Advantech SE Technical Share Document

Date	2019 / 01 / 31	Related Product	CODESYS
Category	☐ FAQ ■ SOP ☐ Driver Tech Note		
Abstract	How to set SDO, PDO and parameters in SoftMotion		
Keyword	SoftMotion, PDO, SDO, Parameter		
Related OS	Windows		
Revision History			
Date	Version	Author	Reviewer	Description
2019/01/31	V1.0	Tenjin.Lin/Owen.Chang	Nick.Liu	CODESYS V3.5 SP15

■ **Problem Description & Architecture:**

The following picture show that how to make a communication between servo driver. PDO is the data which will be cyclically updated. SDO is not cyclical data which usually used to read and set the configuration of slaves. This FAQ will shows that how to add SDO and PDO in CODESYS and how to make a SoftMotion control with EtherCAT Slave.
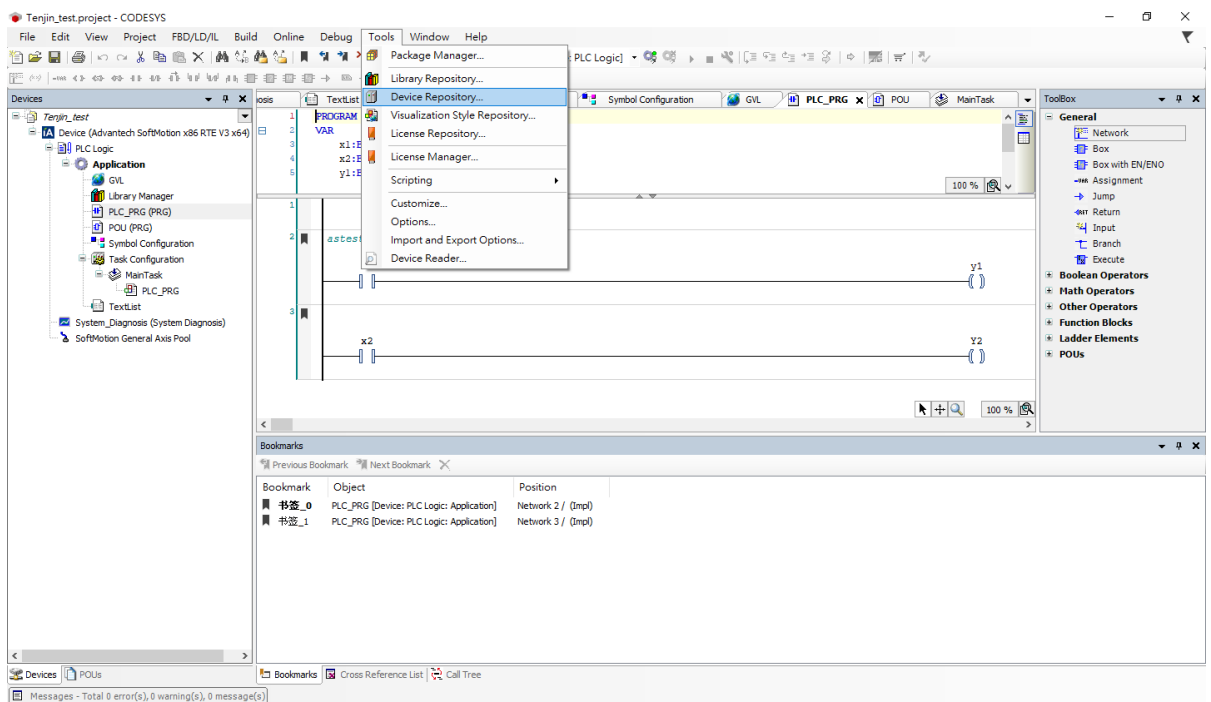
■ **Brief Solution - Step by Step:**
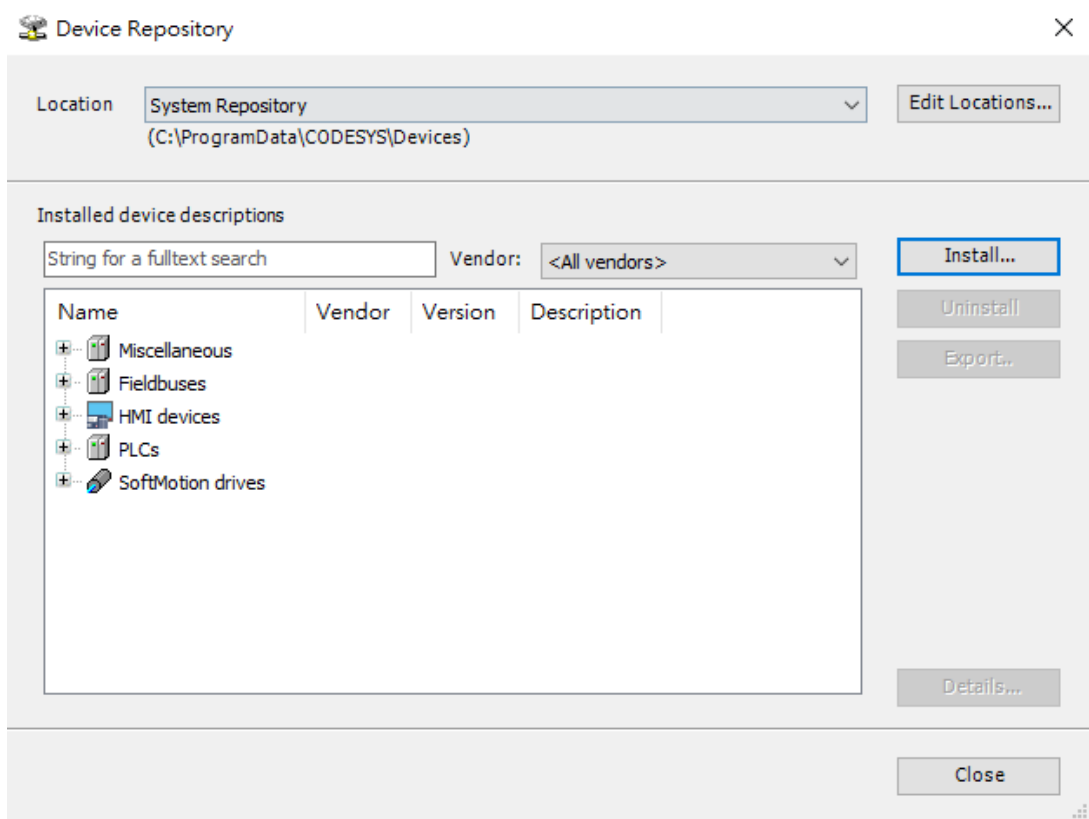
1. Open Codesys IDE
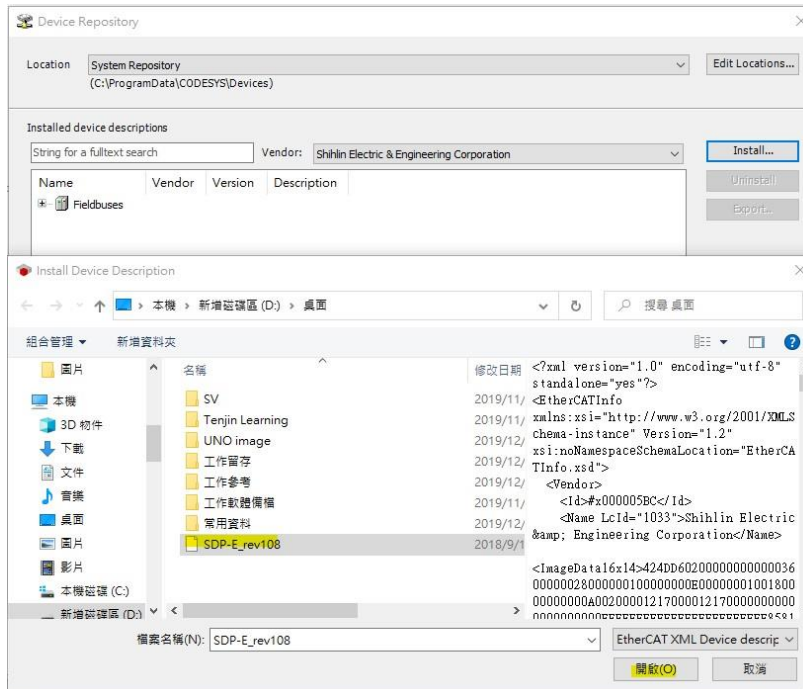

