



Programmable Controllers  
**MELSEC iQ-F**  
series



**Ezi-STEP**® CC-Link IE TSN  
Micro Stepping System **4X**

## 접속 가이드

**MELSEC iQ-F** series and **Ezi-STEP**® CC-Link IE TSN  
Micro Stepping System **4X**

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

파스텍 제품  
Ezi-STEP CC-Link IE TSN 4X

# 시작하기 전에

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- 저희 회사의 제품을 이용해 주셔서 감사합니다.
- Ezi-STEP CC-Link IE TSN 4X는 32비트 고성능 ARM 프로세서를 탑재한 드라이브와 다양한 모터로 구성된 스테핑모터 유닛으로, CC-Link IE TSN 네트워크에서 리모트국으로 사용됩니다.
- Ezi-STEP 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-STEP 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](http://cltsn.fastech-motions.com))를 참고하시기 바랍니다.

# 매뉴얼 정보

- Ezi-STEP 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-STEP 4X] Micro Stepping System    |        |
| [접속가이드][CC-Link IE TSN][MELSEC iQ-F FX5-SSC-G][Ezi-STEP 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 Motion Unit User's Manual (Startup Edition)                                         | IB-0300405 |
| MELSEC iQ-F Motion Unit User's Manual (Network Edition)                                         | IB-0300425 |
| MELSEC iQ-F Motion Unit User's Manual (Simple Motion Mode Application Edition)                  | IB-0300571 |
| MELSEC iQ-F Motion Unit User's Manual (Simple Motion Mode Advanced Synchronous Control Edition) | IB-0300574 |
| 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-STEP 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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# 1. 개 요

# 1-1. 개요

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- MELSEC iQ-F FX5-SSC-G와 Ezi-STEP 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>

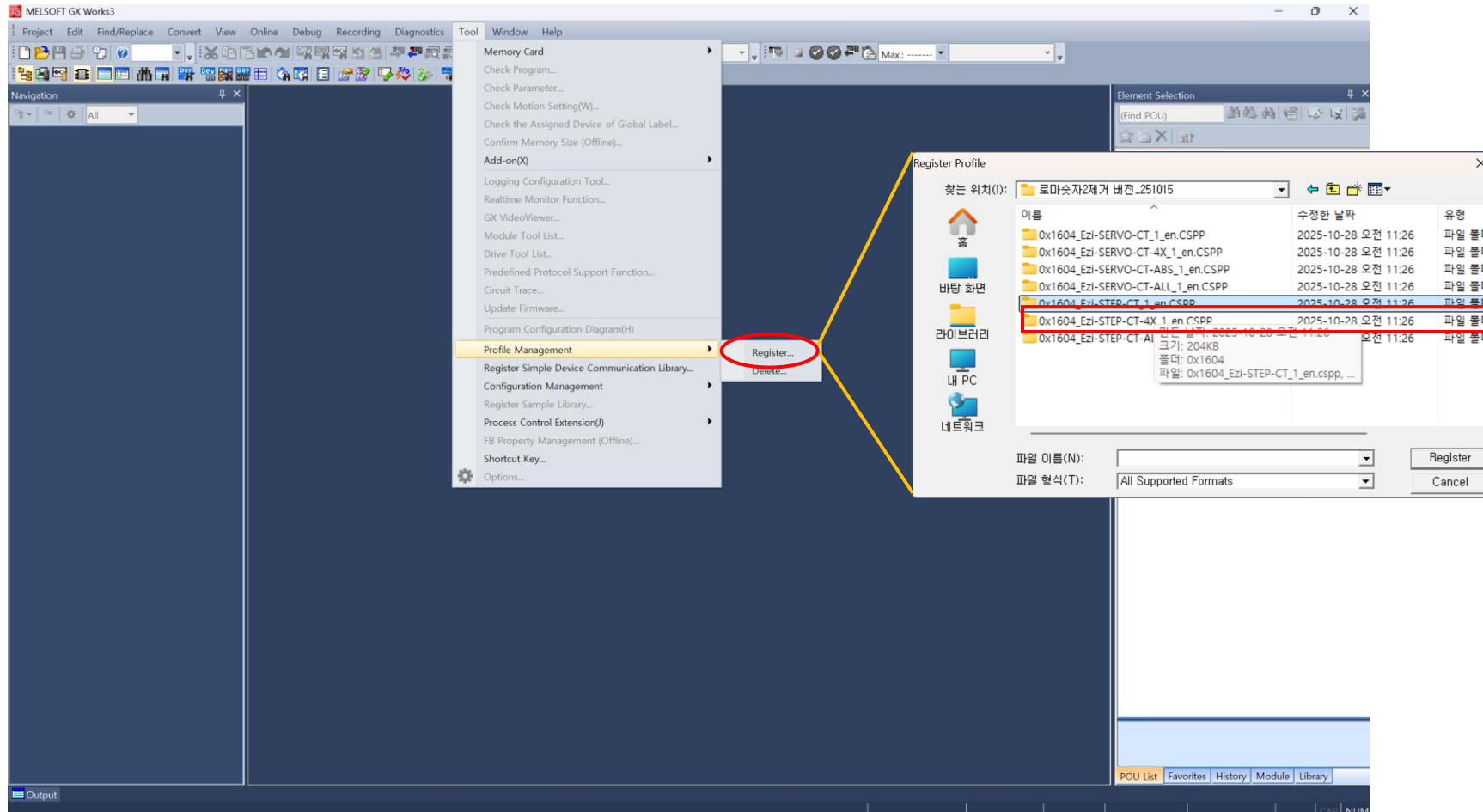
- ◆ 리모트국: Ezi-STEP CC-Link IE TSN 4X

- CSP+ 파일 다운로드 주소 : <https://cltsn.fastech-motions.com/download/quick>
  - 파일명 : 0x1604\_Ezi-STEP-CT-4X\_1\_en\_CSPP

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

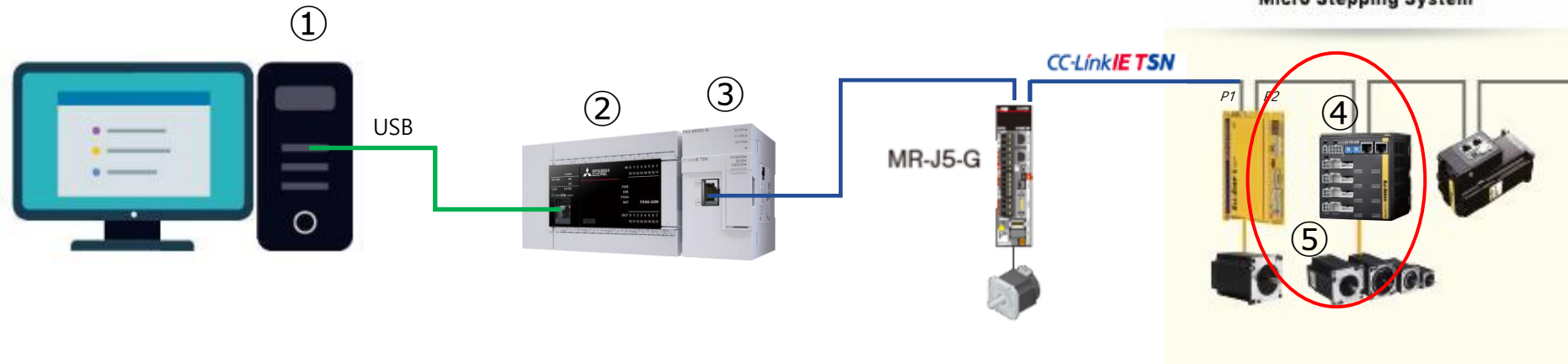
## ● CSP+ 등록

- [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) |
| ④  | 드라이브        | EzT2-CT-4X     |
| ⑤  | 모터          | BM-42S         |

