환 중(b5) · 토크 제한 중(b13) · 절대 위치 소실 중 (b14) · 경고 중(b15)
Md.119: 서보 상태 2	모니터 데이터 중 아래 비트는 항상 'OFF' 상태입니다. · 영점 통과(b0) · 영속도 중(b3) · 속도 제한 중(b4) · PID 제어 중(b8)
Md.115: 서보 알람 상세 번호	지원되지 않습니다. 이 모니터 데이터는 항상 '0'으로 표시됩니다
Cd.108: 게인 전환 명령 플래그	지원되지 않습니다. MELSERVO만 이 데이터에 대응합니다.
Cd.133: 세미-풀 전환 요구	지원되지 않습니다. MELSERVO만 이 데이터에 대응합니다..
Cd.136: PI-PID 전환 요구	지원되지 않습니다. MELSERVO만 이 데이터에 대응합니다.

2. FX5-40SSC-G(S) 설정

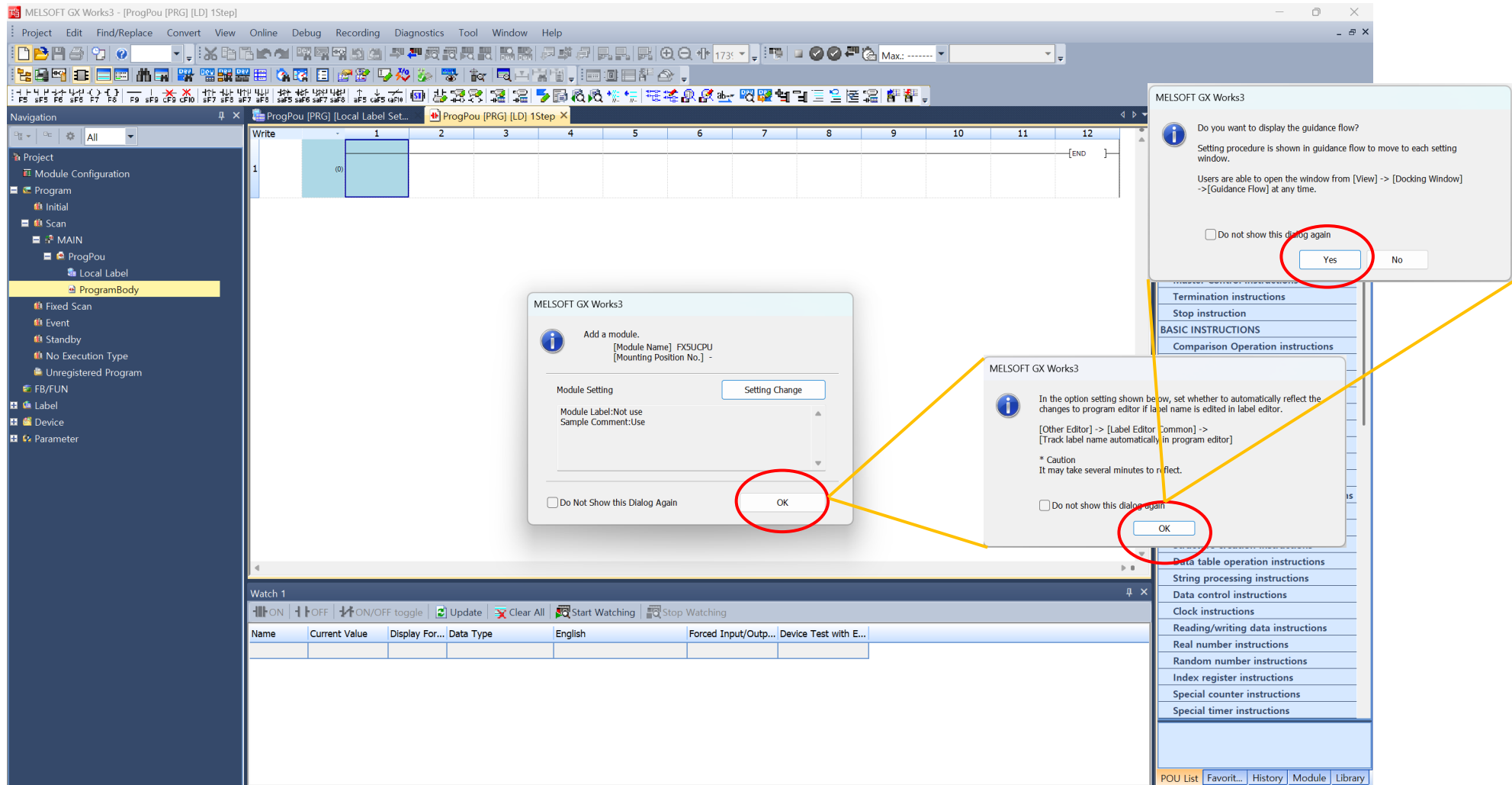
2-1. Project 생성

- 신규 Project 생성 시 iQ-F FX5, 모델명, 사용 축수, Program 언어를 선택



2-2. Module 등록

- FX5UCPU 등록



2-3. Module Configuration – H/W

- 마우스로 클릭&드래그하여 FX5-40SSC-G(S) 설치

The screenshot shows the MELSOFT GX Works3 interface in the 'Module Configuration' mode. 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 rack configuration with a CPU module (FX5UCPU) and a slot for a new module. A yellow arrow labeled '2' points from the 'FX5-40SSC-G(S) 4 axes CC-Link IE TSN' module in the 'Element Selection' list on the right to the empty slot in the rack. A yellow callout box with the text '[클릭 & 드래그] 1. FX5UCPU가 생성됨. 2. FX5-40SSC-G(S)' is positioned near the slot. 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

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...

