

GY GZ axis setup with Jetter Motors

Autoflow MK4 GY&GZ axis setup with Jetter Motors

 Difficulty **Medium**

 Duration **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.

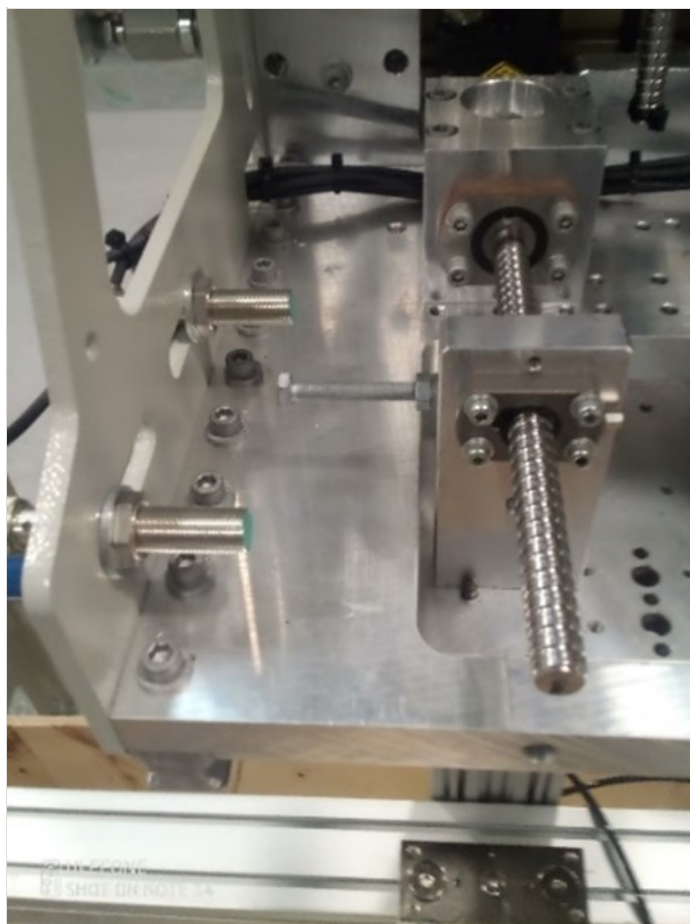


Step 2 - GY Axis:

Check that proximity arm is in between the proximity sensor.

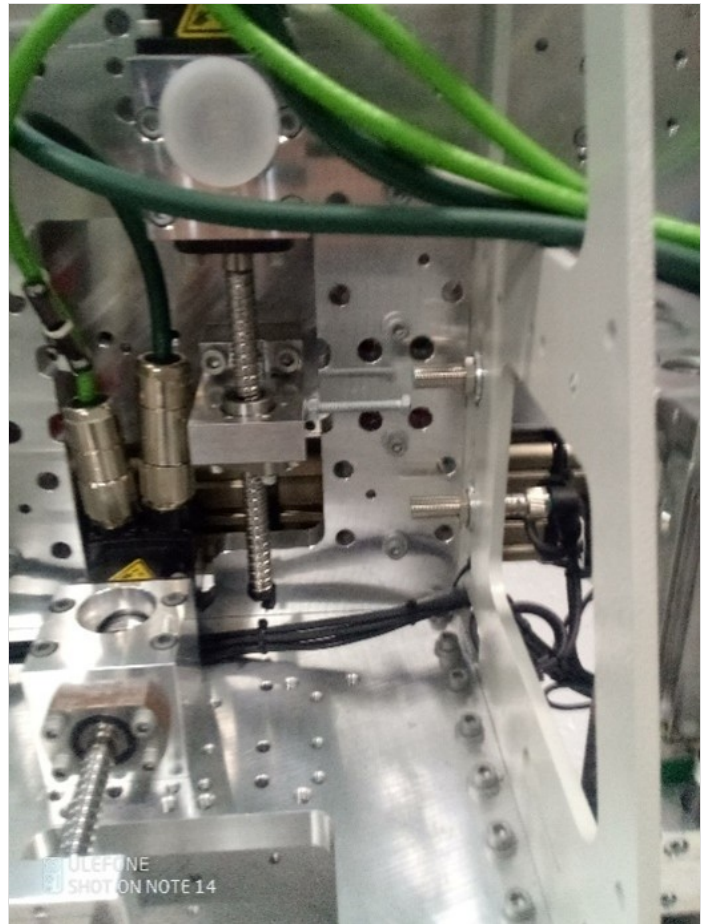
You should be able to turn the leadscrew by hand to move it.

