EC4S -P04D

Quick User Manual

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Catalogue

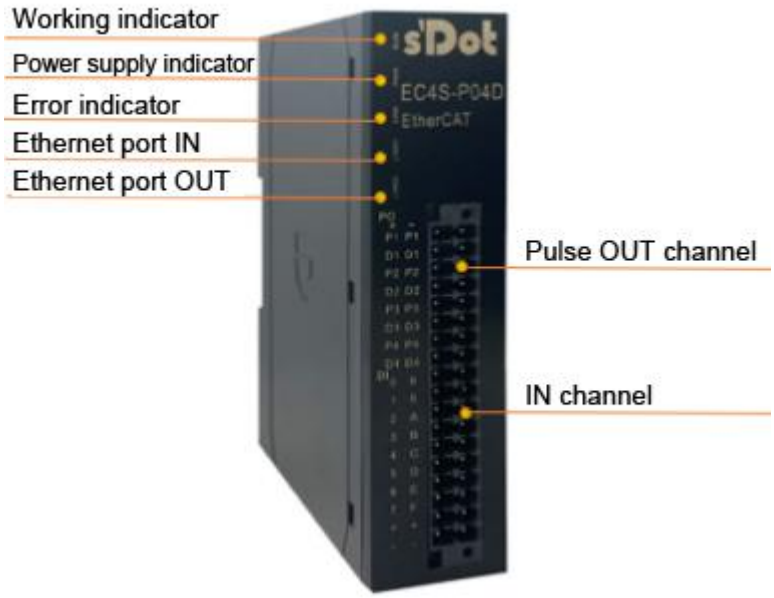
1 Product introduction

The EC4S-P04D is a 4-channel pulse output and a 16-channel digital quantity input module, using the Ether CAT industrial Ethernet bus.

This manual mainly describes the specifications, technical parameters and use methods of EC4S-P04D.

2 Panel

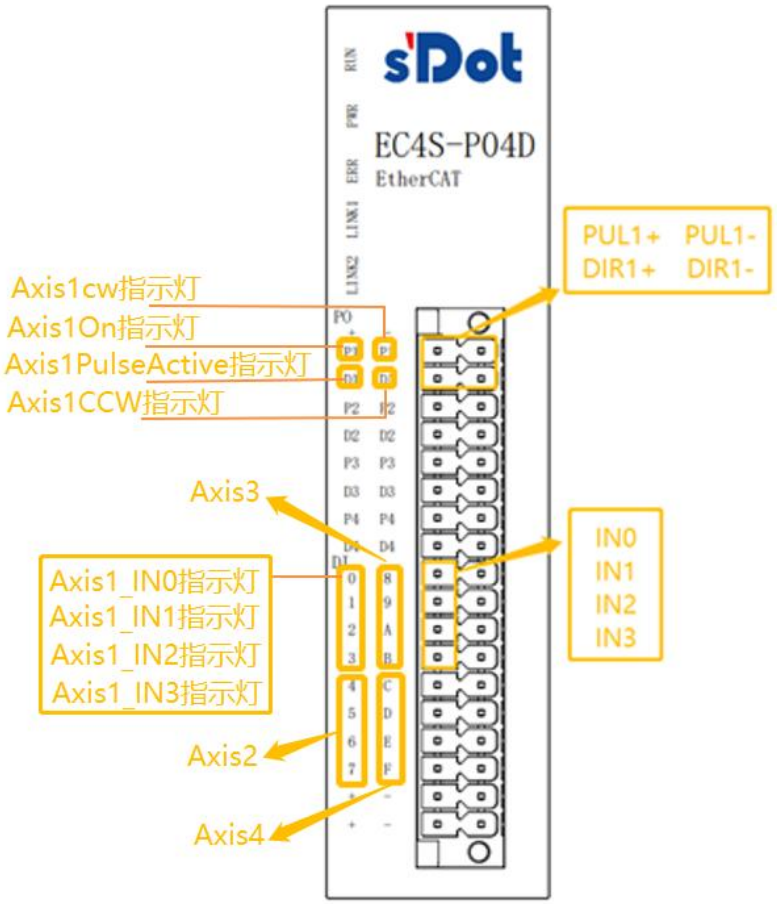
Name and functional description of the parts of the module



Indicator light description

PWR	green	On	The working power supply is normal
		Off	The product is not powered up or the power supply module is abnormal
RUN	green	On	The module is in the normal operation state
		Off	The module is in the initial state
		Flashing	2Hz: Pre-operation state 1Hz: safe operation state

ERR	red	Flashing	Module working operation or communication connection
		Off	The module works without exception
Input the signal indicator	green	On	The module detection channel has a signal input
		Off	The module channel has no signal input or abnormal signal input
Port definition description			



The Axis1ON light is on the 402 state machine of the shaft Axis 1; the Axis1PulseActive light when the shaft Axis 1 has pulse output; the Axis1CW light when turning clockwise; the Axis1CCW light when turning counterclockwise; the other axes are similar.

Axis 1 _ IN 0 ~ 3 corresponds to the PDO of axis 1: Digital inputs low 4 bits.

For example, if Axis 1 _ IN 0 has a signal input, then Digital inputs = 0x0001;

If Axis 1 _ IN 1 has a signal input, then Digital inputs = 0x0002;

If Axis 1 _ IN 2 has a signal input, then Digital inputs = 0x0004;

If Axis 1 _ IN 3 has a signal input, then Digital inputs = 0x0008.