2. Add XML file of EtherCAT slave.
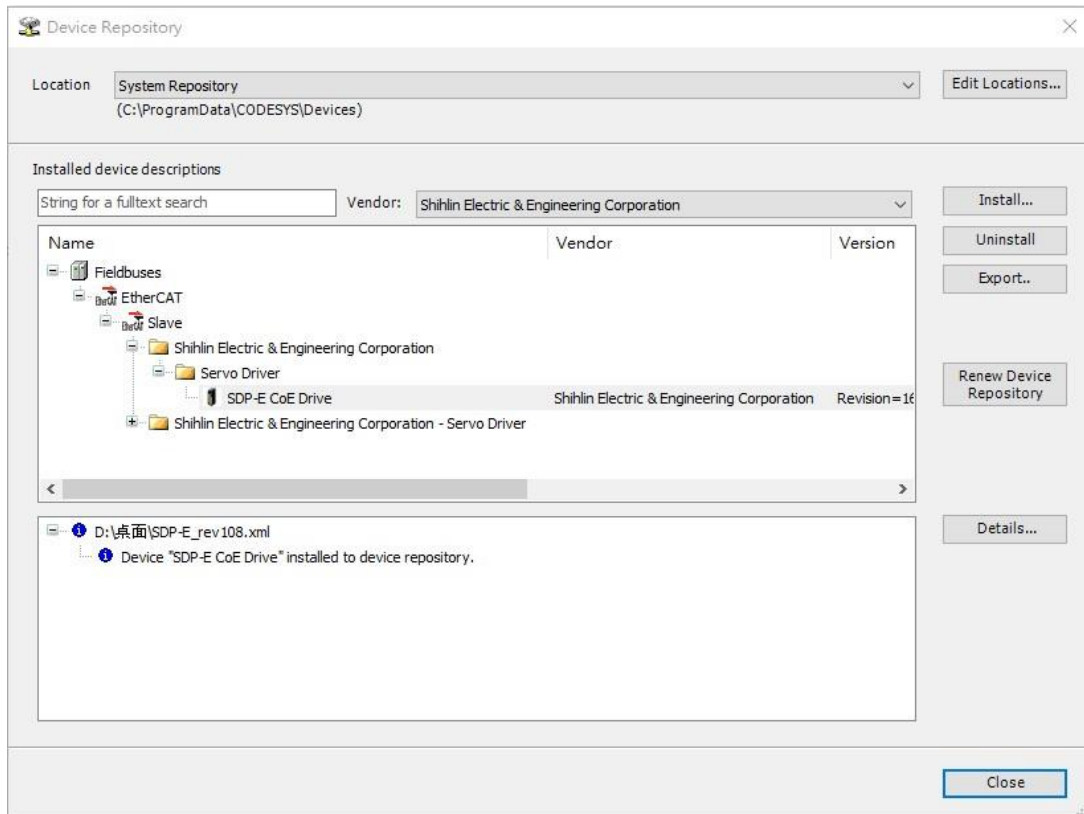
(1) Click **Tool**->**Device Repository**。

(2) Click **Install**
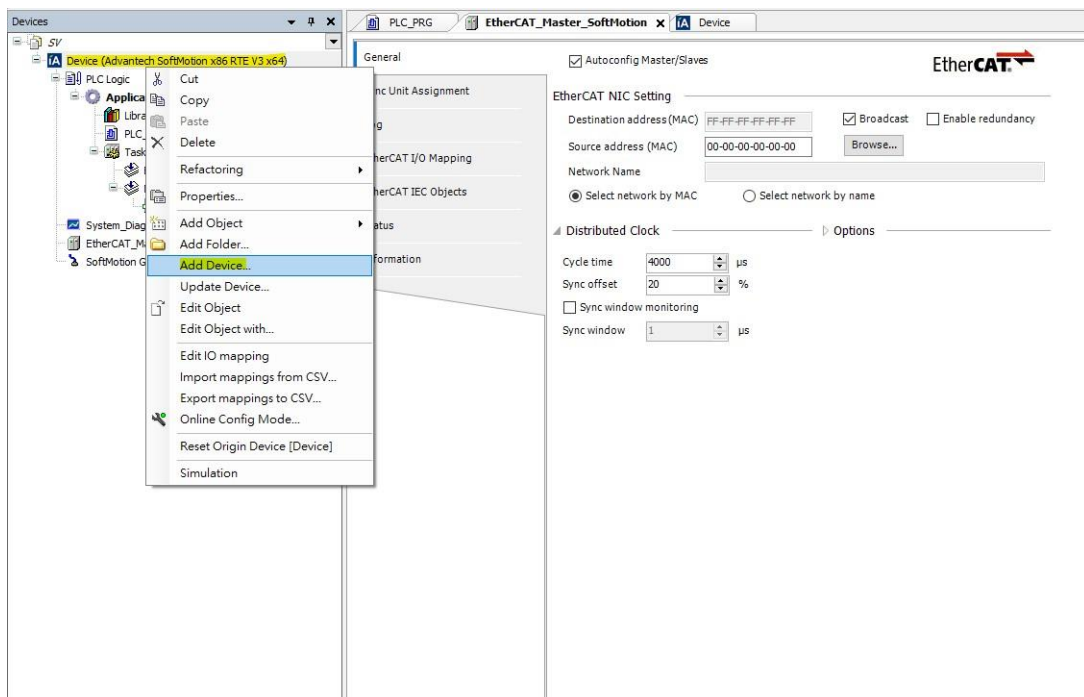

(3) Choose the XML and click **Open**。

