Fitting Zx5 Crank Upgrade

Fitting the crank upgrade to Z065, Z066, Z067

Difficulty **Hard** Duration **2 day(s)**

Contents

Introduction

This upgrade replaces the crank arm assemblies on Z065, Z066 and Z067 with a direct drive system to improve reliability
This procedure involves mechanical fitting, electrical wiring and help from a TwinCAT3 competent engineer at HQ for software changes

> ...The drives must be programmed before parts sent out

> ...Motors must be rewired for Delta and NOT Star

Step 1 - 06/10/2025 Moved to Confluence

https://stuga-ltd.atlassian.net/wiki/x/s4CFAg

Step 2 -

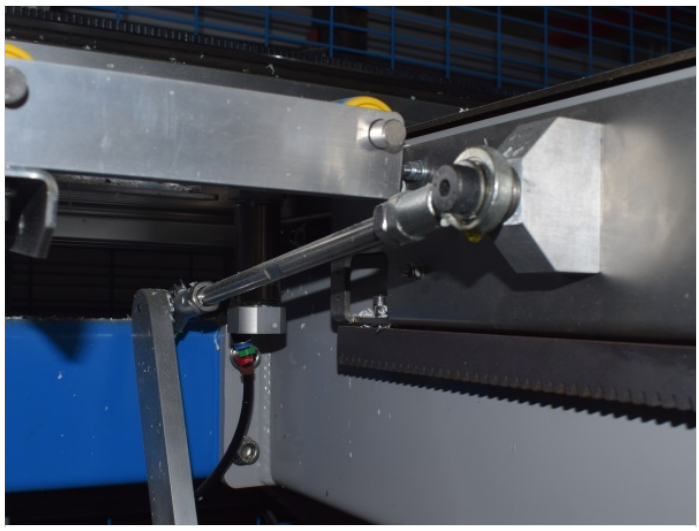
- IF EATON DRIVES ONLY*

Program Drives before they leave

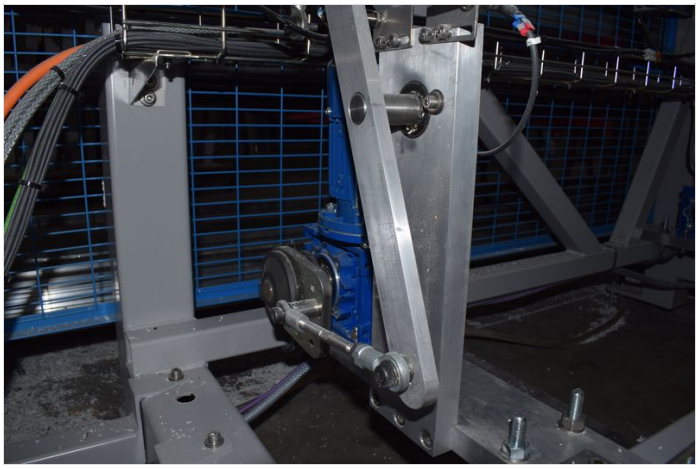
Running frequency
Control mode
Accel time
Decel time

https://stuga.dokit.app/wiki/Programming_Eaton_DE_Drive

Step 3 - Remove Link arm connecting to rack and pinion



Step 4 - Remove pivot shaft and arm

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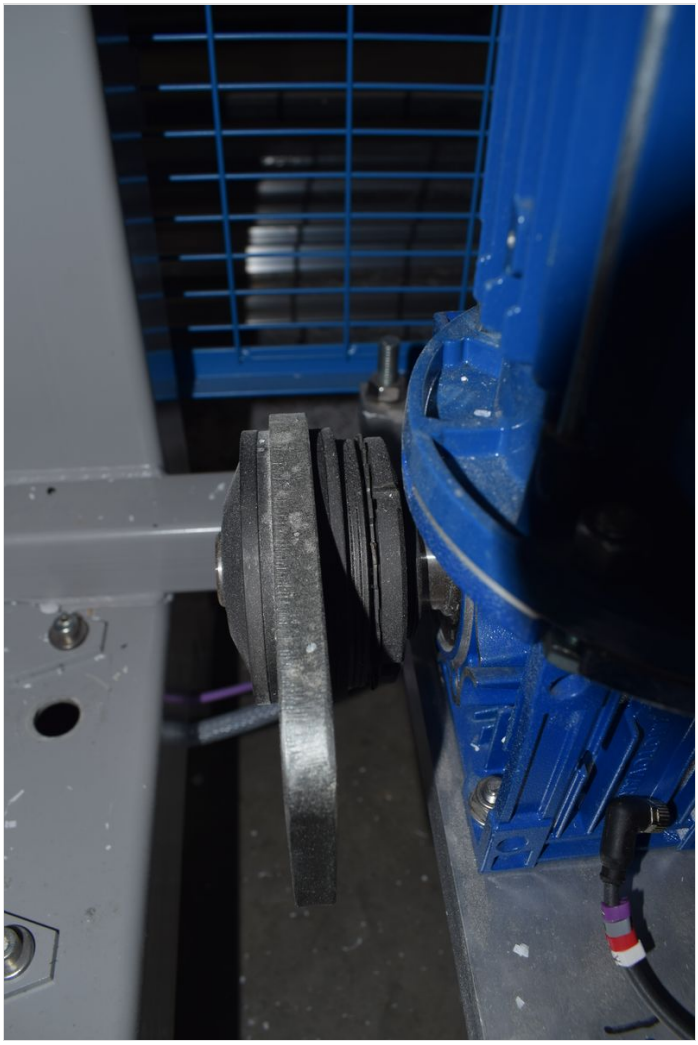
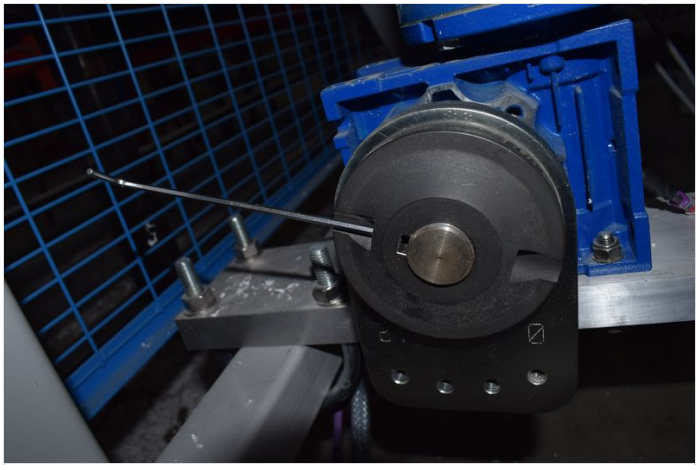
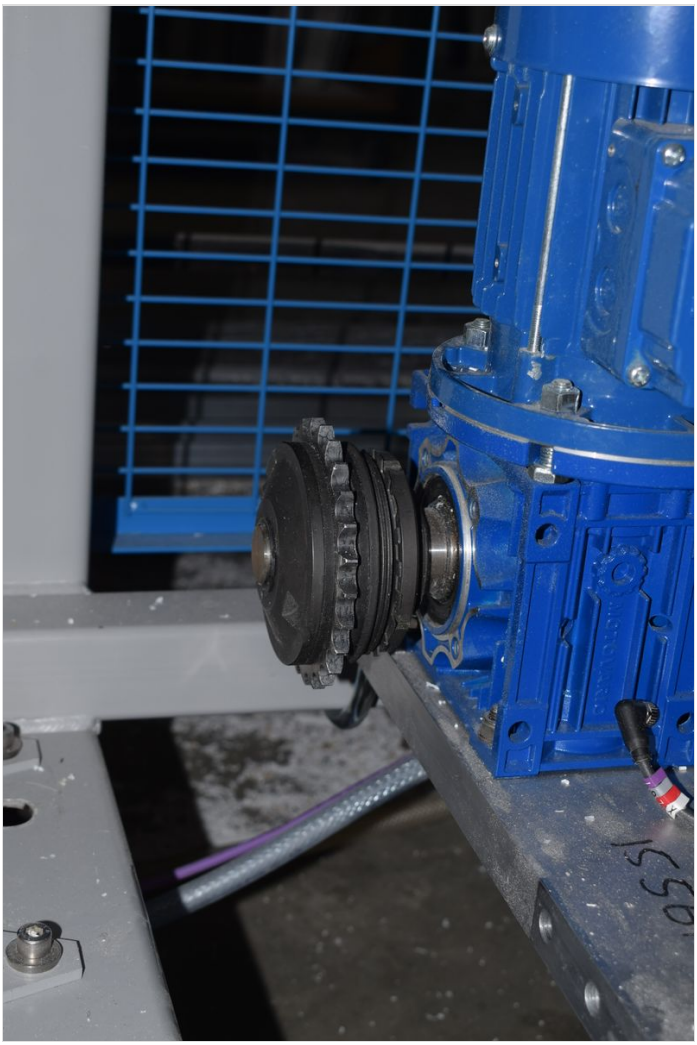
Step 5 - Undo clutch and remove Cam



