DCNC BeltDrive manual

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Contents

Chapter 1

Introduction

Thank you for purchasing a DCNC BeltDrive Module.

In order to assemble your DCNC BeltDrive Module, it is highly recommended that you first read the entire manual.

Chapter 2

DCNC BeltDrive Module

2.1 Introduction

This chapter outlines the assembly of the DCNC BeltDrive Module.
Step by step it is explained which action should be performed.
This chapter consists of the following sections:

- 2.2 Considerations
- 2.3 Required tools
- 2.4 Preparations
- 2.5 Assembly
- 2.6 Checklist

2.2 Considerations

Please bear in mind that the used high precision parts and components require special care.

The most critical measures are listed below, and repeated during this chapter.

- Hiwin carriages contain multiple guidance balls. These balls will fall out when the carriage runs off the rails, leaving the Hiwin carriage unusable! Never slide Hiwin carriages off the end of the rails without the plastic tube to keep the balls in place, and never remove the plastic tube unless you intend to mount the Hiwin carriage onto a rail.
- Unless stated otherwise, do not tighten alignment sensitive parts such as rails, and Hiwin carriage mounts until the system is complete and ready for alignment.

2.3 Required tools

The required tools are listed below:

- Tap M8
- Allen Keys
- Open end or Ring Wrench 8 mm
- Socket spanner, Open end or Ring Wrench 5 mm
- Magnetic stand, with Dial Gauge, or lever type gauge with dial indicator
- Feeler gauge (1 mm thickness)

2.4 Preparations

Perform the following preparations:

- Mount the grease nipple to the Hiwin carriage as shown in figure 2.1:

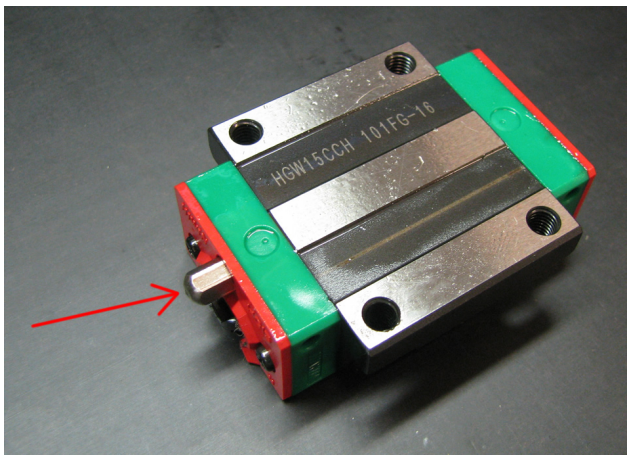

Figure 2.1:

- Tap M8 thread, to a depth of about 15 mm, on both ends of the profile, as indicated on the figure:

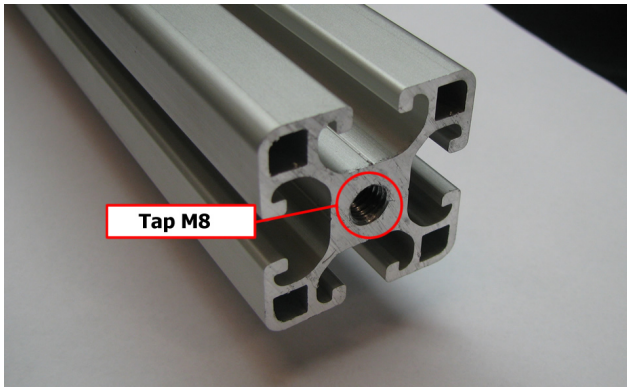

Figure 2.2:

- Mount the M5 T nuts, by spreading them evenly on the designated slot:

Figure 2.3:

2.5 Assembly

Now the preparations are completed, you can start assembling.

- First, place the Hiwin HG15R rail above the placed T nuts as is shown in figure 2.4. Fasten the supplied M4x20 bolts such that the bolthead is lower than the top of the rail, but not tightened; allowing the rail to move a little.