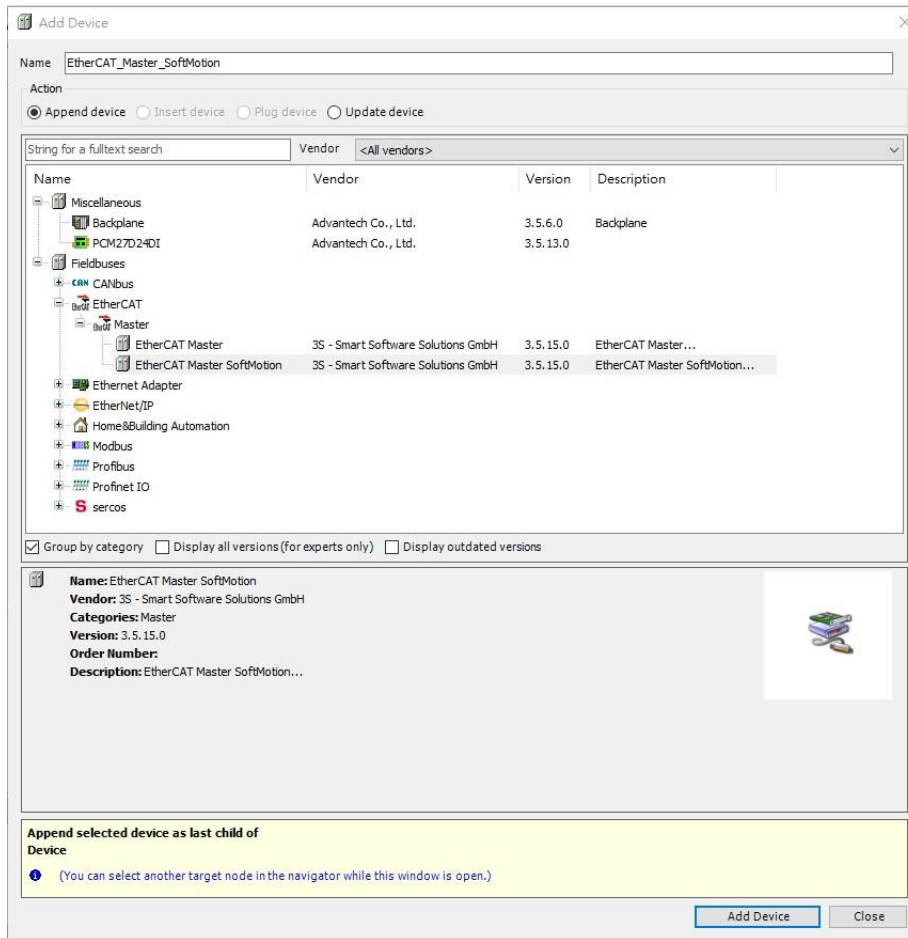(4) Then you could see that the device is already imported into CODESYS.

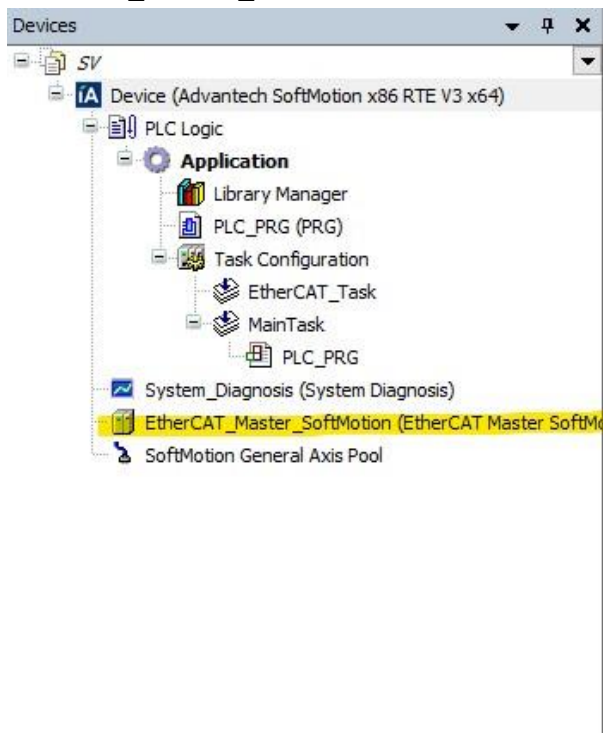3. Add EtherCAT_Master_SoftMotion and add EtherCAT servo in the project.