## 1-3. CC-Link IE TSN 구성

- Ezi-STEP 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 $\mu$ s                                                          |
|         | 네트워크 동기 통신 | 동기 통신 (CSP, PP, HM) / 비동기 통신 (PP, HM)                                   |
| 인코더 타입  |            | 인크리멘탈 타입                                                                |

## 1-4. 설정 순서

### ● Ezi-STEP, FX5 파라미터 설정

| No. | 항목                                                                                                          | 내용                                                                                                                                                                                                                      |
|-----|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Ezi-STEP 설정<br>            | 드라이브 설정 프로그램(Ezi-CT Manager)을 이용하여 파라미터를 설정합니다.<br>설정 프로그램과 사용 방법은 (주)파스텍 홈페이지에서 다운로드하시기 바랍니다.<br>※ 주소: <a href="https://cltsn.fastech-motions.com/download/quick">https://cltsn.fastech-motions.com/download/quick</a> |
| 2   | PLC FX5 CPU 설정<br>         | 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-STEP 동작 확인<br> | FX5 CPU 모듈과 Ezi-STEP이 올바르게 설정되어 있는지 확인하기 위한 프로그램을 작성합니다.<br>라벨을 조작해 모터가 정상적으로 작동하는지 확인합니다                                                                                                                               |

## 1-4. 설정 순서

### ● Ezi-STEP 설정 참고 사항

| 항목              | 내용                                                                                                                                                                                                                                                                    |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP 주소 설정        | ① 드라이브의 로터리 스위치로 설정<br>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<br>- '0'(초깃값) → '33' 등 원점복귀 방법 설정 ※ [부록1] 원점복귀 방법 참조<br>② Home offset (Index: 607Ch, Subindex:00h) → '0' 설정 필요<br>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<br>- 0: PP, HM → 급정지 / CSP → 정지하지 않음<br>- 1: PP, HM → 감속 정지 / CSP → 정지하지 않음<br>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<br>- 사용 환경을 고려하여 인포지션 범위(5~20000 pulse) 내의 값을 등록<br>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-STEP)

| 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.<br><ul style="list-style-type: none"> <li>• Positive torque limit value (Index:60E0h, Subindex:00h)</li> <li>• Negative torque limit value (Index:60E1h, Subindex:00h)</li> </ul>                                                          |
| 절대 위치 시스템          | 인코더가 인크리멘탈 타입이기 때문에 절대 위치 시스템을 사용할 수 없습니다                                                                                                                                                                                                                                               |
| 폴로 업(Follow up) 기능 | 이 제품은 반드시 서보 ON 시에 원점복귀를 실시해 주십시오.<br>오픈 루프 제어 시스템이므로 서보 OFF 상태에서는 'Position actual value (Index:6064h, Subindex: 00h)'를 업데이트하지 않습니다.<br>폴로 업 기능에서는 'Position actual value (Index:6064h, Subindex:00h)'를 기준으로 모터의 회전량을 컨트롤러의 명령에 반영하기 때문에, 서보 OFF 중에 모터가 회전한 만큼 컨트롤러 명령과 모터의 위치가 어긋납니다. |
| 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.<br>초깃값은 "0: 미설정"입니다. 따라서 [Md.109~112: 임의 데이터 모니터 출력 1~4]는 '0'이 됩니다.                                                                                       |

## 1-5. 제약 사항

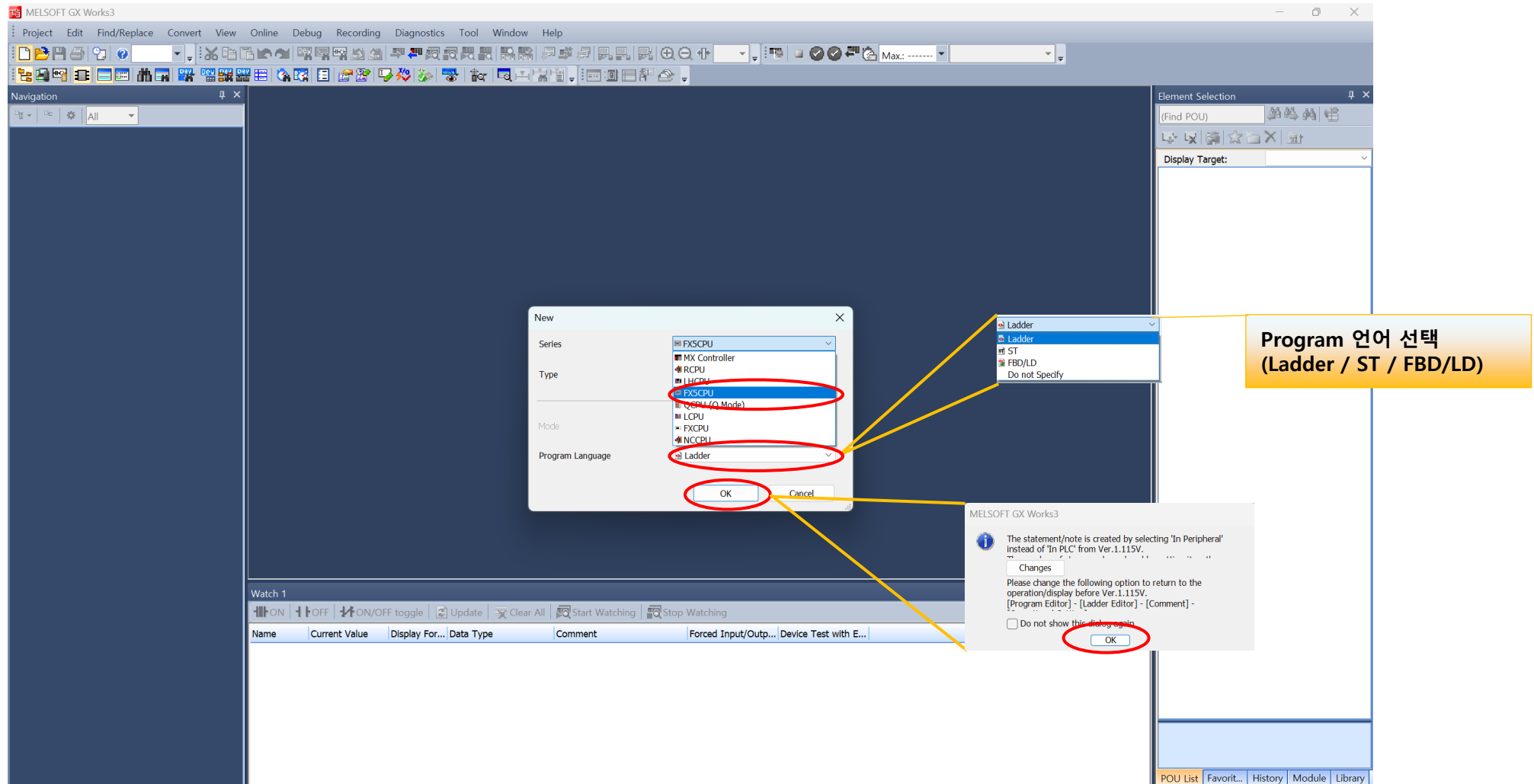
### ● 모션 제어 기능 제약 사항 (FX5와 Ezi-STEP)

| 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. <ul style="list-style-type: none"><li>· 게인 전환 중 (b4)</li><li>· 풀 클로즈드 제어 전환 중(b5)</li><li>· 토크 제한 중(b13)</li><li>· 절대 위치 소실 중 (b14)</li><li>· 경고 중(b15)</li></ul> |
| Md.119: 서보 상태 2      | 모니터 데이터 중 아래 비트는 항상 'OFF' 상태입니다. <ul style="list-style-type: none"><li>· 영점 통과(b0)</li><li>· 영속도 중(b3)</li><li>· 속도 제한 중(b4)</li><li>· PID 제어 중(b8)</li></ul>                                      |
| 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**