Figure 2.4: Orientation of the rails

- orient the 40x40L profile with the rails oriented towards yourself, see figure 2.5.
- Slide a M5 T-nut into each end of the 40x40L profile, with the threaded holes oriented close to each end, see figure 2.5.

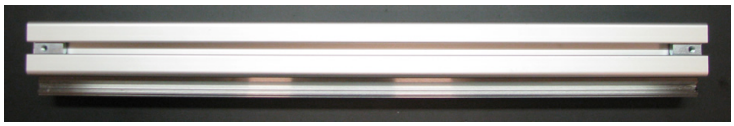

Figure 2.5:

Loosely mount a DCNC BeltDrive Tensioner with M5x12 DIN 912 Metric bolts.

Figure 2.6:

- Mount the DCNC BeltDrive Endplates with ISO 7380 M8x16 bolts. Use M5x12 DIN 912 Metric bolts to connect the BeltDrive Tensioner to the Endplates. Leave about 5 mm of space between the Tensioner and the Endplate to have space for adjustment when tensioning the belt.

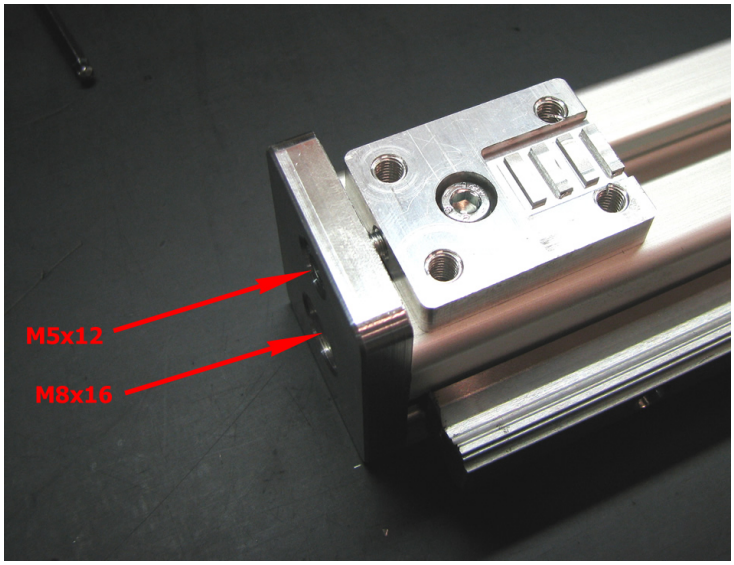

Figure 2.7:

- Slide the Tollok (350 d x D 6.35x16) in de pulley (16XL037) as shown in figure 2.8.

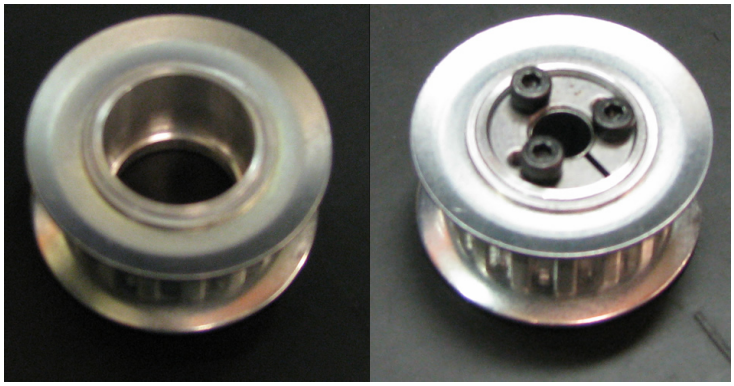

Figure 2.8:

- Position the pulley with tollok onto the axis of the DCNC IP54 1.0Nm Steppermotor. Use a 1mm feelergauge to position the pulley at 1mm distance from the steppermotor flange. Lock the pulley onto the axis by tightening the 3 black Tollok bolts.