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

[클릭 & 드래그]
1. FX5UCPU가 생성됨.
2. FX5-40SSC-G(S)

MELSOFT GX Works3

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

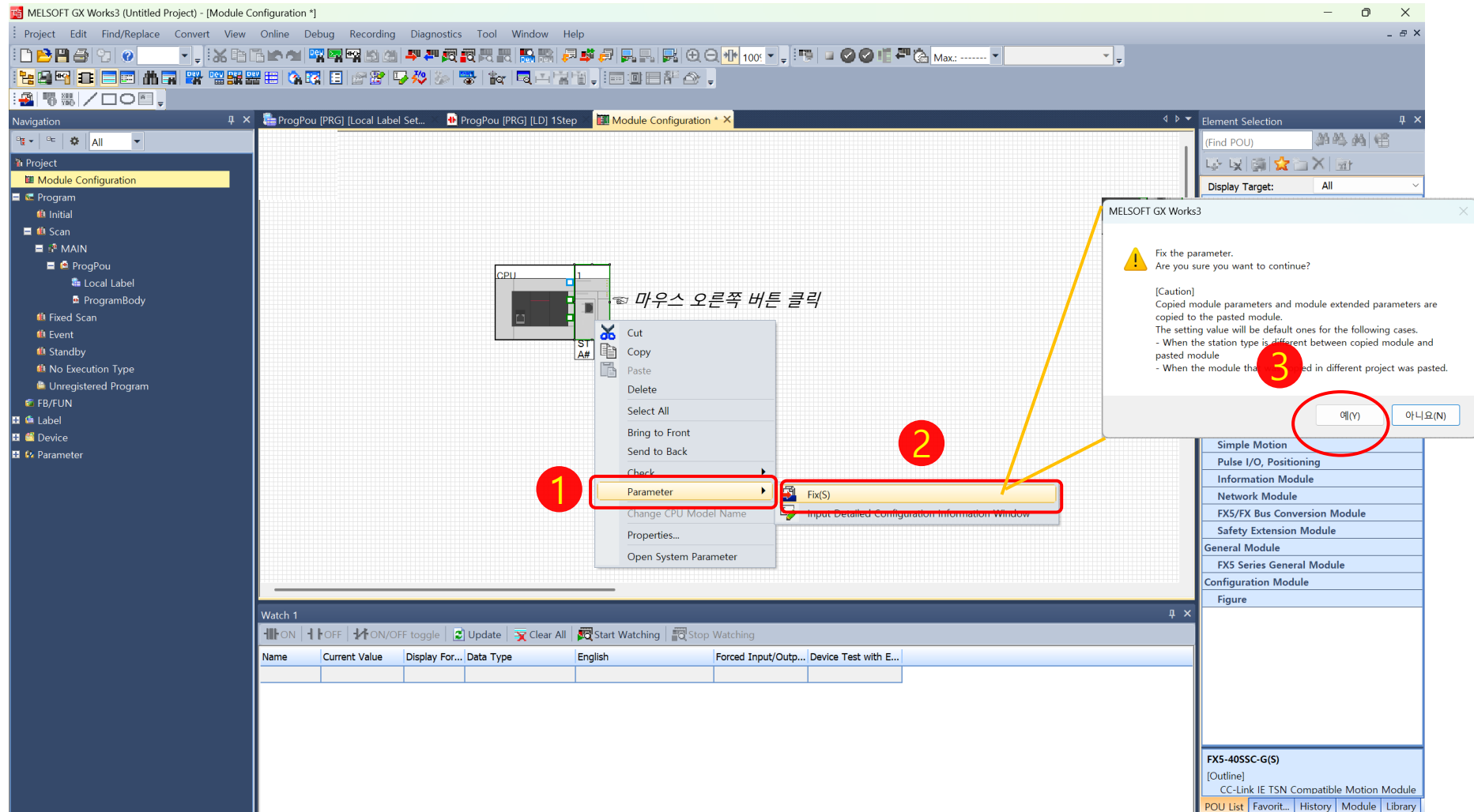
FX5-40SSC-G(S)