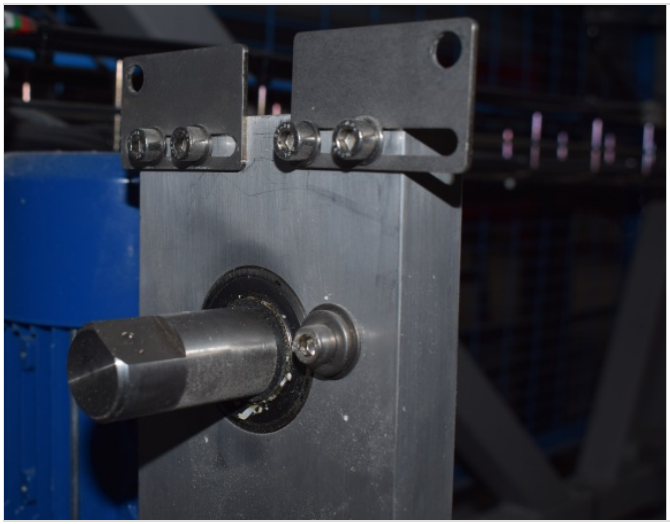


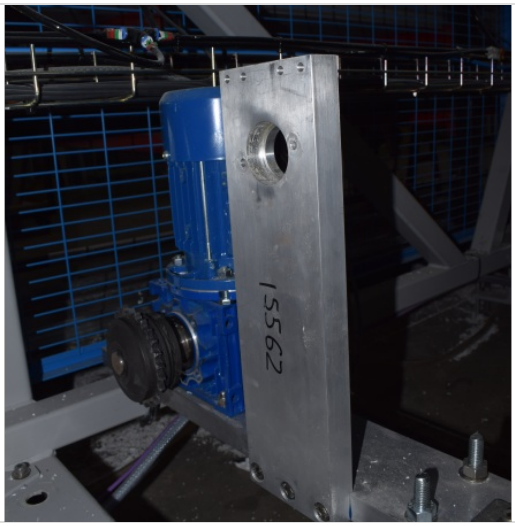
Step 6 - Add sprocket to clutch

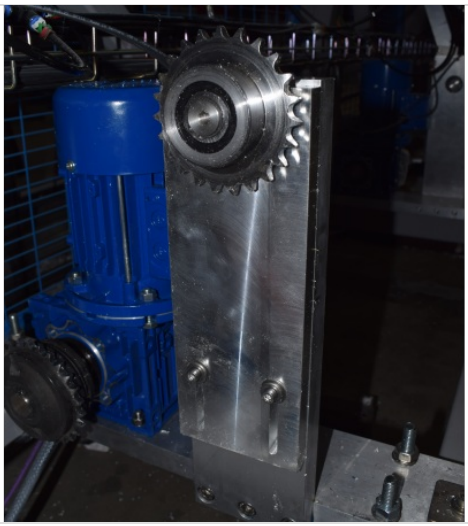
B0001166



Step 7 - Fix idler plate to upright

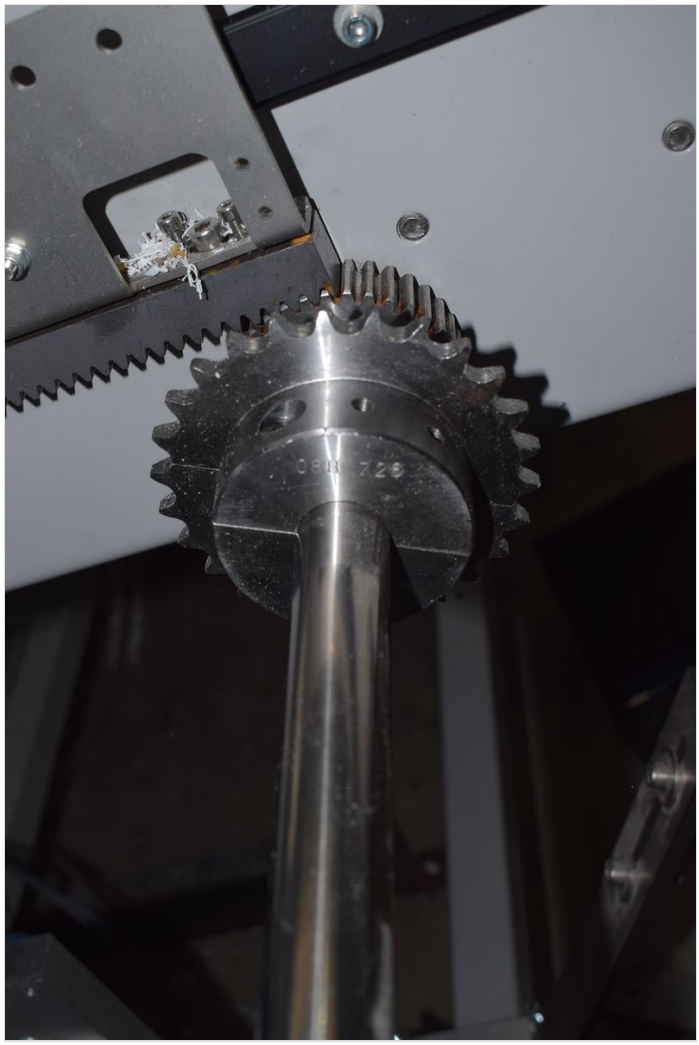




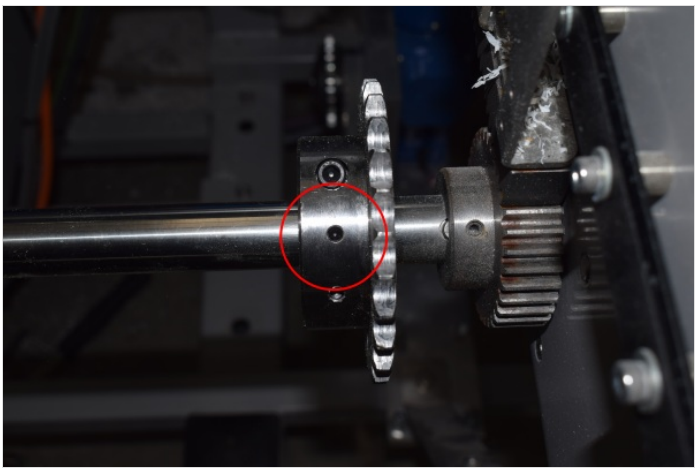


Step 8 - Fix split sprocket onto drive shaft

...Line up with a straight edge

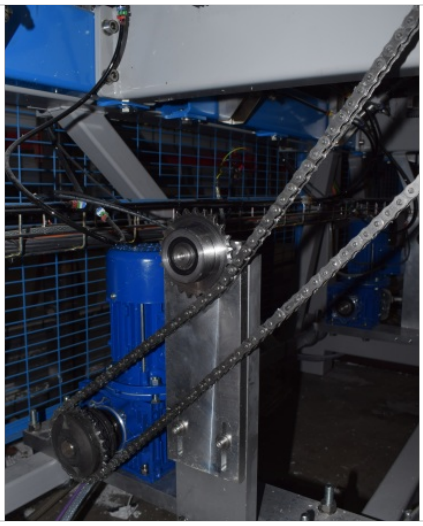


Step 9 - Drill and pin split sprocket to shaft



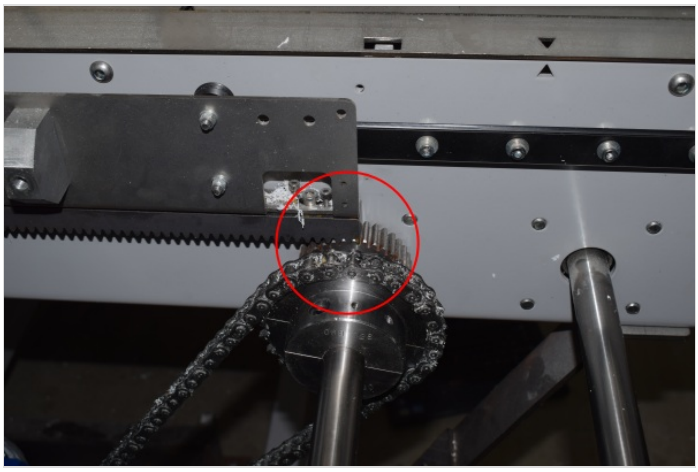
Step 10 - Add chain minimum length sprocket to sprocket

