ADVANTECH
Enabling an Intelligent Planet

Advantech SE Technical Share Document

Date	2019 / 03/ 10	**Related Product**	CODESYS
Category	□ FAQ ■SOP □ Driver Tech Note		
Abstract	How to set Profile Position via EtherCAT on CODESYS?		
Keyword	Profile Position Mode, PDO, EtherCAT		
Related OS	Windows		

Revision History				
Date	Version	Author	Reviewer	Description
2020/03/10	V1.0	Owen.Chang	Nick.Liu	Softmotion 4.6.0.0 with CODESYS SP15

■ Problem Description & Architecture:

In Profile Position, Profile Velocity and Profile Torque modes, the master station only write related parameters such as speed, acceleration, deceleration, and emergency stop deceleration to the servo and the servo is mainly responsible for the trajectory planning

This FAQ shows how to set Profile Position mode via EtherCAT master on CODESYS.

■ Brief Solution - Step by Step:

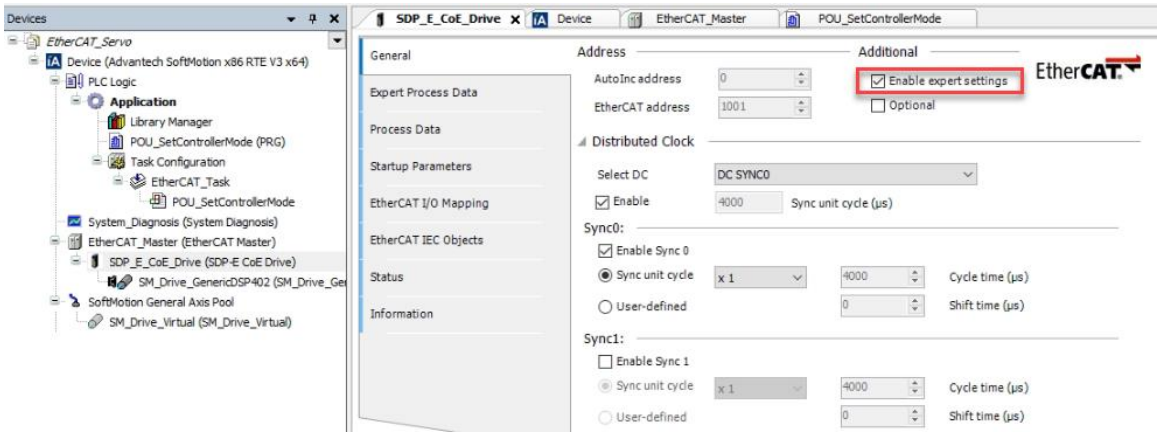
We take Shihlin SDP-010E2C servo as example, you could download the manual from the website:
Shihlin_SDP_Servo_English Manual_V1.03

In chapter 5.1, it shows the operation steps of Profile Position(PP) mode control.

