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FASTECH
Fast Accurate Smooth Motion



MELSEC MX Controller



Demo

Demo User Guide

MELSEC MX Controller and

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

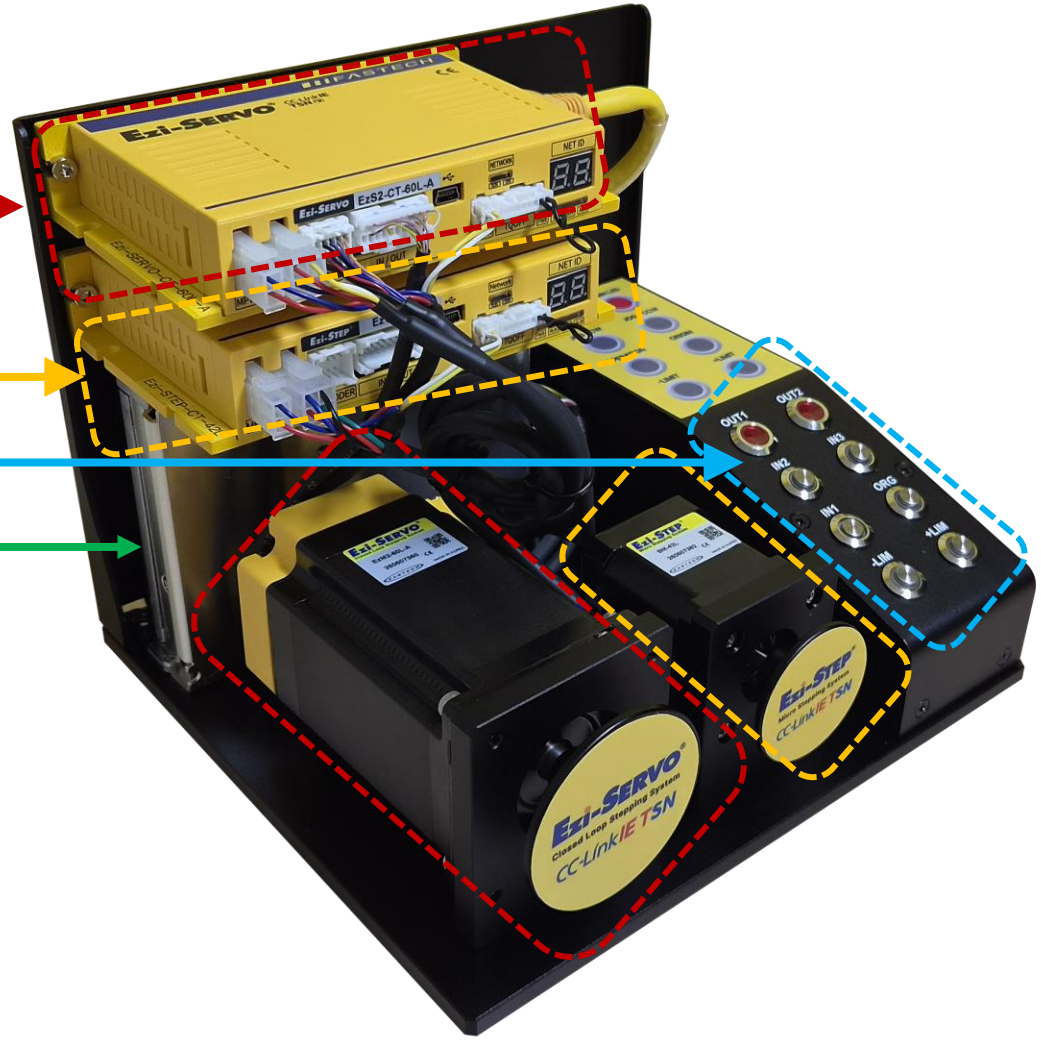
Ezi-STEP® CC-Link IE TSN
Micro Stepping System

Mitsubishi Electric Products
MXR300-32

FASTECH Products
Ezi-SERVO CC-Link IE TSN
Ezi-STEP CC-Link IE TSN

Demo Setup

- **Ezi-SERVO-CT-60L-A**
  - Drive: EzS2-CT-60L-A
  - Motor: EzM2-60L-A
- **Ezi-STEP-CT-42L**
  - Drive : EzT2-CT-42L
  - Motor : BM-42L
- **Control Panel**
  - Switch (6EA) : FLS(+Limit), RLS(-Limit), DOG(Origin), IN1, IN2, IN3
  - Lamp (2EA) : OUT1, OUT2
- **SMPS**
  - IN : 100 VAC ~ 240 VAC
  - OUT : 24V, 4.5A
- **Dimension**
  - 220(D) x 200(W) x 180(H)



Information on Stepper Motors and Drives

- **Ezi-SERVO-CT-60L-A**
  - ❖ **Encoder Resolution : 10,000 P/R**
  - ❖ **Torque Off Function**
  - ❖ **FLS[*1](+Limit), RLS[*2](-Limit), DOG[*3](Origin)**
  - ❖ **Provide user I/O (Input: 6 points, Output: 5 points)**



Ezi-SERVO CC-Link IE TSN
Go to Introduction page

- **Ezi-STEP-CT-42L**
  - ❖ **Microstep Resolution : 10,000 P/R**
  - ❖ **Torque Off Function**
  - ❖ **FLS (+Limit), RLS (-Limit), DOG (Origin)**
  - ❖ **Provide user I/O (Input: 6 points, Output: 5 points)**



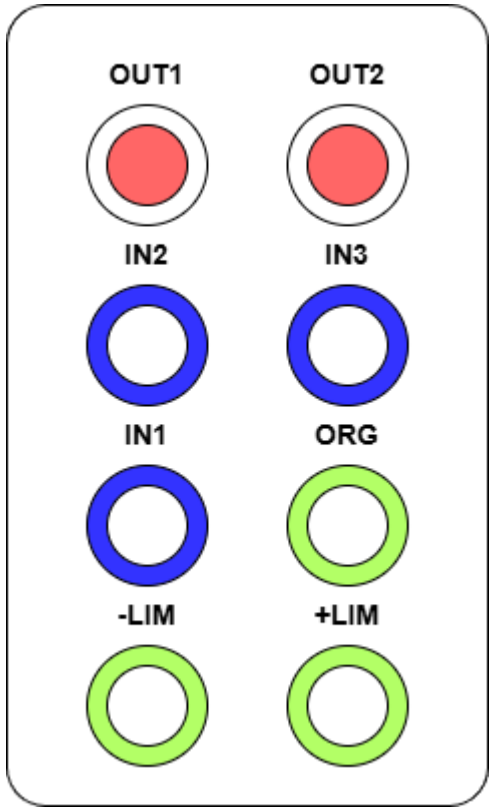
Ezi-STEP CC-Link IE TSN
Go to Introduction page

*1 FLS: Forward Limit Switch
*2 RLS: Reverse Limit Switch
*3 DOG: Origin Sensor

Control Panel Description

Label	Color	Information
+LIM	Green	FLS button
-LIM	Green	RLS button
ORG	Green	DOG button
IN1	Blue	Demo Operation button
IN2	Blue	JOG CW
IN3	Blue	JOG CCW
OUT1	Red	Servo enabled
OUT2	Red	Homing done