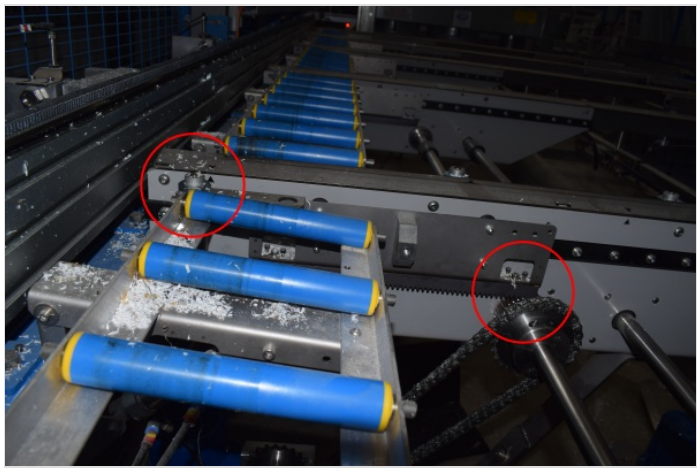
Use idler to create tension

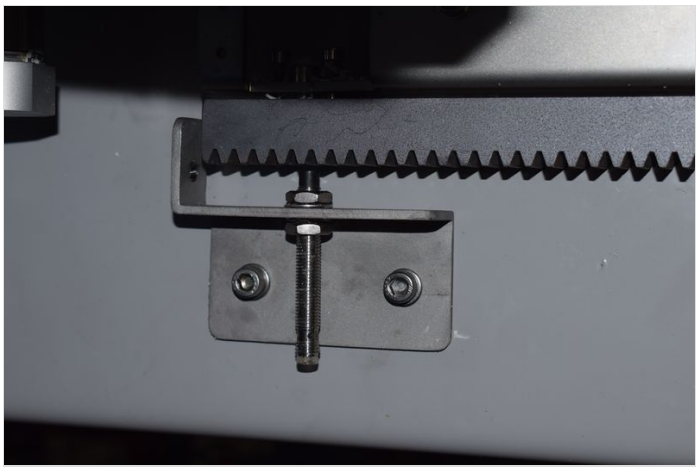


Step 11 - Fit Module C Crank Home sensor plate to Arm 5

Sensor cables run to rear Module C cabinet - EtherCAT fieldbus boxes

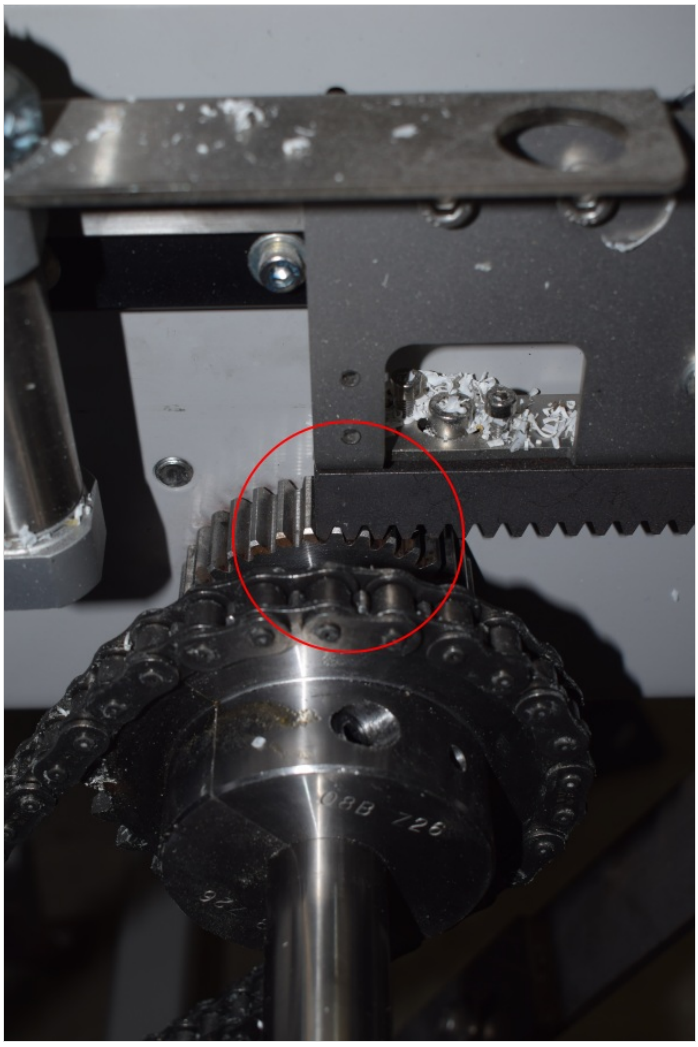


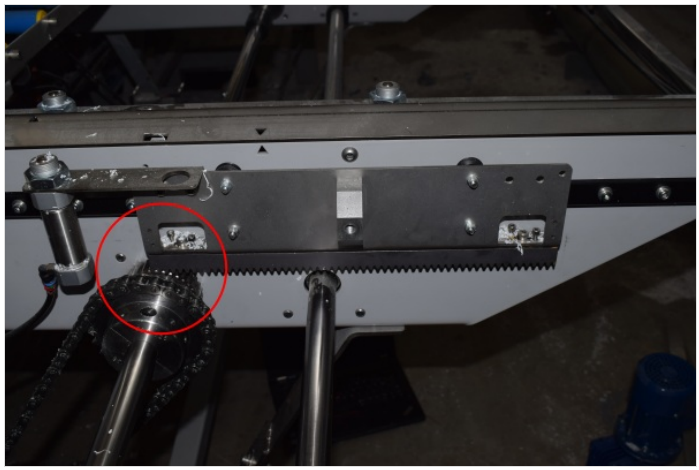


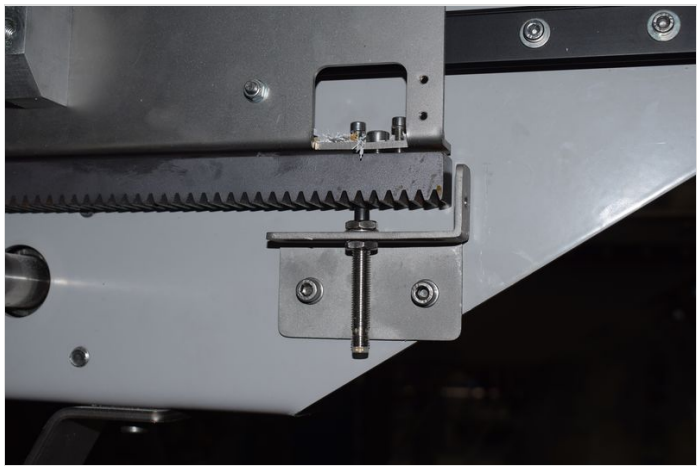


Step 12 - Fit Module C Crank Out sensor plate to Arm 5