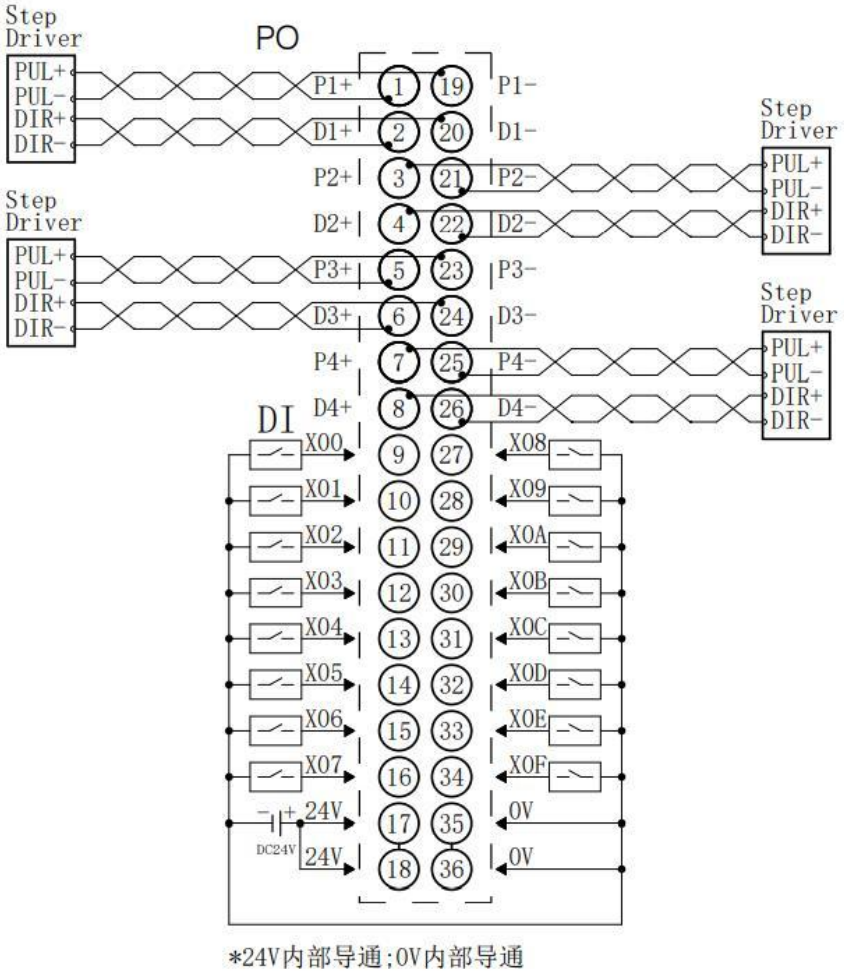
3 Product parameters

interface parameters ·	
bus protocol	EtherCAT
transmission speed	100 Mbps
BI	Bottom bus
technical parameter	
Configuration mode	Through the main station
source	5 VDC (powered by the system)
Ci A402	support
Distribution clock	support
number of axles	<=4
output frequency	<=400KH z
synchronizing cycle	>= 1ms
Limit input	16 The
Limit signal	N PN
Limit filter	3ms
driving signal	Differential signal
pilot lamp	green
Power contact	Max. 24V DC / max. 10A
Electrical isolation	500V (power supply contact / power supply voltage / E thernet)
specification and dimension	113×98×28.3mm
weight	150g

working temperature	-10~+60℃
Storage temperature	-20℃~75℃
relative humidity	95%, with no condensation
levels of protection	IP20

4 The wiring

.1 4 Wiring diagram

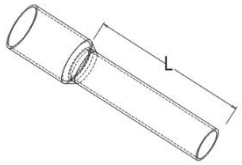


*24V内部导通;0V内部导通

4.2 Terminal terminal and wiring instructions

binding post		
Signal line terminal	number of poles	36 P
	Line diameter	26~16 AWG 0.2~1.5 mm²

- **Wiring method**
  - The signal and power terminal are screw-free design, and the installation and disassembly of the cable can be completed by using a one-character screwdriver (knife head width: 3 mm).
  - The recommended stripping length is 10mm.
  - Single strand hard wire, after stripping the corresponding length of the wire, the pressure button will insert the single wire at the same time.
  - Multiple flexible wire, after stripping the corresponding length of the wire, can be directly connected or matched with the corresponding standard specifications of the cold pressure end (pipe insulation terminal, the following table), and the pressure button will insert the line at the same time.

Specification table of pipe-type insulated end head		
Specification requirements	model	Lead boundary area is mm²
 The length of the tube-type insulated terminal L is ≥10mm	E 0510	0.5
	E7510	0.75
	E 7512	
	E 1010	1.0
	E 1012	
	E 1510	1.5
	E 1518	

5 Use

.1　5 Preparations

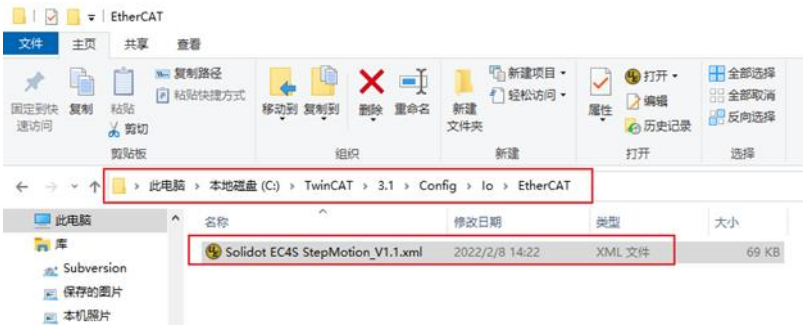
This paper introduces the application of EC4S-P04D module in TwinCAT3 software environment as an example.