[Outline]
CC-Link IE TSN Compatible Motion Module

POU List Favorit... History Module Library

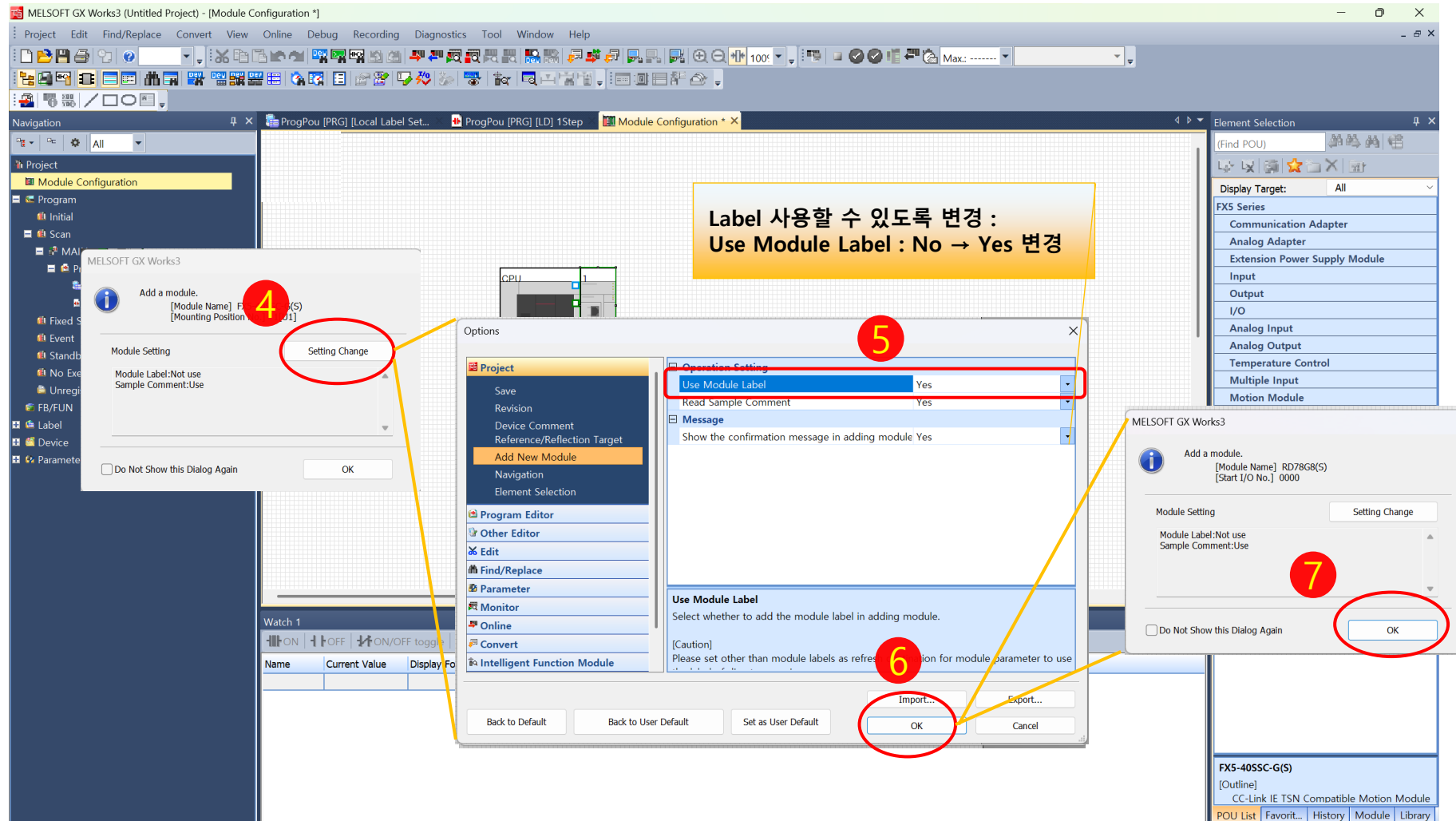
2-3. Module Configuration – H/W

- 마우스의 오른쪽 버튼을 클릭하여 Fix(S) 선택으로 Module 구성 완료 (1/2)



2-3. Module Configuration – H/W

- 마우스의 오른쪽 버튼을 클릭하여 Fix(S) 선택으로 Module 구성 완료 (2/2)



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

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

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

2 Network No.: 1

3 IP Address Setting: 192.168.3.253

Network 국번 : 1

IP Address : 192.168.3.253
Subnet Mask : 255.255.255.0
※ 참고: Ezi-SERVO Default IP는 192.168.3.xxx

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)

Watch 1

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' folder is highlighted with a red box and a red circle labeled '1'.
- Setting Item List (Center):** Lists the configuration items. The 'Network Configuration Settings' item is highlighted with a red box and a red circle labeled '2'.
- Configuration Window (Right):** Displays the 'CC-Link IE TSN Configuration' settings. The '<Detailed Setting>' button is highlighted with a red box and a red circle labeled '3'.

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

- Mode Setting:** Online (Unicast Mode)
- Cyclic Transmission Time (Min.):** 50.00 us
- Module List:** A list of modules is shown, including 'General CC-Link IE TSN Module' and 'CC-Link IE TSN Module (Mitsubishi Ele)'. The 'CC-Link IE TSN Module (Mitsubishi Ele)' is selected.
- Output:** A table showing the output status of the modules.

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

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

- N/W 미연결 상태 : CC-Link IE TSN Module을 수동(클릭&드래그)으로 구성

The screenshot shows the 'CC-Link IE TSN Configuration' window. The 'Module List' on the right includes 'Ezi-SERVO-CT-4X' and 'Ezi-SERVO-CT-4X' (highlighted). The main table lists modules with IP addresses. A red box highlights the IP address '192.168.3.18' for the selected module. A yellow callout box contains the following text:

[Ezi-SERVO CC-Link IE TSN 4X IP Address 임의로 수정]

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

※ IP Address 변경 후 전원 RESET 필요

1. 마우스 클릭 & 드래그 (반복)

2. [참고] Ezi-SERVO CC-Link IE TSN 4X IP Address 설정 16진수 로터리 스위치

The diagram shows the physical layout of the module with 16 rotary switches labeled P2, P1, X16, and X1. The switches are used to set the IP address in hexadecimal.

Network Label: STA#1, STA#2, STA#3, STA#4

Host Station: STA#0 Master Station, Total STA#13 Unit Star

Output: Error, Warning, Information

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

- CC-Link IE TSN Module을 Motion Control Station 및 Synchronous 선택

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:

Cyclic Transmission Time (Min.):	22.00	us
0	Host Station	
1	Ezi-SERVO-CT-4X	
2	Ezi-SERVO-CT-4X	
3	Ezi-SERVO-CT-4X	
3	Ezi-SERVO-CT-4X	

1

Motion Control Station - Check (마우스 클릭)

Module List

CC-Link IE TSN Selection Find Module My 4

- General CC-Link IE TSN Module
- CC-Link IE TSN Module (Mitsubishi Elect)
- Master/Local Module
- Motion Module
- GOT3000 Series
- GOT2000 Series
- General-Purpose AC Servo
- General purpose Inverter
- DC Input
- Transistor Output
- I/O Combined
- Analog Input
- Analog Output
- EnergyMeasuringUnit
- Bridge module
- FPGA module
- CC-Link IE TSN Module (FASTECH Co. L
- Closed-loop Step Drive
- Ezi-SERVO-CT Closed-Loop
- Open-loop Step Drive
- Ezi-STEP-CT Open-Loop

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

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

- PDO Mapping Setting은 아래와 같이 자동으로 할당되어 설정됩니다.