This one has an extension that may or not be required. See Module D Crank Out Sensor for more info.
Sensor cables run to rear Module C cabinet - EtherCAT fieldbus boxes

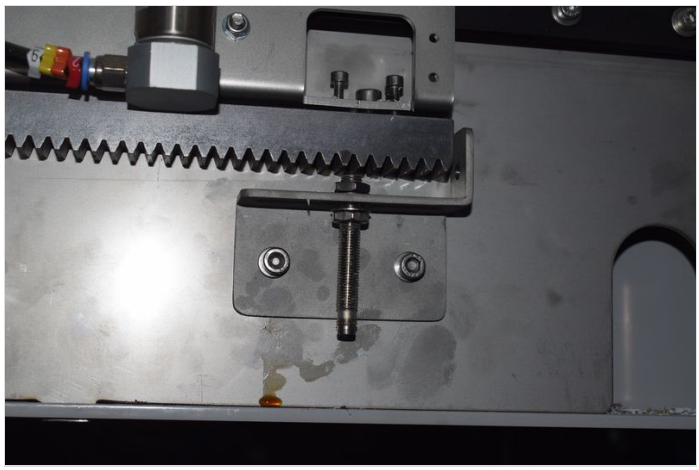






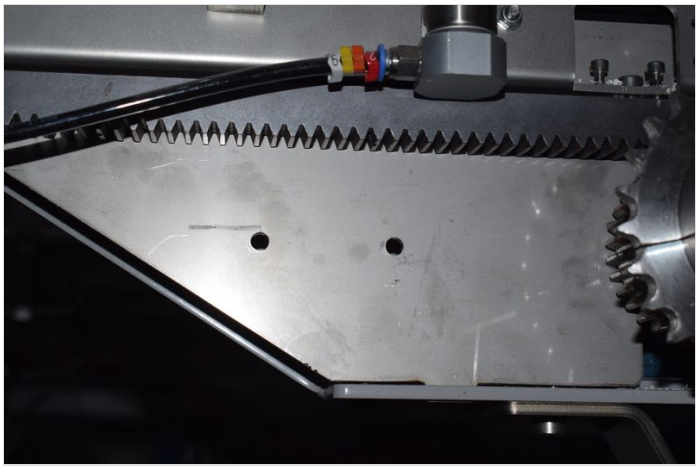
Step 13 - Fit Module D Crank Home sensor plate to Arm 5

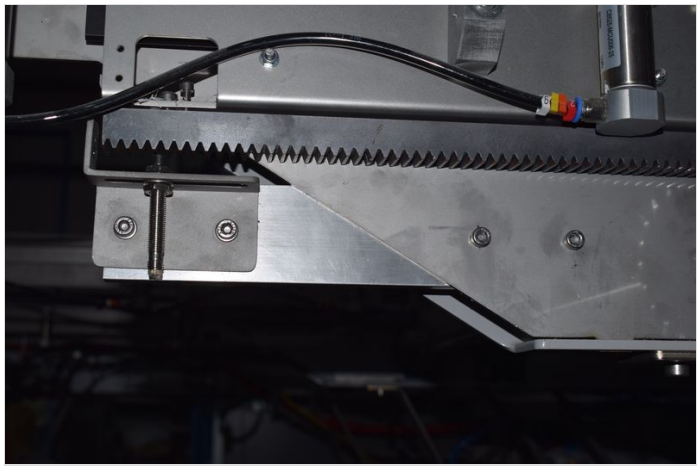
Sensor cables run to rear Module C cabinet - EtherCAT fieldbus boxes