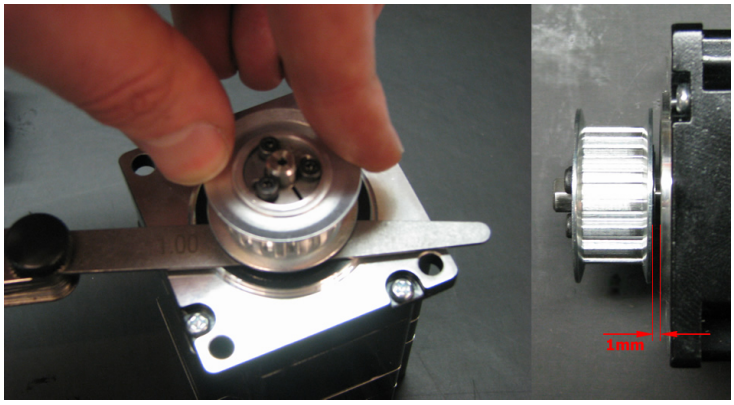

Figure 2.9:

- Orient the motor and steppermotor flange as shown in figure 2.10.

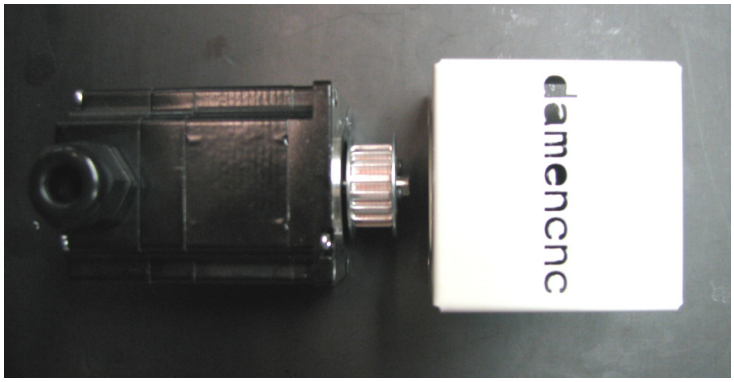

Figure 2.10:

- Use two M5x12 DIN 912 Metric bolts and two M5 DIN 985 locking nuts to connect the steppermotor flange to the steppermotor.

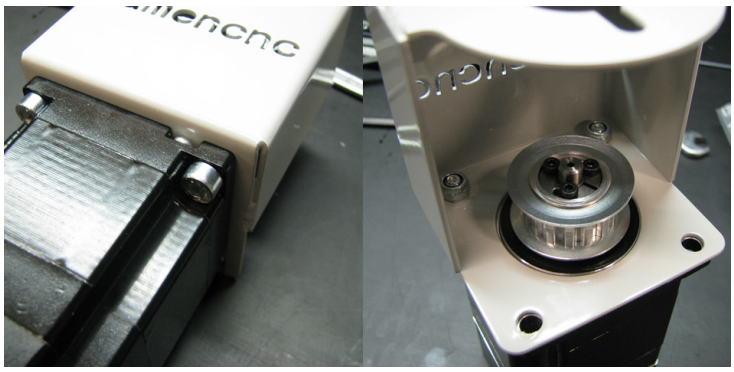

Figure 2.11:

- Use the other two holes in the flange of the motor to mount the following parts, in the order specified. Also shown in figure 2.12

  - 1x M5x25 bolt
  - 1x DIN125A M5 ring
  - 1x Groove ball bearing flanged 605ZZ with flange towards the motor
  - 3x DIN125A M5 ring
  - 1x Groove ball bearing flanged 605ZZ with flange away from the motor
  - 1x DIN 985 M5 locking nut

Figure 2.12:

- Center the rail on the profile. Firmly tighten the first (on either end of the rail) M4x20 bolt.

