

XY Frame Assembly



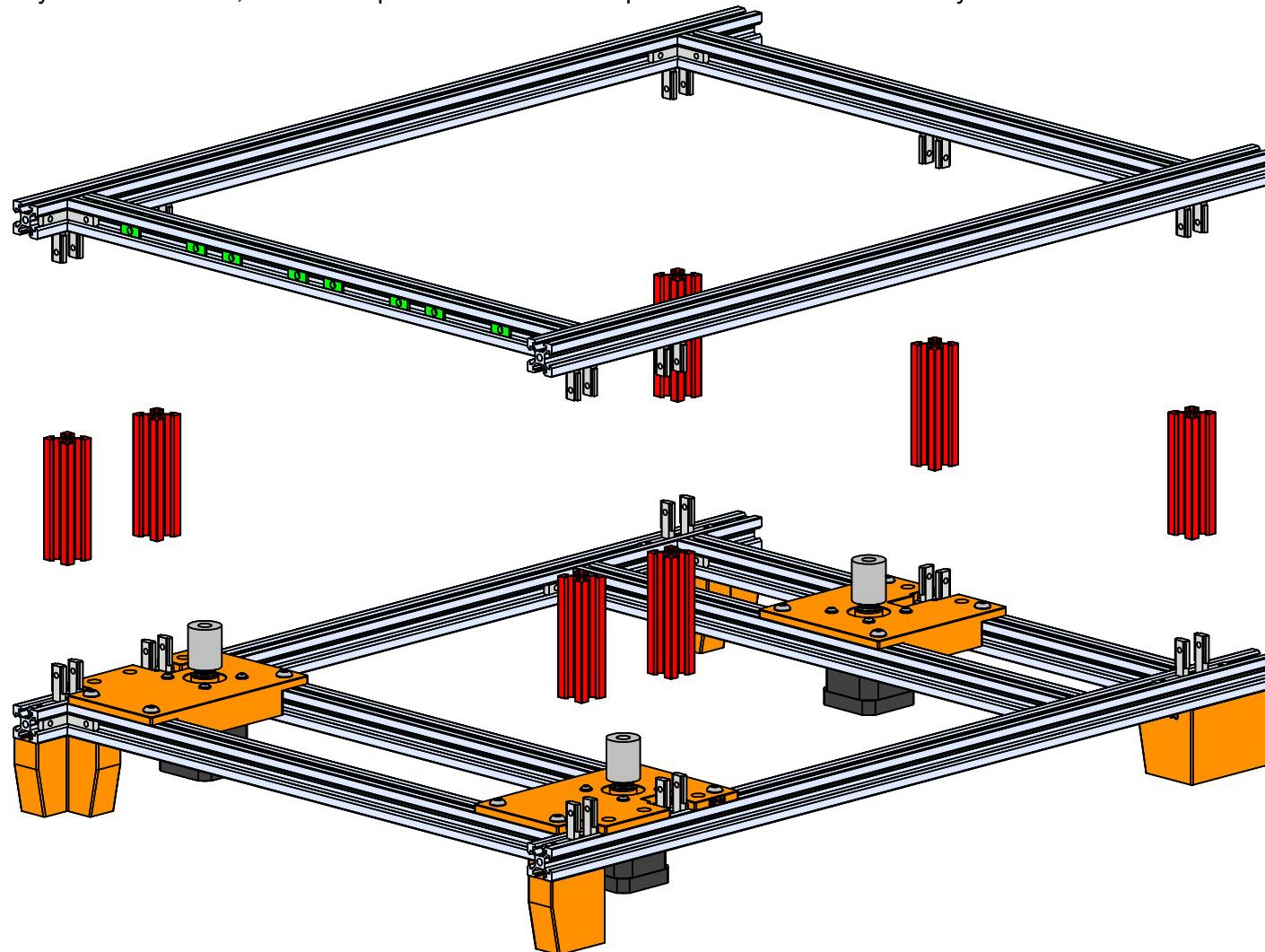
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Joshua Vasquez

last edited:  
3/15/2021

SCALE: 1:3

SHEET 1 OF 18

This next process aligns the Inside-Corner Brackets to ensure a square frame.  
Using the temporary short extrusions, slide the top frame onto the completed Lower frame assembly.



Tighten all Inside-Corner Brackets on the lower frame first to set their location. Then tighten the screws for all Inside-Corner Brackets attached to the upper frame.

With all set screws tightened, the Inside-Corner Bracket positions should be fixed on the upper and lower frames.

Now, loosen all set-screws connecting the red extrusions only to the lower frame.

Set aside the lower frame.