Step 14 - Fit Module D Crank Out sensor plate to Arm 5

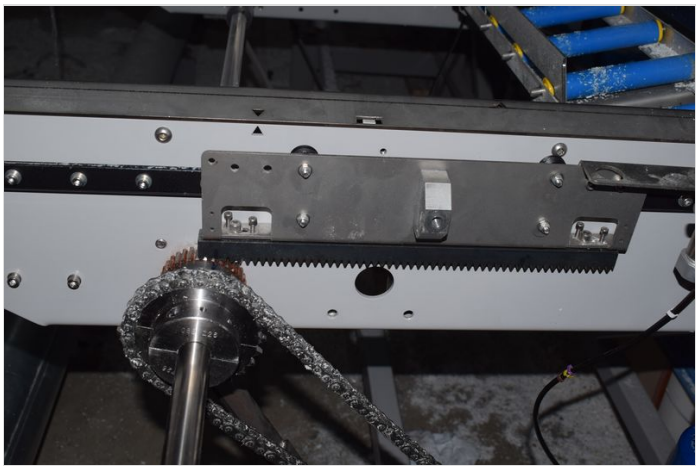
This one has an extension
Sensor cables run to rear Module C cabinet - EtherCAT fieldbus boxes

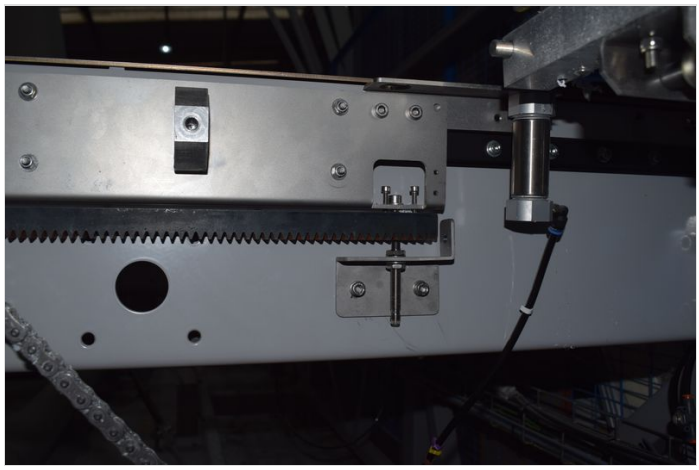




Step 15 - Fit Module E Crank Out sensor plate to Arm 5

Sensor cables run to rear Module E cabinet - EtherCAT fieldbus boxes

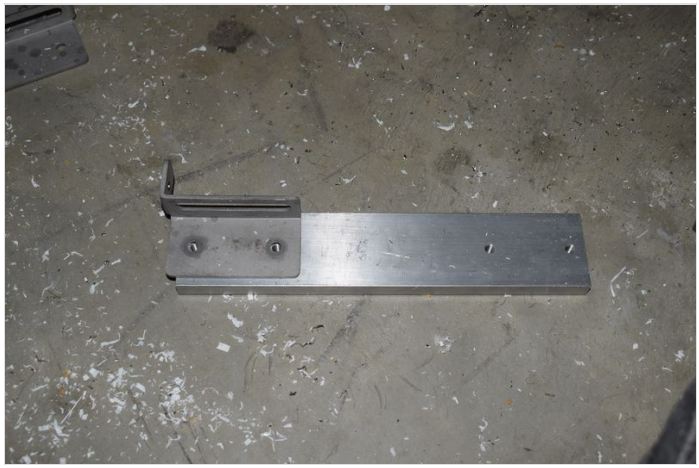


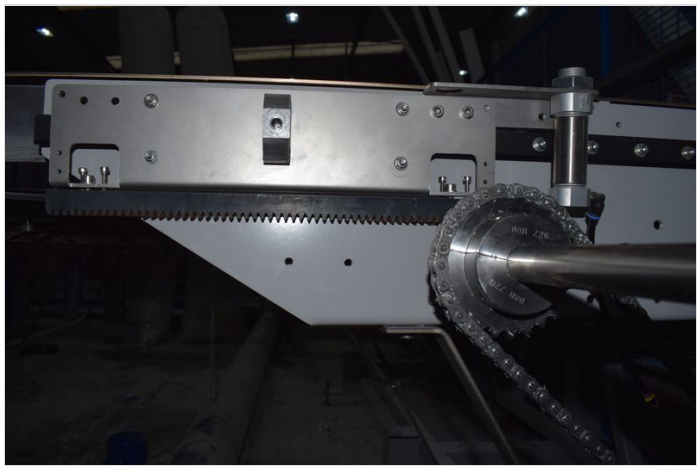


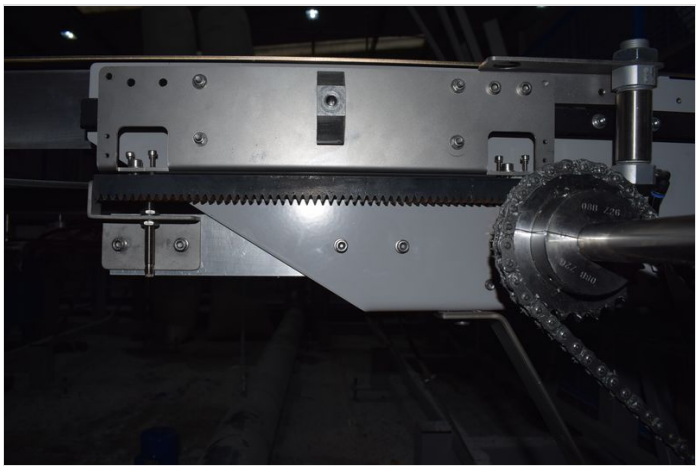
Step 16 - Fit Module E Crank Home sensor plate to Arm 5

This one has an extension

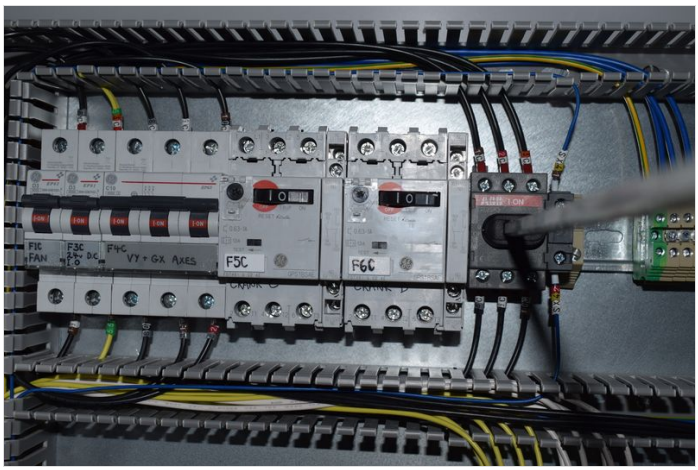
Sensor cables run to rear Module E cabinet - EtherCAT fieldbus boxes