1. Equipment preparation

- One computer, pre-installed with TwinCAT3 software
- EtherCAT Special shielding cable
- Switch power supply
- Device profile file Solidot EC4S StepMotion_V1.1.xml
- One E C4S-P04D module

2. Add the device configuration file

Place the XML file of the module into the installation directory of the TwinCAT under: C: \ TwinCAT \ 3.1 \ Config \ Io \ EtherCAT.



.2　5 Module use

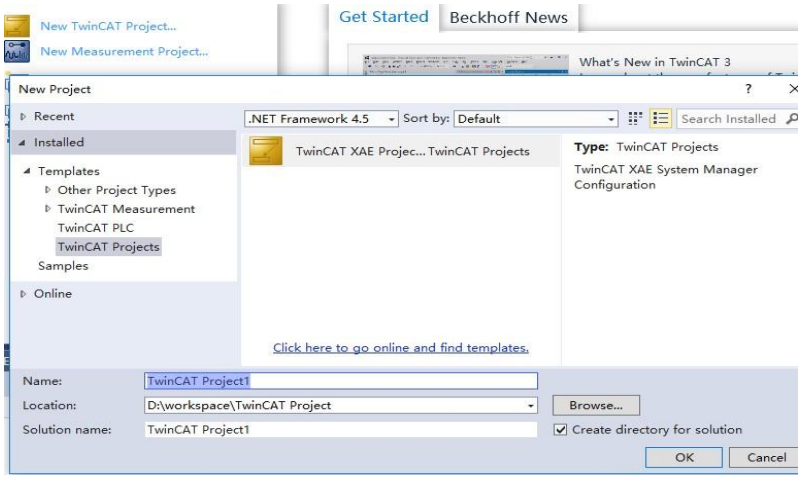
1. Scan equipment

- Run the TwinCAT software

Click the TwinCAT icon in the lower right corner of the desktop, select "TwinCAT XAE (VS xxxx)" to open the TwinCAT software.

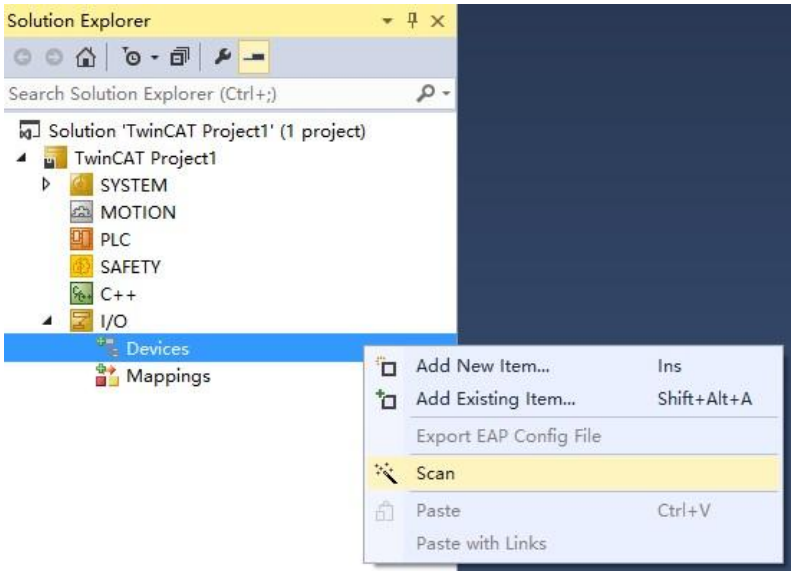
- Create the project

Click "New TwinCAT Project" to create a new project, as shown in the figure below.



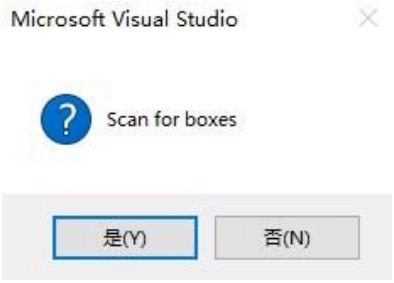
- scanner

Right-click "I / O-> Devices" and click "Scan" option to scan the station equipment, as shown in the figure below.

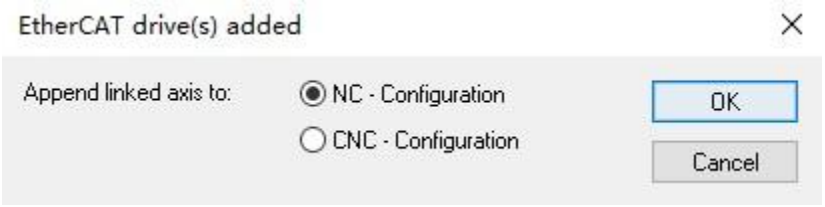


Check the "Local Connection" network card, and click the "OK" option, as shown in the figure below.

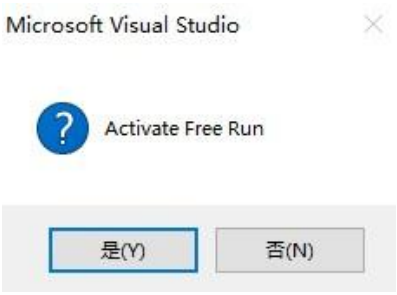
Select Yes in the displayed Scan for boxes dialog box, as shown in the figure below.