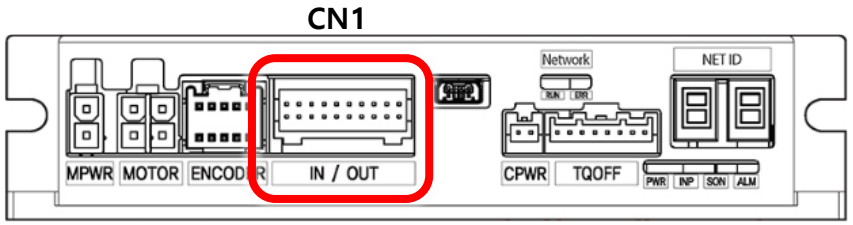
Control Panel

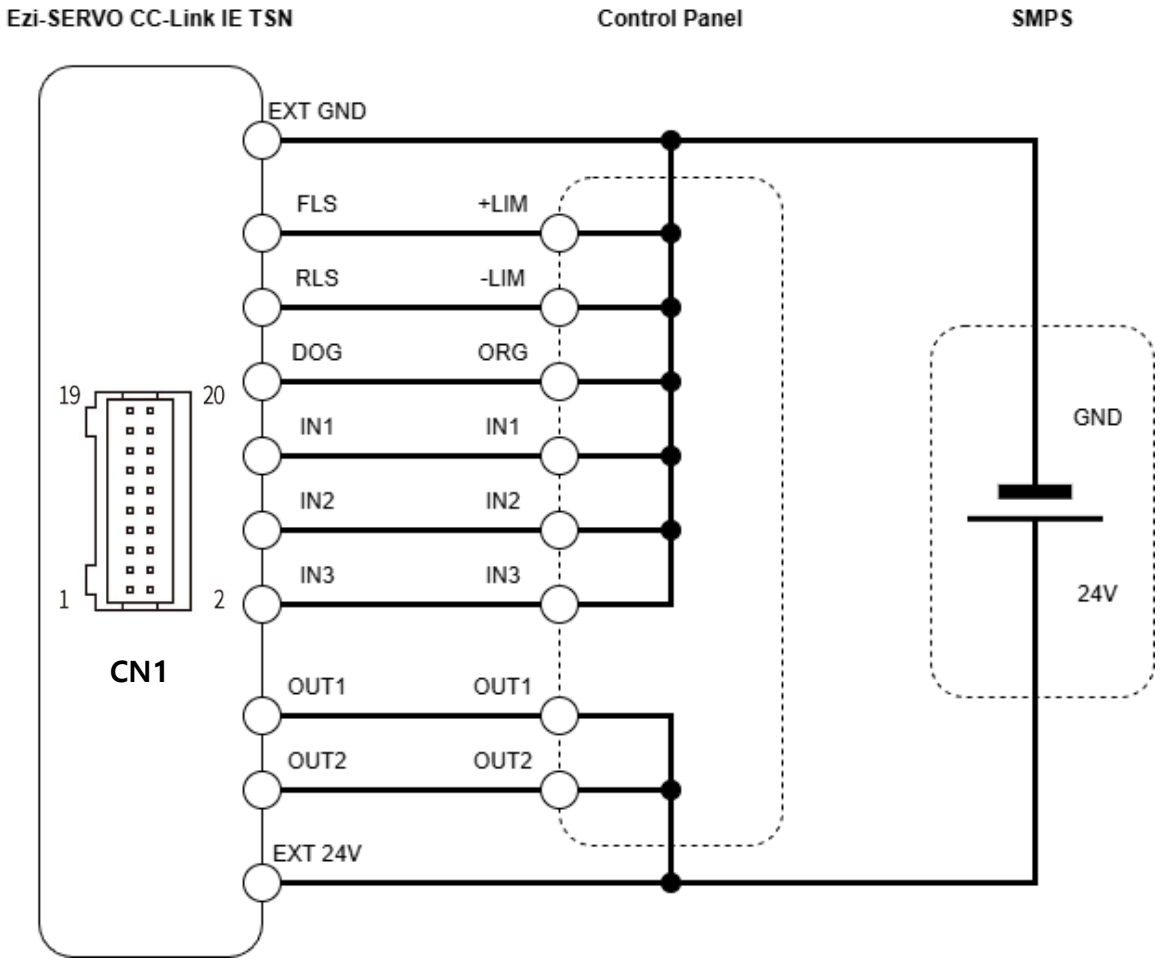


Control Panel I/O Wiring Diagram

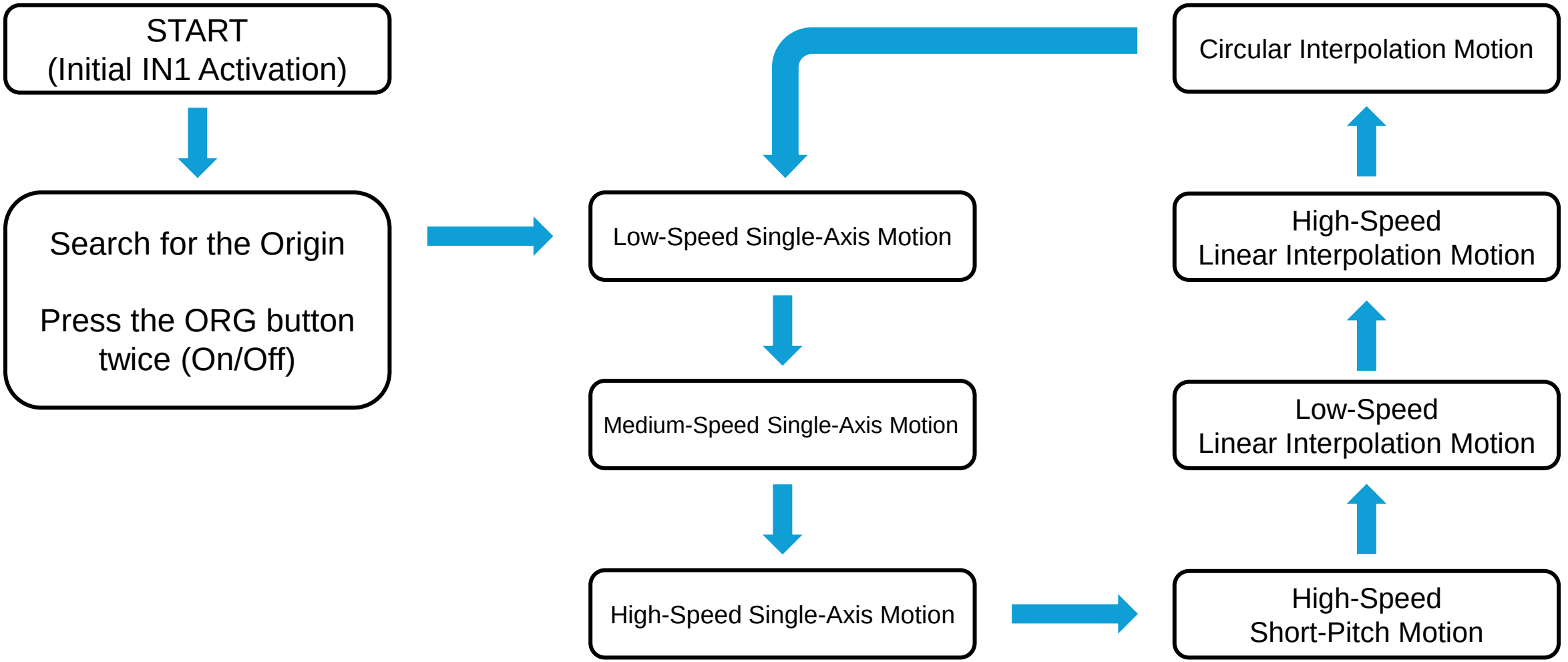
- **Wiring to the input/output connector (CN1) of the Ezi-SERVO-CT-60L-A**

