GY GZ axis setup with Jetter Motors

Autoflow MK4 GY&GZ axis setup with Jetter Motors

Difficulty Medium

Ouration 2 hour(s)

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Introduction

WARNING:

The Jetter motor on the GZ axis has a brake. Releasing the brake without control could be harmful/dangerous. Use the Air Counterbalance rig to assist if necessary.

This assumes that the motors are connected to the Beckhoff drive and are free to move.

Step 1 - Initial Preparation

Ensure that the profile support arm is held out of the way to avoid marking the blue infeed arm.



Step 2 - GY Axis:

Check that proximity arm is in between the proximity sensor.

You should be able to turn the leadscrew by hand to move it.





Step 3 - GZ Axis

Check that proximity arm is in between the proximity sensor This has a brake and you can only turn the leadscrew by hand if the counterbalance is fitted.



Step 4 - Counterbalance

Counterbalance fitted under the carriage.

Adjust the pressure until you can turn the leadscrew of the GZ axis by hand. (6 bar)

Do not move the GY axis if the counterbalance is active



Step 5 - CX5203 Firmware Upgrade

The firmware on the CX5203 must be high enough to be supported under Drive manager 2.

Because you have to remove and add drives back into a project, create a new project just to update the drives.

- 1. Expand I/O -> Devices-> Device (EtherCAT), Double click and open the Online tab.
- $2. \ Update the Twincat3 folder firmware from \verb+\mainserver+Data+Design+TwinCAT3+Firmware from + and the folder firmware folder firmware folder firmware folder firmware from + and the folder firmware firmware folder firmware folder firmware folder firmware folder firmware folder firmware firmware folder firmware firmware folder firmware folder firmware folder firmware firmware folder firmware folder firmware folder firmware folder firmware folder firmware firmware folder firmware f$
- 3. Check the Drive you are going to update is in OP state and right mouse click on it.
- 4. Select FIRMWARE UP. Navigate to the location of the firmware. Normally C:\TwinCAT\Functions\TE5950-Drive-Manager-2\Firmware\AX5000
- 5. Do the same process for the EEROM matching the version number.
- 6. Check that you have the XML definition file for the version of firmware in C:\TwinCAT\3.1\Config\lo\EtherCAT\Beckhoff AX5xxx
- 7. With this done you should be able to delete the drives and add them back and check under drive manager 2





ailable EEPROM Descriptions:	Show Hidden Devices	OK
⊟ ➡₫ AX5yxx-0000-021x		Cancel
AX5101-0000-0214 EtherCAT Drive	(SoE, 1 Ch.) (AX5101-0000-0214)	
	(SoE, 1 Ch.) (AX5103-0000-0214)	
	(SoE, 1 Ch.) (AX5106-0000-0214)	
	(SoE, 1 Ch.) (AX5112-0000-0214)	
AX5118-0000-0214 EtherLAT Drive	(SoE, 1 Ch.) (AX5118-0000-0214)	
	(SoE, 1 Ch.) (AX5125-0000-0214)	
	(SoE, 1 Ch.) (AX5140-0000-0214)	
AX5160-0000-0214 EtherLAT Drive	(SoE, 1 Ch.) (AX5160-0000-0214)	
	(SoE, 1 Ch.) (AX5172-0000-0214)	
	(SoE, 1 Ch.) (AX5190-0000-0214)	
	(SoE, 1 Ch.) (AX5191-0000-0214)	
	(SoE, 1 Ch.) (AX5192-0000-0214)	
	(SoE, 1 Ch.) (AX5193-0000-0214)	
AX5201-0000-0214 EtherCAT Drive	(SoE, 2 Ch.) (AX5201-0000-0214)	
AX5203-0000-0214 EtherCAT Drive	(SoE, 2 Ch.) (AX5203-0000-0214)	
AX5206-0000-0214 EtherCAT Drive	(SoE, 2 Ch.) (AX5206-0000-0214)	
	(SoE, 1 Ch.) (AX5101-0000-0210)	
	(SoE, 1 Ch.) (AX5103-0000-0210)	Browse
	(SoE, 1 Ch.) (AX5106-0000-0210)	
	(SoE, 1 Ch.) (AX5112-0000-0210)	
	(SoE, 1 Ch.) (AX5118-0000-0210)	
	(SoE, 1 Ch.) (AX5125-0000-0210)	
	(SoE, 1 Ch.) (AX5140-0000-0210)	
	(SoE, 1 Ch.) (AX5160-0000-0210)	
AX5172-0000-0210 EtherCAT Drive	(SoE, 1 Ch.) (AX5172-0000-0210)	