 Do not move the GY axis if the counterbalance is active.



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.

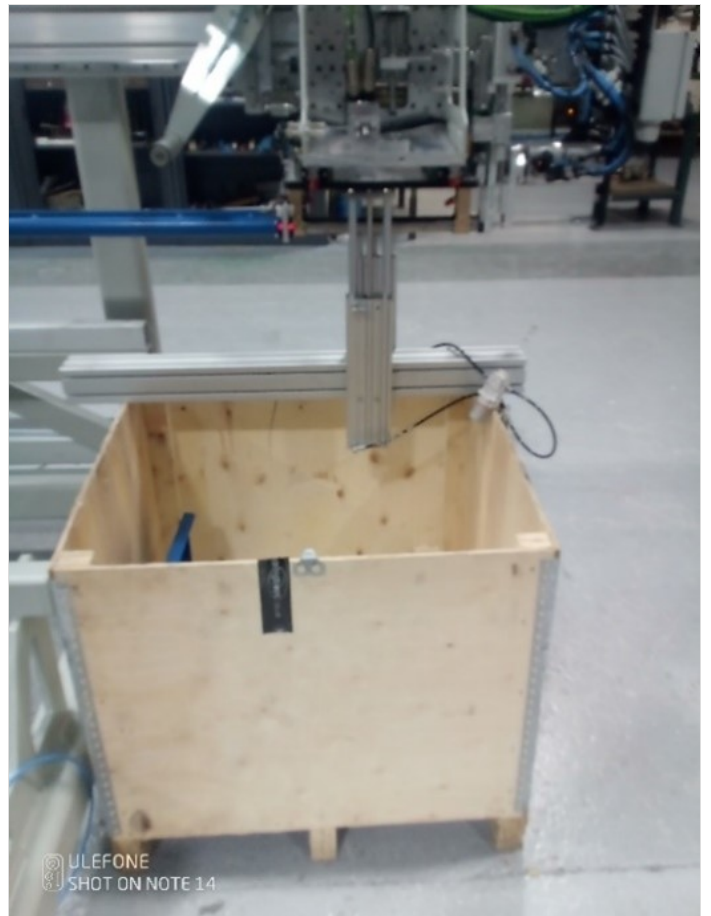


Step 4 - Counterbalance

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

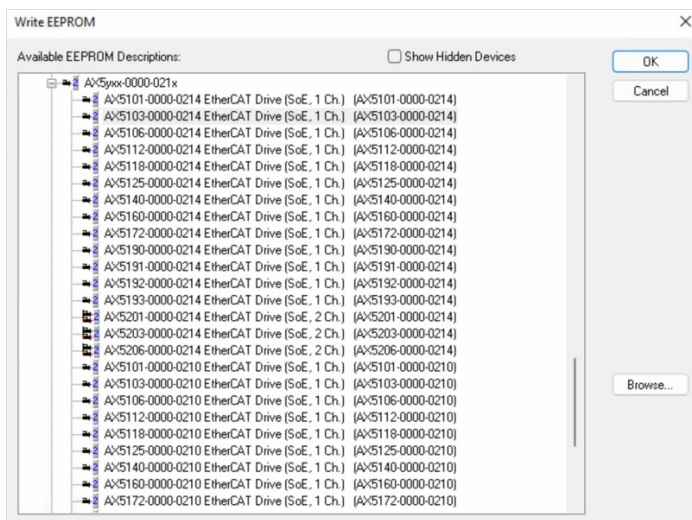
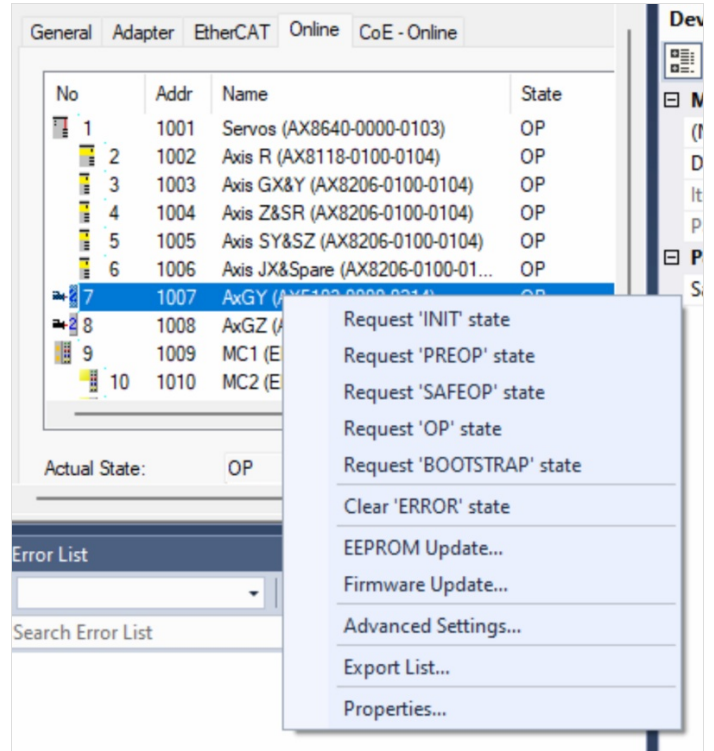
