Beckhoff_AX5000 与第三方电机的连接

- 1. 把第三方电机的.XML 文件,拷贝到 C:\TwinCAT\Io\TcDriveManager\MotorPool 目录下,并重新启动 TwinCAT。
- 2. 打开新的 System Manager 文件,完成 Choose Target 之后,把 TwinCAT System Manager 置为 Config mode。
- 3. 右击 I/O-Configuration 中 I/O Devices, Scan Devices, 如图 1 所示



4. 会跳出对话框,如图2所示



5. 点击"是 (Y)",因为接了伺服驱动器,跳出下面的对话框,



 点击"是(Y)",出现下面的界面。扫描到伺服之后,(1) TSM 文件自动添加 了 NC-Configuration 项,如图中小标题 1 所示。(2) 添加了伺服驱动器: Driver 1 (AX5203-0000-0010)。图中对话框,点击否(N)。

7. 左键点击上图中的 Driver 1 (AX5203-0000-0010),出现下图的界面。



8. 上图中的 Configuration 项是调试电机的选项。点击 Configuration,出现下面的界面。AX5203 是两轴伺服,所以会出现 ChannelA 和 ChannelB,点击 ChannelA,出现 ChannelA 的界面,其中 Motor 项是对电机的配置。

说明:TSM 扫描只能扫描到伺服驱动器,扫描不到电机,电机需要手动配置。



9. 点击上图中的 Motor, 出现 Motor 的配置界面。如果是 Beckhoff 自己的电机, 点击 Scan motor and feedback 1*就可以自动扫描到电机的类型和反馈的类型。

第三方电机的配置需要有相应的.XML 文件。点击 Motor*图标,从 Motor*中 配置电机。



10. 在电机配置的时候, 需要把 Change Phase 项选择到 Pre-Op 项。确保在 Pre-Op 状态。



11. 点击 Motor*图标,出现下面的对话框

Select a motor. (SchemaVersion.2.0)	
■ Synchronous Motors ■ Asynchronous Motors	OK Cancel
Info:	
Only show the suitable motors for this drive.	

12. 点击 Synchronous Motors -> Rotational -> 找到需要的第三方电机,例如 Golden Age。(此处根据自己实际情况,选取对应的电机,GK 仅为举例)

■ Select a motor. (Sch	emaVersion.2.0)	
 Synchronous Motors Botational BECKHOFF Siemens Danaher SEW Harmonic Drive St?ber Golden Age Heidolph Emoteq Lust Parker VSM LENZE FESTO 		OK Cancel
Only show the suitable motors for	r this drive.	

Select a motor. (SchemaVersion. 2.0)		K
Synchronous Motors Rotational BECKHOFF Siemens Danaher SEDU(Cancel]
Harmonic Drive St?ber Golden Age	≣	
i⊟- TuningRequired i⊟- GK GK6061-64F61 (ver.1.0.0) III- Heidolph		
⊞ Emoteq ∎ Lust ∎ Parker	<u>~</u>	
Suitable for AX5106-xxxx-xxxx; AX5112-xxxx-xxxx; AX5203-xxxx-xxxx; AX5206-xxxx-xxxx: I Only show the suitable motors for this drive.		

13. 点击 Golden Age -> TuningRequired -> GK -> 选择 GK6061-6AF61(电机的类型)。

14. 点击上图中的 OK, 出现下面的对话框

Power supply settings for GK6061-6AF61	
Choose the power supply settings: (Uact=391.7V) 400 V 3 phase 50 Hz (Europe)	OK Cancel
Details Umain 400.0 V Enable Umain Phase Error Detection U+rng 10.0 % Disable Umain Phase Error Detection U-rng 10.0 %	
+ More settings	

15. 一般默认的电机电压都是正确的,点击 OK 就可以了,也可以自己手动去选择,红框中的下拉菜单是可以选择的。如下图所示。

Power supply settings for GK6061-6AF61	
Choose the power supply settings: (Uact=391.7V) 400 V I 3 phase I 50 Hz (Europe) 230 V I 1 phase I 50 Hz (Europe) 400 V I 3 phase I 50 Hz (Europe) America 120 V I 1 phase I 60 Hz (America) 480 V I 3 phase I 60 Hz (America) 0ther settings (please edit the values.) • More settings	OK Cancel

16. 点击 OK, 电机类型选择完毕。出现下面的界面, 可以看到, Feedback 1*和 Motor* 均 显 示 出 所 选 择 的 类 型 。 如 下 图 所 示 。