Figure 2.13:

- Clean the rail with a clean cloth.
- Carefully place the first Hiwin carriage on the rail. Note that the text of the carriage should be oriented in the same direction as the text on the rial; push the plastic tube out in the process as shown in figure 2.14:

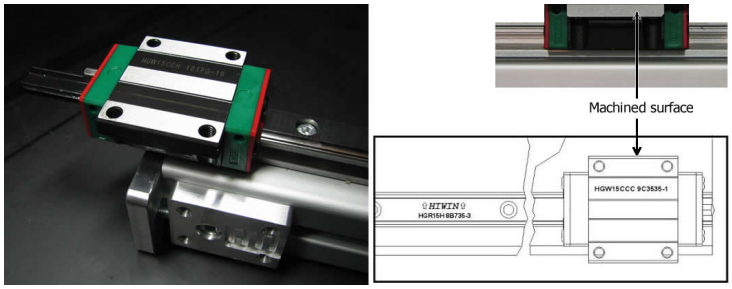

Figure 2.14:

- Place your magnetic stand on the Hiwin carriage, and set the dial gauge to 0.00 on the side of the 40x40L profile as shown in figure 2.15:

  Translate the Hiwin carriage until next bolt appears. Now adjust the rail and try to get the gauge to read 0.00 again, and tighten the M4x20 bolt. In practice you can expect a variation of between +0.01 and -0.01 or between +0.02 and -0.02 depending on the amount of time you're willing to spend. We align the rails to the profile because we assume the aluminium profile to be perfectly straight. From our experience we know that assumption is valid for this case.

  Repeat this process until all bolts of the rail are tightened; be careful not to run the Hiwin carriage off the end of the rail.

- Press the green protection caps into the hiwin rails mounting holes.