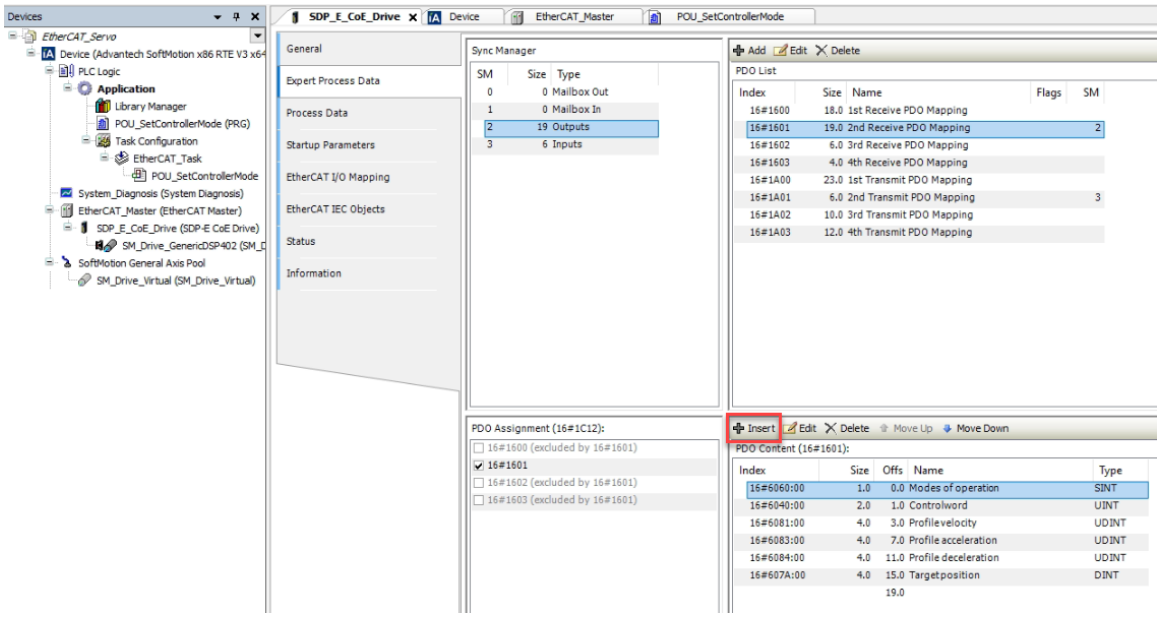
1. Set object 6060h(Mode of operation) as 0x01.
2. Set object 607Ah(Target position) a destination in pulse unit.
3. Set object 6081h(Profile velocity) to define the profile velocity in pulse per second unit.(pulse/s).
4. Define the acceleration: and deceleration by setting the object 6083h and 6084h.(pulse/s2)
5. Modify the Controlword(6040h) from 0x06 to 0x07, then to 0x0F. So that, the Servo On state of drive is activated. When the transient state from 0x0F to 0x1F is done, it triggers the position mode.
6. Use the object 6067h(Position window) setting value to define the allowable tolerance of in position. Besides, set the object 6068h(Position window time) to duration time that the final location remains in the position window range. The above conditions are completed, it means that “Target Reached”.
7. Object 6065h(Following error window) defines the detection range for the following error. Object 6068h is used to specify the duration time that the final position remains in the following error window setting range.

Mode of operation, Target position, Profile velocity, Profile acceleration, Profile deceleration and Controlword is demanded for PP mode. The following shows how to use CODESYS write the parameter to servo and control the Controlword.

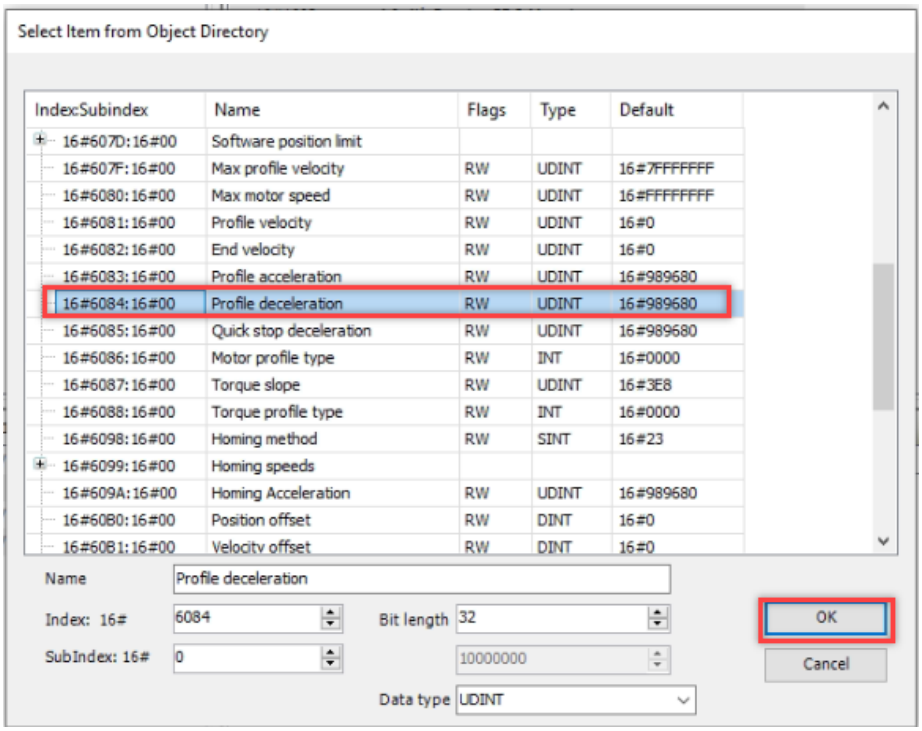
1. Enable expert settings in servo's page