17. 也可能会出现矫正初始相位角的提示,直接点击确定即可。

Motor an	d Feedback	×
i	In order to use the parameter channel of the feedback, please follow the documentation to calibrate the commutation offset.	
	确定	

18. 若出现设置 NC 参数的对话框,点击取消,后期再做设置。



📑 无标题 - Ivi	nCAI System Hanag	er				
<u>F</u> ile <u>E</u> dit <u>A</u> ction	us <u>V</u> iew <u>O</u> ptions <u>H</u> elp		_			
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E SYSTE	neral EtherCAT DC	Process Data Start	up SoE - Online Onl	ine Configuration		
	> ⊅ ℡⊟ ← →	🔞 🗖 🗣 🕻 🎘	? -Change Phase 💊]		
÷ Tr	ee X	Channel A>>Parameter>>h	Motor and Feedback			
	- Device - Device Info - Power Management - Display	*Add/Remove Standar	d+User defined 💌 motor Reset (All motor/f	feedback(s) data directly to/fro	m the Startuplist	
Cam -	-Channel A	Feedback 1 connector		Feedback 2	connector	
□	🚍 Parameter	3: X11 (Front, Encoder	. 🕶	0: No conn	ector 🔽	
	+ Axis Managemen + Controller Ove	Scan mo	otor and feedback 1*	Scan fe	edback 2*	
	 Process Data/O Digital I/O Parameter List Scalings Operation Diagnostics Channel B 	Feedback	n Motor [×]		Feedback 2*	
	i Parameter i Operation i Diagnostics	Feedback 1type: Heid#EQN1325-512S-5	Motor type: V-E: GK6061-6AF61	Feedback 2	type:	
		Feedback 1 Paramete	ers Motor Para	meters Feedback	2 Parameters	¢
	Pre-Op AxisState	Error Id Umain OK	DcLink OK AmplTe.	. Actual op v <= v_0	Positive c	Negative
Chi	annel A Not Ready D	001: Pr R	0.0	2: velo control		•
	anneib Not Ready D	UUI: PT <u>H</u>		2: veio control 🛛 🌻	-	•

20. 跳出下面的对话框

TwinCA	I System Hanager 🛛 🔀
?	Activate Configuration (Old Configurations will be overwritten!)
	() 确定) 取消

21. 点击"确定",跳出下面的对话框

TwinCA	I System Hanager	×
2	Restart TwinCAT System in Run	Mode
	确定 取消	

22. 点击 "确定", 等待 TwinCAT 运行之后。矫正初始相位角。 23. 鼠标左键点击 Startup list。跳出下面的界面,

General EtherCAT DC Pr	ocess Data Startup SoE -	Online Online Configuration
\$ ♥ TE H ← → �a	🐢 💶 🎘 🎘 ? 🖂	ange Phase 💙
Tree X	Channel Startup list Drive C	Commands
⊡-Device Device Info	Command IDNs	
- Power Management	on offset (pc)	
Display Watch Window	IDNs activiated by commands.	
- Channel A	IDN	Name
	🕀 P-0-0165	Commutation offset calibration parameter
Probe Unit	P-0-0057	Electrical commutation offset
	P-0-0058	Mechanical commutation offset
Drive Commands		
∃ Diagnostics		

s already in Starl	up list								Channel		
DN	Tr	Order	Name		Se	et Value	Uni t		В		
S S-0-0015	PS	002	Telegram type		0000000	0 00000111		~			
S S-0-0016	PS	003	Configuration list of AT		Edit list	(disabled)	····^	1	Transition		
S S-0-0024	PS	005	Configuration list of MDT		Edit list	(disabled)		1			
S S-0-0032	PS	009	Primary operation mode		2: velo c	ontrol		1_	En-/Disabl		
S-0-0091	PS	082	Bipolar velocity limit value		7158196	1	inc/(1	1=	Move		
S S-0-0100	PS	079	Velocity loop proportional gain		10.000		A/(ra	1			
S-0-0101	PS	080	Velocity loop integral action time	9	3.5		ms	1	Add		
S S-0-0106	PS	077	Current loop proportional gain 1		43.1		V/A		Dalaha		
S S-0-0107	PS	078	Current control loop integral act	ion time 1	0.7		ms	1	Delete		
S S-0-0109	PS	055	Motor peak current		13.500		A	1	Clean up		
S S-0-0111	PS	056	Motor continuous stall current		56 Motor continuous stall current 4.500			A	1		
S S-0-0113	PS	068	Maximum motor speed		4000		rpm	1	Export List		
S S-0-0136	PS	064	Positive acceleration limit value	Positive acceleration limit value		6283.18		1			
S S-0-0137	PS	065	Negative acceleration limit valu	Negative acceleration limit value		6283.18		1	Import List		
S-0-0201	PS	058	Motor warning temperature		80.0		°C	1	01		
S S-0-0204	PS	059	Motor shut down temperature	Motor shut down temperature		own temperature			°C	1	
S P-0-0002	PS	074	Current ctrl cycle time		62		us		Cancel		
CUUU C 🛃	DC	nop	Yelesitu etd euele time		105		110	" ``	Cancer		
s modified by Tc	DriveMana 1	ıger	Y	C + 11 3	5	Show only t	ne differen	се	Accest		
	F U		Name	Set Value	Uni	it			Accept		
<u>™</u> P-0-0180	Feedbac	k 2 type							Accept Al		