■ TPDO

Index	Sub index	Data Type	내용
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	Stausword
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	내용
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)

- CC-Link IE TSN Module을 Motion Control Station 및 Synchronous 선택

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		

클릭하면 바로 반영됨

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
- Analog Output
- Network Interface Board
- EnergyMeasuringUnit
- Bridge module
- FPGA module
- CC-Link IE TSN Module (FASTECH Co. Ltd.)
- 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)

- Network Configuration Settings 적용

The screenshot displays the MELSOFT GX Works3 interface for configuring the 1[U1]:FX5-40SSC-G(S) module. The left sidebar shows the project structure, with 'Module Configuration' expanded. The main window is divided into three panes: 'Setting Item List', 'Setting Item', and 'Explanation'.

Setting Item List:

- Required Settings
 - Station Type
 - Network No.
 - Parameter Setting Method
 - Station No./IP Address Setting
- Basic Settings
 - Network Configuration Settings
 - Refresh Setting
 - Network Topology
 - Communication Period Setting
 - Connection Device Information
 - Device Station Setting
 - Application Settings

Setting Item:

Item	Setting
Network Configuration Settings	<Detailed Setting>
Refresh Settings	<Detailed Setting>
Network Topology	Line/Star
Communication Period Setting	
Basic Period Setting	
Communication Period Interval Setting	1000.00 us
System Reservation Time	20.00 us
Cyclic Transmission Time	500.00 us
Transient Transmission Time	480.00 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
TSN HUB Setting	Not to Use TSN HUB
Device Station Setting	

Explanation:

Set parameters of device stations (the number of points and assignment of link devices) in the master station.

The 'Apply' button is circled in red.

Watch 1:

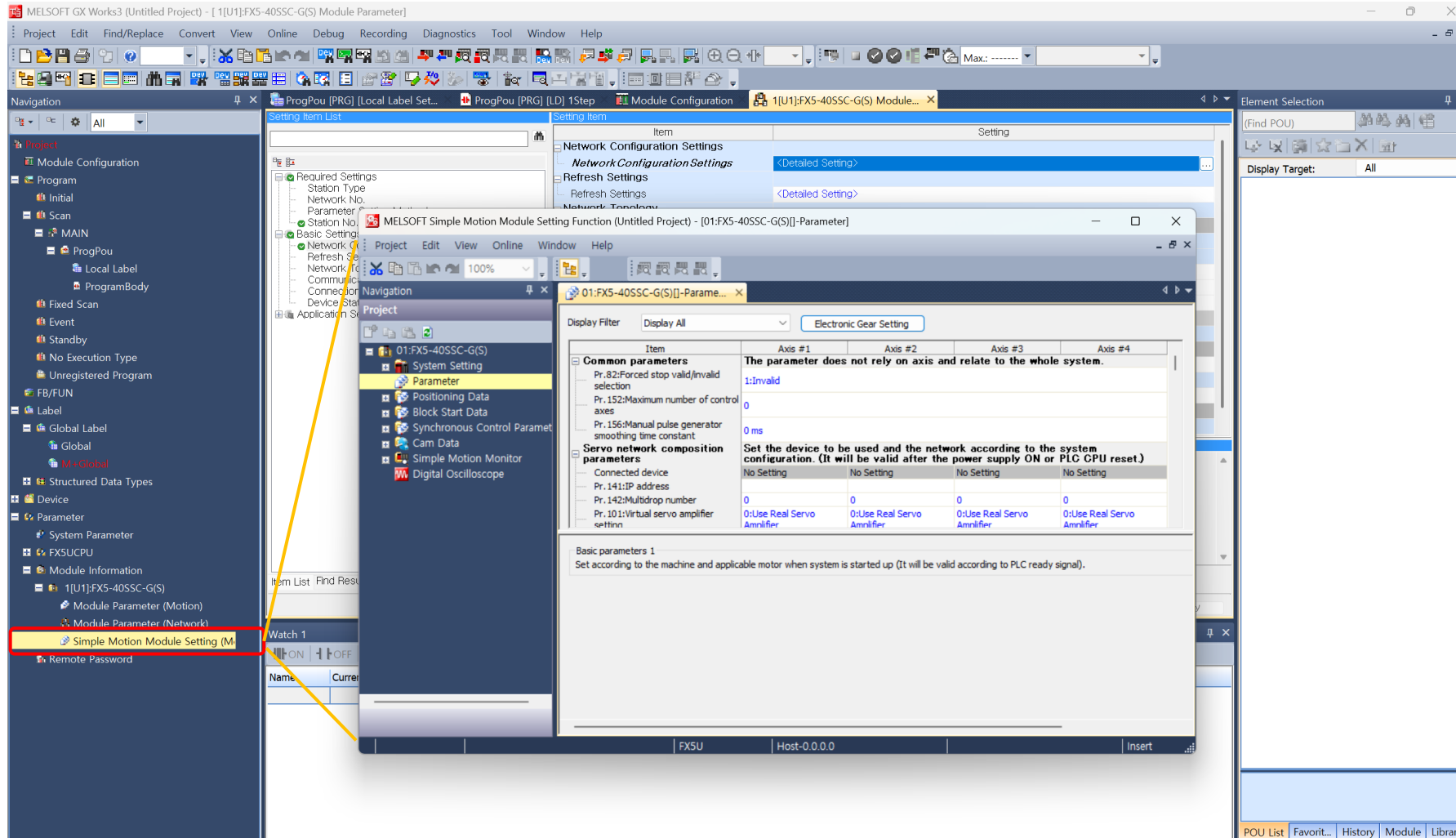
Name	Current Value	Display For...	Data Type	English	Forced Input/Outp...	Device Test with E...