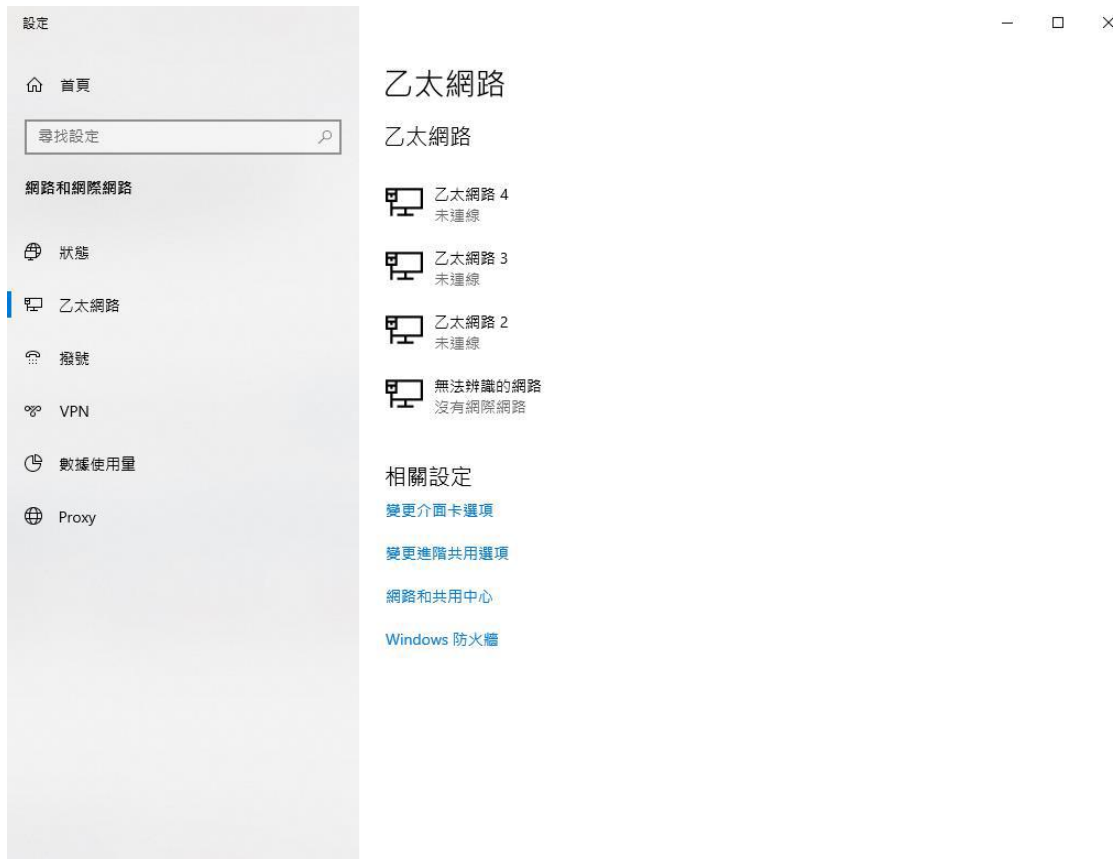(1) Right Click **Device** and choose **Add Device**.

(2) **Fieldbuses**->**EtherCAT**->**Master**->**EtherCAT_Master_SoftMotion**. Then, click **Add Device**.
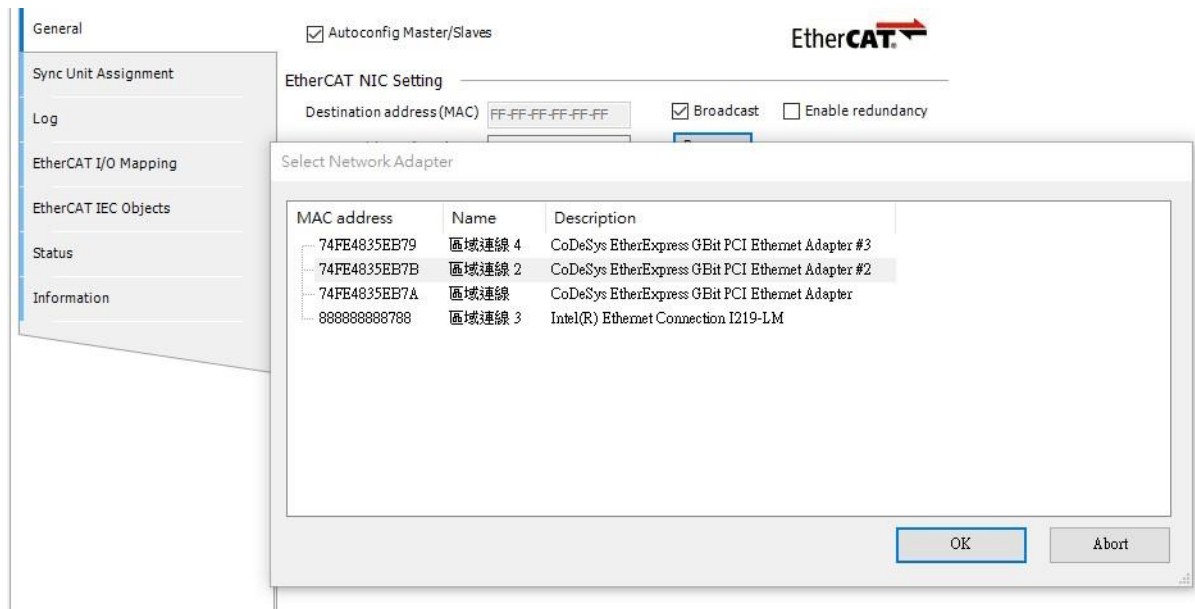

(3) **EtherCAT_Master_SoftMotion** will be added in project tree.

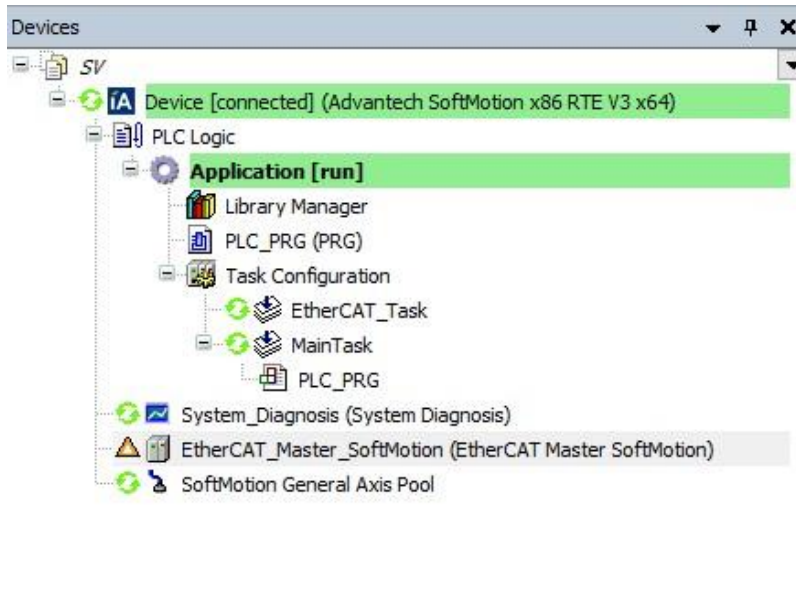(4) Please check that what Ethernet port connect to EtherCAT slave.
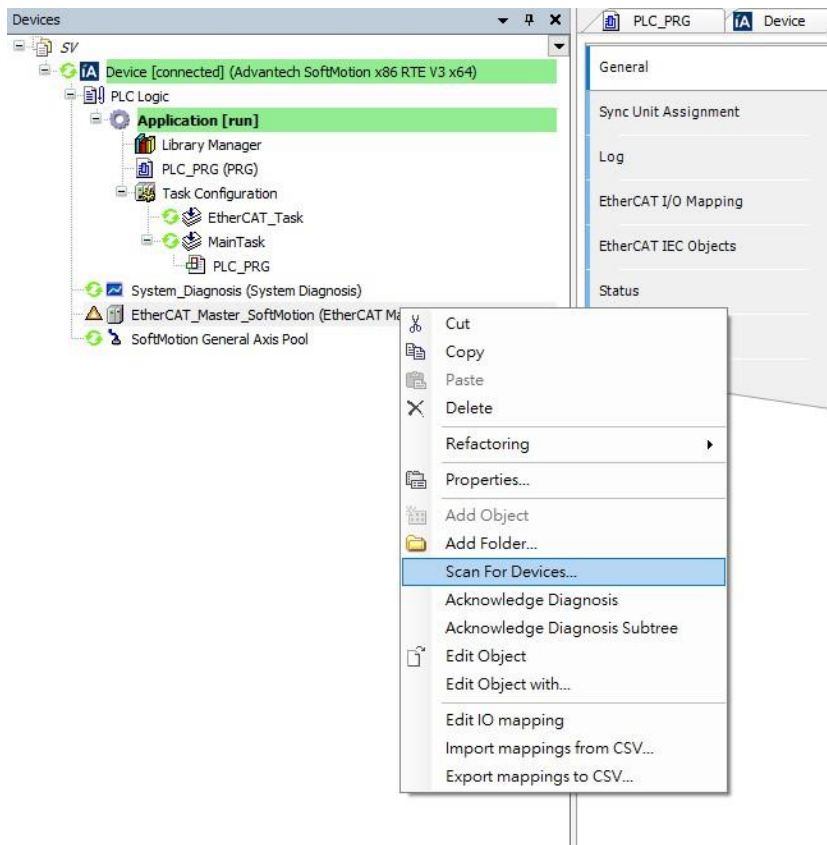