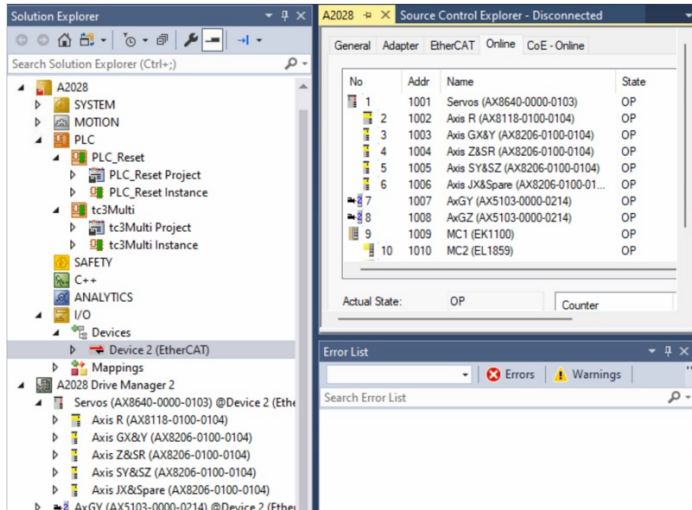


Step 5 - CX5203 Firmware Upgrade

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 \\mainserver\Data\Design\TwinCAT3\Firmware
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\Io\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