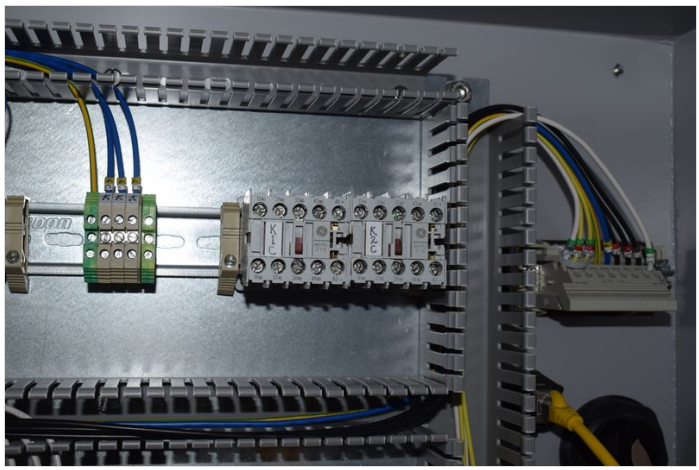






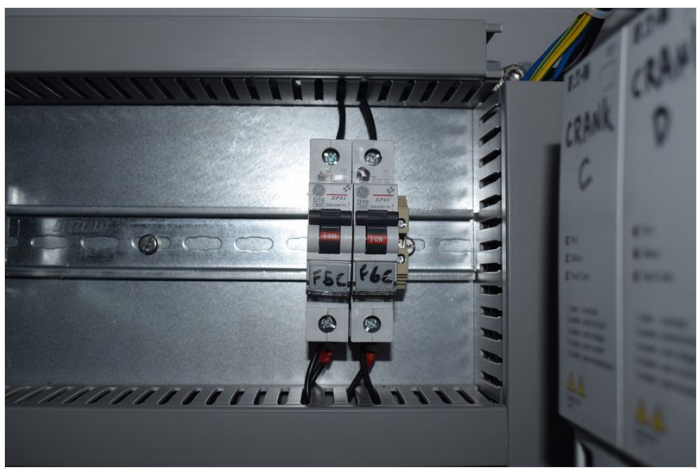
Step 17 - Remove 2 off motor breakers and contactors from Module C





Step 18 - Add 2 off 10A single pole MCB's in Module C

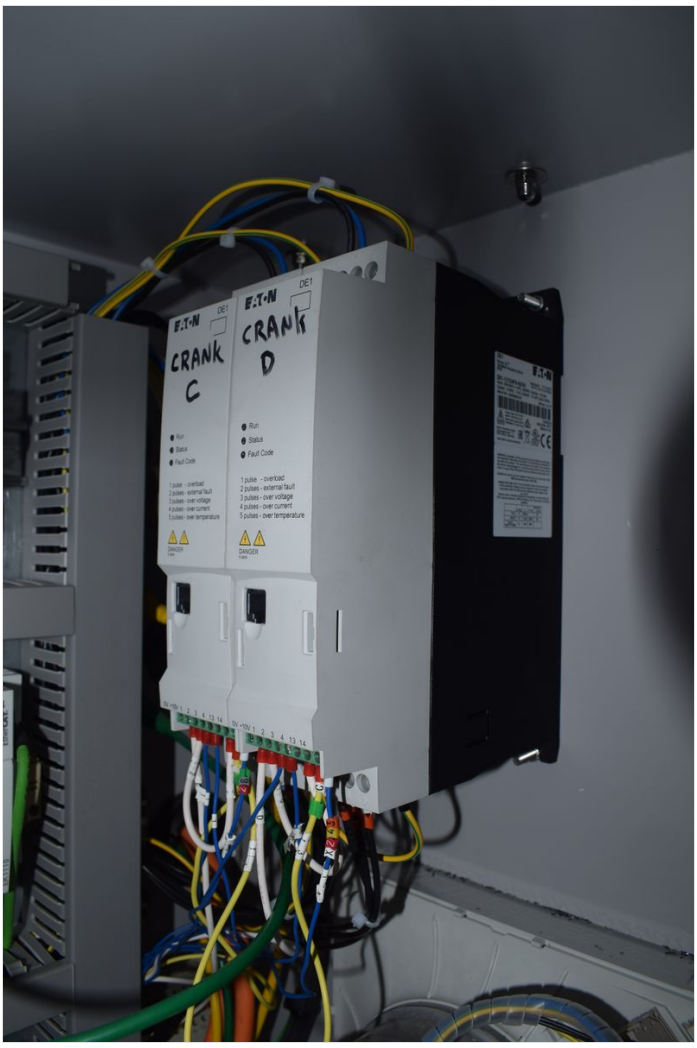
Tidy wires away for the spare 2 phases



Step 19 - Add 2 off drives to Module C

May need to move trunking or mount directly to side of enclosure.

Drive can be WEG or EATON



Step 20 - Remove breaker and contactor from Module E

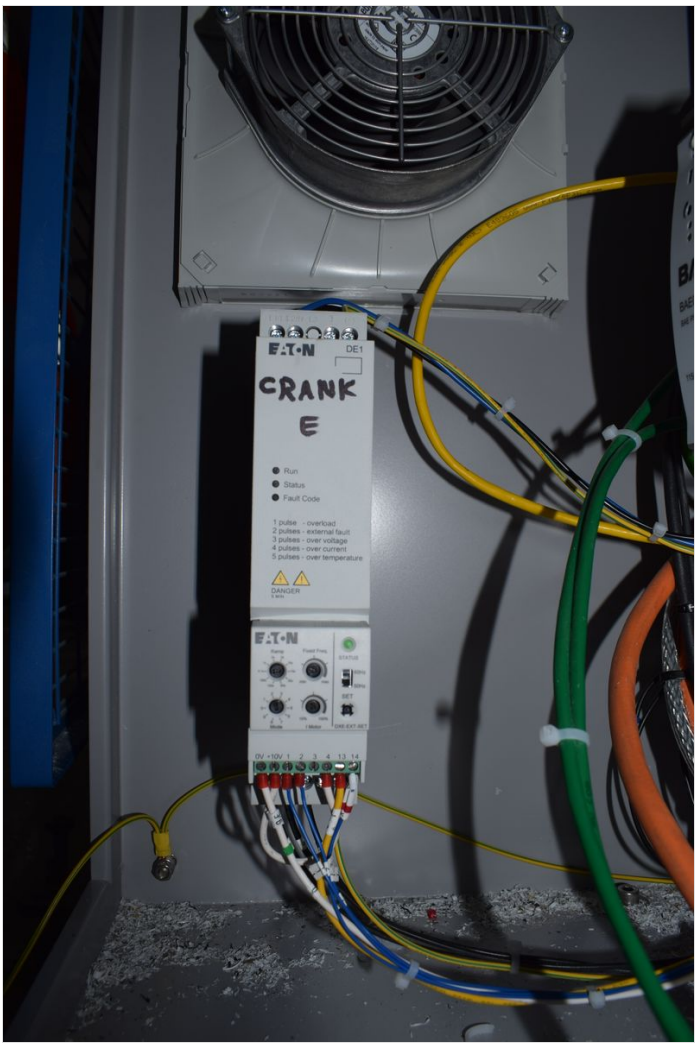
Step 21 - Add 10A single pole MCB in Module E