(5) Click **EtherCAT_Master_SoftMotion** in CODESYS，Click **Browse** the port checked at step (4) and

click **OK**.
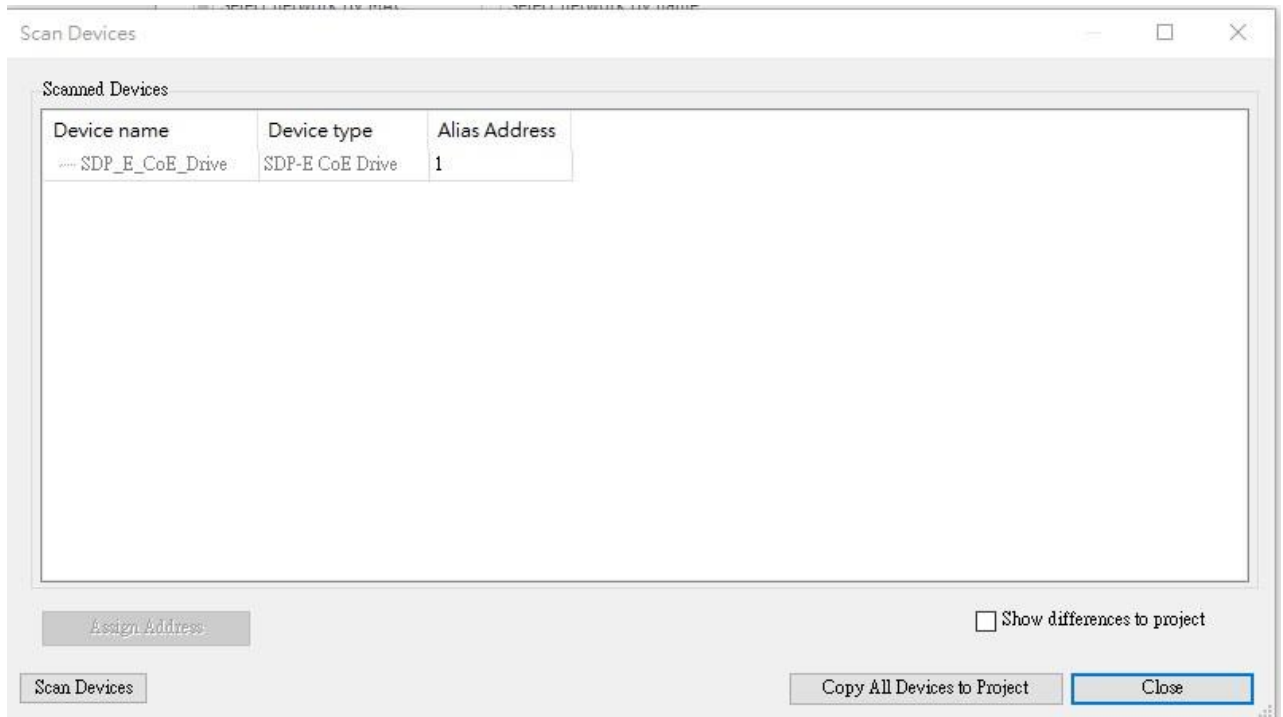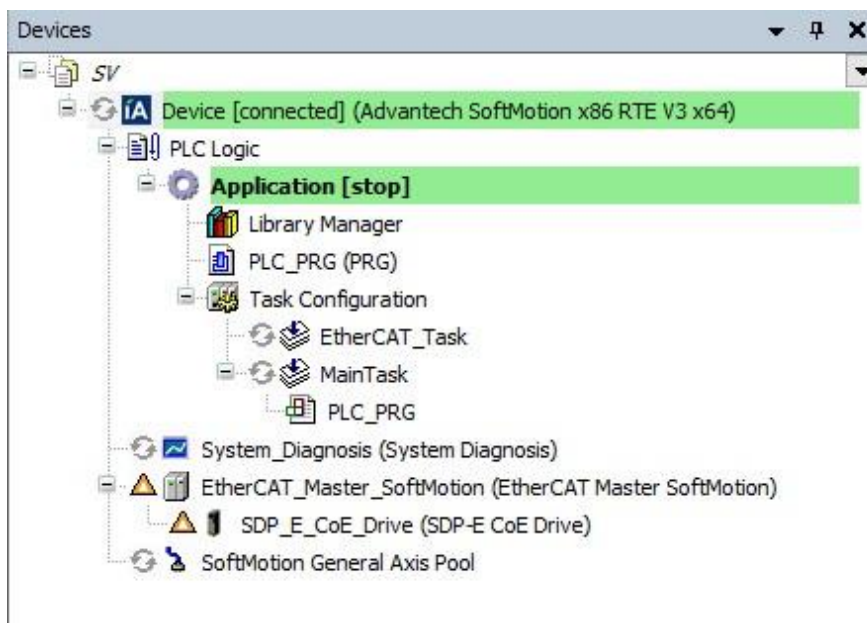
(6) **Login**(Alt+F8) and click **RUN**。

(7) Right click **EtherCAT_Master_SoftMotion** and choose **Scan For Devices**.