Pin Number	Signal Name	Symbol
1	Forward Limit Switch	FLS
2	Reverse Limit Switch	RLS
3	Near-point Dog	DOG
4	Digital Input 1	IN1
5	Digital Input 2	IN2
6	Digital Input 3	IN3
10	Digital Output 1	OUT1
11	Digital Output 2	OUT2
17	External GND	EXT_GND
18	External 24V	EXT_24V





Operation Flowchart



※ Homing Method : 11

Homing on home switch (negative direction, positive edge) and index pulse (Refer to pages 4-23 of the manual)

Operation Video

Please refer to **[Reference Video1]** in the

[User Guide for Demo] folder for the operation video.

Items to Be Prepared by the Customer (MELSEC MX Controller Series)



MELSEC MX Controller

Note: Examples of how to use the MELSEC MX controller used in this Demo

Control Unit	Components	Details	IP Address
MELSEC MX Controller	CPU	MXR300-32	192.168.3.253
	Base Module	R33B	-
	Power Supply	R61B	-

Files Required to Run the Demo

- **File List**

List	File Path and Name
GX-Works3 Program Source	USB:\[MELSEC MX Controller]\08. [Demo Program Source]\ [Source][CC-Link IE TSN][MELSEC MX Controller][MXR300-32][Demo6] (260729).gx3
Ezi-SERVO CSP+ file	USB:\[MELSEC MX Controller]\09. [CSPP FILE]\[Ezi-SERVO]\ 0x1604_Ezi-SERVO-CT_1_en_CSPP.zip
Ezi-STEP CSP+ file	USB:\[MELSEC MX Controller]\09. [CSPP FILE]\[Ezi-STEP]\ 0x1604_Ezi-STEP-CT_1_en.CSPP.zip

- **The connection guide for the MELSEC MX Controller can be downloaded from the official Mitsubishi Electric FA website.**



[Connection Guide]

How to Write a Demo Program to the MELSEC MX Controller

- Required Program Files

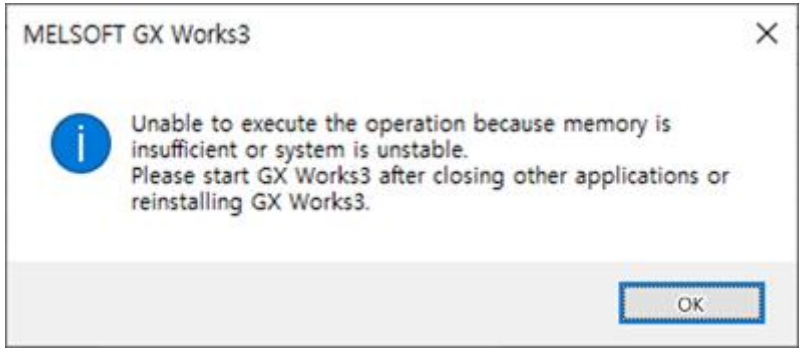
Program Types	File Path and Name
GX-Works3 Program Source	USB:\[MELSEC MX Controller]\08. [Demo Program Source]\ [Source][CC-Link IE TSN][MELSEC MX Controller][MXR300-32][Demo6] (260729).gx3

Software Requirements

- **Development software information**

List	Product Model Code	Version	File Name (Example)
GX-Works3 Software	sw1dnd-gxw3	1.117X	sw1dnd-gxw3-e_117x.exe
Motion Control Setting Software	sw1dnn-mucnf	1.075D	sw1dnn-mucnf-e_075D.exe
Motion Control FB Library		13N	MotionControl_RD78_1.13N.mslm

- **The version information refers to the versions of the software and libraries used when the sample program was developed. If an error occurs during the setup process, as shown in the screen below, please reinstall GX-Works3 using a different version.**



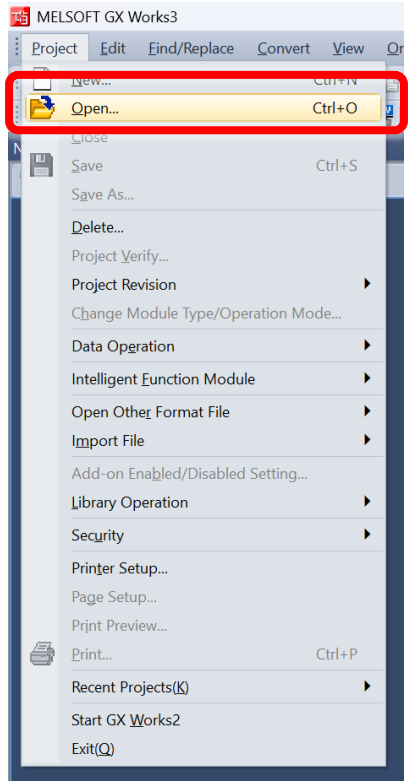
Open the Demo program source code

- **This section explains the procedure for installing a Demo program on a PLC.**

Before proceeding with the process, you must first register a product profile.