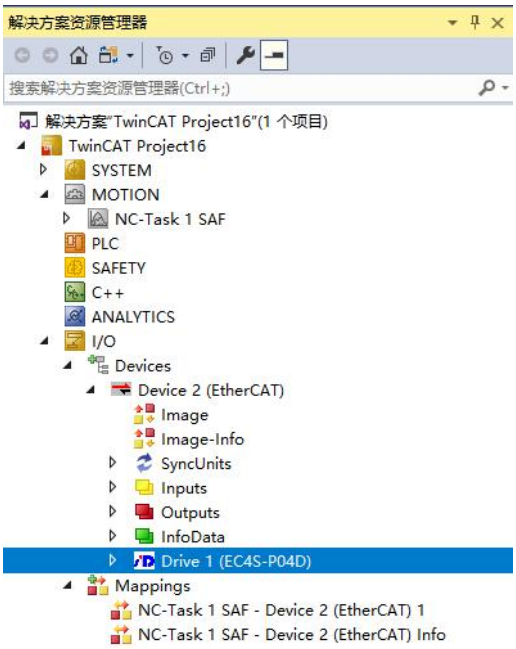
Select the associated NC axis and click the "OK" option as shown in the following below.



Select Yes in the dialog of "Activate for Run", as shown in the following below.

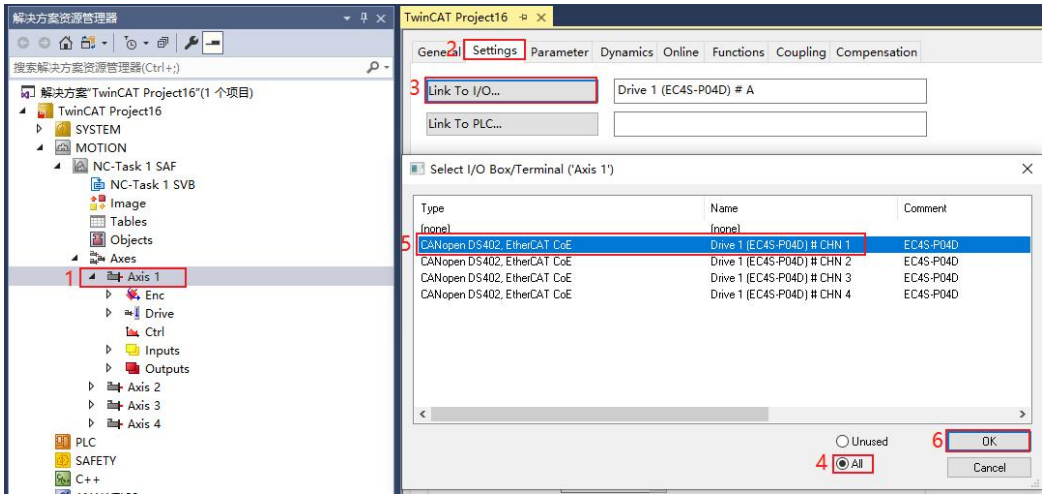


Scan to the module E C4S-P04D, as shown in the figure below.

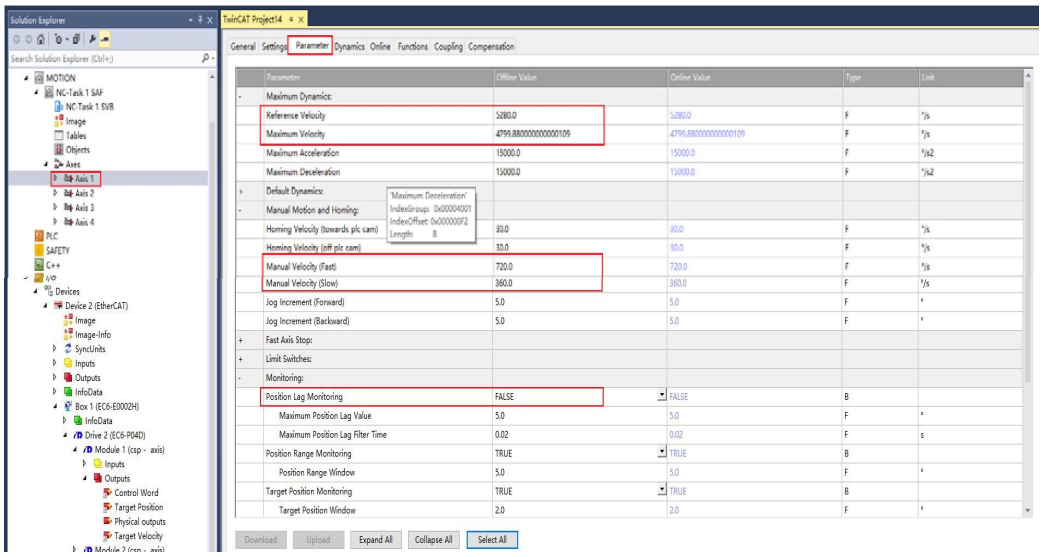


2. Configure the NC axis parameters

- In axis 1, for example, double-click Axis 1, open the Settings tab, and associate the axis