K2E
F7E
EtherCAT
EtherCAT

Step 22 - Add 1 Off drive to Module E

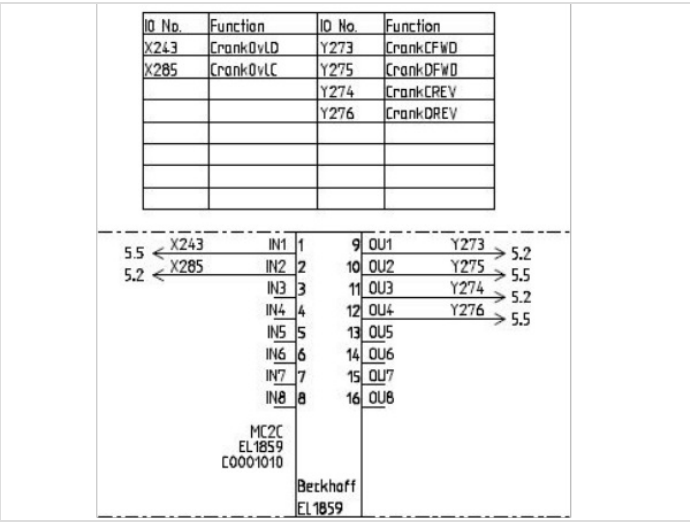
May need to move trunking or mount directly to side of enclosure.

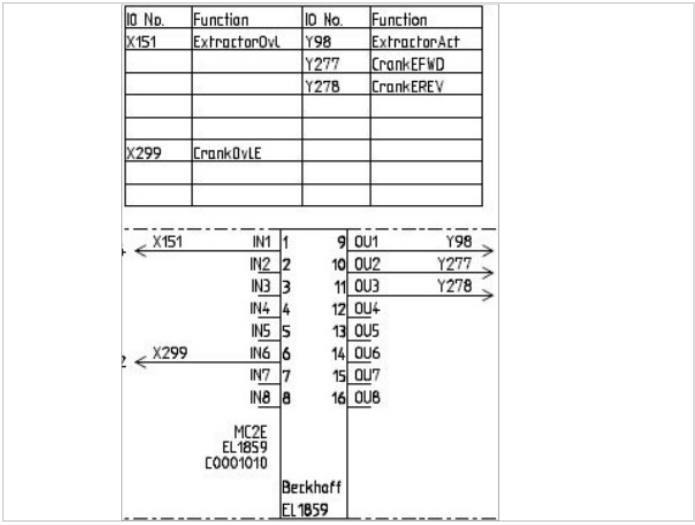
Drive can be WEG or EATON

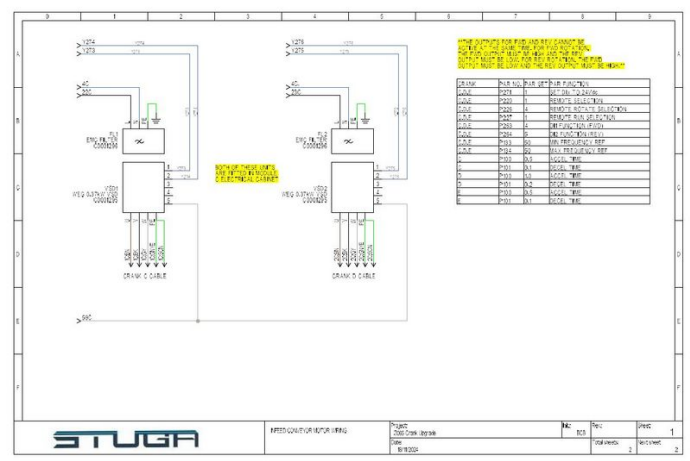


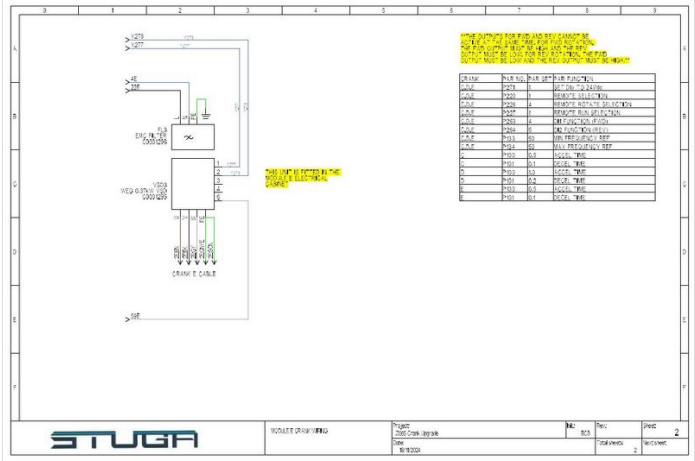
Step 23 - For each WEG drive

- Live wire
- Neutral wire
- Earth wire
- 0v supply
- FWD and REV Signals
- Motor cables wire directly into bottom of the drive



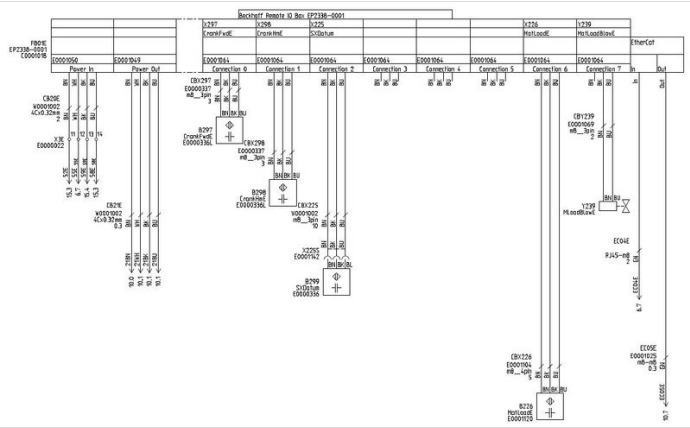


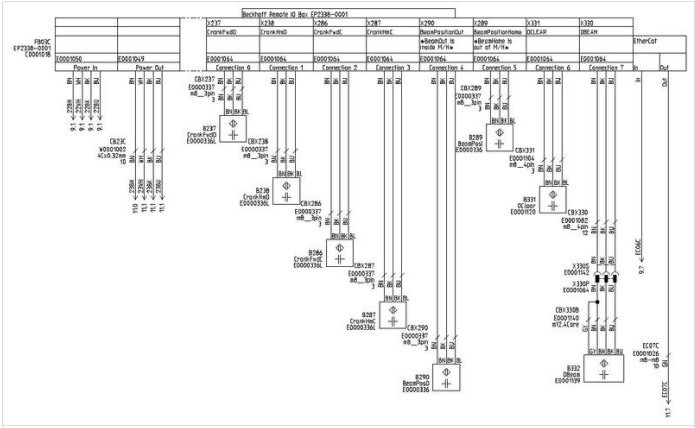




Step 24 - Wire Sensor Cables to EtherCAT boxes

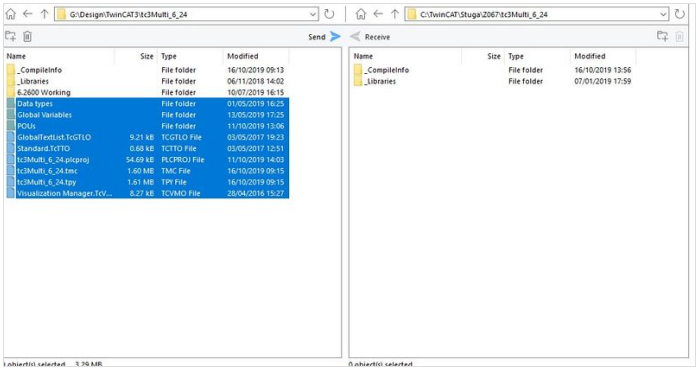
Module C and D cranks to back of Module C cabinet
Module E crank to back of Module E cabinet