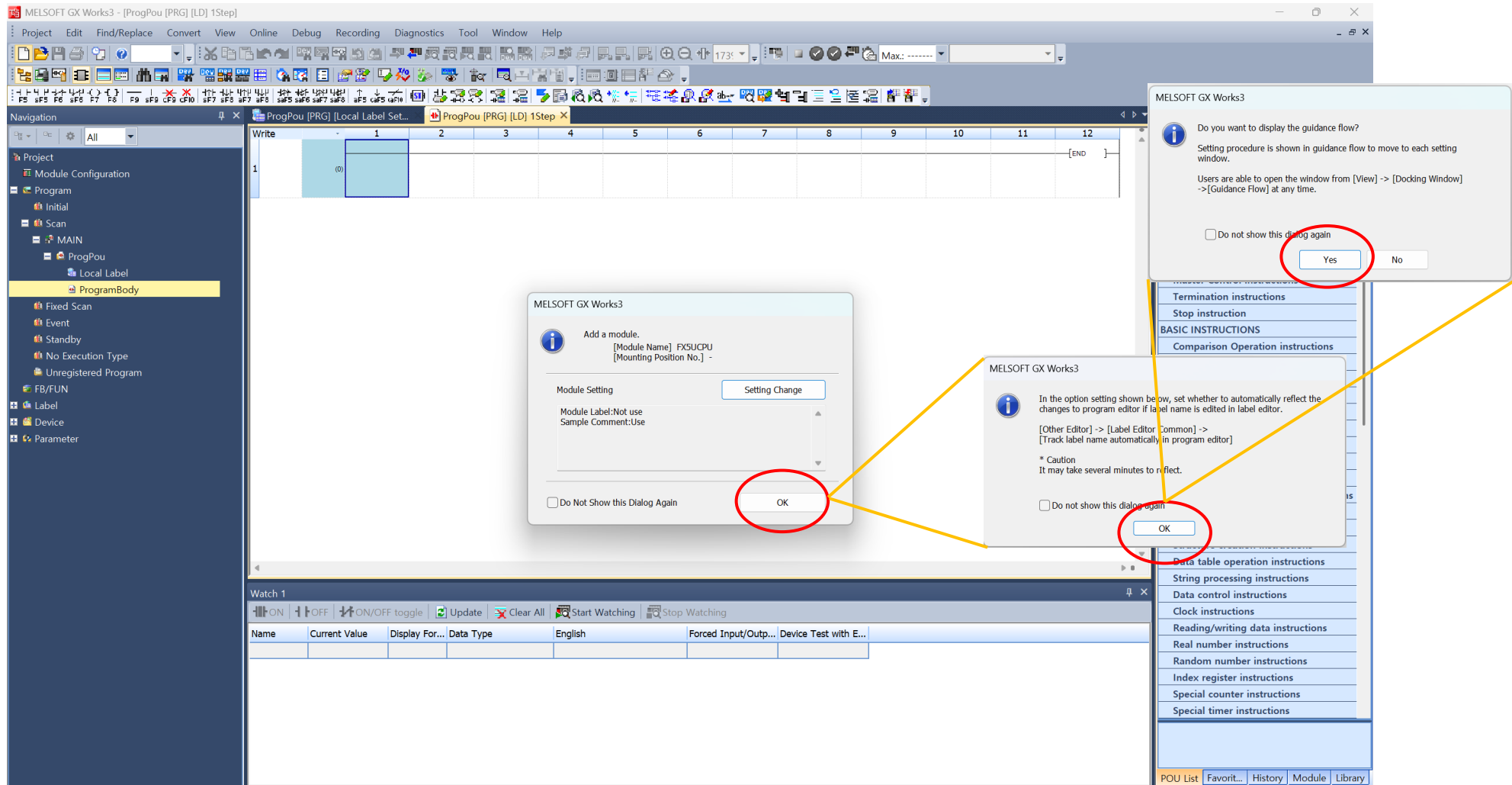
## 2-1. Project 생성

- 신규 Project 생성 시 FX5CPU, 모델명, 사용 축수, Program 언어를 선택



## 2-2. Module 등록

- FX5UCPU 등록



## 2-2. Module 등록

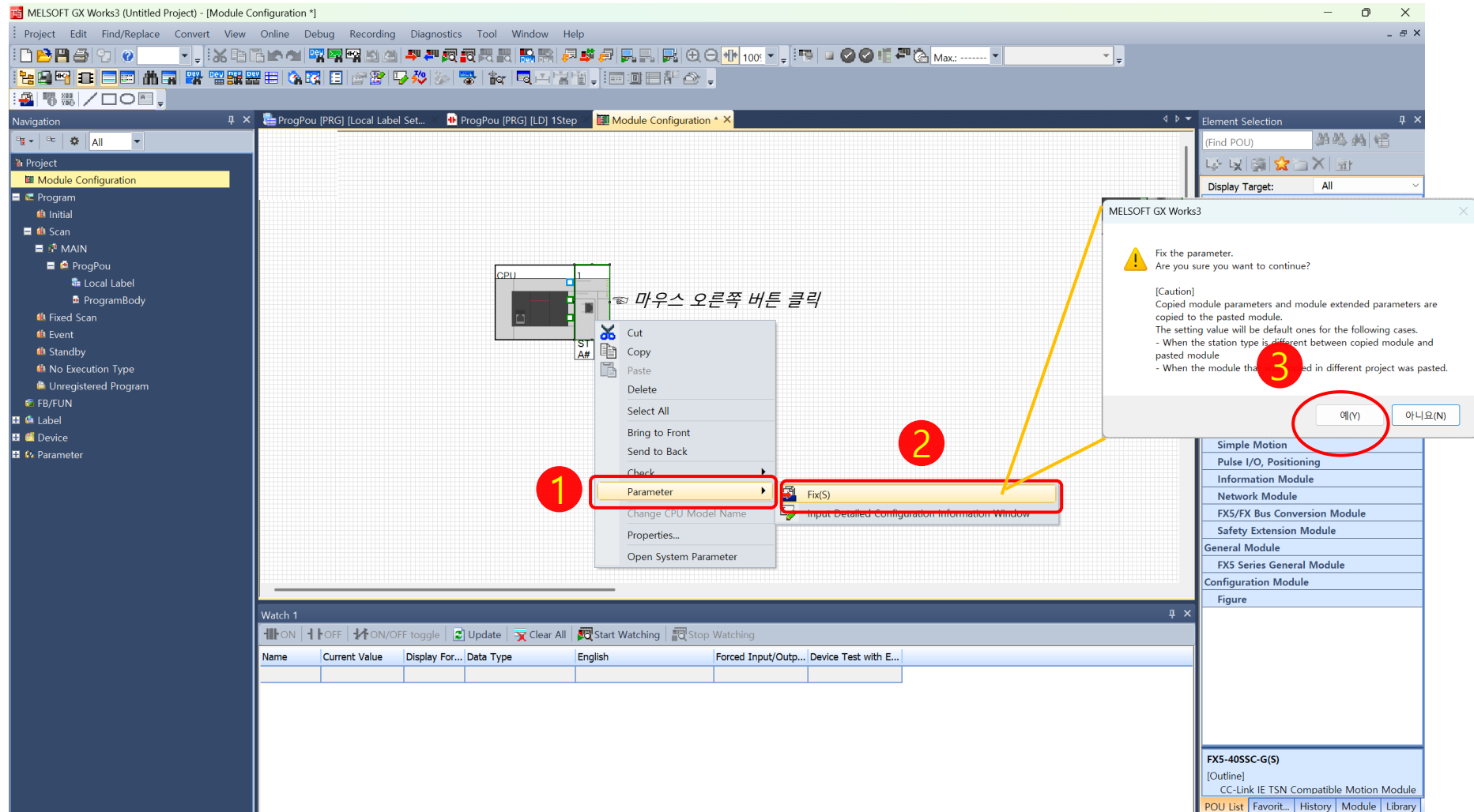
- FX5UCPU 등록

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 rack configuration with a CPU module 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 contains the text: [클릭 & 드래그] 1. FX5UCPU가 생성됨. 2. FX5-40SSC-G(S). A dialog box in the bottom left corner contains the text: 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.