- Open the Parameter tab and set the following for the Axis1 parameter



*** Reference Velocity: Reference speed, generally 110% of Maximum Velocity**

* Maximum Velocity: Maximum speed of the shaft (in this case, the default pulse volume of the motor rotation encoder is 10000, the maximum speed of the motor is 800 rpm, the amount of the motor rotation is 360°, the parameter unit is seconds, so

the maximum speed of the shaft = (800 / 60) * 360)

*** Default Dynamics: acceleration and deceleration setting**

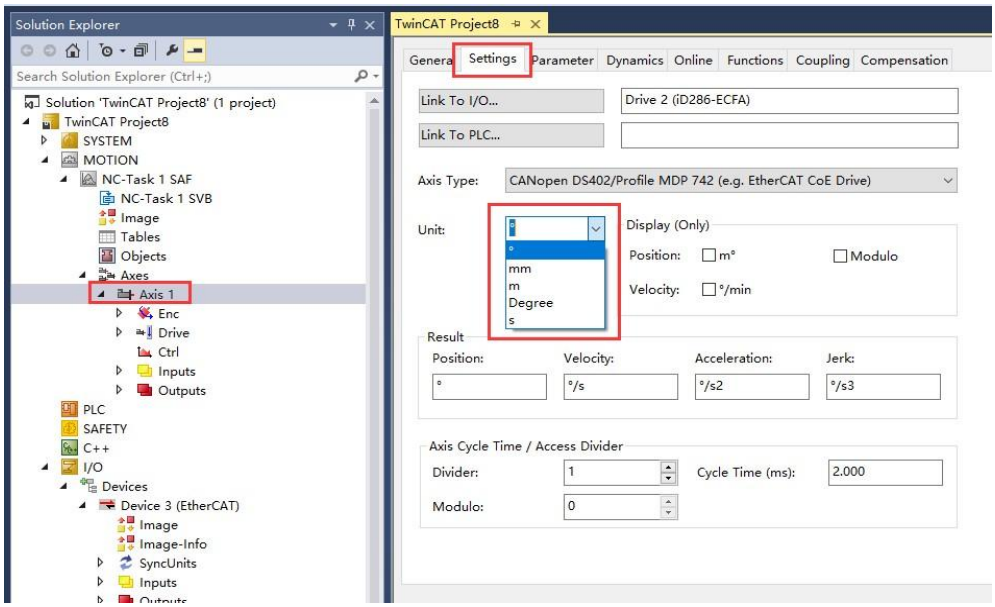
*** Manual Motion and Homing: Set the point movement and parameter search speed.** The Manual Velocity (Fast) and Manual Velocity (Slow) are the high speed and low speed of the Online control interface respectively

*** Fast Axis Stop: The axis quick stop parameter can be set**

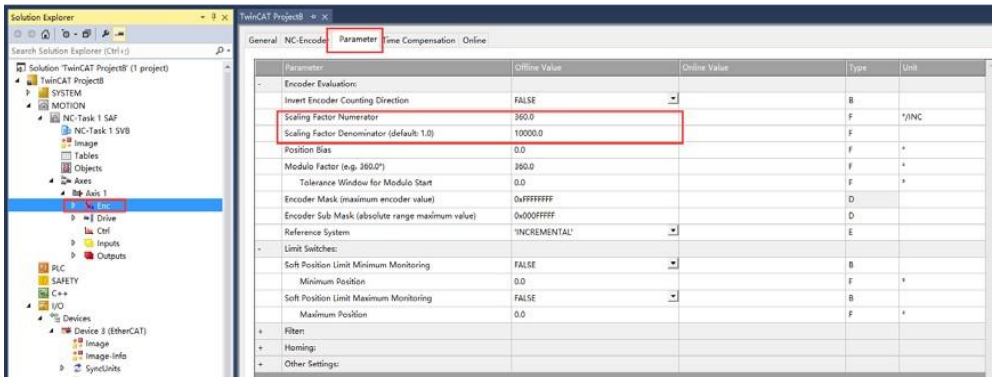
*** Limit Switches: Open soft limit position can be set**

*** Monitoring: Set the axis following error.** Here Position Lag Monitoring needs to be changed to FALSE, otherwise an alarm may occur during manual debugging

- Open the Settings tab to set the engineering unit when the motor runs



- Double-click Enc under Axis1 to open the Parameter tab to set the parameter for Enc (this parameter must be set)

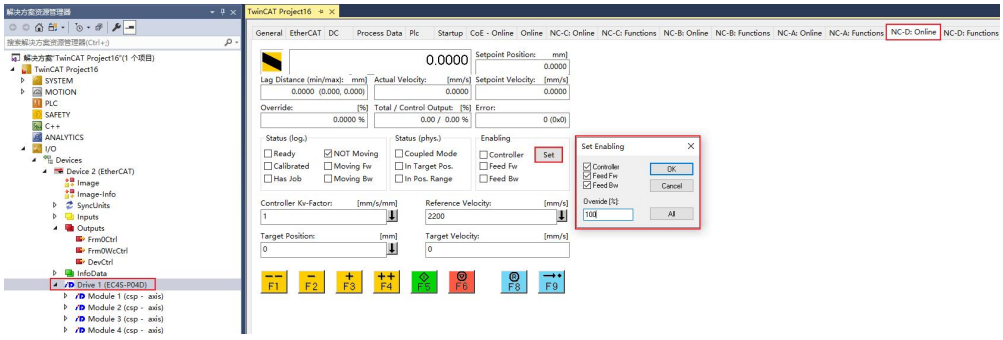


*** Scaling Factor Numerator: The final engineering movement of the motor to turn around**

*** Scaling Factor Denominator: Number of encoder feedback pulses**

For example, if the motor turns a circular load to move by 360°, then Scaling Factor Numerator =360°. In this case, the pulse volume of the default encoder is 10000, so Scaling Factor Denominator =10000.