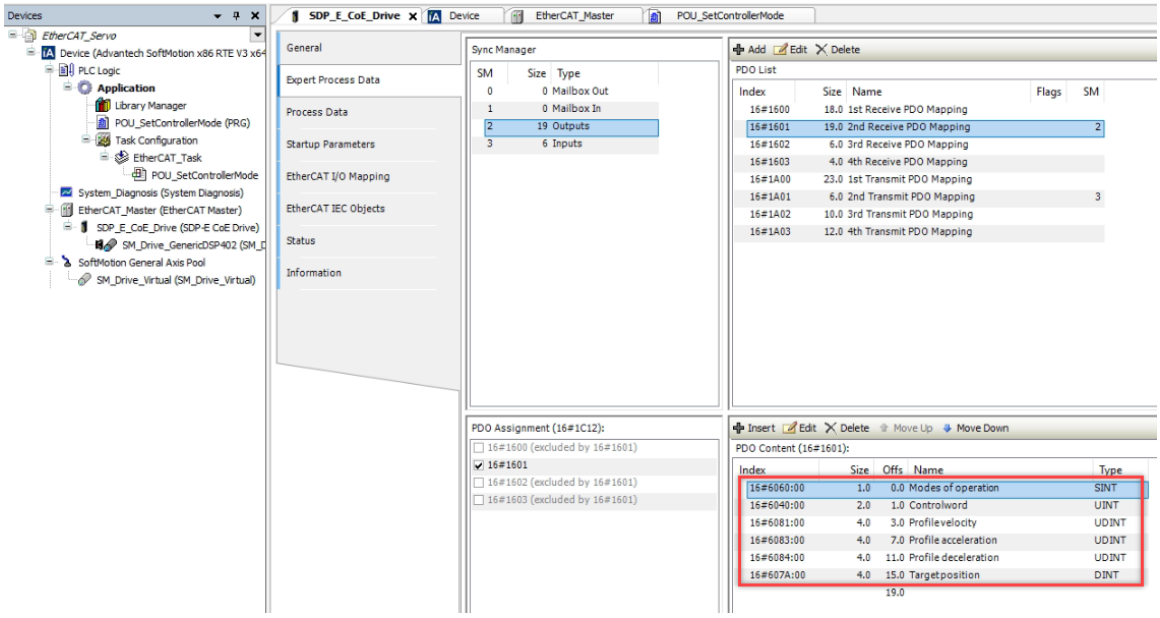
2. Insert item from Object Directory



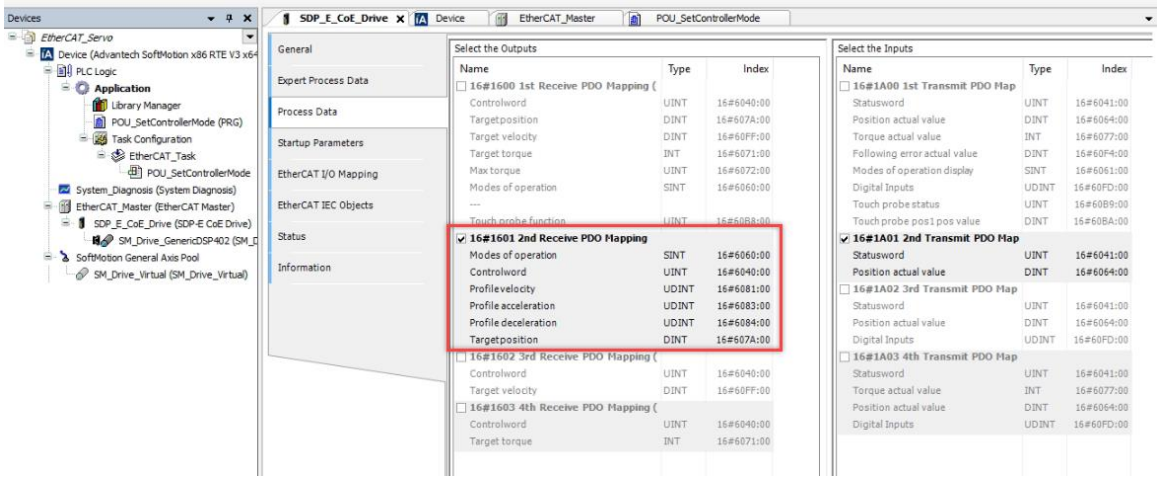
3. Select the required item and click **OK**