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

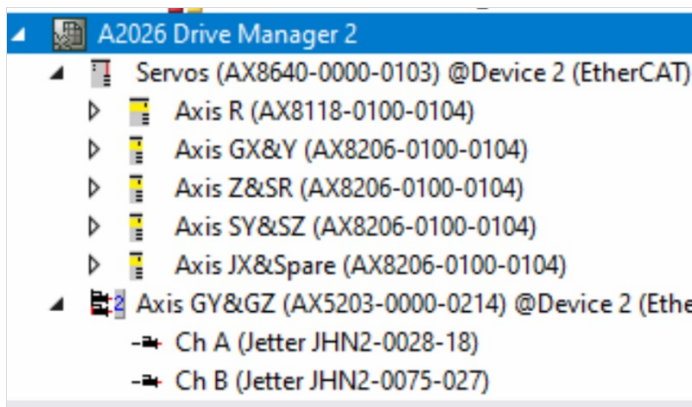
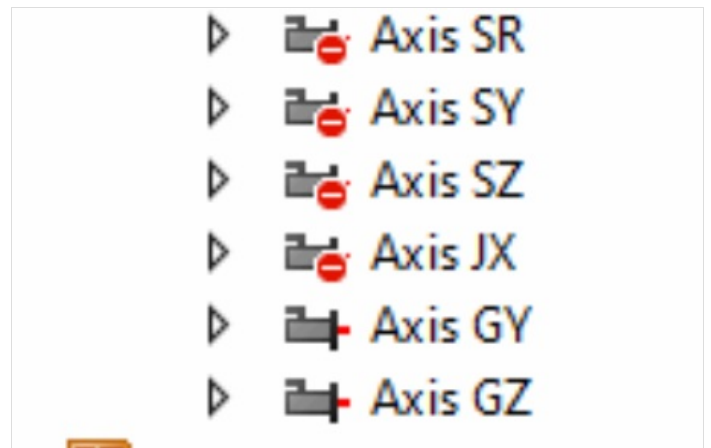
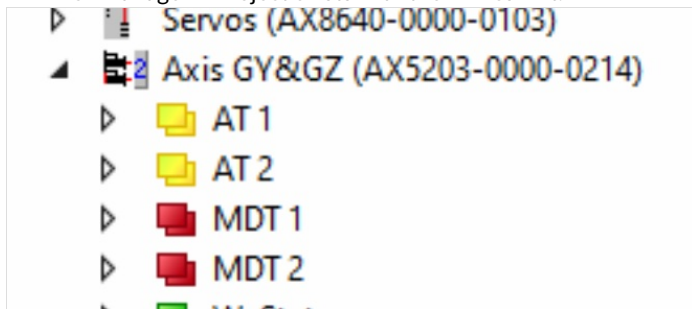
GY on the A channel