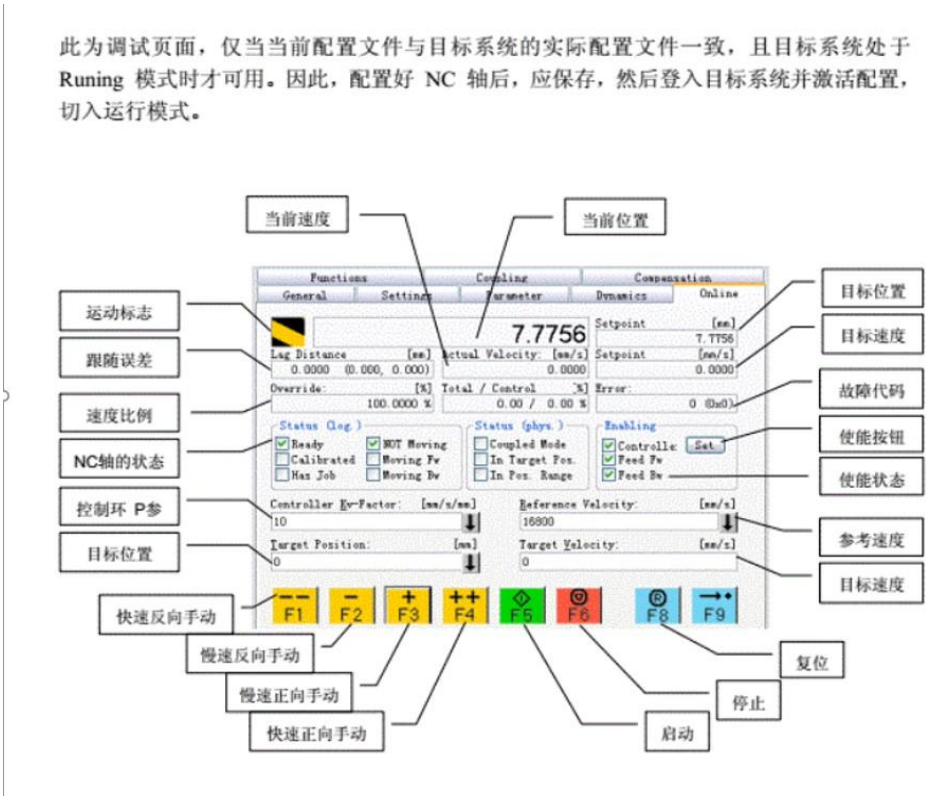
- Click (Activate Configuration) to activate the configuration, then click Drive 1 (EC 4S-P04D) to switch to the NC: Online tab for the following settings:



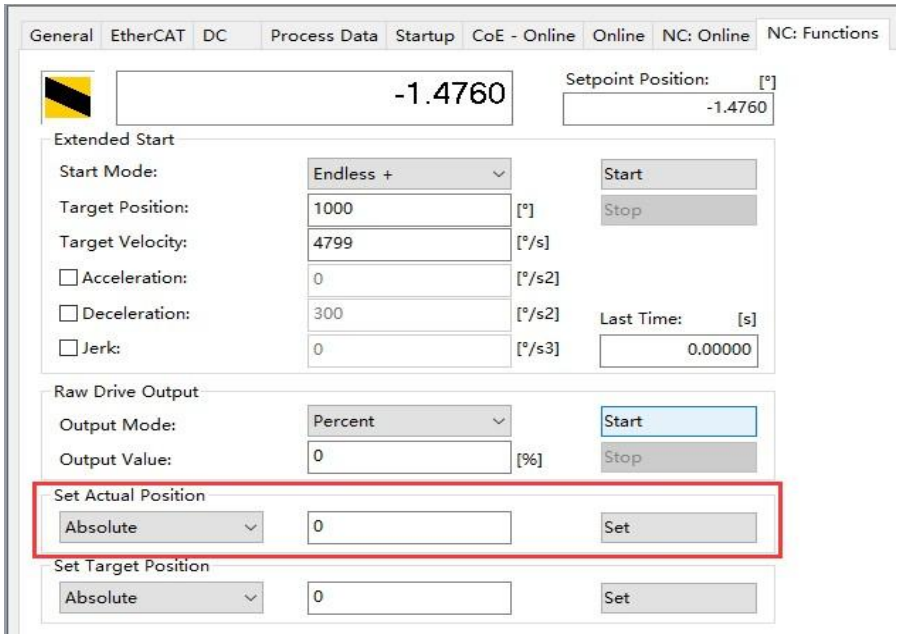
Click "SET", manually select Controller (enable), Feed Fw (forward), Feed Bw (reverse), and set Override (speed ratio), then click OK; or directly click ALL to enable axis, automatically set the speed ratio to 100%.

At this time, F1-F4 can be controlled to control the axis, set the target speed (limited by Manual Velocity (Fast) parameters) and target position, click F5 to start operation, F6 stops running, F9 is automatically returned to zero function, and not used when there is no reference point. Controller Kv-Factor is the axis positioning compensation. If the axis positioning is not accurate when the point moves, it can be adjusted appropriately (no more than 20).