Step 6 - Drive Manager 2 and Support Jetter Files

Ensure Drive Manager 2 is installed (Version 1.1.60.0 minimum) Copy the files from :

G:\Design\TwinCAT3\Other Motor Definition Files

GY Jetter JHN2-0028-18 SyncRot.dmmotor GZ Jetter JHN2-0075-027 SyncRot.dmmotor

to C:\TwinCAT\Functions\TE5950-Drive-Manager-2\Database\Motors

Step 7 - Basic Assumptions

The Motors are connected to an AX5203 Drive GY on the A channel GZ on the B channel The Drive is labelled GY & GZ The channels are mapped to AXIS with appropriate names A Driver Manager 2 Project exists with the Drives in it. Servos (AX8640-0000-0103)





🔺 🌆 A2026 Drive Manager 2

- Servos (AX8640-0000-0103) @Device 2 (EtherCAT)
 - Axis R (AX8118-0100-0104)
 - Axis GX&Y (AX8206-0100-0104)
 - Axis Z&SR (AX8206-0100-0104)
 - Axis SY&SZ (AX8206-0100-0104)
 - Axis JX&Spare (AX8206-0100-0104)
 - Axis GY&GZ (AX5203-0000-0214) @Device 2 (Ethe
 - -=+ Ch A (Jetter JHN2-0028-18)
 - -- Ch B (Jetter JHN2-0075-027)

Step 8 - GY setup Motor

- 1. Double click on GY axis (Ch A) in drive manager 2. You will not see the information highlighted yet.
- 2. For the Motor, press Select then select the filter options.
- 3. Select Import.
- 4. Move to the folder C:\TwinCAT\Functions\TE5950-Drive-Manager-2\Database\Motors
- 5. Select the GY and Open
- 6. The parameters should all match the screen shots.

BEC	KHOFF New Autom	tion Technology	,	Online	DriveRead	y 💀 🔽	[🖾 NC: Axi	s GY] [en-US]
*	Basic settings	Scaling	Run motor	¢ [©] Tune drive	🔍 Di	iagnostics	Advance	ed
								Reset all
×	Motor		Jetta Jetter JHN2- <mark>00</mark> 28-18 motor	Rotary synchrono		Select	Scan	Reset
Þ	Feedback 1	1	Hiperface; Sine cosine 1V RESO: 12 Bit; Single turn I 128 sig./turn	ipp; Rotary; Multi tu RESO: 12 Bit; Analog	urn g RESO: [Select	Scan	Reset
۱.	Brake							Select
Þ.	Feedback 2				[Select	Scan	Reset
×.	Load		J: 0 kgcm ² ; Feed constant	t: 5 mm / motor rot	tation			
•	Digital IOs							Reset

Filte	r settings					
Vend	dor					
20	Beckhoff Third party 🖉 Manual i	input				
Con	struction					
0	synchronous asynchronou	s JS				
Fund	tion					
	rotary linear					
Brak	e					
	No brake Holding bra	ke				
Load exported motor dat	ta file					×
← → ~4 =	« TwinCAT > Functions > TE5950-Drive-Mana	ager-2 > Database > Mo	tors ~	C	, Search Motors	
Organise • New folde	R. V.				= -	• 🖬 0
> 🌰 OneDrive	Name	Date modified	Type	Size	6 V D	
🗸 📮 This PC	GZ Jetter JHN2-0028-18 SyncRot.dmmotor	20/01/2023 08:50	DMMOTOR File		6 KB	
Desktop Decuments Documents Downloads Onucle Pictures Videos Uideos Dos (C) Data (\\182.168						
File n	ame: GY Jetter JHN2-0028-18 SyncRot.dmmotor			~	DriveManager2 expo	rted motor 🗸
					Open	Cancel