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

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

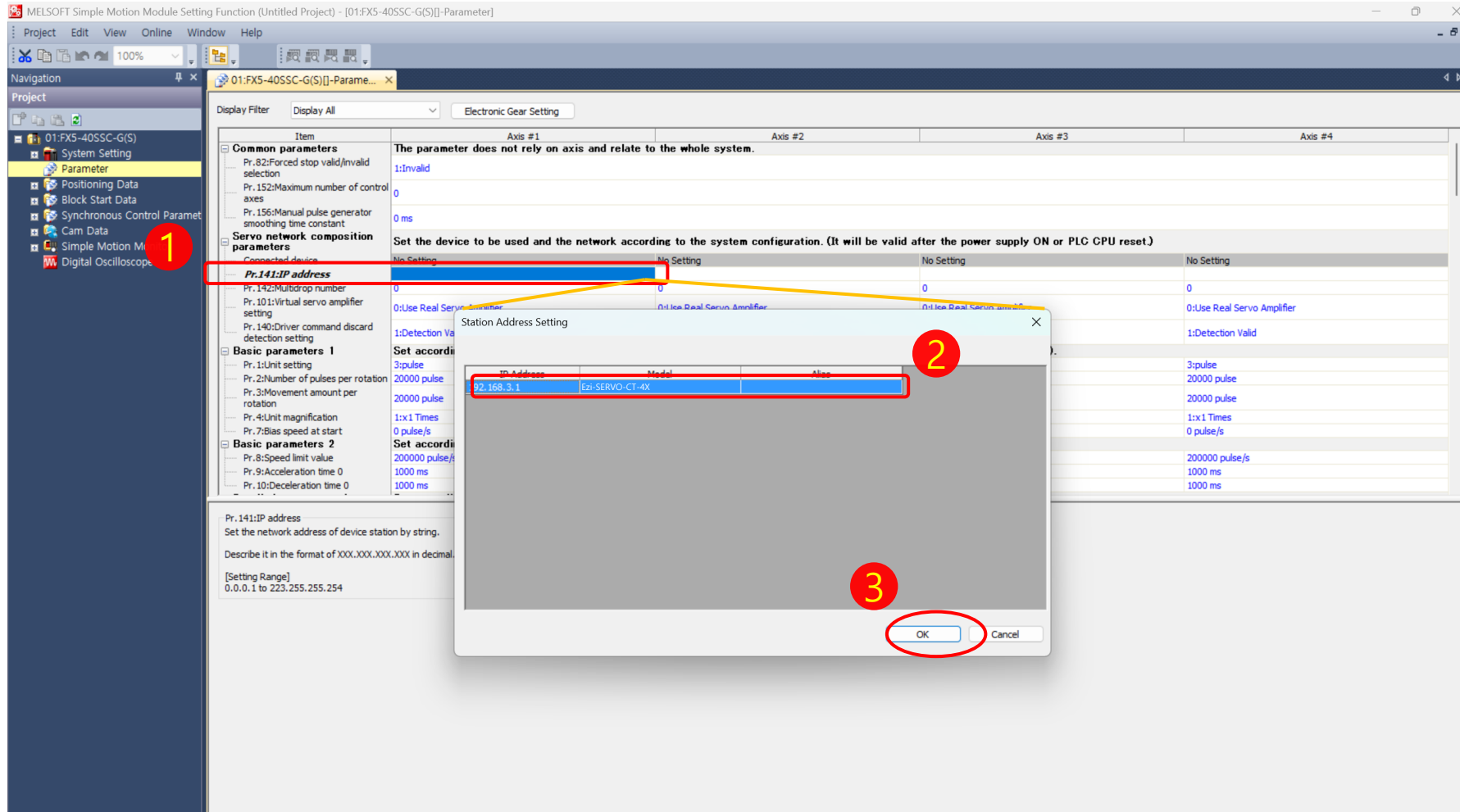
- Simple Motion Module Setting 프로그램 실행하기

1



2-5. Simple Motion Module Setting

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



2-5. Simple Motion Module Setting

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

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
※ 모터에 장착된 인코더 규격에 따라 설정을 변경할 수 있습니다.

2-5. Simple Motion Module Setting

- Parameter / HPR parameters / Pr.46:HPR speed(500pulse/s) 설정

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

※ Bias speed(Pr.7)값보다 HPR speed(Pr.46)값이 크면 (1C15H:원점복귀속도Error)가 발생합니다.

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 project structure, with 'Parameter' selected under 'System Setting'. The main window is divided into two panes: 'Common parameters' and 'Electronic Gear Setting - Axis #1'.

In the 'Common parameters' pane, the 'Basic parameters 1' section is expanded, and 'Pr. 2: Number of pulses per rotation' is highlighted with a red box and a red circle labeled '1'. The value '10000 pulse' is entered in the field.

In the 'Electronic Gear Setting - Axis #1' pane, the 'Machine Components' dropdown is set to 'Others'. The 'Unit Setting' is '3:pulse'. The 'Movement Amount per Load Rotation (dSL)' is set to '10000 [pulse]' with a red circle labeled '2'. The 'Encoder Resolution' is set to '10000 [pulse]' with a red circle labeled '3'. The 'Calculate Electronic Gear' button is circled in red with a red circle labeled '4'.