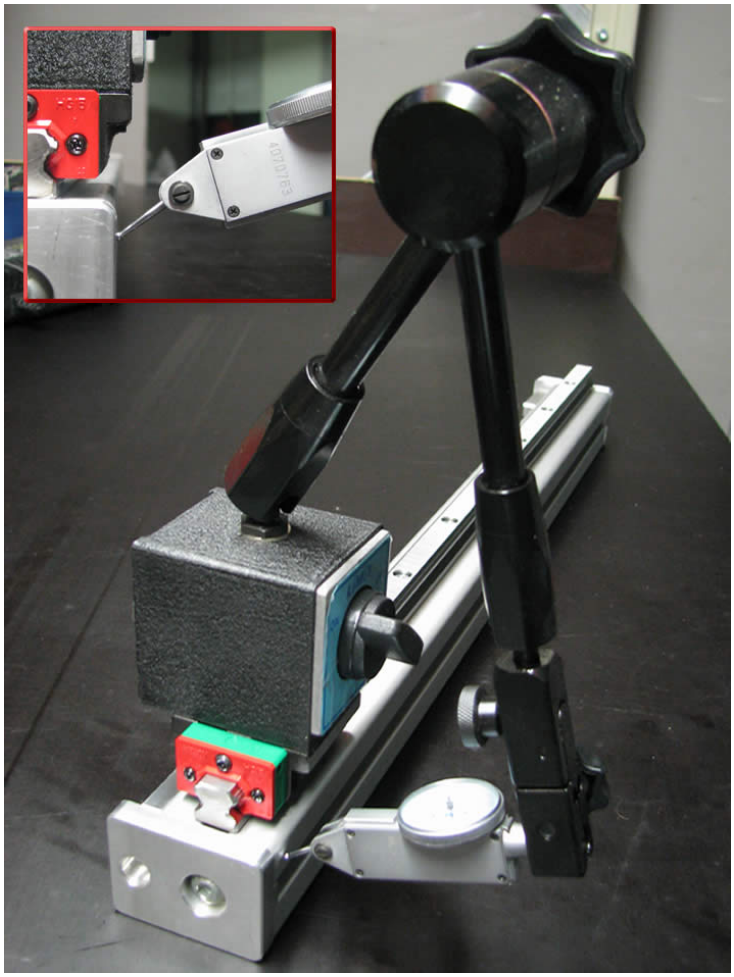

Figure 2.15: Align the rail using a dial gauge

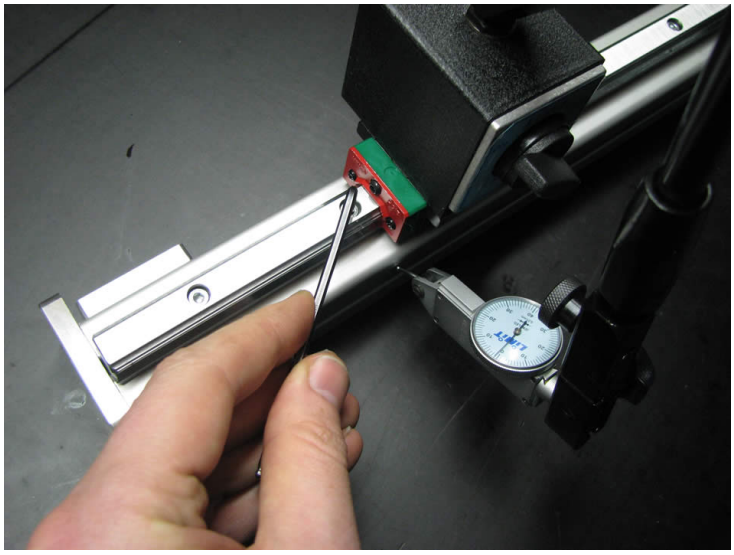

Figure 2.16:

- Mount the DCNC BeltDrive Slideplate to the HIWIN Carriage with 4 M5x12 DIN 912 Metric bolts as shown in figure 2.17.

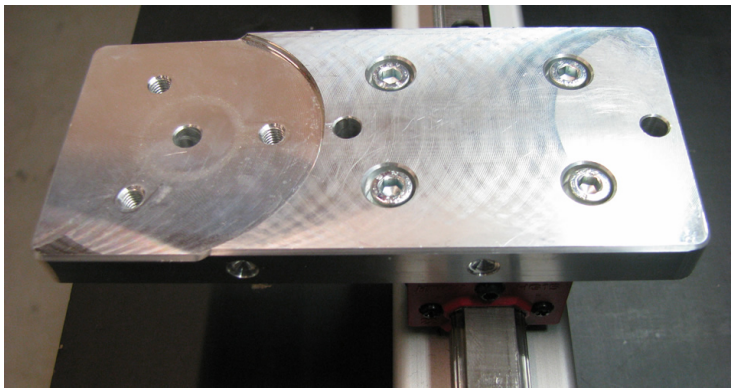

Figure 2.17:

- Mount the DCNC Motor-Flange to the DCNC BeltDrive Slideplate with 3 M5x10 bolts as shown in figure 2.18.

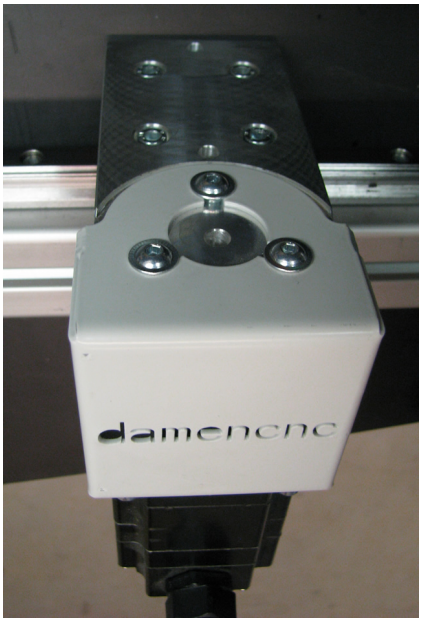

Figure 2.18:

- Choose on of the Beltdrive tensioners and position the belt into it, with the belt as far as possible from the rails, as shown in figure 2.19.
- Mount the DCNC BeltDrive Tensioner Cover with 4 M5x10 bolts, as shown in figure 2.20.