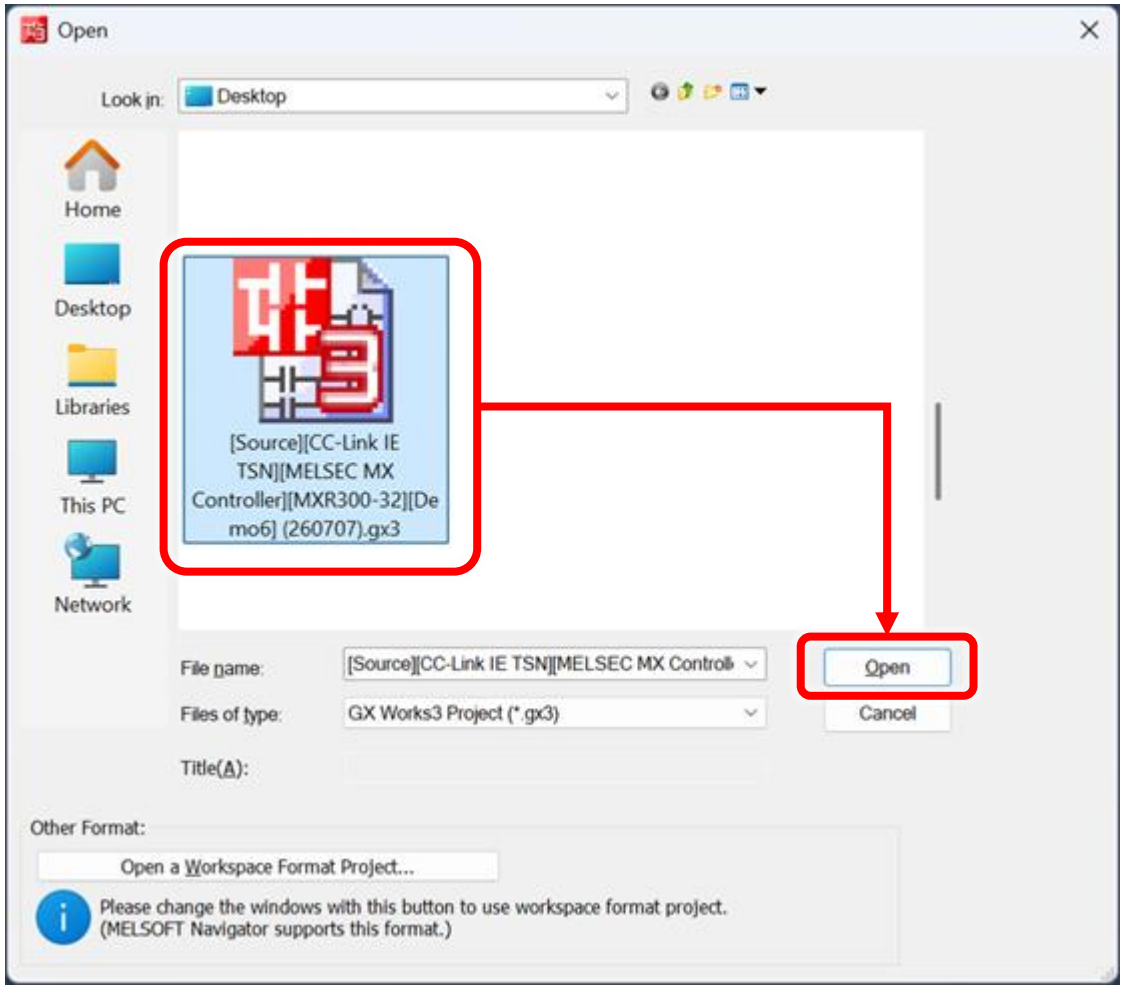
Please refer to “Appendix 1 – Profile Registration.”

1. Select [Project] → [Open] from the menu



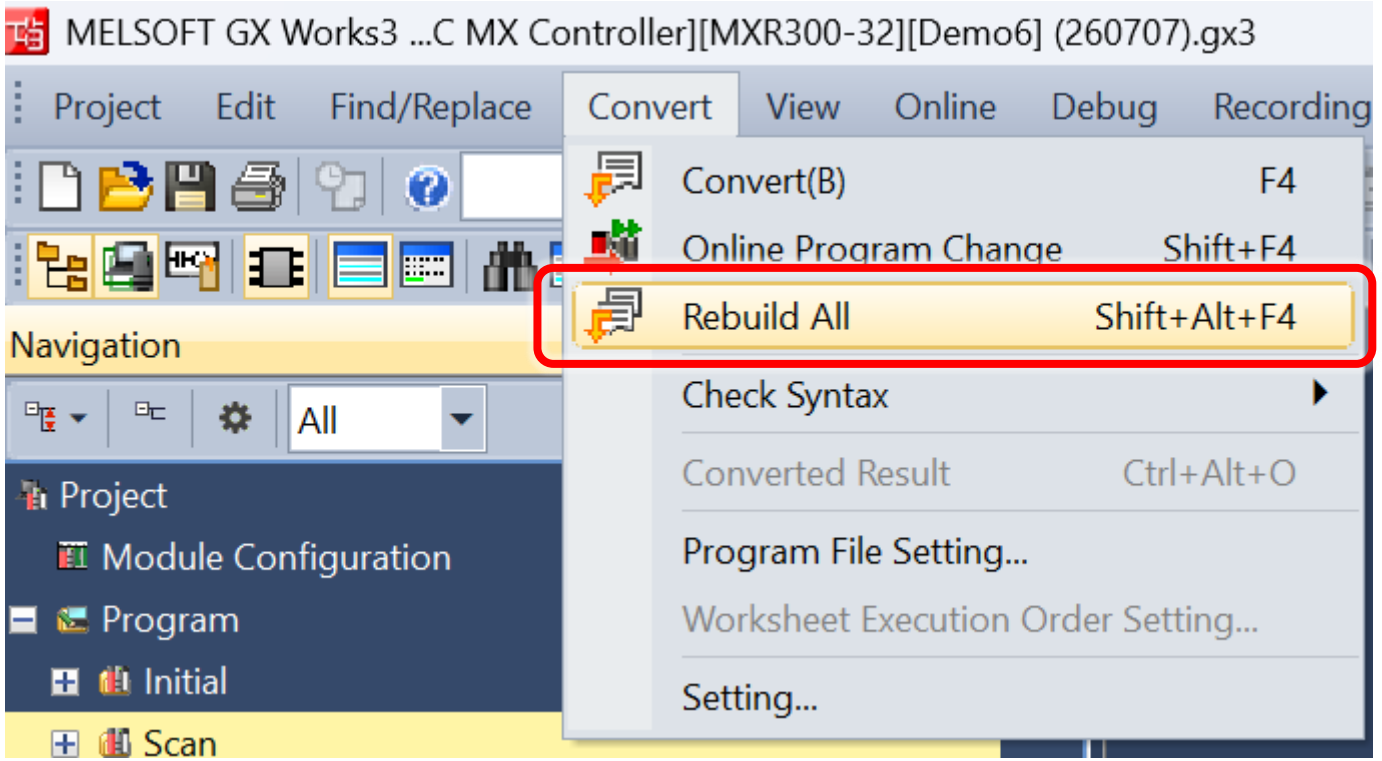
Selecting and Loading Demo Programs

2. Select the following file, then click the [Open]
   [Source][CC-Link IE TSN][MELSEC MX Controller][MXR300-32][Demo6] (******).gx3