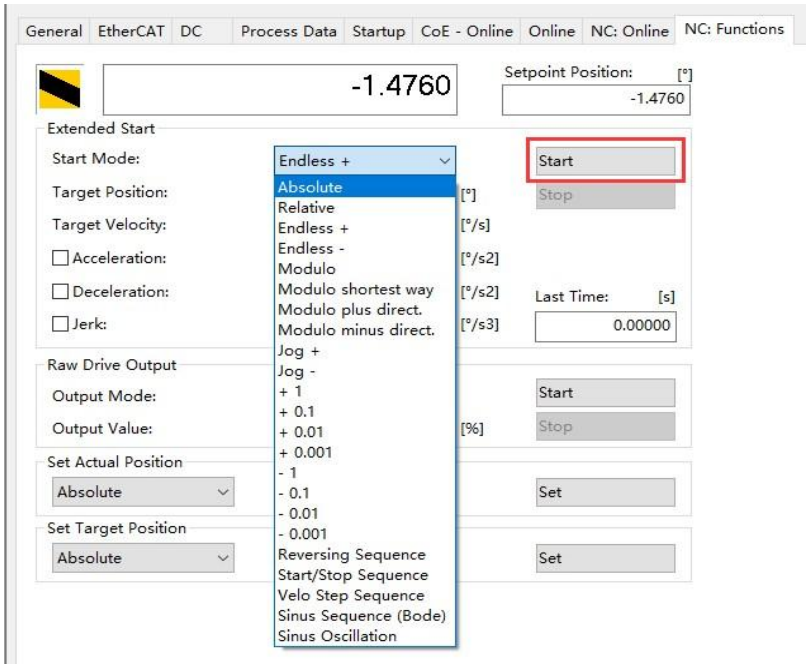
- Introduction of the function of the debugging page



1) Switch to NC: Functions tab, Set Actual Position can modify the current position of the axis. If the current position is set to 0, the current position is the origin, which will be lost after the TwinCAT restart. If it is the feedback of the absolute encoder type, then the restart is followed by the actual feedback position of the encoder as the current position.



2) Start Mode There are many debugging methods for single axis, commonly used as Absolute (absolute position movement), Relative (relative position movement), Endless + - (infinite forward and reverse), Modulo (modular value movement), Reversing Sequence (round trip sequence), Start / Stop Sequence (start and stop sequence), Velo Step Sequence (speed step sequence).



*** Target Position: Target location**

*** Target Velocity: Target speed**

After setting these two parameters, click "Start" and "Stop" to control the start and stop. The target speed set here is not limited by the Manual Velocity (Fast) parameters.

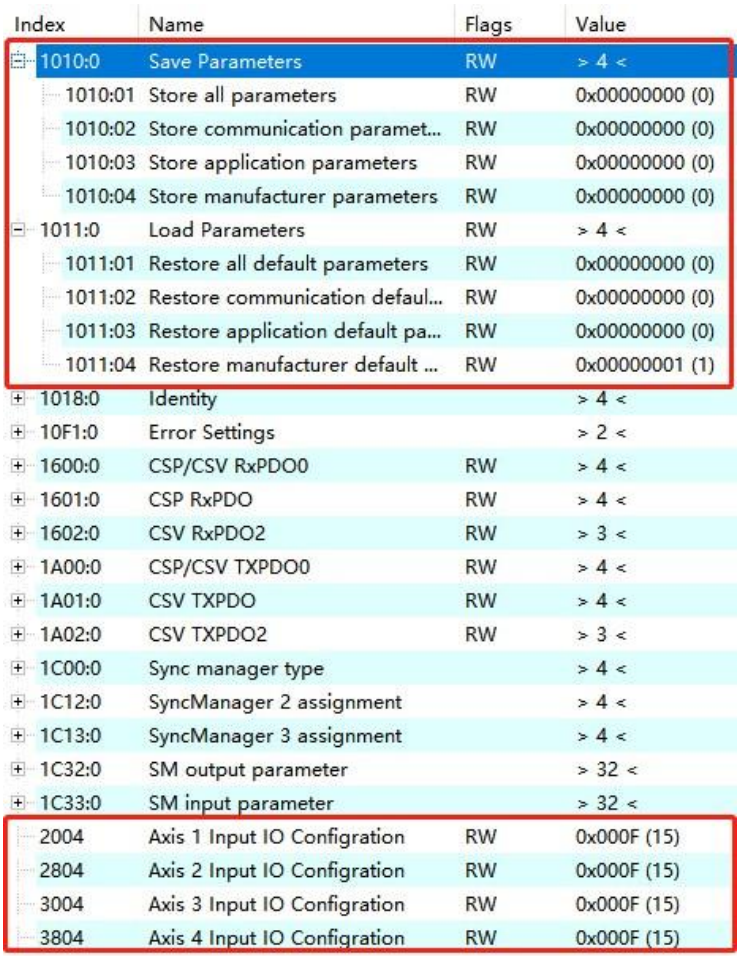
3. Function introduction

- Save the current settings

Where object 1010 is the save configuration parameter, the current version can only save 2004,2804,3004 and 3804 objects to save: 0x 65766173 after written through the 1010:01 object or 1010:04 object, the current configuration value will be written to FLASH, the power can be saved, and the 1010:01 or 1010:04 object will return 0x00000001 value.

- factory data reset

The main station can write the ASCII code "load": 0x 64616f 6c through 1011:01 or 1011:04 objects, then the module restores the factory setting parameters and writes the factory parameters to the FLASH, and the 1011:01 or 1011:04 objects will return 0x00000001 value.