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

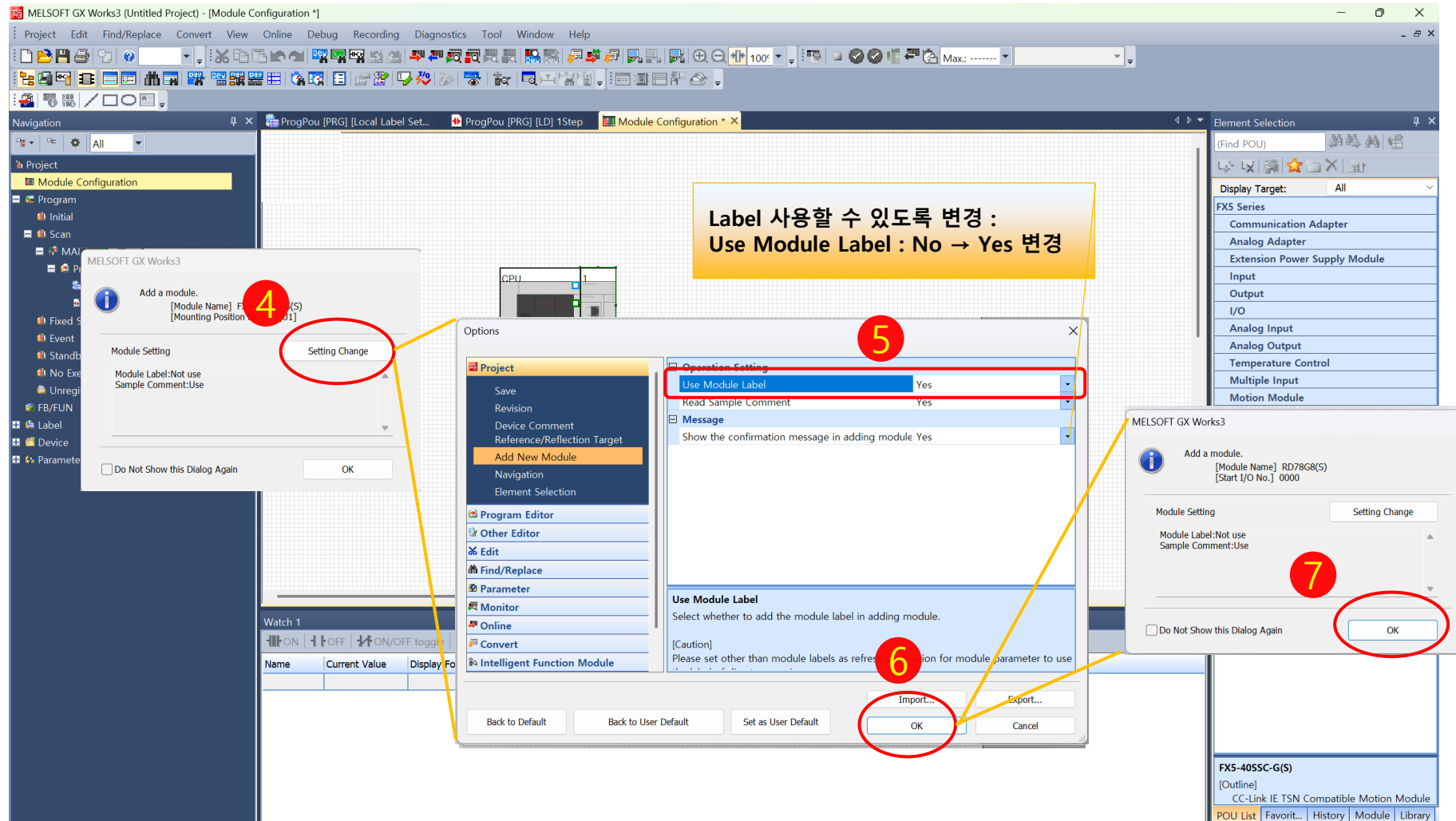
## 2-3. Module Configuration – H/W

- 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 Information

**2** Station No./IP Address Setting

**3** Apply

Network 국번 : 1

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

| 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)

### ● Network Configuration Settings

The screenshot displays the MELSOFT GX Works3 interface for configuring a 1[U1]:FX5-40SSC-G(S) module. The left sidebar shows the Project tree with the 'Module Information' folder selected (indicated by a red circle 1). The central 'Setting Item List' pane shows the 'Network Configuration Settings' item selected (indicated by a red circle 2). The right pane shows the 'CC-Link IE TSN Configuration' window, which includes a 'Module List' and a 'Detailed Setting' link (indicated by a red circle 3). The 'Module List' shows the 'General CC-Link IE TSN Module' selected. The 'Detailed Setting' link is highlighted with a yellow box. The bottom status bar shows the 'Watch 1' window with a table of current values.

| 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

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:

| Cycle Transmission Time (ms): | 35.00          | us Setting | Parameter Automatic Setting | PDO Mapping Setting | IP Address  | Subnet Mask   | Default Gateway | Reserved/Error Invalid Station | Network Synchronous Communication |
|-------------------------------|----------------|------------|-----------------------------|---------------------|-------------|---------------|-----------------|--------------------------------|-----------------------------------|
| 0                             | Host Station   | 0          | Master Station              |                     |             |               |                 |                                |                                   |
| 1                             | Ezi-STEP-CT-4X | 1          | Remote Station              |                     | 192.168.3.1 | 255.255.255.0 |                 | No Setting                     | Synchronous                       |
| 2                             | Ezi-STEP-CT-4X | 2          | Remote Station              |                     | 192.168.3.2 | 255.255.255.0 |                 | No Setting                     | Synchronous                       |
| 3                             | Ezi-STEP-CT-4X | 3          | Remote Station              |                     | 192.168.3.3 | 255.255.255.0 |                 | No Setting                     | Asynchronous                      |
| 4                             | Ezi-STEP-CT-4X | 4          | Remote Station              |                     | 192.168.3.4 | 255.255.255.0 |                 | No Setting                     | Asynchronous                      |

2

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

- 192.168.3.1
- 192.168.3.2
- 192.168.3.3
- 192.168.3.4

※ IP Address 변경 후 전원 RESET 필요

1

마우스 클릭 & 드래그 (반복)

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
- EnergyMeasuringUnit
- Bridge module
- FPGA module
- CC-Link IE TSN Module (FASTECH Co. Ltd.)
- BLDC Servo Drive
- Closed-loop Step Drive
- Open-loop Step Drive
- Ezi-STEP-CT Open-Loop st
- Ezi-STEP-CT-4X Open-Loop st
- Ezi-STEP-CT-ALL Open-Loop st
- Speed Control

STA#0 Master Station  
Total STA#4  
Line/Star

STA#1 STA#2 STA#3 STA#4

Ezi-STEP-CT-4X Ezi-STEP-CT-4X Ezi-STEP-CT-4X Ezi-STEP-CT-4X

Output

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

P2 P1 X16 X1

FASTECH Co. Ltd.  
[Station Type]  
Remote Station

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

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

The screenshot displays the 'CC-Link IE TSN Configuration' software interface. The main window shows a table of stations and their configurations. A red box labeled '1' highlights the 'Motion Control Station' column, and a red box labeled '2' highlights the 'Synchronous' selection in the 'Network Synchronous Communication' column.