24. 鼠标左键点击 P-0-0150 -> Parameter Channel,

١	Tran	Order	Name		Se	tValue	Unit			A
S P-0-0150	PS	045	Feedback 1 type							
			Manuracturer		7: Harowe					Transitio
			Feedback type		0: Rotation	nal feedback				Transitio
			Feedback type string		Harowe#1	5BRX700D				En-/Disab
			Feedback use		0: Commut	tation motorf				Maura
			Feedback direction		0: Positive	direction				Move
÷			rsvd							Add
÷			Power settings							
÷			Process channel							Delete
-			Parameter channel							Clean u
			Parameter interface		0: No com	mutation inte.				Ciedinu
			Connector		0: No con	nector				Export Li
			Identifier		0					
			Bit resolution singletum position	1	0					Import Li
			Bit resolution multitum position	0				E		
			Number of clockcycles to get s	. 0				Compar		
		···	Number of clockcycles to get multitum position		0					OK
		· · · · · · · · · · · · · · · · · · ·	Digital name plate		0: No digit	al name plate				UN
			Commutation mode		3: Adjusta	ble offset (P	l l			Cance
			Adjustable commutation offset		0.0		deg			
			Linear resolution about digital ir	nterface in nm	0					
		· · · · · · · · · · · · · · · · · · ·	rsvd		···				*	
modified by T	cDriveMana	ger					Show	only the differe	ence	
1			Name	SetValue	Unit	:				Accep
P.0.0150	Feedbac	k 1 type							·····	Accent
1-0-0130										100000

25. Digital name plate,选择"0: No digital name plate"; Communication mode 选择"3: Adjustable offset"

INs already in Star	tup list		1					Channel
IDN	Tran	Order	Name		SetValue	Unit		A
· · · · ·			Feedback use		0: Commutation motor	f	_	
· · · · · · · · · · · · · · · · · · ·			Feedback direction		0: Positive direction			Transition
÷			rsvd					Transition
<u>+</u>			Power settings					En-/Disabl
.			Process channel]	Mayra
<u> </u>			Parameter channel					Move
			Parameter interface		4: Hiperface			Add
			Connector		3: X11 (Front, Encode	er		
			Identifier		255			Delete
			Bit resolution singletum position		12			Clean up
	Bit resolution multitum position			0			ologinap	
			Number of clockcycles to get singletum position or		. 12			Export List
			Number of clockcycles to get multitum position		0		E	
			Digital name plate 0		0: No digital name pla	te		Import List
			Commutation mode 3		3: Adjustable offset (F	⁹		Compare
			Adjustable commutation offset		0.0	deg		Compare
			Linear resolution about digital interface in nm		0			OK
.			rsvd					
		۸	Data				*	Cancel
Ns modified by To	DriveManag	jer			V Show only	the differen	се	
IDN 		-	Name 9	SetValue	Unit			Accept
		1 type					Accept A	

26. 跳出下面的对话框,选择"是"。然后点击右侧"OK"按钮。再次点击 Activate

Configuration _____,使刚才所做的配置生效。



27. 鼠标左键点击 ChannelA -> Operation -> Drive Commands 出现下图右半部分 的界面,选择 P-0-0160 Calibrate commutation offset (pc) 。点击 Start。



General EtherCAT DC Process Data Startup SoE - Online Online Configuration								
$\cancel{0} \ \textcircled{0} \ \fbox{1} \ \rightleftarrows \rightarrow \textcircled{0} \ \blacksquare \ \blacksquare \ \swarrow \ \fbox{1} \ \textcircled{0} \ \swarrow \ \fbox{1} \ \textcircled{0} \ \r{0} \ \r$								
Tree ×	Channel A>>Operation>>Driv	e Commands						
 Device Device Info Power Management Display Watch Window Channel A Parameter Operation Probe Unit Manual Operation Drive Commands Diagnostics Error History Channel B 	Command IDNs P-0-0160: Calibrate community IDNs activiated by command IDN P-0-0165 P-0-0057 P-0-0058	tation offset (pc) ds. Commutation offset calibration parameter Electrical commutation offset Mechanical commutation offset	V Start Download Upload					