A yellow callout box on the right contains the following text:

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

The 'Calculation Result' section shows the following values:

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

The 'Movement Amount per Pulse' is calculated as 10000 pulse. The 'Error Calculation' section shows '0 [pulse]' for the error for the movement amount and '0 [pulse]' for the error for the movement amount you want to perform is about. The 'OK' button is circled in red with a red circle labeled '5'.

2-5. Simple Motion Module Setting

- Parameter / HPR parameters / Pr.46:HPR speed(500pulse/s) 설정

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, Detailed parameters 1

Axis #1

Pr.2: Number of pulses per rotation (Pr.2) is highlighted with a red circle and the number 1.

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

Encoder Resolution: 10000 [pulse/rev]

Setting Range

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

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 200000000 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

Display Filter: Display All | Electronic Gear Setting

Project: 01:FX5-40SSC-G(S) | 0000:RD78G8(S)[]-Axis #1 Posit...

Basic parameters 2

Item	Axis #1	Axis #2	Axis #3	Axis #4
Pr.8:Speed limit value	500000 pulse/s	200000 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

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

The graph shows Speed on the Y-axis and Time on the X-axis. A trapezoidal profile is shown, starting from 0, rising linearly to a constant speed level (Speed limit value), and then falling linearly back to 0. The rising slope is labeled 'Acceleration time 0' and the falling slope is labeled 'Deceleration time 0'.

- ✓ Pr8 : Speed limit value → 500,000 (Encoder 10,000pulse의 경우)
- ✓ Pr9 : Acceleration time 0 → 200ms (Ezi-SERVO는 100ms도 가능)
- ✓ Pr10: Deceleration time 0 → 200ms (Ezi-SERVO는 100ms도 가능)

2-5. Simple Motion Module Setting

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

설정이 끝나면 윈도우 종료로 설정 값 반영됨

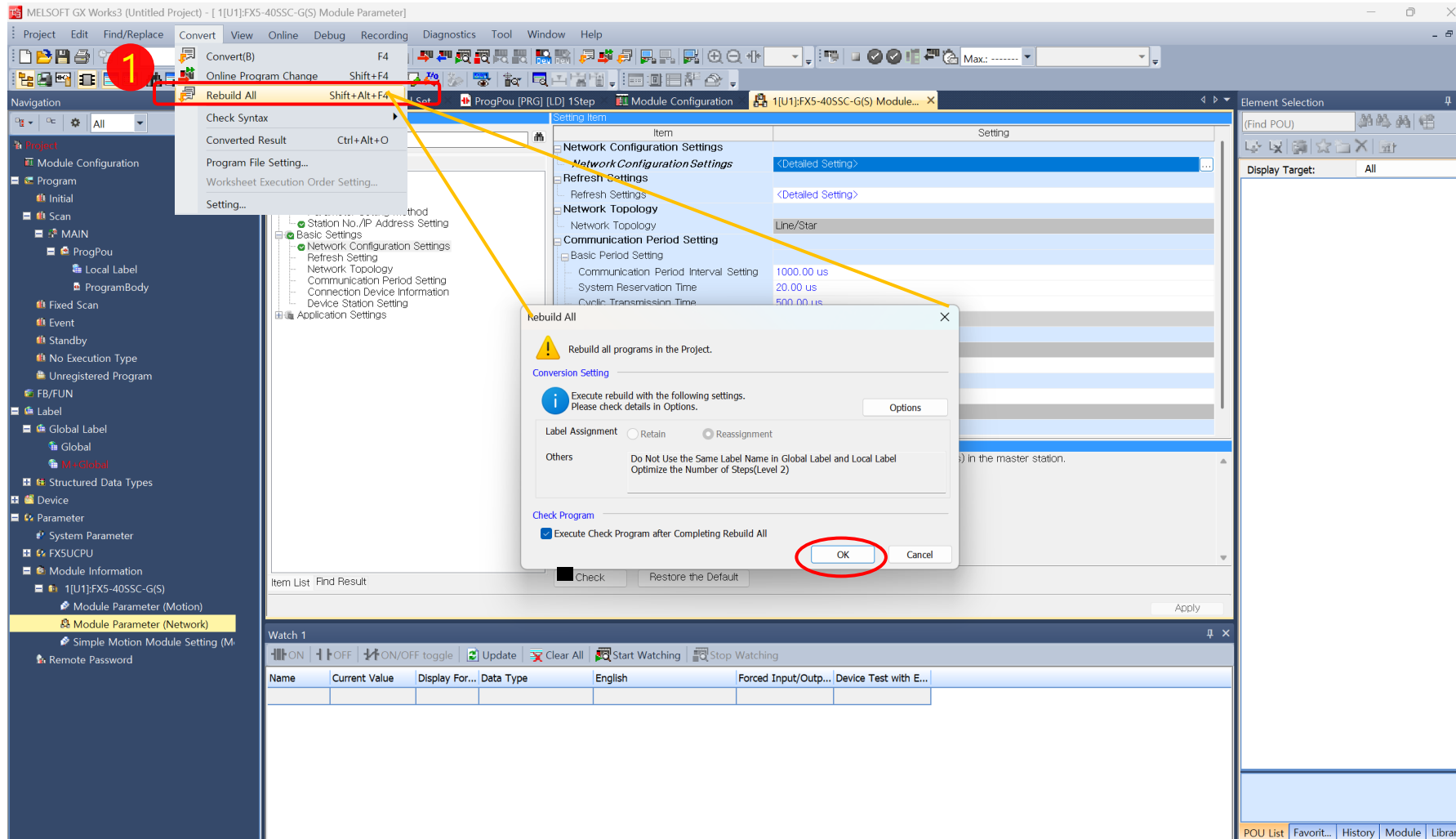
Limit Sensor를 연결하지 않은 상태에서 Ezi-SERVO 동작 테스트를 하려면 Pr.116, Pr.117, Pr.118 모두 Invalid로 설정해야 함

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 (INC Mode)	0: Speed-position Switching Control (INC Mode)	0: Speed-position Switching Control (INC Mode)	0: Speed-position Switching Control (INC 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
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).