| Station No. | Station Name   | Station Type   | Motion Control Station              | Points | Points | Points | Points | Parameter Automatic Setting | PDO Mapping Setting | IP Address    | Subnet Mask   | Default Gateway | Reserved/Error Invalid Station | Network Synchronous Communication |
|-------------|----------------|----------------|-------------------------------------|--------|--------|--------|--------|-----------------------------|---------------------|---------------|---------------|-----------------|--------------------------------|-----------------------------------|
| 0           | Host Station   | Master Station |                                     |        |        |        |        |                             |                     | 192.168.3.253 | 255.255.255.0 |                 |                                |                                   |
| 1           | Ezi-STEP-CT-4X | Remote Station | <input checked="" type="checkbox"/> |        |        |        | 16     | 16                          | <Detail Setting>    | 192.168.3.1   | 255.255.255.0 |                 | No Setting                     | Synchronous                       |
| 2           | Ezi-STEP-CT-4X | Remote Station | <input checked="" type="checkbox"/> |        |        |        | 16     | 16                          | <Detail Setting>    | 192.168.3.2   | 255.255.255.0 |                 | No Setting                     | Synchronous                       |
| 3           | Ezi-STEP-CT-4X | Remote Station | <input checked="" type="checkbox"/> |        |        |        | 16     | 16                          | <Detail Setting>    | 192.168.3.3   | 255.255.255.0 |                 | No Setting                     | Asynchronous                      |
| 4           | Ezi-STEP-CT-4X | Remote Station | <input checked="" type="checkbox"/> |        |        |        | 16     | 16                          | <Detail Setting>    | 192.168.3.4   | 255.255.255.0 |                 | No Setting                     | Asynchronous                      |

Annotations:

- 1 Motion Control Station - Check (마우스 클릭)
- 2 Synchronous 선택

Module List (Right Panel):

- 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
- EnergyMeasuringUnit
- Bridge module
- FPGA module
- CC-Link IE TSN Module (FASTECH Co. Ltd.)
- BLDC Servo Drive
- Closed-loop Step Drive
- Open-loop Step Drive
- Ezi-STEP-CT
- Ezi-STEP-CT-4X
- Ezi-STEP-CT-ALL
- Speed Control

Output (Bottom Panel):

Host Station

STA#0 Master Station

STA#1 STA#2 STA#3 STA#4

Ezi-STEP-CT-4X Ezi-STEP-CT-4X Ezi-STEP-CT-4X Ezi-STEP-CT-4X

[Outline]  
Step Drive  
[Specification]  
Open-Loop Step Drive  
Motor: Max. NEMA 24  
Mode: Homing, GSP, PP  
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)

Connected/Disconnected Module Detection Detailed Display

Mode Setting: Online (Unicast Mode) Assignment Method:

| Cycle Transmission Time (µs): | 25.00          | us | Station Type   | Motion Control Station | Points | Points | Points | usSetting | Parameter Automatic Setting | PDO Mapping Setting | IP Address    | Subnet Mask   | Default Gateway | Reserved/Error Invalid Station | Network Synchronous Communication |
|-------------------------------|----------------|----|----------------|------------------------|--------|--------|--------|-----------|-----------------------------|---------------------|---------------|---------------|-----------------|--------------------------------|-----------------------------------|
| 0                             | Host Station   | 0  | Master Station |                        |        |        |        |           |                             |                     | 192.168.3.253 | 255.255.255.0 |                 |                                |                                   |
| 1                             | Ezi-STEP-CT-4X | 1  | Remote Station |                        |        |        | 16     | 16        |                             | <Detail Setting>    | 192.168.3.1   | 255.255.255.0 |                 | No Setting                     | Synchronous                       |
| 2                             | Ezi-STEP-CT-4X | 2  | Remote Station |                        |        |        | 16     | 16        |                             | <Detail Setting>    | 192.168.3.2   | 255.255.255.0 |                 | No Setting                     | Synchronous                       |
| 3                             | Ezi-STEP-CT-4X | 3  | Remote Station |                        |        |        | 16     | 16        |                             | <Detail Setting>    | 192.168.3.3   | 255.255.255.0 |                 | No Setting                     | Asynchronous                      |
| 4                             | Ezi-STEP-CT-4X | 4  | Remote Station |                        |        |        | 16     | 16        |                             | <Detail Setting>    | 192.168.3.4   | 255.255.255.0 |                 | No Setting                     | Asynchronous                      |

클릭하면 바로 반영됨

Module List

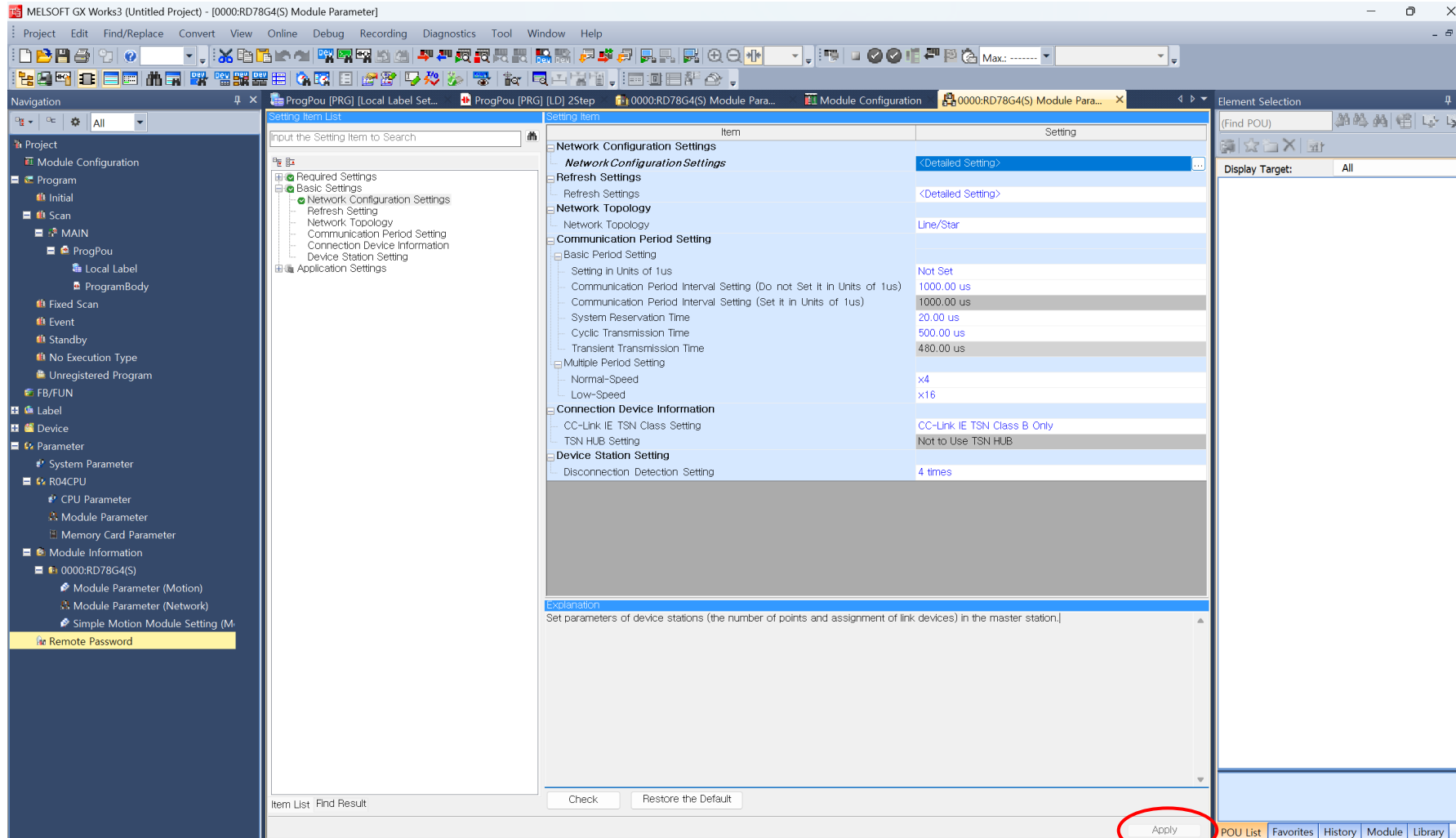
- General CC-Link IE TSN Module
- CC-Link IE TSN Module (Mitsubishi Electric)
- Master/Local Module
- Motion Module
- GOT3000 Series
- GOT2000 Series
- General-Purpose AC Servo
- General purpose Inverter
- DC Input
- Transistor Output
- I/O Combined
- Analog Input
- Analog Output
- EnergyMeasuringUnit
- Bridge module
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- CC-Link IE TSN Module (FASTECH Co. Ltd.)
- BLDC Servo Drive
- Closed-loop Step Drive
- Open-loop Step Drive
- Ezi-STEP-CT
- Ezi-STEP-CT-4X
- Ezi-STEP-CT-ALL
- Speed Control