(8) Then choose scanned devices and click **Copy All Device to Project**

(9) Then the device will showed in project tree below EtherCAT_Master_Softmotion.

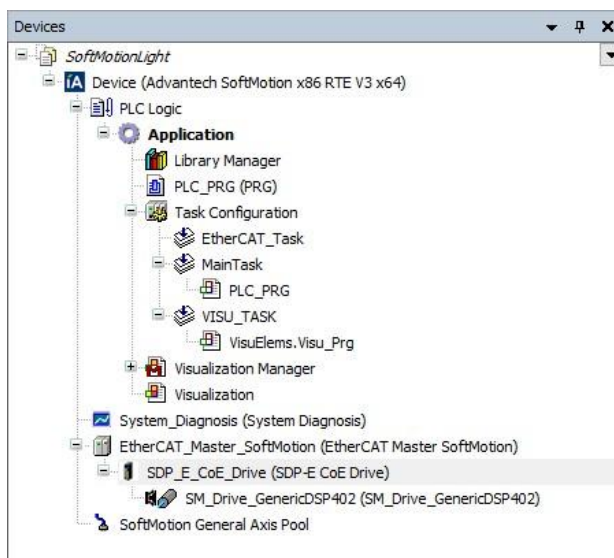(10) **Logout**(Ctrl+F8) and right click **SDP_E_CoE_Drive** ->Add **SoftMotion CiA402 Axis**。

(11) The following structure is showed at the left hand side.

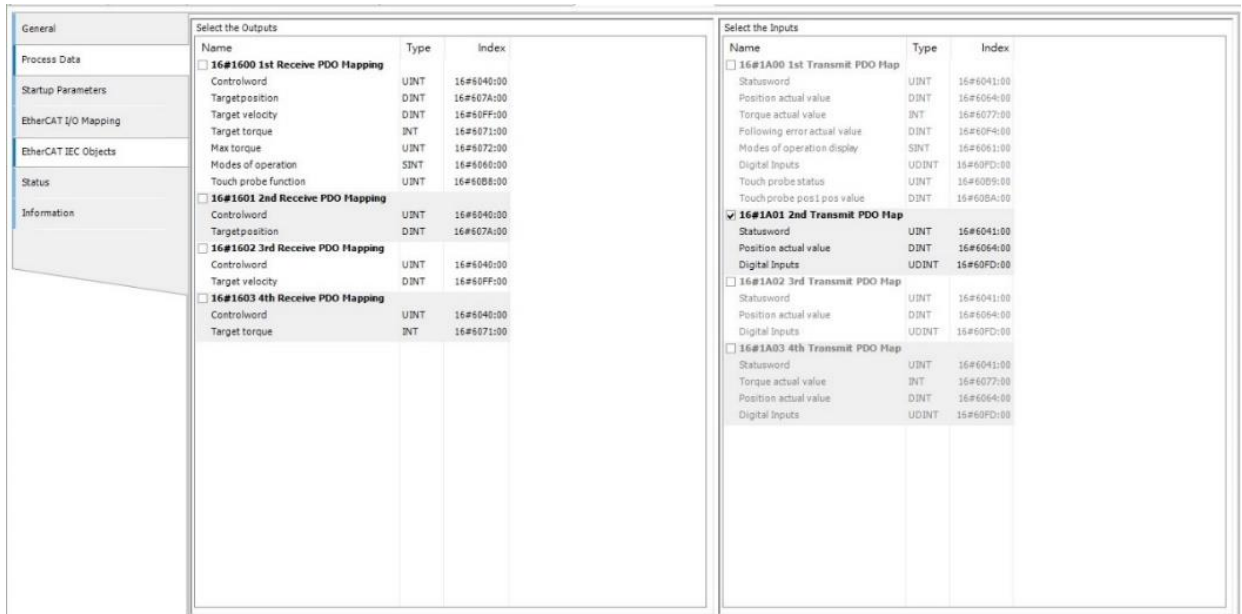EtherCAT_Master_SoftMotion　<-Codesys 的 SoftMotion 等同硬體上的軸卡

└ SDP_E_CoE_Drive　<-等同硬體上的伺服驅動

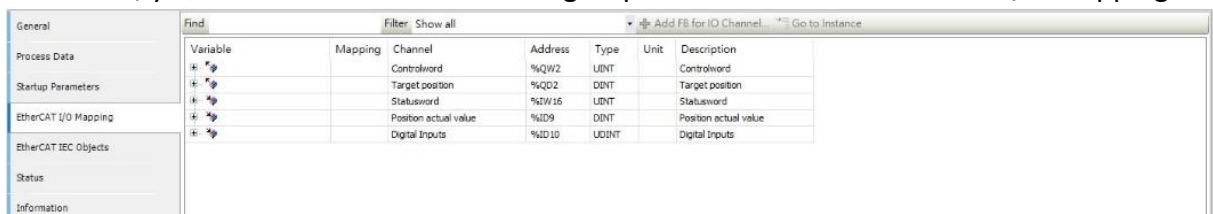　└ SML_Driver _GenericDSP402　<-等同硬體上的馬達

4. Set PDO: Each vendor of EtherCAT slave provide different kind of PDO data which is usually defined in the user manual. We will take the Shihlin servo for the example.
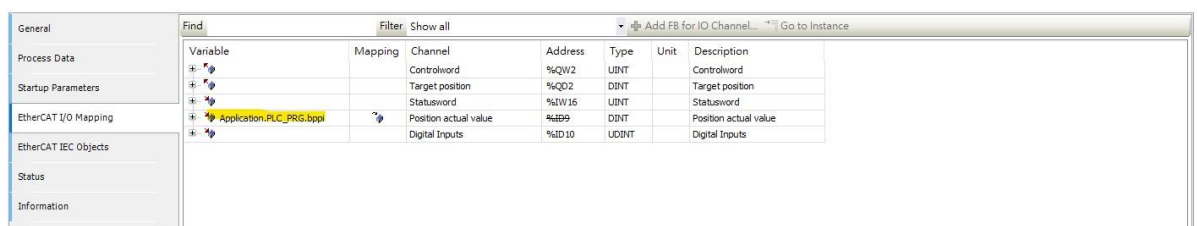
(1) There are two kinds of PDO, TxPDO(Output) and RxPDO(input). The manual should clearly show the meaning of the data in each Index (Address). According to the shihlin servo, Index of Position Actual Value is 16#6064 and the type is DINT. You could check in the recommended PDO list located at EtherCAT IEC Objects tab. As the following picture. All of the Inputs include Position Actual Value, so just choose one of them. In this sample, we choose the PDO list 16#1A01.