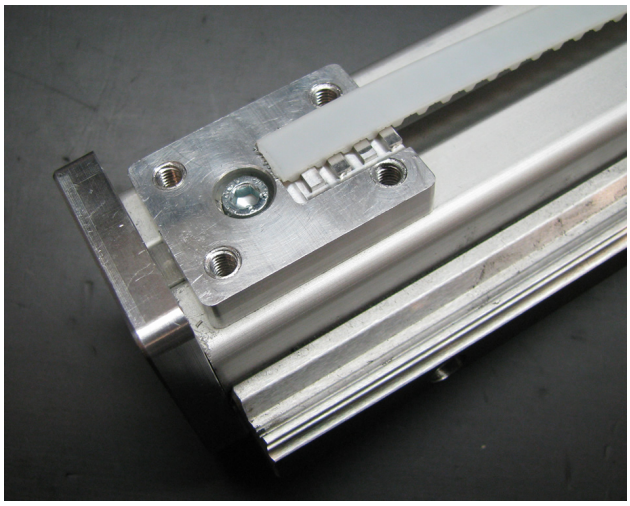

Figure 2.19:

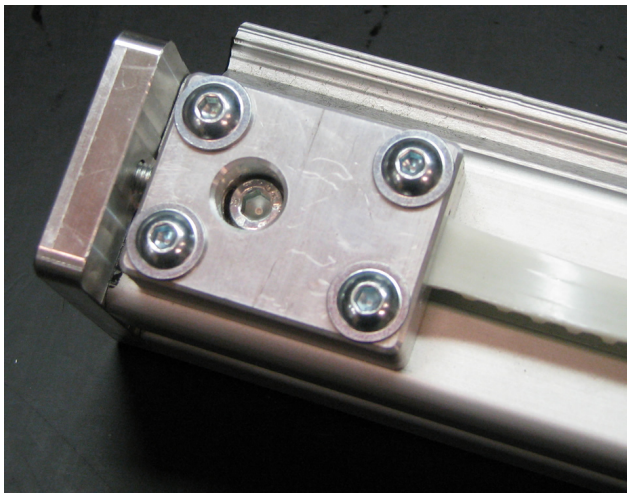

Figure 2.20:

- Guide the belt through the DCNC Motor Flange, as shown in figure 2.21.

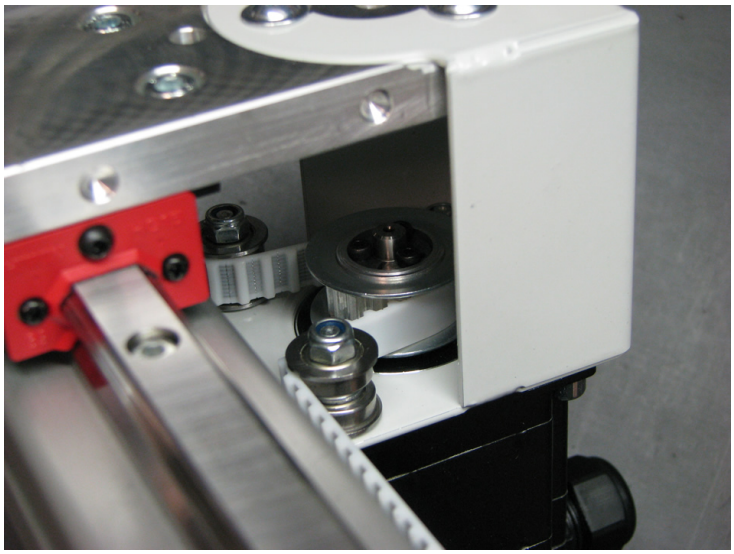

Figure 2.21:

- Mount the other end of the belt into the second BeltDrive Tensioner. You might need to shorten the belt one or two teeth. The belt has the right length if you have the BeltDrive Tensioners positioned each at 5mm from the BeltDrive Endplate, and if you can easily position the belt into the BeltDrive Tensioner with the belt by hand with a very light pretension. Note that the belt should have four teeth inside the BeltDrive Tensioner.

- Tension the belt by carefully tightening the M5x12 bolts in the DCNC BeltDrive ENDPLATE, as shown in figure 2.22.