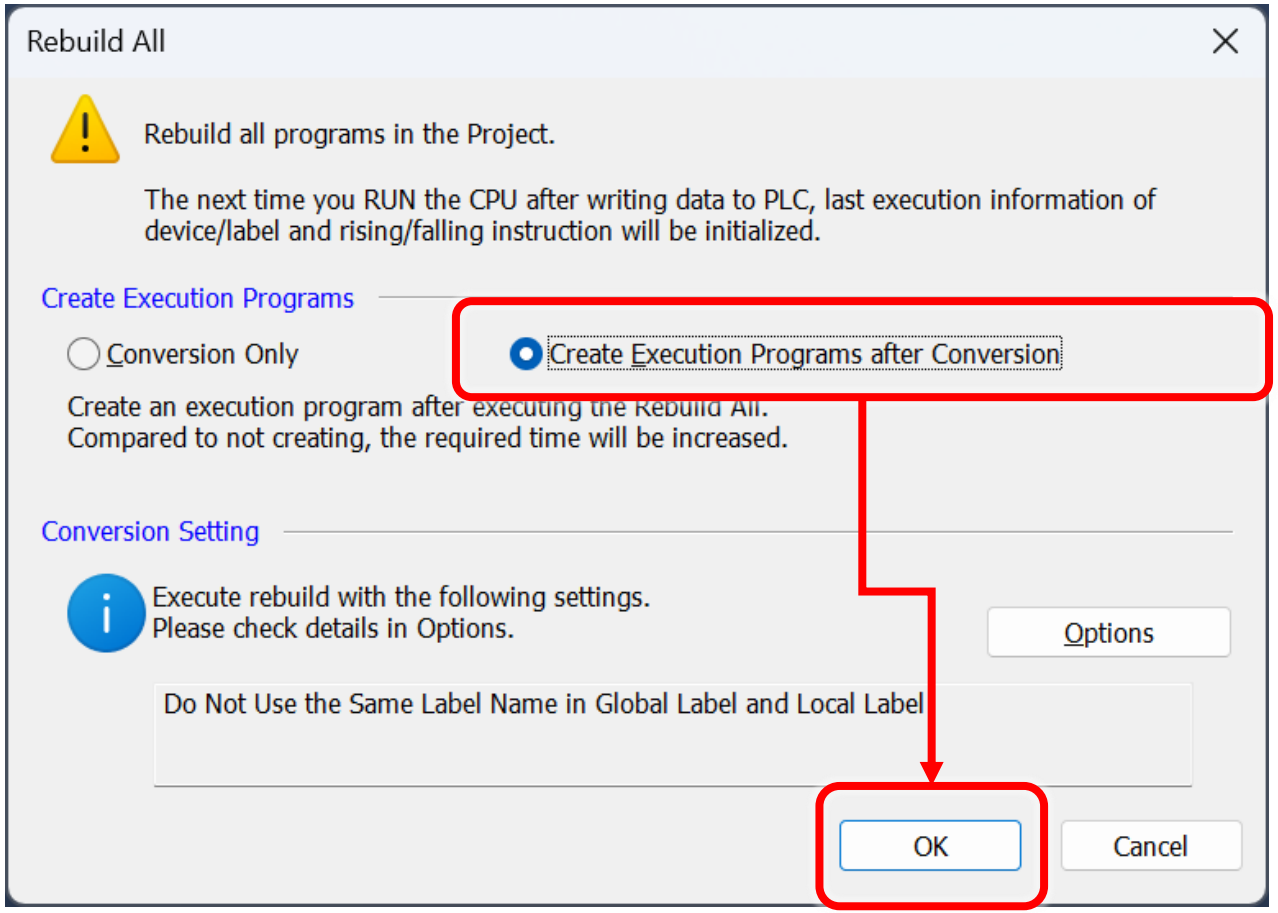
Rebuilding the Demo Program

3. Select [Convert] → [Rebuild All] from the menu



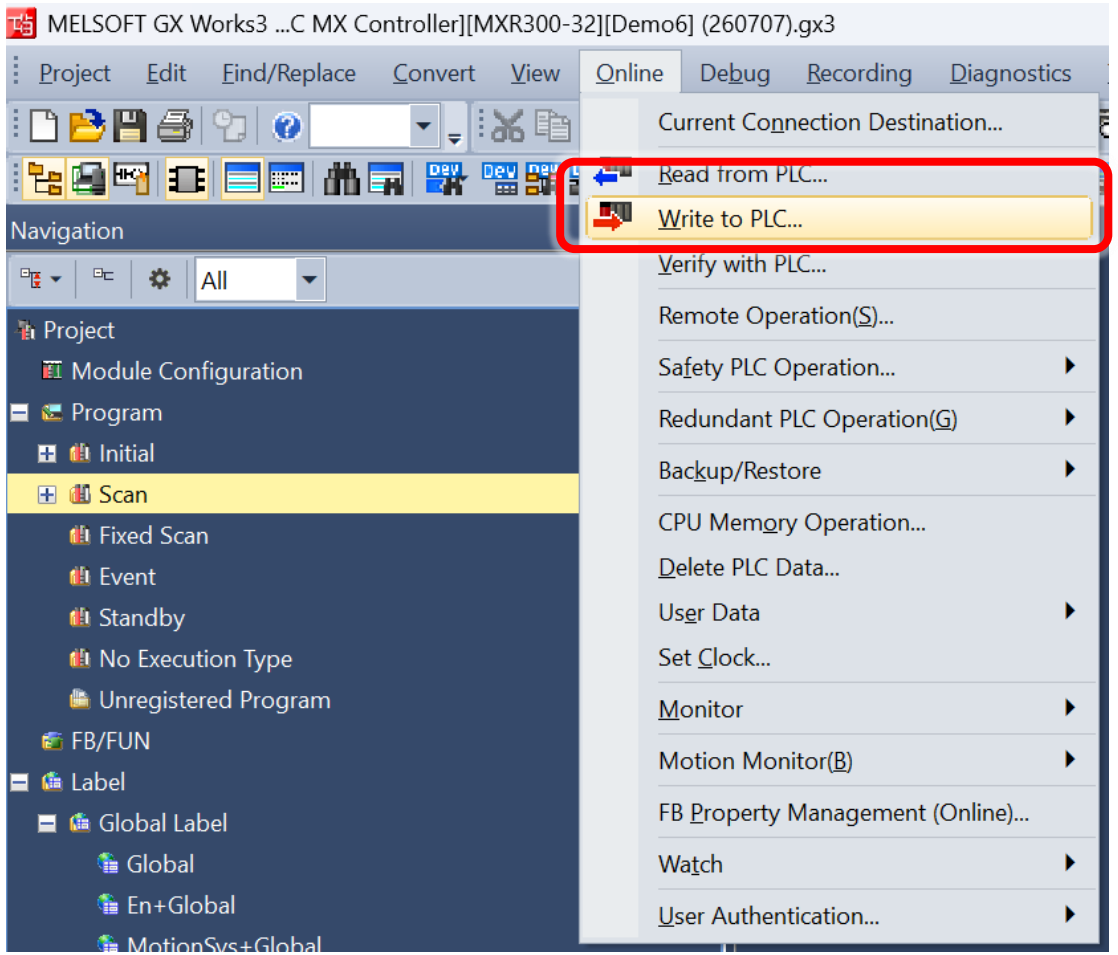
Creating the Executable Program

4. Check [Create Execution Programs after Conversion]
5. Click [OK]



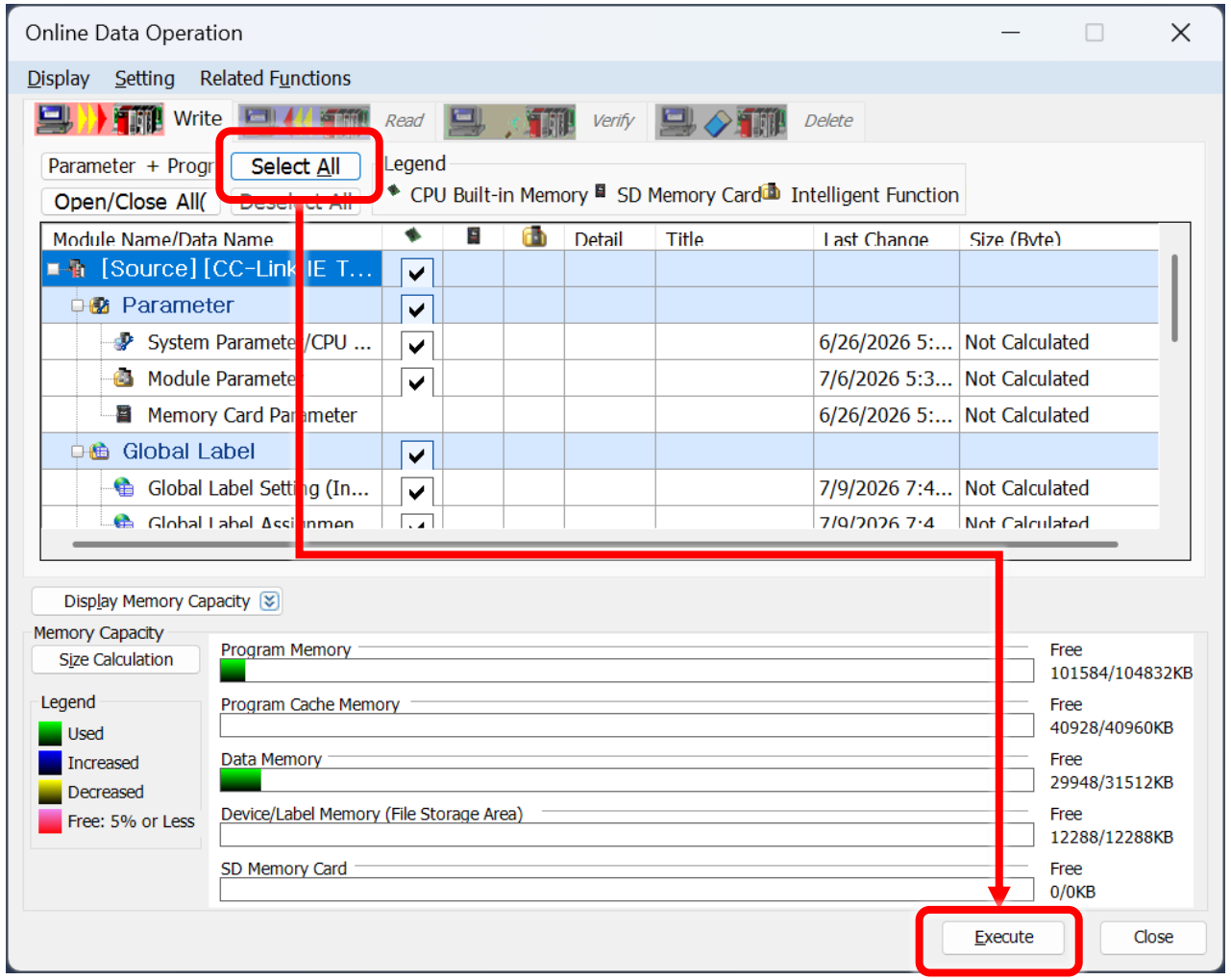
Writing the Executable Program

6. Select [Online] → [Write to PLC…] from the menu
   This sample has been designed to be written to a PLC via a USB connection.
   If a different connection method is used, specify a compatible connection method before performing this task.