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 list of memory areas. The 'Common Device Co...' option is highlighted with a red circle. A yellow callout box contains the following text:

Common Device Co... 체크 시 전송 불가 Error가 발생할 수 있으니 체크하지 않고 전송합니다.

The dialog box also shows a 'Memory Capacity' section with a bar chart and a table of memory usage:

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

The 'Execute' button is circled in red.

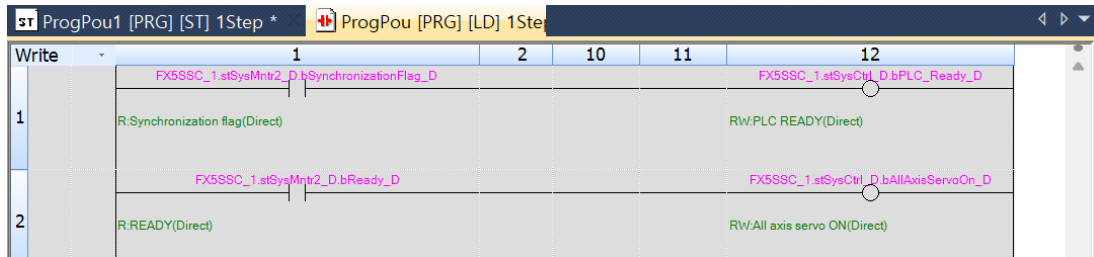
3. 동작 확인

3.1 프로그램 작성

● PLC Motion Module : Ready / Servo On

Label(변수) 방식

[Ladder Program]



- ① 시퀀스 레디 신호 (FX5SSC_1.stSysCtrl_D.bPLC_Ready_D) : ON 되면
- ② 동기용 플래그 (FX5SSC_1.stSysMntr2_D.bSynchronizationFlag_D) : ON 요구
- ③ 준비완료신호 (FX5SSC_1.stSysMntr2_D.bReady_D) : ON 되면
- ④ 전축 Servo (FX5SSC_1.stSysCtrl_D.bAllAxisServoOn_D) : ON 요구

Label(변수) 방식

[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 프로그램 작성

- Jog 설정 : 속도, 한계 속도, 가속시간, 감속시간

The screenshot displays the MELSOFT GX Works3 interface for programming an FX5-40SSC-G(S) module. The main workspace shows a ladder logic program with the following steps:

- Step 1: Initial setup with R.W.PL.C READY(Direct) and R.Synchronization flag(Direct).
- Step 2: R READY(Direct) and R.W.All axis servo ON(Direct).
- Step 3: bSettingParam and DMOV K5000 FX5SSC_1 aSvCrt1_D0JOG_Speed_D R.W.JOG speed(Direct).
- Step 4: DMOV K50000 FX5SSC_1 aSvCrt1_D0JOG_SpeedLimit_D R.W.JOG speed limit value(Direct).
- Step 5: DMOV K200 FX5SSC_1 aSvCrt1_D0JOG_AccelerationTime_D R.W.Acceleration time(Direct).
- Step 6: DMOV K200 FX5SSC_1 aSvCrt1_D0JOG_DecelerationTime_D R.W.Deceleration time(Direct).
- Step 7: [END]

The right panel shows the Element Selection list with various module functions. The selected function is M+FX5SSC_JOG_01A, which is described as JOG/inching operation.

Module Label
Module FB
FX5-40SSC-G(S)
M+FX5SSC_SetPositioningData_ Positioning data set
M+FX5SSC_StartPositioning_01A Positioning start FB
M+FX5SSC_JOG_01A JOG/inching operation
M+FX5SSC_MPG_01A Manual pulse generator
M+FX5SSC_ChangeSpeed_01A Speed change FB
M+FX5SSC_ChangeAccDecTime_ Acc./dec. time SV c
M+FX5SSC_ChangePosition_01A Target position change
M+FX5SSC_Restart_01A Restart FB
M+FX5SSC_OperateError_01A Error operation FB
M+FX5SSC_InitializeParameter_0 Parameter initialization
M+FX5SSC_WriteFlash_00A Flash ROM writing
M+FX5SSC_ChangeTorqueControl_ Torque control mode
M+FX5SSC_ChangeSpeedControl_ Speed control mode
M+FX5SSC_ChangePositionControl_ Position control mode
M+FX5SSC_ChangeContinuousTorque_ Continuous torque
M+FX5SSC_Sync_01A Starting/ending synchronization
M+FX5SSC_ChangeSyncEncoder_ Sync encoder position
M+FX5SSC_DisableSyncEncoder_ Sync encoder count
M+FX5SSC_EnableSyncEncoder_ Sync encoder count
M+FX5SSC_ResetSyncEncoder_ Sync encoder error
M+FX5SSC_ConnectSyncEncoder_ Sync encoder connection
M+FX5SSC_MoveCamReference_ Cam reference position
M+FX5SSC_ChangeCamPosition_ Cam position per cycle
M+FX5SSC_ChangeMainShaftGear_ MG Position per cycle
M+FX5SSC_ChangeAuxiliaryShaftGear_ AG position per cycle
M+FX5SSC_MoveCamPositionPerCycle_ Cam position per cycle
M+FX5SSC_MakeRotaryCutterCam_ Cam for rotary cutter
M+FX5SSC_CalcCamCommandPerCycle_ Cam command position
M+FX5SSC_CalcCamPositionPerCycle_ Cam position per cycle