Index	Name	Flags	Value
1010:0	Save Parameters	RW	> 4 <
1010:01	Store all parameters	RW	0x00000000 (0)
1010:02	Store communication paramet...	RW	0x00000000 (0)
1010:03	Store application parameters	RW	0x00000000 (0)
1010:04	Store manufacturer parameters	RW	0x00000000 (0)
1011:0	Load Parameters	RW	> 4 <
1011:01	Restore all default parameters	RW	0x00000000 (0)
1011:02	Restore communication defaul...	RW	0x00000000 (0)
1011:03	Restore application default pa...	RW	0x00000000 (0)
1011:04	Restore manufacturer default ...	RW	0x00000001 (1)
1018:0	Identity		> 4 <
10F1:0	Error Settings		> 2 <
1600:0	CSP/CSV RxPDO0	RW	> 4 <
1601:0	CSP RxPDO	RW	> 4 <
1602:0	CSV RxPDO2	RW	> 3 <
1A00:0	CSP/CSV TXPDO0	RW	> 4 <
1A01:0	CSV TXPDO	RW	> 4 <
1A02:0	CSV TXPDO2	RW	> 3 <
1C00:0	Sync manager type		> 4 <
1C12:0	SyncManager 2 assignment		> 4 <
1C13:0	SyncManager 3 assignment		> 4 <
1C32:0	SM output parameter		> 32 <
1C33:0	SM input parameter		> 32 <
2004	Axis 1 Input IO Configration	RW	0x000F (15)
2804	Axis 2 Input IO Configration	RW	0x000F (15)
3004	Axis 3 Input IO Configration	RW	0x000F (15)
3804	Axis 4 Input IO Configration	RW	0x000F (15)

- The DI signal mapping function

In axis 1, for example, the value of DI 0-3 is mapped to object 60 FD: bit0-3 by default, and object 2004h: bit0-3 is the remapping enable bit of DI 0-3. Modify the value of object 2004h: bit0 to 0, the value of DI 0 is mapped by the default 60 FD: bit0 to 60 FD: bit16, and the remaining DI signals can control the remapping in the same way. This parameter does not maintain power, using the "keep setting function" can achieve power retention.

- DI signal open on / closed setting

Take axis 1 as an example, the mapping value of DI 0-3 is 0 (normally open), the value of modified object 2004h: bit 8-11 is 1, the mapping value of DI 0-3 is 1 (normally closed), the mapping address is set by the "DI signal mapping function", the parameter is not maintained, using the "keep setting function" can achieve the power retention.

		2004h	60FD映射	2004h	60FD映射	2004h	开关类型	2004h	开关类型
DI 0		bit:0 = 1	bit0	bit:0 = 0	bit16	bit:8 = 0	常开	bit:8 = 1	常闭
DI 1	轴1	bit:1 = 1	bit1	bit:1 = 0	bit17	bit:9 = 0	常开	bit:9 = 1	常闭
DI 2		bit:2 = 1	bit2	bit:2 = 0	bit18	bit:10 = 0	常开	bit:10 = 1	常闭
DI 3		bit:3 = 1	bit3	bit:3 = 0	bit19	bit:11 = 0	常开	bit:11 = 1	常闭
		2804h	68FD映射	2804h	68FD映射	2804h	开关类型	2804h	开关类型
DI 4		bit:0 = 1	bit0	bit:0 = 0	bit16	bit:8 = 0	常开	bit:8 = 1	常闭
DI 5	轴2	bit:1 = 1	bit1	bit:1 = 0	bit17	bit:9 = 0	常开	bit:9 = 1	常闭
DI 6		bit:2 = 1	bit2	bit:2 = 0	bit18	bit:10 = 0	常开	bit:10 = 1	常闭
DI 7		bit:3 = 1	bit3	bit:3 = 0	bit19	bit:11 = 0	常开	bit:11 = 1	常闭
		3004h	70FD映射	3004h	70FD映射	3004h	开关类型	3004h	开关类型
DI 8		bit:0 = 1	bit0	bit:0 = 0	bit16	bit:8 = 0	常开	bit:8 = 1	常闭
DI 9	轴3	bit:1 = 1	bit1	bit:1 = 0	bit17	bit:9 = 0	常开	bit:9 = 1	常闭
DI A		bit:2 = 1	bit2	bit:2 = 0	bit18	bit:10 = 0	常开	bit:10 = 1	常闭
DI B		bit:3 = 1	bit3	bit:3 = 0	bit19	bit:11 = 0	常开	bit:11 = 1	常闭
		3804h	78FD映射	3804h	78FD映射	3804h	开关类型	3804h	开关类型
DI C		bit:0 = 1	bit0	bit:0 = 0	bit16	bit:8 = 0	常开	bit:8 = 1	常闭
DI D	轴4	bit:1 = 1	bit1	bit:1 = 0	bit17	bit:9 = 0	常开	bit:9 = 1	常闭
DI E		bit:2 = 1	bit2	bit:2 = 0	bit18	bit:10 = 0	常开	bit:10 = 1	常闭
DI F		bit:3 = 1	bit3	bit:3 = 0	bit19	bit:11 = 0	常开	bit:11 = 1	常闭

4个输入IO可根据2004h对象低4位bit0-3进行重映射功能，也可以通过bit8-11进行常开常闭开关设置
默认bit0-3不偏移