4. The demanded items are added in Output PDO Assignment.

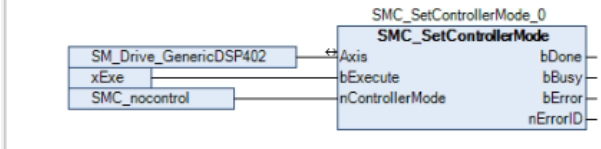


5. Please double confirm that you really add the item in Outputs PDO.

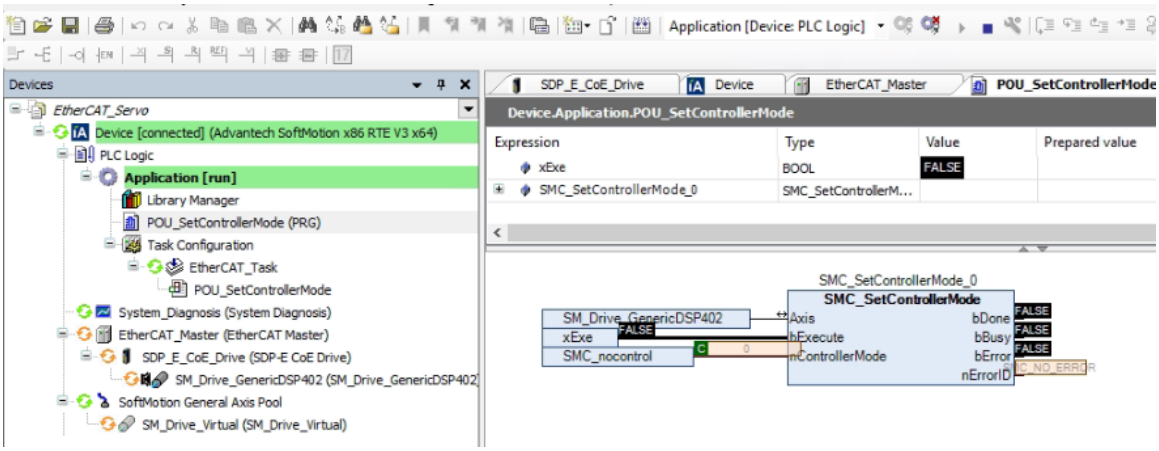


6. Now we need to disable CODESY Softmotion drive to make the Outputs PDO could be controlled by users. By switching the drive to "nocontrol" with SMC_ControllerMode, the SoftMotion driver no longer writes the Outputs PDO.

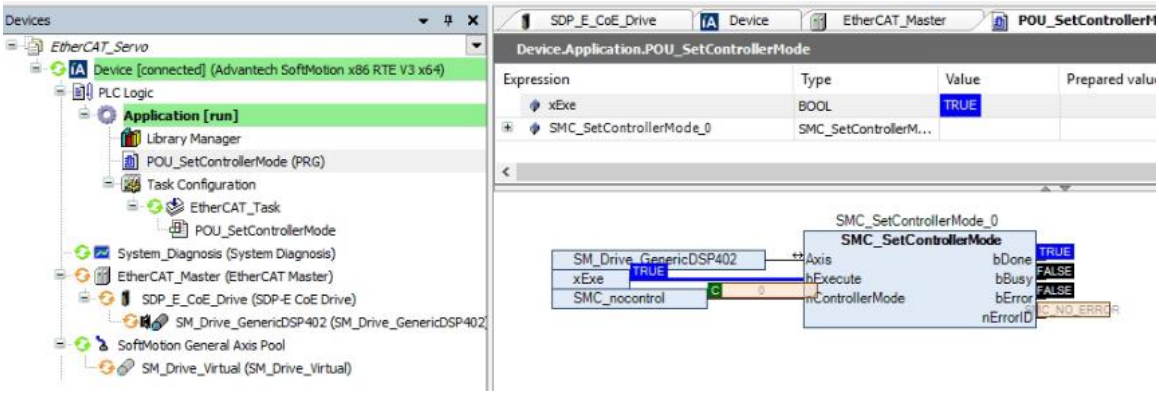
```
PROGRAM POU_SetControllerMode
VAR
    xExe: BOOL;
    SMC_SetControllerMode_0: SMC_SetControllerMode;
END_VAR
```