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

Output

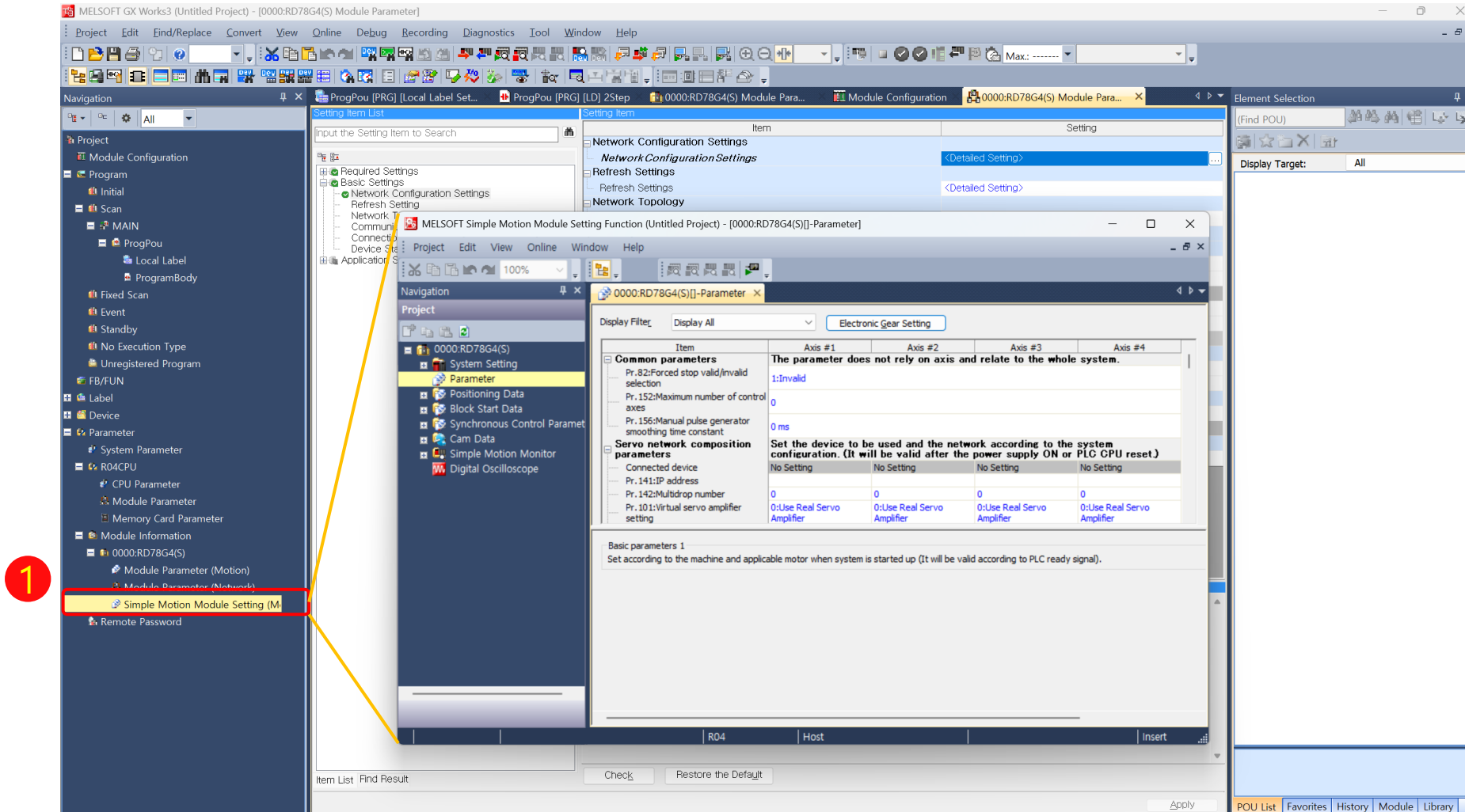
## 2-4. Parameter / Module Information / 1[U1]:FX5-40SSC-G(S)

- Network Configuration Settings 적용



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

- Simple Motion Module Setting 프로그램 실행하기





## 2-5. Simple Motion Module Setting

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

The screenshot shows the MELSOFT Simple Motion Module Setting Function software. The 'Parameter' tab is selected in the left sidebar. The 'Servo network composition parameters' section is expanded, showing 'Pr.141:IP address' set to '192.168.3.1'. A red box highlights this value. A yellow arrow points from this box to a 'Station Address Setting' dialog box. In the dialog box, the 'IP Address' column shows '192.168.3.1' selected, with a red box around it. A red box also highlights the 'OK' button in the dialog box. A red circle with the number '3' is placed near the 'OK' button. The background shows various other parameters for Axis #1, #2, and #3, including 'Common parameters', 'Basic parameters 1', 'Basic parameters 2', and 'Detailed parameters 1'.

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

## 2-5. Simple Motion Module Setting

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

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

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

Project: 0000:RD78G4(S)

System Setting

Parameter

Positioning Data

Block Start Data

Synchronous Control Parameter

Cam Data

Simple Motion Monitor

Digital Oscilloscope

Display Filter: Display All

Electronic Gear Setting

| Item                                                                                                                          | Axis #1                                                  | Axis #2                                                  | Axis #3                                                  | Axis #4                                                  |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
| Pr. 141: IP address                                                                                                           | 192.168.3.1                                              |                                                          |                                                          |                                                          |
| Pr. 142: Multidrop number                                                                                                     | 0                                                        | 0                                                        | 0                                                        | 0                                                        |
| Pr. 101: Virtual servo amplifier selection                                                                                    | 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 setting                                                                                         | 0: Driver Communication Invalid                          | 0: Driver Communication Invalid                          | 0: Driver Communication Invalid                          | 0: Driver Communication Invalid                          |
| 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                                                |
| 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                                                  |
| 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                                                  | 0 pulse                                                  | 0 pulse                                                  |
| Pr. 12: Software stroke limit upper                                                                                           | 2147483647 pulse                                         | 2147483647 pulse                                         | 2147483647 pulse                                         | 2147483647 pulse                                         |
| Pr. 13: Software stroke limit lower                                                                                           | -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                                                                                           | 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 time                                                                                          | 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: 500 pulse/s

※ 모터에 장착된 인코더 규격에 따라 설정을 변경할 수 있습니다.