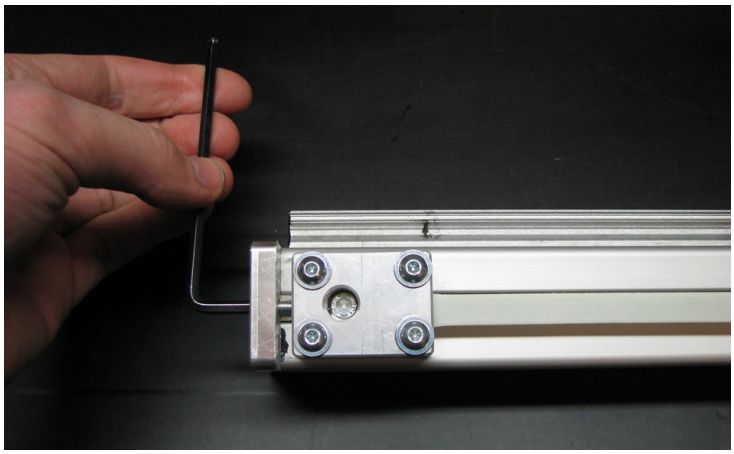

Figure 2.22:

- Check if the belt tension is correctly by moving the DCNC Motor flange to either end of the profile. The XL037 Belt should not touch the profile because of its own weight. If you apply about 1 kilogram of force in the middle of the belt, the belt should just touch the profile.

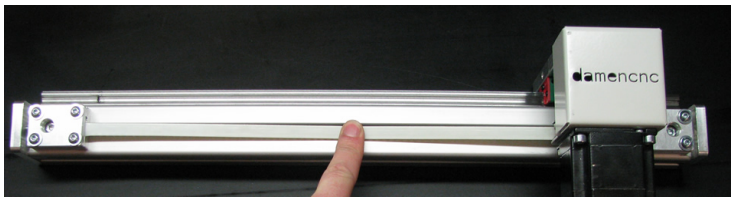

Figure 2.23:

If the belt is tensioned, tighten the M5x12 bolts of the BeltDrive Tensioners to fix their position, as shown in figure 2.24.

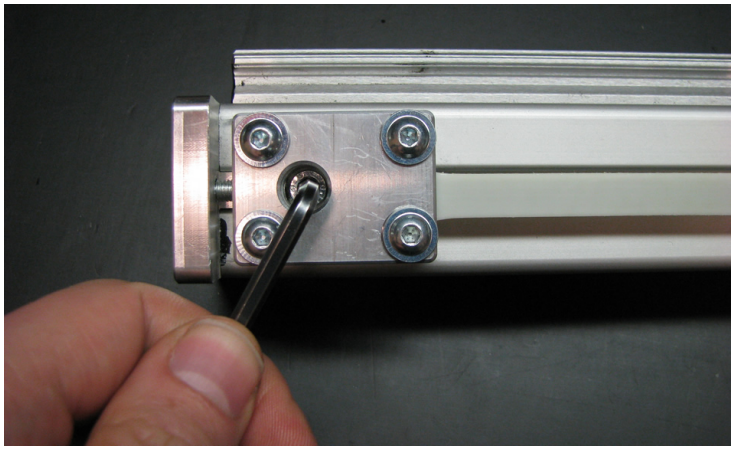

Figure 2.24:

2.6 Checklist

- Check if the motor axis is perpendicular to the 40x40L profile. If not align the motor by flexing the DCNC Motor-Flange.
- Check if the belt is running in a straight line. If not, reposition the belt in the DCNC Tensioners or change the offset of the pulley and bearings.

Chapter 3

Connecting 2 DCNC BeltDrive Modules

3.1 Introduction

This chapter outlines connecting two of the DCNC BeltDrive Modules together.