7. Download and run the project



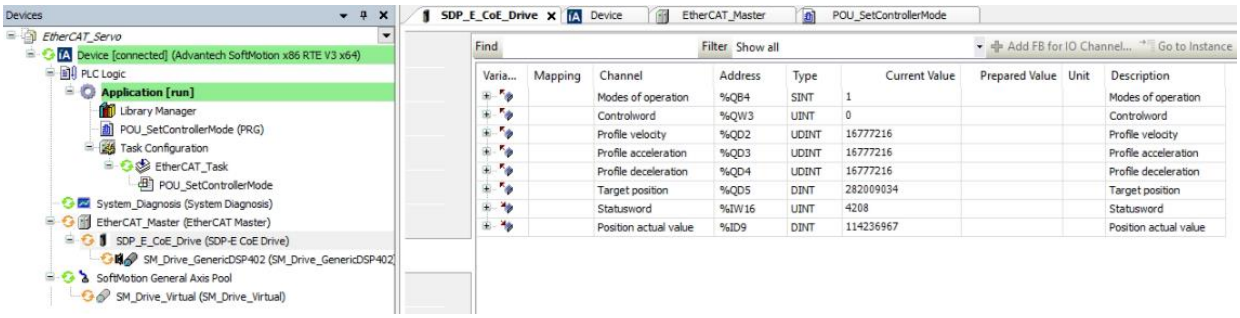
8. Execute SMC_SetControllerMode to switch the drive to “nocontrol” (SMC_nocontrol)



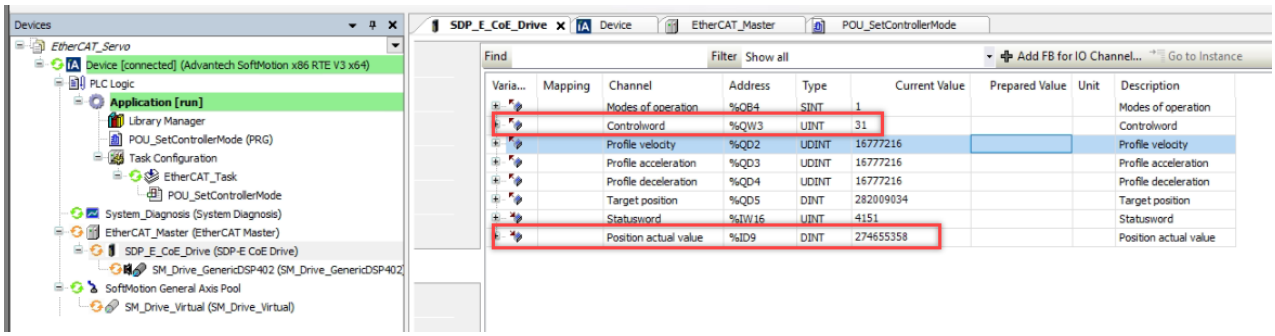
9. Please follow the operation steps showed in servo manual. Velocity is 1 cycle/s, Acceleration and deceleration are 1 cycle/ss. Moving distance is 10 cycle. The drive is 24bit resolution (16777216), in other words, 1 turn is for 16777216 increments, Velocity/Acceleration/Deceleration is 16777216, and Target position is 282048931 (114276771 + 10*16777216).

Varia...	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
		Modes of operation	%QB4	SINT	8	1		Modes of operation
		Controlword	%QW3	UINT	0			Controlword
		Profile velocity	%QD2	UDINT	0	16777216		Profile velocity
		Profile acceleration	%QD3	UDINT	0	16777216		Profile acceleration
		Profile deceleration	%QD4	UDINT	0	16777216		Profile deceleration
		Target position	%QD5	DINT	114276771	282048931		Target position
		Statusword	%IW16	UINT	112			Statusword
		Position actual value	%ID9	DINT	114236866			Position actual value

10. Debug -> Write Values



11. Then change Controlword to 0x06 -> 0x07 -> 0x0F to make Servo On. When the transient state from 0x0F to 0x1F is done, it triggers the position mode.



Reference:

N/A