Manual input

Save the data as file to 'ManualInputPool' Import Export

Basic		
Vendor	Jetta	
Order code	Jetter JHN2-0028-18	
Standstill torque	0.28	Nm ~
Standstill current	0.97	Α ~
Rated current	0.91	Α ~
Peak torque	1.1	Nm 🗸
Peak current	4.4	Α ~
Max. mechanical speed	12000	rpm 🗸
Max. rated mains voltage	530	v v
Max. DC-Link voltage	880	v v
Voltage constant	17.5	mV/rpm ~
Pole pairs	3	
Winding resistance R Ph-Ph 20°C	28.3	Ω ~
Winding inductance L Ph-Ph 20°C	28.4	mH ~

Step 9 - GY Setup FeedBack

- 1. From the Manager Screen, press Select to "Feedback 1"
- 2. Under filter Select as shown (Hiperface being the important one)
- 3. Expand Sick#SKx and select SKM36- HFA0-S05 and OK

Select a feedback	– 🗆 ×
Filter settings	Search feedback:
Vendor	Selection
Function © rotary innear	 ▲ Sick ▷ Sick#SCx ▷ Sick#SEx ▷ Sick#SFx
Absolute interface No interface BiSS B EnDat2.1 Phiperface BiSS C unidirectional Hiperface DSL Resolver Mechanical analog commutation channel: cos and sin	 Sick#SKx Sick#SK38-HFA0-K02 (Single turn RES0: 12 Bit; Analog RES Sick#SK386-HFA0-K02 (Multi turn RES0: 12 Bit; Single turn Sick#SK36-HFA0-S05 (Single turn RES0: 12 Bit; Single Sick#SK36-HFA0-S05 (Multi turn RES0: 12 Bit; Single Sick#SK36-HFA0-S01 (Single turn RES0: 12 Bit; Analog RES Sick#SKM36-HFA0-S01 (Multi turn RES0: 12 Bit; Single turn Sick#SKM36-HFA0-S01 (Multi turn RES0: 12 Bit; Single turn
Single/Multiturn All Singleturn Multiturn	
Relative interface	Ok Cancel

Step 10 - GY Setup Scaling

- 1. Select the Scaling Tab
- 2. Adjust the settings Highlighted.
- 3. When checking the INVERT boxes you will get a request to activate it straight away. Do not bother as you have to activate all settings done later.
- 4. Before you save the NC Parameters look at the values in red. If the new value is different to the Online value of the screen shot de-tick this selected box so that it does not update.