28. 此时电机会略转一定角度,请勿连接负载。并计算出需要矫正的机械角度。 P-0-0058 Mechanical commutation offset 269.80 deg。(能计算出客户电机的具体数值)

Channel A>>0	peration>>Drive Commands							
Command ID	Ns.							
P-0-0160: Ca	P-0-0160: Calibrate commutation offset (pc)							
IDNs activiat	IDNs activiated by commands.							
IDN	Name	Act Val	ue Set Value	Uni t	Download			
🕀 P-0-016	5 Commutation offset calibration parameter							
P-0-005	7 Electrical commutation offset	270.00	270.00	deg	Upioad			
P-0-005	8 Mechanical commutation offset	269.80		deg				

29. 记录该值,将其键入 24 步中的 Adjustablecommutation offset,必须按自己电 脑键盘上的"Enter键",数值被修改,然后点击右侧"OK"。

									A
IDN	Tran	Order	Name			SetValue	Unit		~
			Feedback use		0: Comr	nutation motorf			
			Feedback direction		0: Positi	ve direction			Transition
.			rsvd		.				
			Power settings						En-/Disable
			Process channel						Move
			Parameter channel						
			Parameter interface		4: Hiper	face			Add
			Connector		3: X11 (Front, Encoder			Delate
			Identifier		255				Delete
			Bit resolution singletum position		12				Clean up
			Bit resolution multitum position 0		0				
			Number of clockcycles to get singletum position or		. 12				Export List
			Number of clockcycles to get multitum position		0				
			Digital name plate 0		U: No di	gital name plate			Import List
			Commutation mode		3: Adjus	table offset (P			Compare
			Adjustable commutation offset		269.8		deg		Compare
			Linear resolution about digital interface in nm		0			~	ОК
<u>.</u>			nsva Dete					~	
±									Cancel
Ns modified by Tc[DriveManage	er				Show only the	e differen	ice	
IDN			Name	SetValue	U	nit			Accept
∄122 P-0-0150	Feedback	1 type							Accept All

30. 跳出下面的对话框

Change	SetValue
⚠	P-O-0150 is set as STANDARD motor data. The change may cause unexpected result or even damages. Are you sure that you want to change the value?
	是(I) 否(II)

- **31.** 点击"是(Y)",再次点击 Activate Configuration **述**,使刚才所做的配置生

效。

32. 下面校验初始相位角。点击 ChannelA -> Operation -> Drive Commands 出现下 图右半部分的界面,选择 P-0-0166 Motor and feedback connection check (pc)。 点击 Start。



33. 查看 P-0-0167 -> Results -> commutation position difference。如果这里的角度显示为 355°到 5°之间(最好在 357°到 3°间),且 EqualDirections 的 Act Value为"1: Yes"(如果不为 Yes,请检查接线),则说明初始相位角设置成功。

General EtherCAT DC	Process Data Startup SoB	- Online Online Configuration						
	♥↓ ₩ № ? [Change Phase 💟						
Tree X	Channel A>>Operation>>Drive C	Commands						
Device Device Info Power Management	Command IDNs P-0-0165: Motor and feedback connection check (pc)							
Display Watch Window	IDNs activiated by commands.							
😑 Channel A	IDN	Name	Act Value	Set Value	Unit	Download		
⊕ Parameter ■ Operation	🖃 P-0-0167	Motor and feedback connection check p				Lipload		
- Frobe Unit		eMode	0: Rotating vector	0: Rotating vec		Copidad		
		Current level	50.0	50.0	%			
Drive Commands		Moving distance	90	90	deg/p			
Diagnostics		Velocity	30	30	deg/(
🖃 Channel B		rsvd	0	0				
∃ l'arameter		rsvd	0	0				
Diemesties		Results						
T Diagnostics		EqualDirections	1: Yes	0: No				
		Commutation position difference	359.86	0.00	deg			
		rsvd	0	0				
	L	rsvd	0	0				
	P-0-0057	Electrical commutation offset	270.00	270.00	deg			
	Currended to shut the comm		, 					
	Succeeded to start the comma				_			
<					~	ب		

34. 随后调试电机的 PID 参数,请参考倍福的运动控制中文指导手册。 35. ChannelA -> Controller Overview。



36. 位置环。



37. 速度环



38. 电流环