M+FX5SSC_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 프로그램 작성

- Jog 동작 프로그램 : Module FB (MFX5SSC_JOG_01A1 클릭&드래그)

The screenshot displays the MELSOFT GX Works3 software interface. The main workspace shows a ladder logic program with a network containing a function block call. A red box highlights the 'FB Instance Name' dialog box, which is open for the 'MFX5SSC_JOG_01A1' instance. The dialog box has a 'Local Label (ProgPou)' dropdown and an 'OK' button. A red circle with the number '1' is placed over the 'MFX5SSC_JOG_01A1' entry in the 'Element Selection' pane on the right. Below the dialog box, a yellow box contains the text '✓ JOG 동작 FB 생성 : OK'. The 'Element Selection' pane on the right lists various function blocks, with 'MFX5SSC_JOG_01A1' highlighted. The bottom of the pane shows the details for 'MFX5SSC_JOG_01A1', including its name in Japanese and a description: 'JOG運転 / インチング運転を行います。' (Perform JOG operation / inching operation).

FB Instance Name

Local Label (ProgPou)

MFX5SSC_JOG_01A1

OK

Exit

Register a FB instance at the last row.

✓ JOG 동작 FB 생성 : OK

1

MFX5SSC_JOG_01A1

[Japanese]
JOG運転 / インチング運転を行います。

POU List Favorites History Module Library

3.1 프로그램 작성

● Jog 동작 프로그램 : Module FB 설정 / 동작 / 결과

The screenshot displays the MELSOFT GX Works3 interface for a ladder logic program. The main workspace shows a sequence of steps (1 to 15) with various logic elements. A red box highlights the output status of the M+FX5SSC_JOG_01A module, showing bJogStatus, bJogOK, and bJogErr. A yellow box highlights the module call M+FX5SSC_JOG_01A. A blue box highlights the command bJogForwardReq, bJogReverseReq, and bJogSpeedReq. A green box highlights the output bJogStatus.

✓ JOG 동작 실행 지령

✓ Jog Forward 지령

✓ Jog Reverse 지령

✓ Jog 속도 지령

✓ Jog 결과 출력

3.2 Axis 모니터링

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

FX5-40SSC-G

READY ●

D LINK ●

SD/RD ●

1 MELSOFT GX Works3 C:\Work\커넥션가이드\1[U1]:FX5-40SSC-G(S) - Axis Monitor

2 Axis Monitor

3 Synchronization flag(X1)

Md.	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

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(U0WG4000)

Md.133:Operation cycle over flag(U0WG4239)

Md.64:Network error No.(U0WG31504)

Md.132:Operation cycle setting(U0WG4238)

1006h:1.000ms

Md.134:Operation time(U0WG4008)

150 μs

Md.135:Maximum operation time(U0WG4009)

172 μs

Md.19:Number of write accesses to flash ROM(U0WG...

0 times

Md.52:Communication between amplifiers axes search...

Communication between set amplifier...

Md.131:Digital OSC. running flag(U0WG4011)

Stopped

[동작 확인 : ON 시 녹색]

- ✓ Synchronization flag(X1) : CPU - Motion Module 간 연결 가능 상태
- ✓ PLC Ready(Y0) : Motion Module 활성화 지시
- ✓ READY(X0) : Motion Module 제어 가능 상태
- ✓ All axes servo ON(Y1) : 모든 축 Servo ON 지시

3.3 Axis 동작 확인

- Jog 동작 – 설정 및 이동 (Jog 동작 가능 확인 : FX5SSC_1.stnAxMntr_D[0].uServoStatus1_D.1 → TRUE)

Program 방식(Ladder, Label)



✓ bSetJogSpeed,
bSetJogSpeedLimit,
bSetJogAccel,
bSetJogDesel
ON/OFF로 값 설정

✓ Jog 동작 확인
bJogMoveCW : ON → CW회전, OFF → 정지
bJogMoveCCW : ON → CWW회전, OFF → 정지

Watch 방식

Watch 1[Watching]

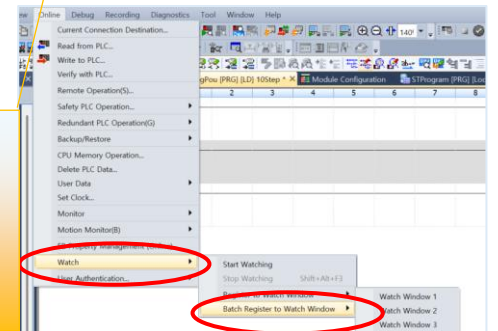
ON OFF ON/OFF toggle Update Clear All

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...

- ✓ Jog 동작을 위한 라벨 등록

[동작 확인]

- ✓ Jog Speed/SpeedLimit/Accel/Decel에는 위와 같은 값으로 키인
- ✓ Jog 동작 확인
...uStartForwardJOG_D : 1 → CW회전, 0 → 정지
...uStartReverseJOG_D : 1 → CWW회전, 0 → 정지



3.3 Axis 동작 확인

● Jog 동작 : 정지 → 이동

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...
- 0 times
- Md.52:Communication between amplifiers axes se...
- Communication between set amplif...
- Md.131:Digital OSC. running flag(U0#G4011)
- Stopped

JOG
동작

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)
- 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)
- 150 μs
- Md.135:Maximum operation time(U0#G4009)
- 171 μs
- Md.19:Number of write accesses to flash ROM(U0...
- 0 times
- Md.52:Communication between amplifiers axes se...
- Communication between set amplif...
- Md.131:Digital OSC. running flag(U0#G4011)
- Stopped

부 록

[부록1] 원점복귀 방법

원점복귀 방법은 Homing method(6098h)에 설정한 값에 따라 다음과 같이 분류됩니다.

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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