BECKHOFF New Automation Technology	Online	AxisOp Op 🛃	De 🔁 [🗠 NC: A		
A Basic settings Scaling O Run motor ϕ_0^{O}	Tune drive	Diagnost	ics 🕈 Advan	ced	
Parameter	Online value	IsSelected	Current value	Current unit	New value
Scale factor numerator	5	\checkmark	5		5
Scale factor denominator	1048576	\checkmark	1048576		1048576
Encoder mask	4294967295	\checkmark	4294967295		4294967295
Encoder sub mask	1048575	\checkmark	1048575		1048575
Invert encoder counting direction	True	\checkmark	True		
Modulo factor	360	\checkmark	360	mm	360
Encoder reference system	INCREMENTAL	\checkmark	INCREMENTAL		INCREMENT
Encoder position offset	0	\checkmark	0		0
Enable encoder soft minimum limit monitoring	False	\checkmark	False		False
Soft minimum limit	0	\checkmark	0		0
Enable encoder soft maximum limit monitoring	False	\checkmark	False		False
Soft maximum limit	0	\checkmark	0		0
Invert motor polarity	True	\checkmark	True		
Output velocity scaling factor	1.02400649589962	\checkmark	1.02400649589962		1.024006495
Unit		\checkmark	mm		mm
Reference velocity: 110% of max motor speed	1100	\checkmark	1100	mm/s	1100
Maximum velocity: 100% of max motor speed	1000	\checkmark	1000	mm/s	1000
Fast velocity: 100% of max motor speed	1000	\checkmark	1000	mm/s	1000
Manual velocity (fast): 30% of max motor speed	10	\checkmark	10	mm/s	300
Manual velocity (slow): 5% of max motor speed	2	\checkmark	2	mm/s	50
Calibration velocity (towards plc cam): 1% of max motor speed	10	\checkmark	10	mm/s	10
Calibration velocity (off plc cam): 1% of max motor speed	10	\checkmark	10	mm/s	10
Acceleration with an acceleration time of 1s	1500	\checkmark	1500	mm/s ²	1500
Decceleration with an acceleration time of 1s	1500	\checkmark	1500	mm/s ²	1500
Max allowed acceleration	15000	\checkmark	15000	mm/s ²	15000
Annual sale site (fact), 200/ of more mater and	10	1	10		200
Annual velocity (last): 50% of max motor speed	2	V	2	mm/s	500
anual velocity (slow): 5% of max motor speed	10	V	10	mm/s	10
alloration velocity (towards pic cam): 1% of max motor speed	10	V	10	mm/s	10
alibration velocity (off pic cam): 1% of max motor speed	10	\checkmark	10	mm/s	10
cceleration with an acceleration time of 1s	1500	\checkmark	1500	mm/s*	1500
ecceleration with an acceleration time of 1s	1500	\checkmark	1500	mm/s*	1500
fax allowed acceleration	15000	\checkmark	15000	mm/s*	15000
lax allowed decceleration	15000	\checkmark	15000	mm/s*	15000
	1500		1500		1500

Step 11 - GY Setup Tuning

- 1. Select the Tune Drive tab
- 2. Set Kp = 0.02
- 3. Set Kp=85.2
- 4. Set Kv=25
- 5. Set Tn=3.0
- 6. Set Tn 0.8

 ...When entering the values type the number and press Ctrl+Enter to save the value. If the value is RED then it has not been saved.



Step 12 - GY Setup Commutation step 1 P-0-150

- 1. Select th Advance tab
- 2. Select Parameter List
- 3. In search Type P-0-150
- 4. Check the settings
- 5. You may have to change the Feedback direction to Negative
- 6. If you change it remember to press download after the change
- 7. Expand the "Parameter channel"
- 8. Make sure that Commutation mode = Adjustable mechanical offset.
- 9. Make sure Adjust commutation offset (Mechanical) is 0.0 deg
- 10. Go to P-0-0057 Electrical commutation offset and set a value of 340 deg



Step 13 - GY Setup Commutation angles(if necessary to change)

There are two forms of commutation set up, Mechanical and Electrical.

Mechanical is going to be 0 degrees and we are going to adjust the Electrical using the command P-0-0166

Step 14 - GZ Setup

Repeat as for GY with the following changes:

- 1) Motor Set up select the GZ jetter file
- 2) Feedback set to Sick#SKS36-HFA0-S05 (Single turn...)
- 3) Brake parameters should be as per image
- 4) Scaling as per GY
- 5) Tune drive settings as per image.
- 6) Commutation P-0-150 as per Image

7) P-0-0057 Electrical commutation offset and set a value of 69 deg

Brake HoldingBrake: Jetter JHN2-0075-027-brake

chnical data		
Holding torque	MBrake [Nm]	2
Release delay time	TBrakeOn [s]	0.02
Application delay time	TBrakeOff [s]	0.02
Min. motor brake current for brake monitoring	IBrakeMin [A]	0.23
BrakeType	BrakeType	HoldingBrake



Name	Actual value	Set value
Scheduler table		
Scheduler times	us	u
Encoder File Access		
Feedback 1 type		
Manufacturer	Sick (3)	Sick (3) V
Feedback type	Rotational feedback (0)	Rotational feedback (💙
Feedback type string	Sick#SKS36-HFA0-S05	Sick#SKS36-HFA0-S05
Feedback use	Commutation motorfeedl	Commutation motor
Feedback direction	Negative direction (1)	Negative direction (1)
rsvd		
Power settings		
Process channel		
Parameter channel		
Manufacturer limits settings		
Feedback options		
rsvd		