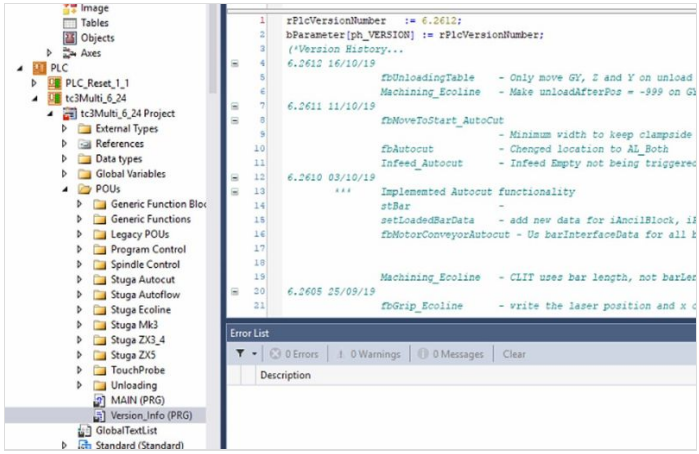


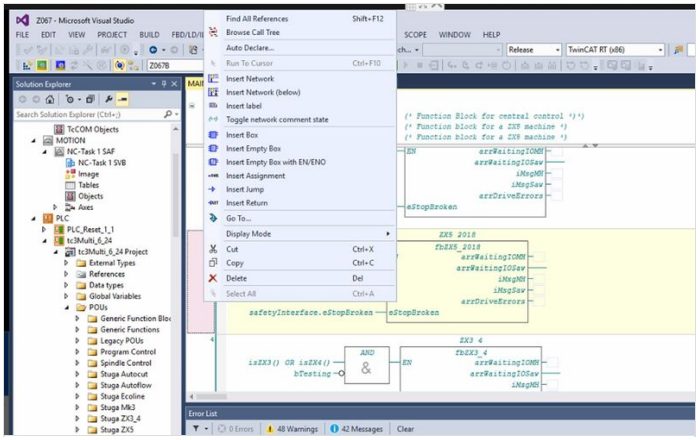


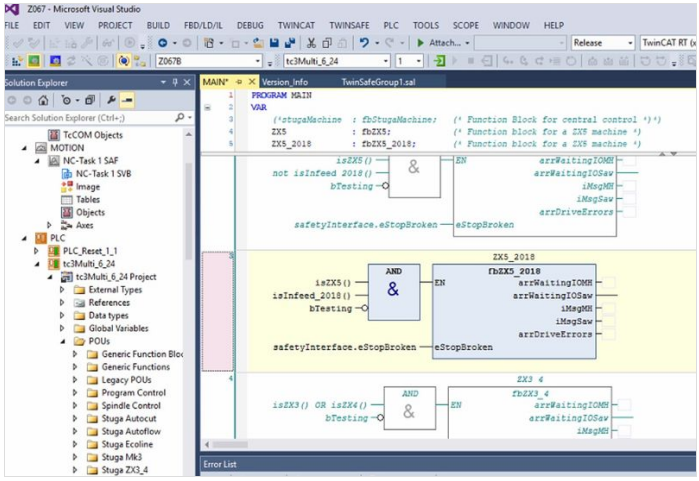
Step 25 - Latest Front End software installed

- Backup Old multi folder
- Copy in new winMulti version to c:\multi overwriting what is there





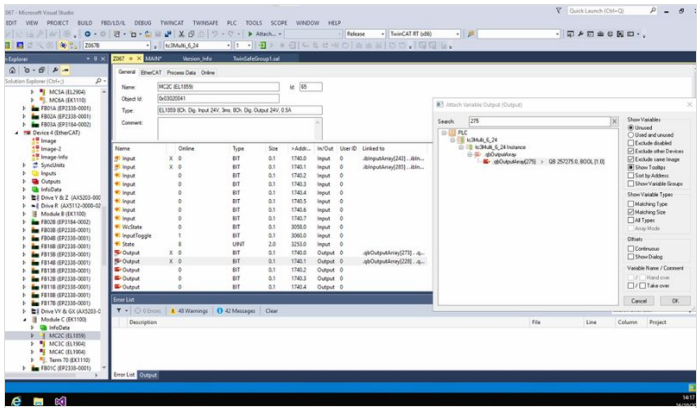




Step 26 - Map new Links

Overwrite existing links if any exist

See the wiring for MC2C and MC2E in Step 22 for the link IORefs and locations



Step 27 - Activate Configuration

And restart in run mode when prompted

Step 28 - Add new IO Refs to IODef.mul

Ask HQ to download a relevant IODef.mul file

Failing this, the following IO refs need to be added

```
OuC_CrankFWD,273,2,0,0,False,False,3,8,-,False,0
OuC_CrankREV,274,2,0,0,False,False,3,9,-,False,0
OuD_CrankFWD,275,2,0,0,False,False,3,10,-,False,0
OuD_CrankREV,276,2,0,0,False,False,3,11,-,False,0
OuE_CrankFWD,277,2,0,0,False,True,64,0,-,False,0
OuE_CrankREV,278,2,0,0,False,True,64,1,-,False,0
```

And these removed

Step 29 - Latest Front End software installed

- Backup Old multi folder
- Copy in new winMulti version to c:\multi overwriting what is there

Step 30 - Programme WEG drives

Follow link below for information on programming WEG drives:

WEG Inverter Setup

Step 31 - Test Function

1. Ensure all Out and home sensors are working and correctly oriented. Home is towards rear of machine, Fwd or Out is towards front.
2. Ensure the clutches are set to slip if the crank bottoms out
3. Test direction of all cranks (Fwd is towards front). Switch phases on motors if direction needs to change. The PLC has hard code to switch the outputs off when the sensors are covered

Key Pointers

- End stops should be set so the rack can never run off the pinion - always a full tooth engaged
- Each crank motion stops when the input is seen, and then decelerates. Therefore, set the crank input position to allow for this deceleration before hitting end stop. Normally about 30mm
- The crank clutches should be set to slip before damage is done to the crank end stops in the event that the sensors do not work