## 2-5. Simple Motion Module Setting

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

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

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

Project: 0000:RD78G4(S)

- System Setting
- Parameter
- Positioning Data
- Block Start Data
- Synchronous Control Parameter
- Cam Data
- Simple Motion Monitor
- Digital Oscilloscope

Display Filter: Display All | Electronic Gear Setting

| Item                                   | Axis #1                                                                                                                                     | Axis #2                                                      | Axis #3                                                      | Axis #4                                                      |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|
| Pr.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                                                |
| <b>HPR parameters</b>                  | <b>Set the parameters required for HPR, which are not set on the driver (servo amplifier) side (Valid when the PLC ready signal is ON).</b> |                                                              |                                                              |                                                              |
| 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                                                      |
| <b>Pr.46:HPR speed</b>                 | <b>500 pulse/s</b>                                                                                                                          | 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                        |
| <b>External input signal assign...</b> | <b>Set the link device to assign external input signal.</b>                                                                                 |                                                              |                                                              |                                                              |
| <b>Forced stop signal</b>              | <b>Set the link device to assign forced stop signal.</b>                                                                                    |                                                              |                                                              |                                                              |
| 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: 500 pulse/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) - [0000:RD78G8(S)]-Parameter window. The left sidebar shows the project tree with 'Parameter' selected. The main window is divided into two panes: 'Common parameters' and 'Electronic Gear Setting - Axis #1'.

**Common parameters:**

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

**Electronic Gear Setting - Axis #1:**

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

**Calculation Result:**

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

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

**Annotations:**

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

## 2-5. Simple Motion Module Setting

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

Pr.2: Number of pulses per rotation  
Set the number of pulses required for a complete rotation of the motor shaft.  
Set it taking the electronic gear of the servo amplifier into consideration.  
Number of pulses per rotation (AP) = Encoder resolution x Electronic gear denominator / Electronic gear numerator  
When the encoder resolution is 67108864 pulses, the electronic gear (numerator / denominator) of the servo amplifier is rewritten with 16/1 inside RD78G(S).  
Therefore, set the number of pulses per rotation (AP) as 4194304 pulses in such a case.  
"Electronic gear function" coordinates the output pulses calculated from the values set as the pulses per rotation and the movement amount per rotation with the actual movement amount of a machine.  
Using the electronic gear setting allows users to configure the electronic gear easily.

Setting Range  
1 to 200000000 pulse

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

Machine Components: Others  
Unit Setting: 3:pulse  
Movement Amount per Load Rotation (dSL): 10000 [pulse]  
Reduction Ratio (NL/NM): 1 / 1  
Encoder Resolution: 10000 [pulse/rev]  
Setting Range: 1 to 200000000 pulse  
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: 0 [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

HPR speed: 500 pulse/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 2 / Speed limit value, Acceleration time 0, Deceleration time 0

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

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

Project: 0000:RD78G8(S) [Parameter]

Display Filter: Display All Electronic Gear Setting

| Item                                                                                                                                                                                           | Axis #1                                                  | Axis #2                                                  | Axis #3                                                  | Axis #4                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
| <b>Common parameters</b><br>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                                                     |                                                          |                                                          |                                                          |
| <b>Servo network composition parameters</b><br>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                          |                                                          |                                                          |
| <b>Basic parameters 1</b><br>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                                              |                                                          |                                                          |
| <b>Basic parameters 2</b><br>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                                                  |
| <b>Detained parameters 1</b><br>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 (Encoder 10,000 pulse의 경우)
- ✓ Pr9 : Acceleration time 0 → 200ms (Ezi-STEP는 100ms도 가능)
- ✓ Pr10: Deceleration time 0 → 200ms (Ezi-STEP는 100ms도 가능)



## 2-5. Simple Motion Module Setting

- Convert / Rebuild All

설정이 끝나면 윈도우 종료로 설정 값 반영됨

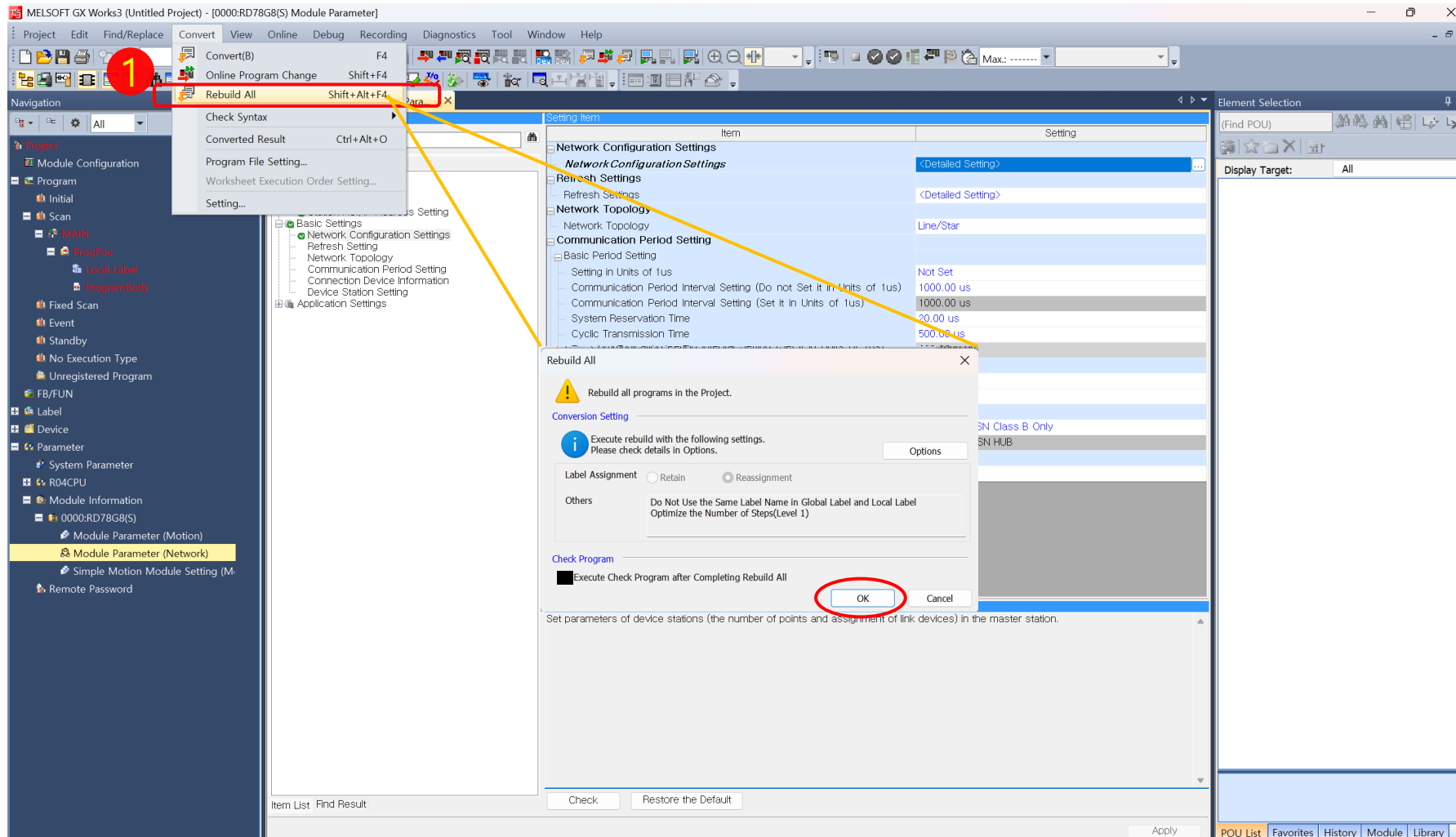
Limit Sensor를 연결하지 않은 상태에서 Ezi-STEP 동작 테스트를 하려면 Pr.116, Pr.117, Pr.118 모두 Invalid로 설정해야 함