GZ on the B channel

The Drive is labelled GY & GZ

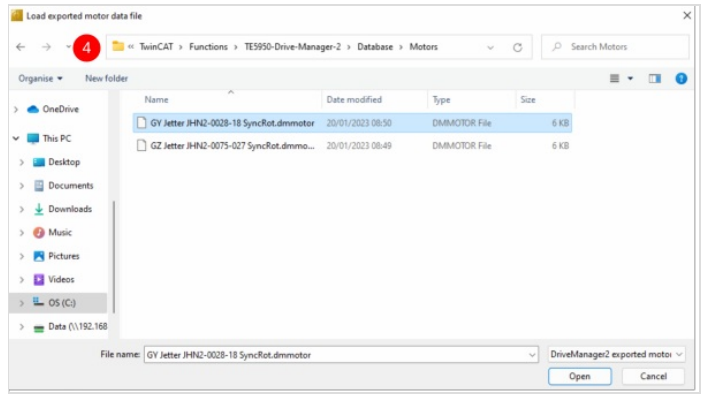
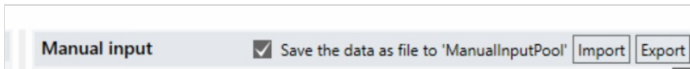
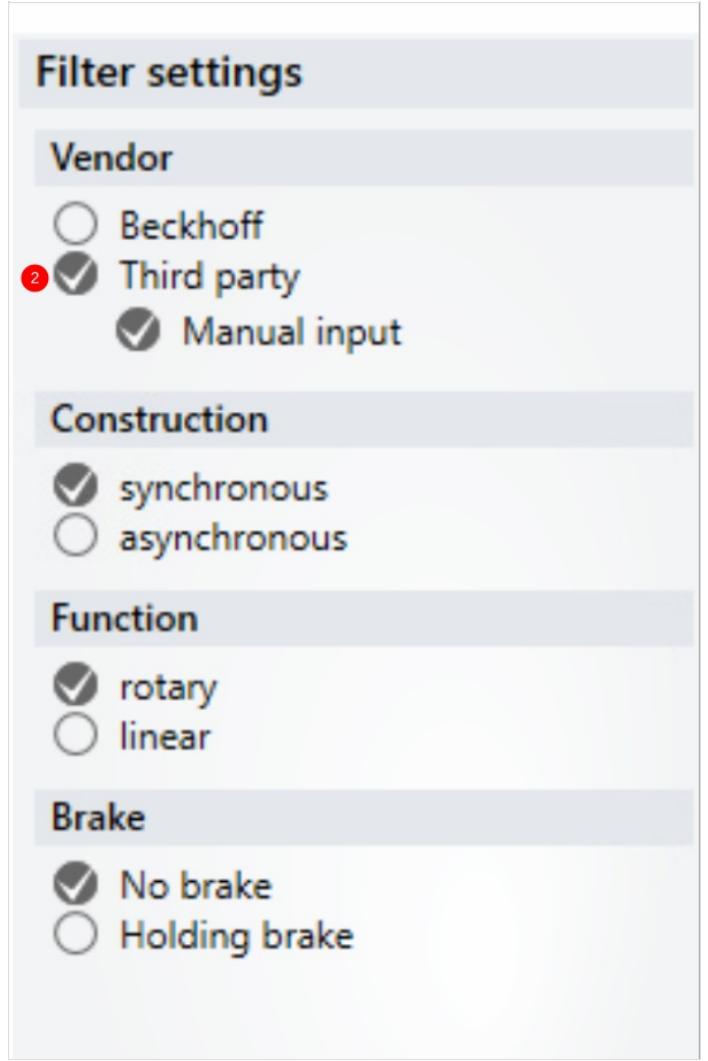
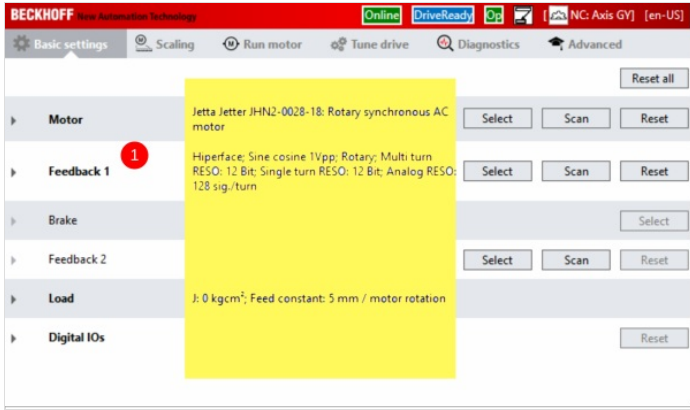
The channels are mapped to AXIS with appropriate names

A Driver Manager 2 Project exists with the Drives in it.



Step 8 - GY setup Motor

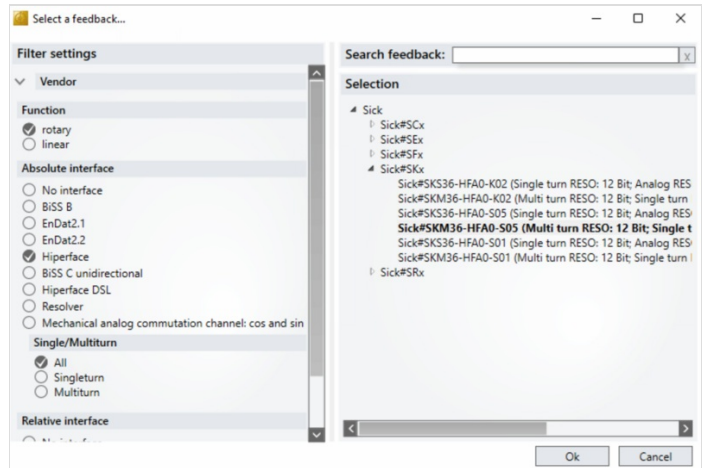
1. Double click on GY axis (Ch A) in drive manager 2 . You will not see the information highlighted yet.
2. For the Motor, press Select then select the filter options.
3. Select Import.
4. Move to the folder C:\TwinCAT\Functions\TE5950-Drive-Manager-2\Database\Motors
5. Select the GY and Open
6. The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