3.2 Required tools

- Allen Keys

3.3 Assembly

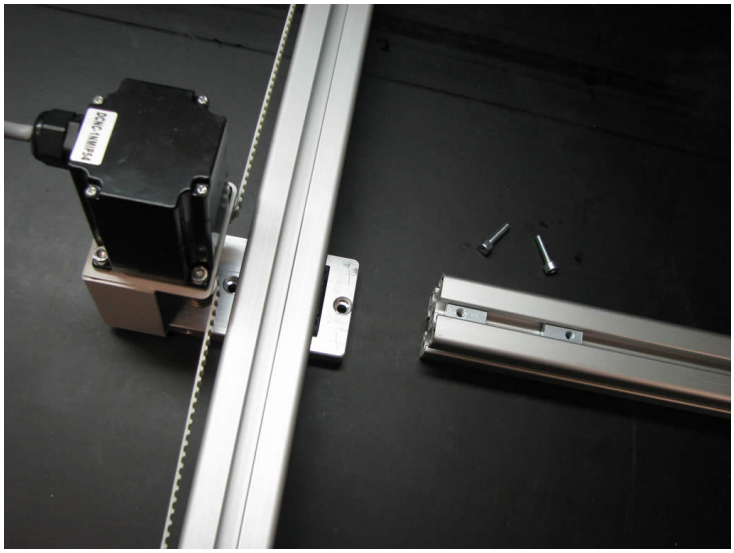

Figure 3.1: To connect the two BeltDrives Modules, you'll need two M5 Tnuts and two M5x20 bolts.

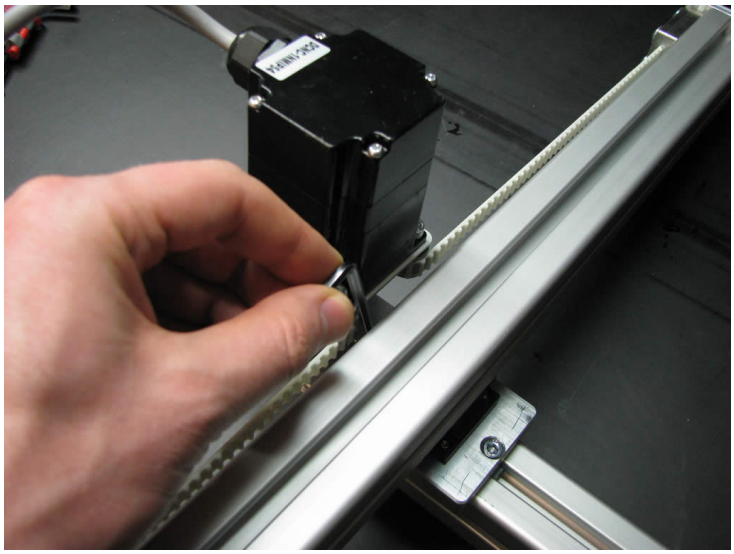

Figure 3.2: Tighten the two bolts.

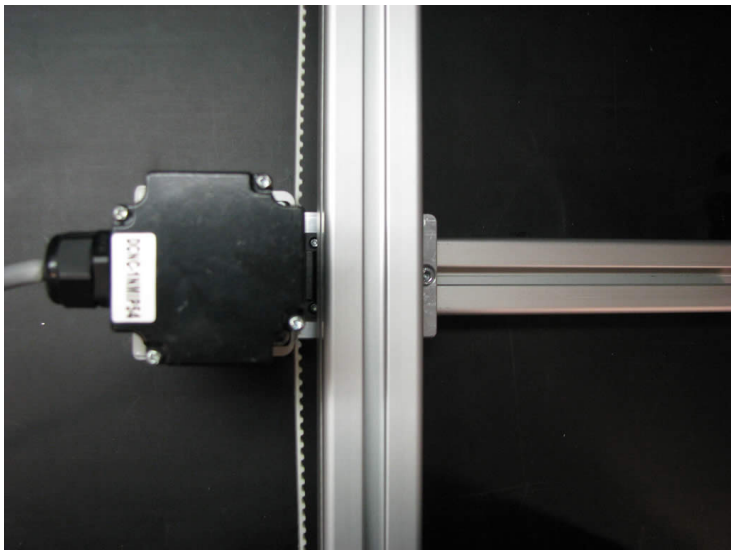

Figure 3.3: Two BeltDrive Modules connected.