1

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

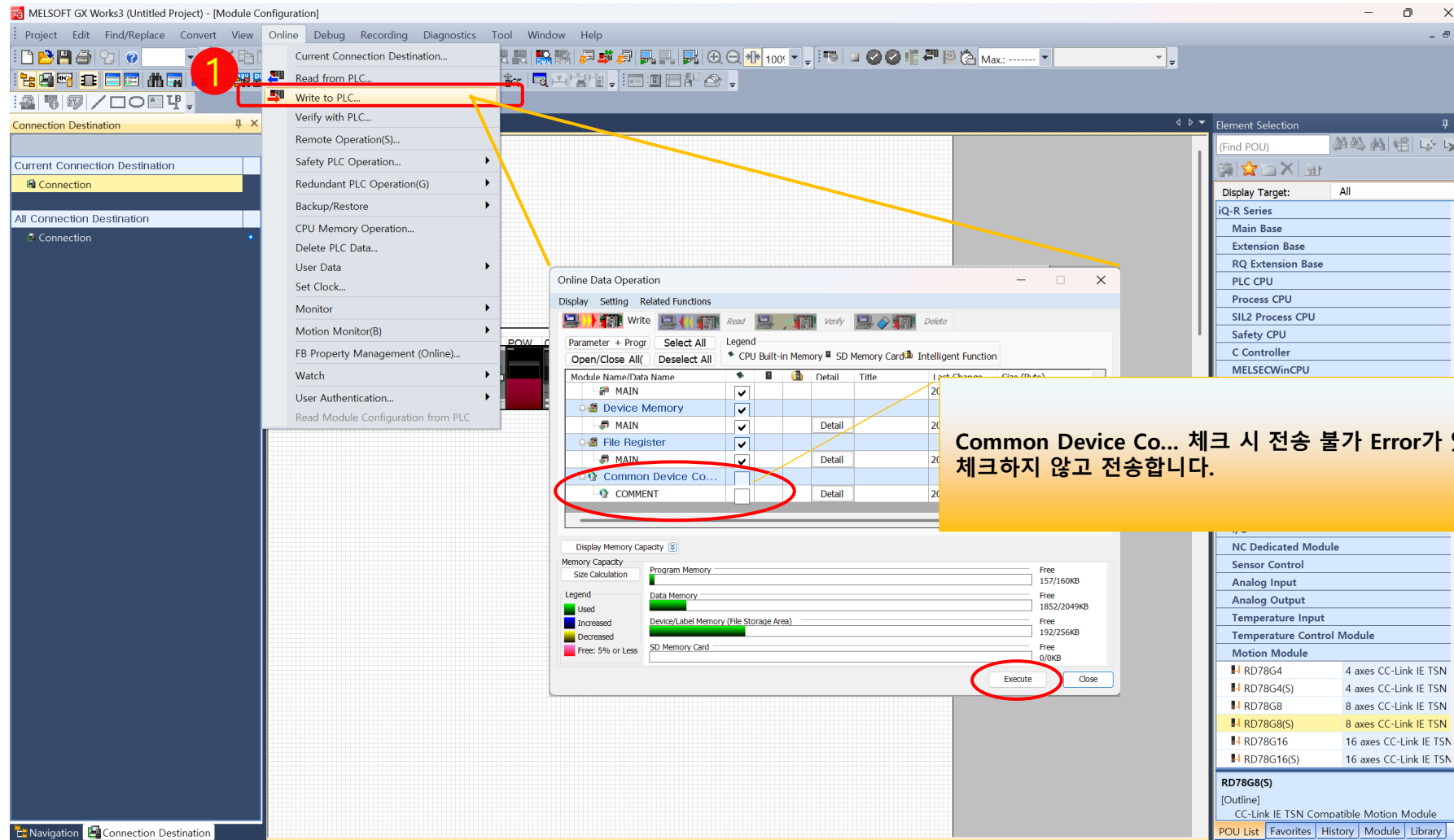
- Convert / Rebuild All





## 2-6. Convert

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



## 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 Area                             | 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.

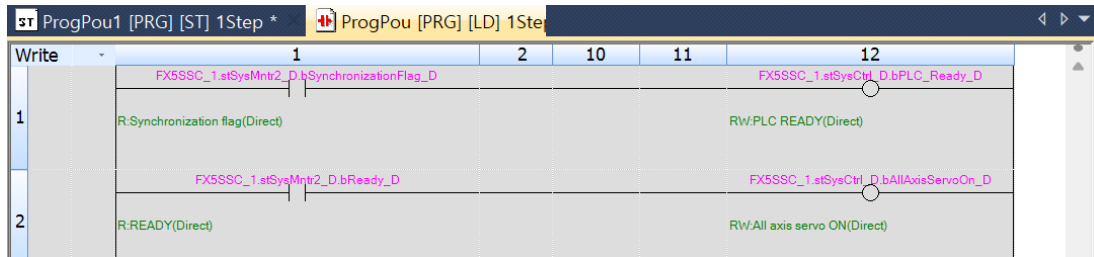
### 3. 동작 확인

## 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 a servo motor control program. The main window shows a ladder logic diagram with the following steps:

- Step 1: Initial conditions and parameter setting for `FX5SSC_1`.
- Step 2: Setting `bSetJogParam` to `K5000` for `FX5SSC_1`.
- Step 3: Setting `K50000` for `FX5SSC_1`.
- Step 4: Setting `K200` for `FX5SSC_1`.
- Step 5: Setting `K200` for `FX5SSC_1`.
- Step 6: Setting `K200` for `FX5SSC_1`.
- Step 7: End of the program.

The right panel shows the **Module Label** list, including the following modules and functions:

- `M+FX5SSC_G(S)`: Positioning data set, Positioning start FB, JOG/inching operation, Manual pulse generator, Speed change FB, Acc./dec. time SV, Target position change, Restart FB, Error operation FB, Parameter initialization, Flash ROM writing, Torque control mode, Speed control mode, Position control mode, Continuous torque, Starting/ending sync, Sync encoder position, Sync encoder count, Sync encoder error, Sync encoder connection, Cam reference position, Cam position per cycle, MG position per cycle, AG position per cycle, Cam position per cycle, Cam for rotary cutter, Cam command position, Cam position per cycle.
- `M+FX5SSC_JOG_01A`: JOG/inching operation.

The bottom right corner shows the **POU List** with the following items:

- `M+FX5SSC_JOG_01A`: JOG/inching operation.
- `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 dialog box titled "FB Instance Name" is open, showing the selection of "MFX5SSC\_JOG\_01A1" as the local label for the function block instance. A red box highlights this selection. A yellow callout box with a checkmark and the text "✓ JOG 동작 FB 생성 : OK" is positioned below the dialog. On the right side, the "Element Selection" pane is visible, showing a list of available function blocks. A red circle with the number "1" highlights the "MFX5SSC\_JOG\_01A1" entry in the list, which is labeled "JOG/inching operation". The bottom of the screen shows the "POU List" tab with the details for the selected function block, including its name in Japanese and a brief description.

FB Instance Name

Local Label (ProgPou): MFX5SSC\_JOG\_01A1

Register a FB instance at the last row.

✓ JOG 동작 FB 생성 : OK

1 MFX5SSC\_JOG\_01A1 JOG/inching operation

MFX5SSC\_JOG\_01A1  
[Japanese]  
JOG運転 / インチング運転を行います。

# 3.1 프로그램 작성

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

✓ 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 [U1]:FX5-40SSC-G(S) – Axis Monitor

Axis Monitor

Axis #1

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

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)

[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) : 모든축 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]

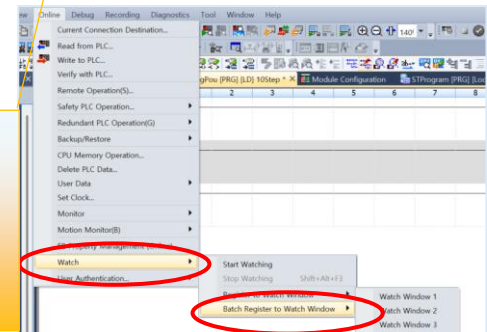
ON OFF ON/OFF toggle Update Clear All

| 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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