Basic		
Vendor	Jetta	
Order code	Jetter JHN2-0028-18	
Standstill torque	0.28	Nm
Standstill current	0.97	A
Rated current	0.91	A
Peak torque	1.1	Nm
Peak current	4.4	A
Max. mechanical speed	12000	rpm
Max. rated mains voltage	530	V
Max. DC-Link voltage	880	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



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.

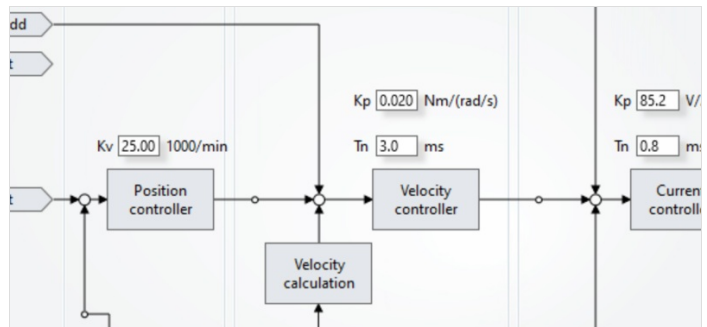
Parameter	Online value	IsSelected	Current value	Current unit	New value
Scale factor numerator	5	<input checked="" type="checkbox"/>	5		5
Scale factor denominator	1048576	<input checked="" type="checkbox"/>	1048576		1048576
Encoder mask	4294967295	<input checked="" type="checkbox"/>	4294967295		4294967295
Encoder sub mask	1048575	<input checked="" type="checkbox"/>	1048575		1048575
Invert encoder counting direction	True	<input checked="" type="checkbox"/>	True		True
Modulo factor	360	<input checked="" type="checkbox"/>	360	mm	360
Encoder reference system	INCREMENTAL	<input checked="" type="checkbox"/>	INCREMENTAL		INCREMENTAL
Encoder position offset	0	<input checked="" type="checkbox"/>	0		0

Parameter	Online value	IsSelected	Current value	Current unit	New value
Scale factor numerator	5	<input checked="" type="checkbox"/>	5		5
Scale factor denominator	1048576	<input checked="" type="checkbox"/>	1048576		1048576
Encoder mask	4294967295	<input checked="" type="checkbox"/>	4294967295		4294967295
Encoder sub mask	1048575	<input checked="" type="checkbox"/>	1048575		1048575
Invert encoder counting direction	True	<input checked="" type="checkbox"/>	True		True
Modulo factor	360	<input checked="" type="checkbox"/>	360	mm	360
Encoder reference system	INCREMENTAL	<input checked="" type="checkbox"/>	INCREMENTAL		INCREMENTAL
Encoder position offset	0	<input checked="" type="checkbox"/>	0		0
Enable encoder soft minimum limit monitoring	False	<input checked="" type="checkbox"/>	False		False
Soft minimum limit	0	<input checked="" type="checkbox"/>	0		0
Enable encoder soft maximum limit monitoring	False	<input checked="" type="checkbox"/>	False		False
Soft maximum limit	0	<input checked="" type="checkbox"/>	0		0
Invert motor polarity	True	<input checked="" type="checkbox"/>	True		True
Output velocity scaling factor	1.02400649589962	<input checked="" type="checkbox"/>	1.02400649589962		1.02400649589962
Unit		<input checked="" type="checkbox"/>		mm	mm
Reference velocity: 110% of max motor speed	1100	<input checked="" type="checkbox"/>	1100	mm/s	1100
Maximum velocity: 100% of max motor speed	1000	<input checked="" type="checkbox"/>	1000	mm/s	1000
Fast velocity: 100% of max motor speed	1000	<input checked="" type="checkbox"/>	1000	mm/s	1000
Manual velocity (fast): 30% of max motor speed	10	<input checked="" type="checkbox"/>	10	mm/s	300
Manual velocity (slow): 5% of max motor speed	2	<input checked="" type="checkbox"/>	2	mm/s	50
Calibration velocity (towards plc cam): 1% of max motor speed	10	<input checked="" type="checkbox"/>	10	mm/s	10
Calibration velocity (off plc cam): 1% of max motor speed	10	<input checked="" type="checkbox"/>	10	mm/s	10
Acceleration with an acceleration time of 1s	1500	<input checked="" type="checkbox"/>	1500	mm/s ²	1500
Deceleration with an acceleration time of 1s	1500	<input checked="" type="checkbox"/>	1500	mm/s ²	1500
Max allowed acceleration	15000	<input checked="" type="checkbox"/>	15000	mm/s ²	15000
Max allowed deceleration	15000	<input checked="" type="checkbox"/>	15000	mm/s ²	15000
Jerk with an acceleration time of 1s	4500	<input checked="" type="checkbox"/>	4500	mm/s ³	4500