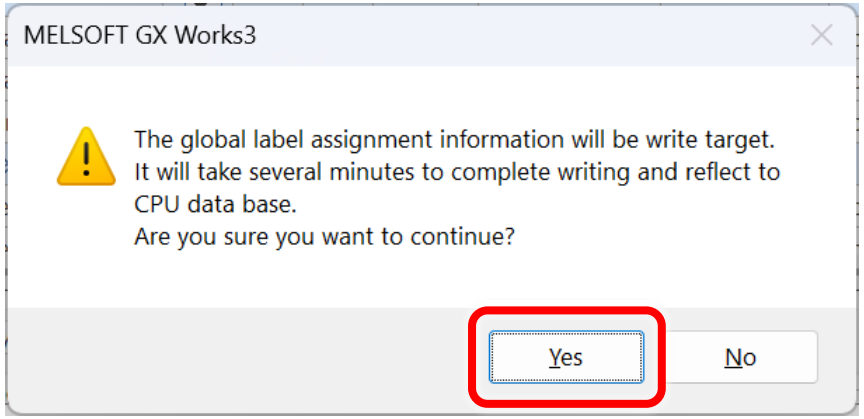
Select all program items

7. Click [Select All] to select all items
8. Click [Execute]

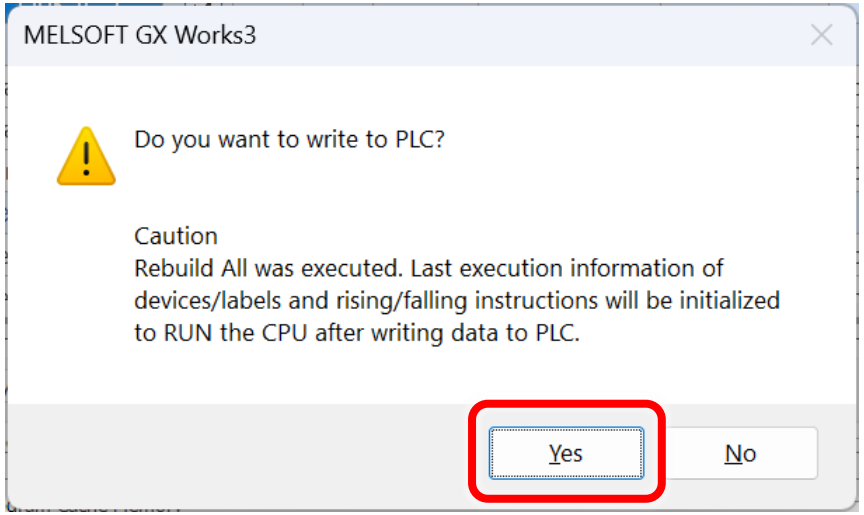


Write All Programs to the PLC

9. Click [Yes] to save the global label assignment information

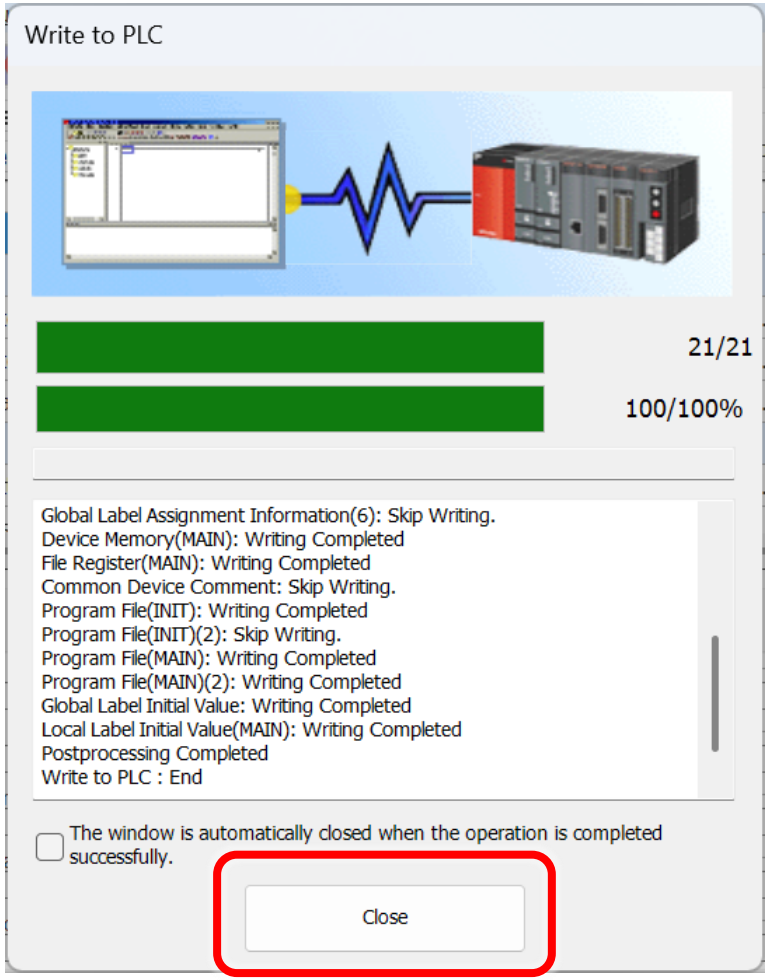


10. Click [Yes] to write the program to the PLC



Installing the Demo Program

11. Click [Close] to complete the PLC write operation

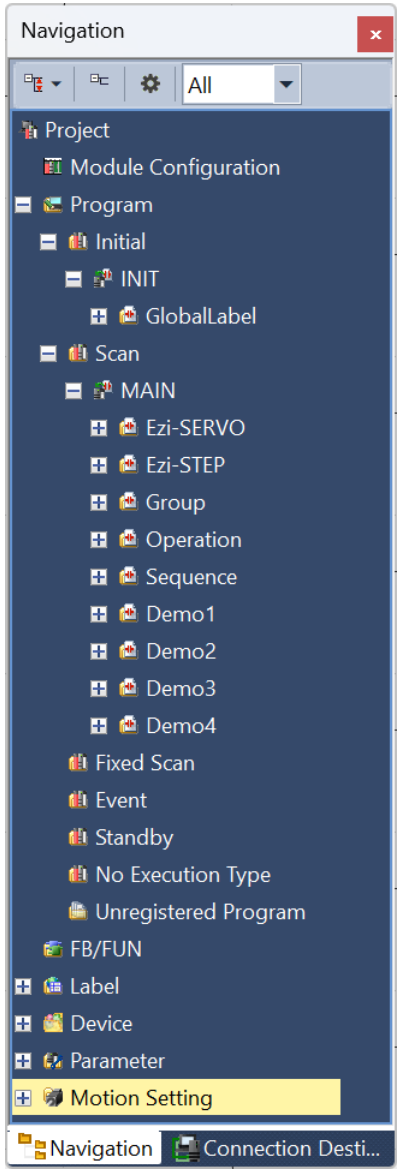


How to Verify Proper Operation After Writing the Demo Program

- **JOG Operation**
  - Press the IN2 button to check that the motor is rotating in the CW direction, then press it again to stop the motor.
  - Press the IN3 button to check that the motor is rotating CCW, then press it again to stop the motor.
  - Pressing the +LIM or -LIM switch will stop the operation.
- **Demo Operation**
  - When you press the IN1 button, the Ezi-SERVO motor begins returning to the home position. (This function operates only once after the PLC program is started.)
  - If you press the IN1 button again, the motion currently in progress will stop.
  - Pressing the +LIM or -LIM switch will stop the operation.
  - Pressing the +LIM or -LIM switch again will resume the Demo operation.

Description of the Demo Source Code

Demo Program Configuration



- **Initial**
  - INIT
    - GlobalLabel : Initializes commonly used label
- **Scan**
  - Main
    - Ezi-SERVO : FB Control Program for Ezi-SERVO Control
    - Ezi-STEP : FB Control Program for Ezi-STEP Control
    - Group : FB Control Program for Interpolation (Interpolation Operation)
    - Operation : Program that manages the execution status of the FB
    - Sequence : Program for running Demo programs sequentially
    - Demo1 : Program for managing the Single-Axis Motion Demo
    - Demo2 : Program for managing the High-Speed Single-Pitch Motion Demo
    - Demo3 : Program for managing the Linear Interpolation Motion Demo
    - Demo4 : Program for managing the Circular Interpolation Motion Demo

FB (Function Block) used in the Demo program

List of FB (Function Block) for Single-Axis Control

- **Implementation Program**
  - Ezi-SERVO
  - Ezi-STEP

Function Name	Function
MC_Power	Enable the drive (SVON).
MC_Reset	Turn off the alarm on the drive.
MC_WriteParameter	Modify the drive's properties (parameters).
MC_Home	The drive performs homing autonomously.
MCv_JOG	Performs JOG motion.
MC_MoveAbsolute	Performs motion to an absolute position.
MC_MoveRelative	Performs motion to a relative position.

Sample Program – Multi-Axis Control FB List

- **Implementation Program**
  - Group

Function Name	Function
MC_GroupEnable	To enable synchronized control, the selected axes are grouped together.
MC_GroupDisable	Releases the synchronized control group.
MCv_MoveLinearInterpolateAbsolute	Starts Linear Interpolation Motion to the specified absolute position.
MCv_MoveLinearInterpolateRelative	Starts Linear Interpolation Motion to the specified relative position.
MCv_MoveCircularInterpolateAbsolute	Starts Circular Interpolation Motion based on the specified absolute position information.
MCv_MoveCircularInterpolateRelative	Starts Circular Interpolation Motion based on the specified relative position information.

