# Fitting Zx5 Crank Upgrade

Fitting the crank upgrade to Z065, Z066, Z067

Difficulty Hard

Ouration 2 day(s)

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- Step 2 Remove Link arm connecting to rack and pinion
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Step 7 - Fix split sprocket onto drive shaft

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Comments

#### 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 - Program Eaton Drives before they leave

Running frequency Control mode Accel time Decel time https://stuga.dokit.app/wiki/Programming\_Eaton\_DE\_Drive

# Step 2 - Remove Link arm connecting to rack and pinion



### Step 3 - Remove pivot shaft and arm







# Step 4 - Undo clutch and remove Cam





# Step 5 - Add sprocket to clutch B0001166





# Step 6 - Fix idler plate to upright







# Step 7 - Fix split sprocket onto drive shaft

 $\bigcirc$  ...Line up with a straight edge





# Step 8 - Drill and pin split sprocket to shaft



# Step 9 - Add chain minimum length sprocket to sprocket

Use idler to create tension



### Step 10 - Fit Module C Crank Home sensor plate to Arm 5

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





# Step 11 - 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 12 - Fit Module D Crank Home sensor plate to Arm 5

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



## Step 13 - 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 14 - Fit Module E Crank Out sensor plate to Arm 5

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



#### Step 15 - 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 16 - Remove 2 off breaker and contactor Module C



#### Step 17 - Add 2 off single pole breaker Module C

Tidy wires away for the spare 2 phases





### Step 18 - Add 2 off Eaton Drive to Module C

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



Step 19 - Add single pole breaker Module E



# Step 20 - Remove breaker and contactor Module E

Step 21 - Add 1 Off Eaton drive to Module E



## Step 22 - For each Eaton Drive

- 1 phase
- Neutral
- Earth
- Fwd and Reverse signals
- Wire motor cables directly to bottom of drives



## Step 23 - 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 24 - Latest Front End software installed

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



### Step 25 - 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 26 - Activate Configuration

And restart in run mode when prompted

### Step 27 - 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 28 - Latest Front End software installed

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

#### Step 29 - 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