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

i ...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 the 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

Index	Name	Actual value
P-0-0150	Feedback 1 type	Sick (3)
	Manufacturer	Rotational feedback (0)
	Feedback type	Sick#SKM36-HFA0-505
	Feedback type string	Commutation motorfeed
	Feedback use	Negative direction (1)
	Feedback direction	
	rsvd	
	Power settings	
	Process channel	
	Parameter channel	
	Manufacturer limits settings	
	Feedback options	
	rsvd	

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

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

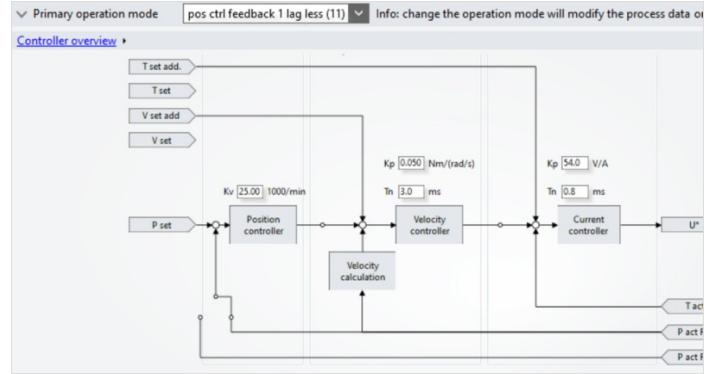
Mechanical is going to be 0 degrees and we are going to adjust the Electrical using the command P-0-0166

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		
Technical Data		
Motor brake force		
Technical data	Symbol [Unit]	Value
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



Search parameter: 150 Search option: Show complete structure

Name	Actual value	Set value
Scheduler table		
Scheduler times	us	us
Encoder File Access		
Feedback 1 type		
Manufacturer	Sick (3)	Sick (3)
Feedback type	Rotational feedback (0)	Rotational feedback (1)
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		

Parameter channel	Parameter interface	Value
Parameter interface	HIPERFACE (4)	
Connector	X21 (Front, Encoder, I)	
Identifier		50
Bit resolution singleturn position		12
Bit resolution multturn position		0
Number of clockcycles to get singleturn position or ab		12
Number of clockcycles to get multturn position		0
Digital name plate	No digital name plate	
Commutation mode	Adjustable mechanic	
Adjustable commutation offset (mechanical)	deg	329.9
Numerator of 'Linear resolution about digital interface'	nm	0
Operation mode	Standard (0)	
Denominator of 'Linear resolution about digital interface'		0
Max number of position extrapolation cycles		0

Search parameter: 0057 Search option: Show complete structure

Index	Name	Actual value	Set value
P-0-0057	Electrical commutation offset	69.00 deg	270.00 deg