Appendix 1 – Profile Registration

Profile Registration (Preparations)

Program Files for Preprocessing

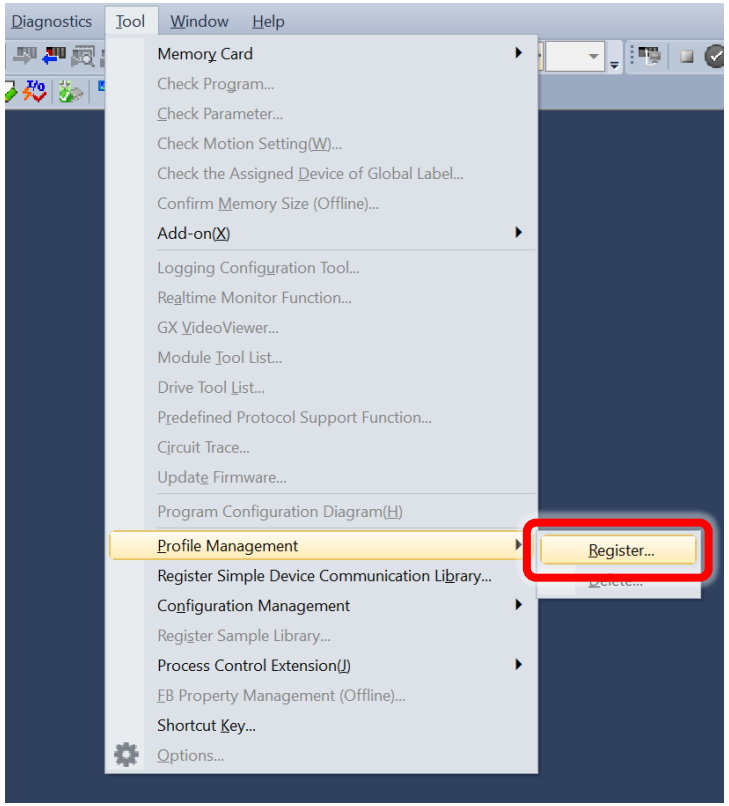
Category	File Path and Name
Ezi-SERVO CSP+ file	USB:\[MELSEC MX Controller]\09. [CSPP FILE]\[Ezi-SERVO]\ 0x1604_Ezi-SERVO-CT_1_en_CSPP.zip  0x1604_Ezi-SERVO-CT_1_en_CSPP.zip
Ezi-STEP CSP+ file	USB:\[MELSEC MX Controller]\09. [CSPP FILE]\[Ezi-STEP]\ 0x1604_Ezi-STEP-CT_1_en.CSPP.zip  0x1604_Ezi-STEP-CT_1_en_CSPP.zip

※ You can download it from the FASTECH website.

[Direct Download Link]

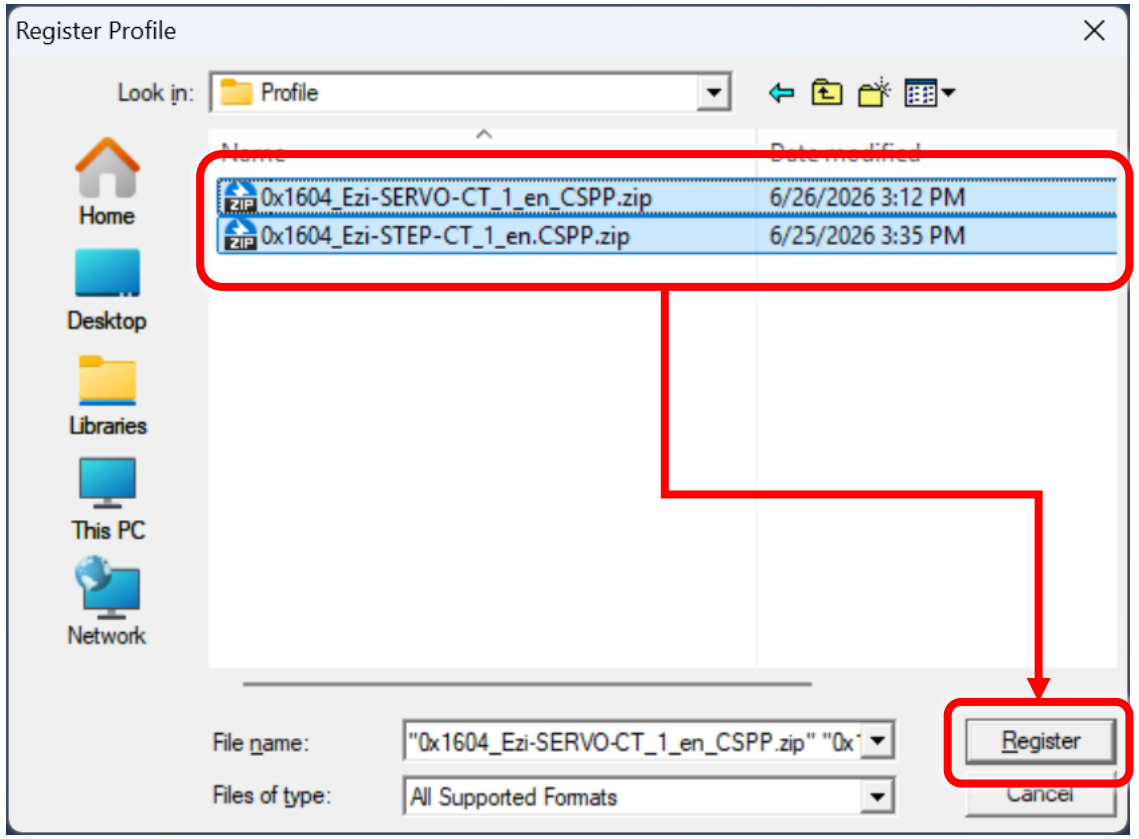
Profile Registration (Open Registration Screen)

- **This section describes the procedure for registering a drive module profile. The registration procedure must be performed with an empty project.**
  1. Please download the CSP+ file from the FASTECH website
  2. From the menu, select [Tool] → [Profile Management] → [Register…]



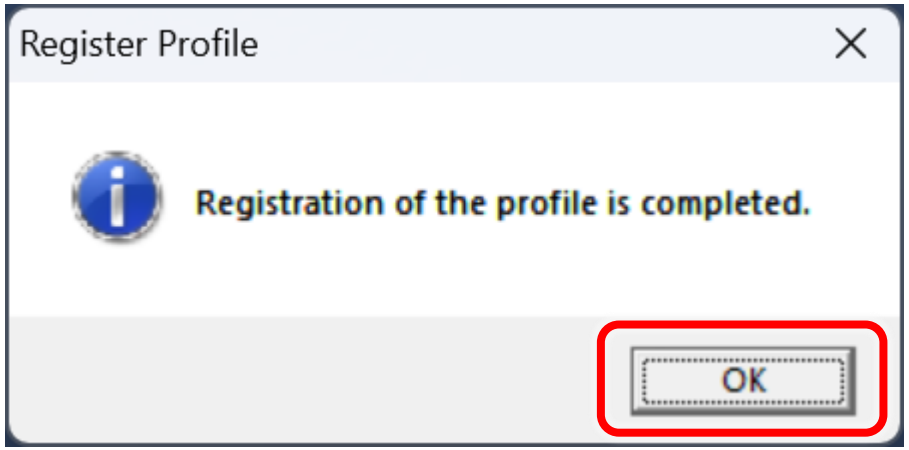
Profile Registration (Product Registration)

3. Select the following file, then click the [Register] button
   - 0x1604_Ezi-SERVO-CT_1_en_CSPP.zip
   - 0x1604_Ezi-STEP-CT_1_en.CSPP.zip



Profile Registration (Registration Complete)

4. Click [OK]



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