(2) After click, you could see that the selected group will be showed in EtherCAT I/O Mapping.

(3) Now we will map DINT variable to get Position Actual Value of the servo. Please declare the DINT variable, bppi, in PLC_PRG(PRG) and represent it as the Position Actual Value by the following mapping.

(4) **Login**(Alt+F8)->run and the Position Actual Value will show at bppi.

(5) If the recommended PDO configuration does not include the index, click **Enable expert settings** in **General** tab。

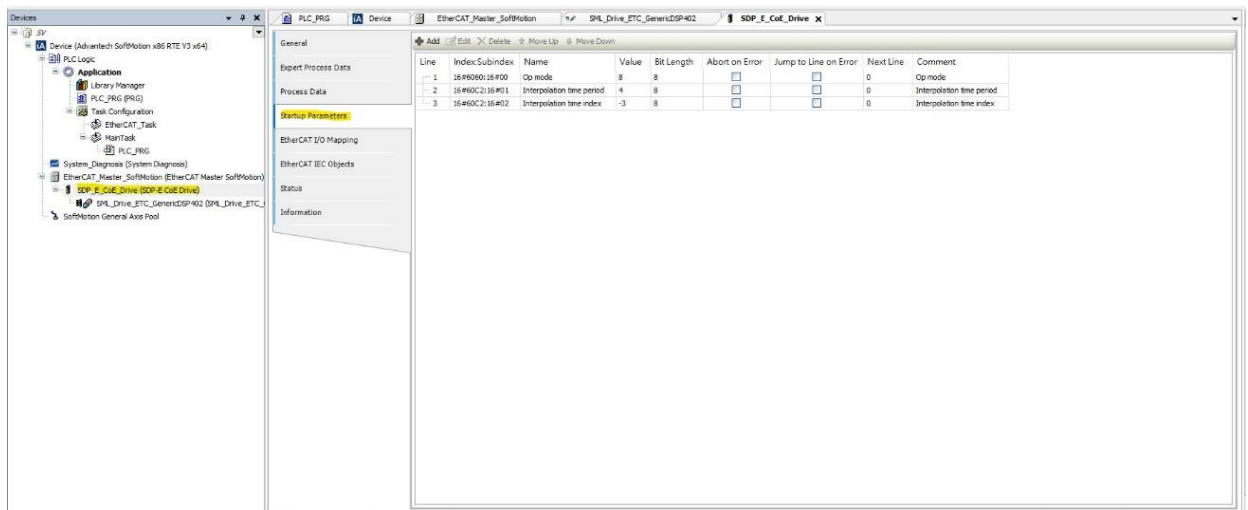(6) Enable expert settings is showed up at the left hand side.

(7) Click the PDO list selected in step (1) and insert the PDO index you want to monitor. More detail about PDO index is in the servo manual.

5. Set SDO: CODESYS library, IODrvEtherCAT, could read/write SDO. More detail about SDO index is in the servo manual.

IODrvEtherCAT
ETC_CO_SdoRead
ETC_CO_SdoRead4
ETC_CO_SdoRreadDword
ETC_CO_SdoRead_Access
ETC_CO_SdoRead_Channel
ETC_CO_SdoWrite4
ETC_CO_SdoWriteDWord
ETC_CO_SdoWrite

6. Parameter setting: normally, there is no need to do the setting, however, if there is specific requirement, the following is steps you could follow. Take closing EMG, LSN, and LSP for example, Index 16#2301 is PD1 which controls EMG, LSN, and LSP according to the servo user manual.

    (1) Click **startup parameters** in **SDP_E_Drive**

    (2) Click **Add**, you would see that the parameter list, according to the servo user manual, the index 16#2301 which is PD01 is the target we want to modify. Value of 16#2301 should be 16#1110(10#4368) if we want to close EMG, LSN, and LSP.

No	Abbr.	Function description	Control mode	Setting range	Unit
PD01	DIA1	Digital input signal auto-ON option 1 　u　z　y　x x: SON open/short option 　0: controlled by external actual wiring 　1: SON-SG is short-circuit without actual wiring y: LSP open/short option 　0: controlled by external actual wiring 　1: LSP-SG is short-circuit without actual wiring z: LSN open/short option 　0: controlled by external actual wiring 　1: LSN-SG is short-circuit without actual wiring u: EMG open/short option 　0: controlled by external actual wiring 　1: EMG-SG is short-circuit without actual wiring	All	0000h ~1111h	-

(3) After clicking **OK**, you could see that the value is revised.

Line	Index:Subindex	Name	Value	Bit Length	Abort on Error	Jump to Line on Error	Next Line	Comment
1	16#6060:16#00	Op mode	8	8	☐	☐	0	Op mode
2	16#60C2:16#01	Interpolation time period	4	8	☐	☐	0	Interpolation time period
3	16#60C2:16#02	Interpolation time index	-3	8	☐	☐	0	Interpolation time index
4	16#2301:16#00	Servo parameter PD01	4368	32	☐	☐	0	

(4) Login (Alt+F8) and re-powering the servo and Login(Alt+F8) again. The parameter will be successfully written into servo.

(5) When Login (Alt+F8), you could also revise the parameter by CoE Online->Online from device. Note: some setting need to reboot the slave.
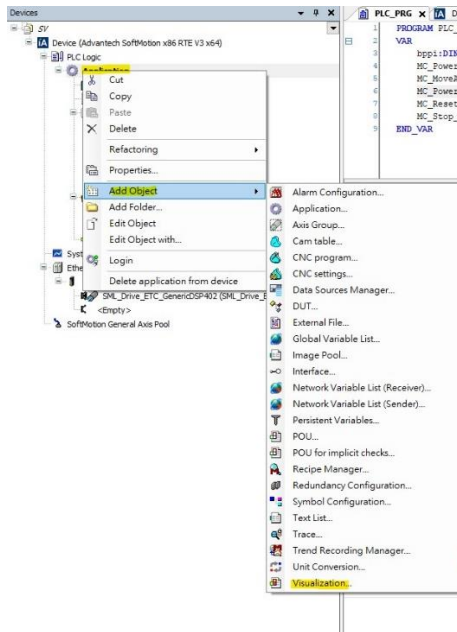
7. Programming

(1) The following example to do the simple program by using basic motion function, MC_MoveAbsolute, MC_Power, MC_Reset and MC_Stop.
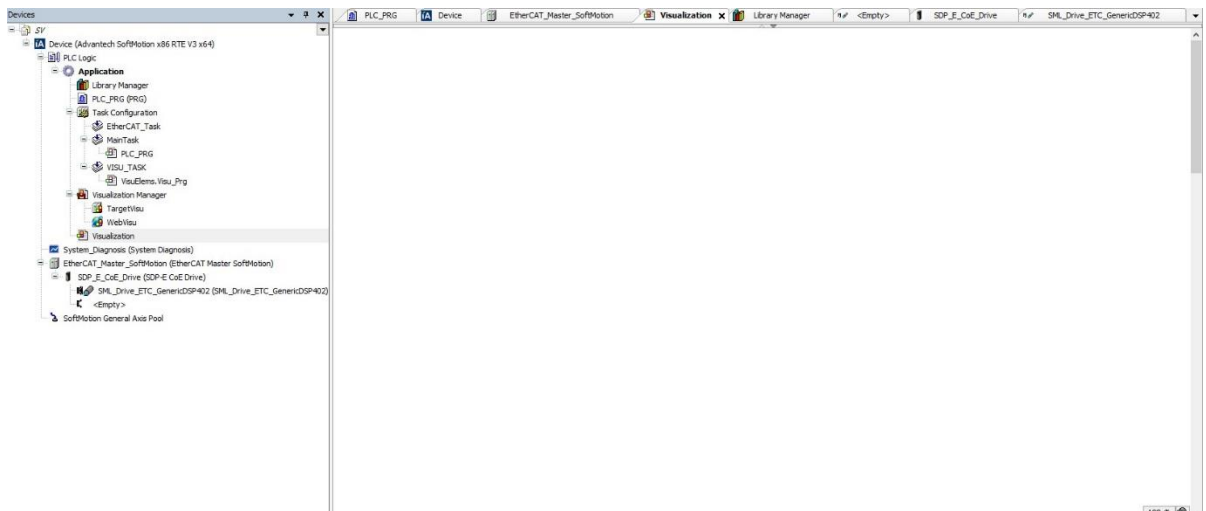
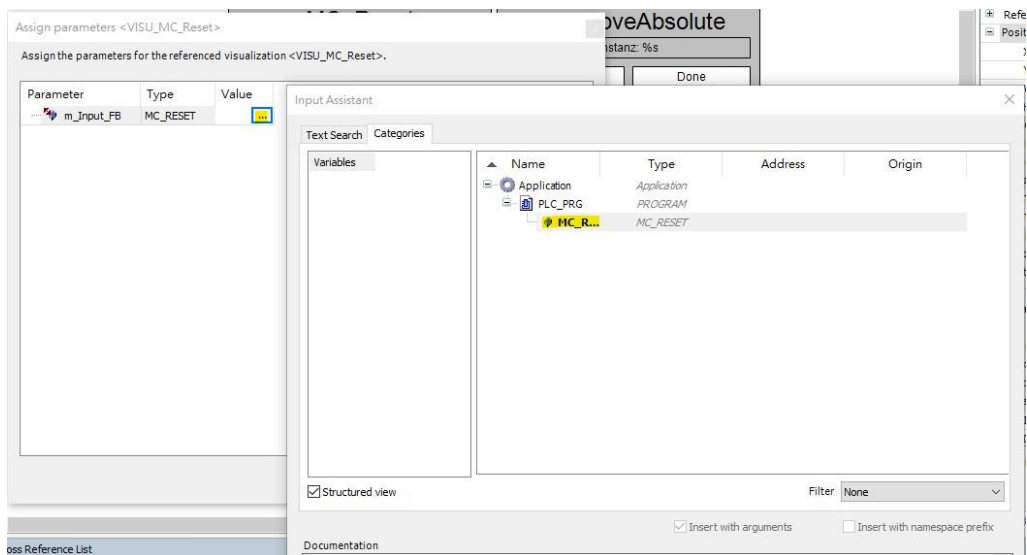![Advantech logo] Enabling an Intelligent Planet

8. Visualization

(1) Right click **Application** and click **Add Object**->**Visualization**.
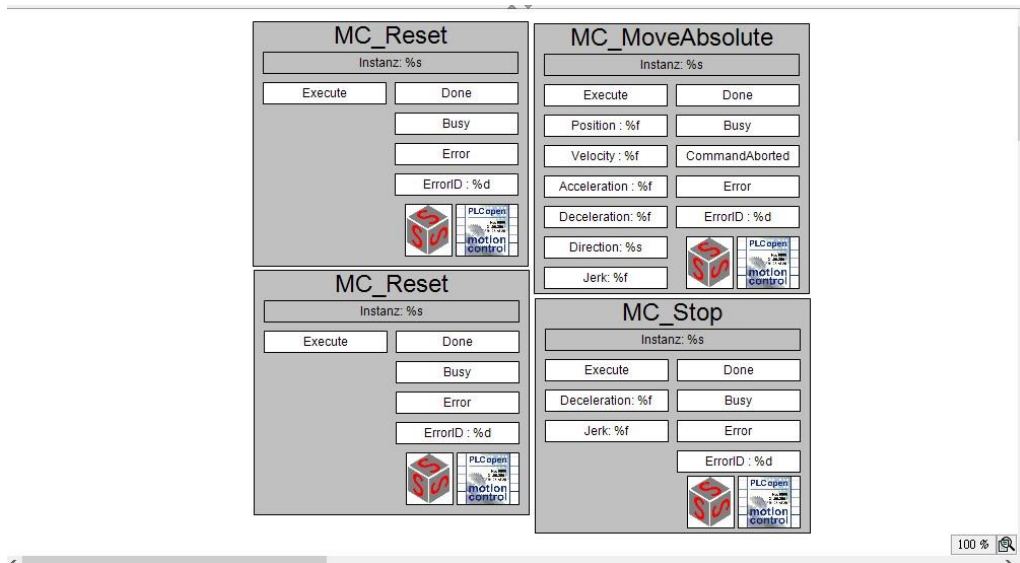

(2) Blank canvas will be showed up.

(3) Click **Visualization ToolBox**->SM3_Basic, drag and drop MC_MoveAbsolute, MC_Power, MC_Reset and MC_STOP into canvas and map them with the program.

(4)   Done as the following picture.

(5)   **Login**(Alt+F8), and servo could be controlled by visualization.

Reference:

(1)   CODESYS Online Help

(2)   OMRON AC SERVOMOTORS/SERVO DRIVES G5-series WITH BUILT-IN EtherCAT® COMMUNICATIONS Linear Motor Type

(3)   Shihlin SDP servo EtherCAT manual