#### Upper Bracket Alignment 1



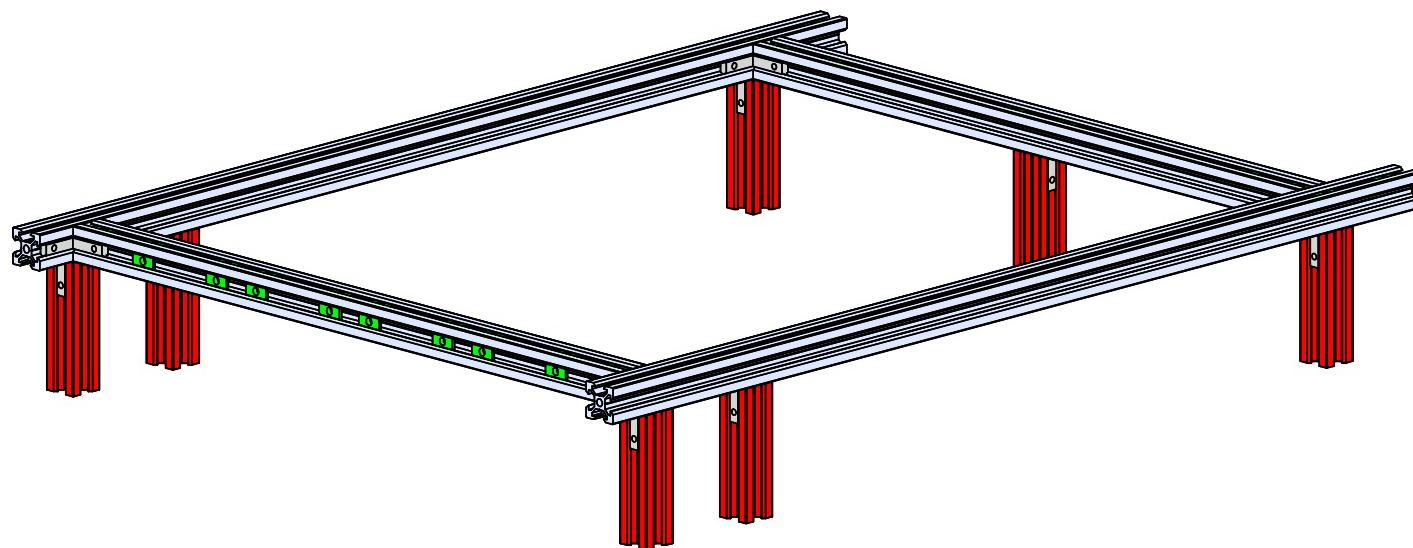
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SHEET 2 OF 18

For the rest of this instruction booklet, you can work with the frame propped up on the red extrusions. (They will not be shown in the renderings.)

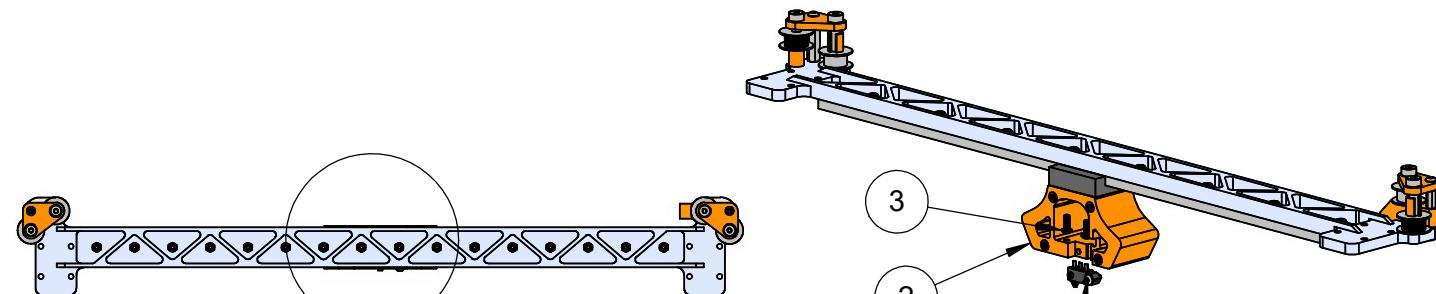


#### Frame Conveniences



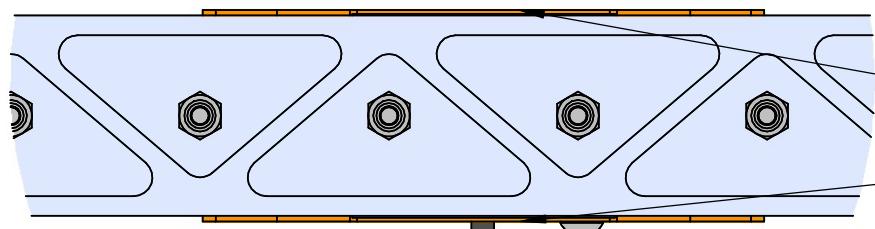
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SCALE: 1:4      SHEET 3 OF 18



Top View

This limit switch should have wires attached to it (not shown in the rendering above).



Ensure that when the carriage is installed, it clears the crossbar on both sides. Otherwise, the carriage will bind when it slides back-and-forth.

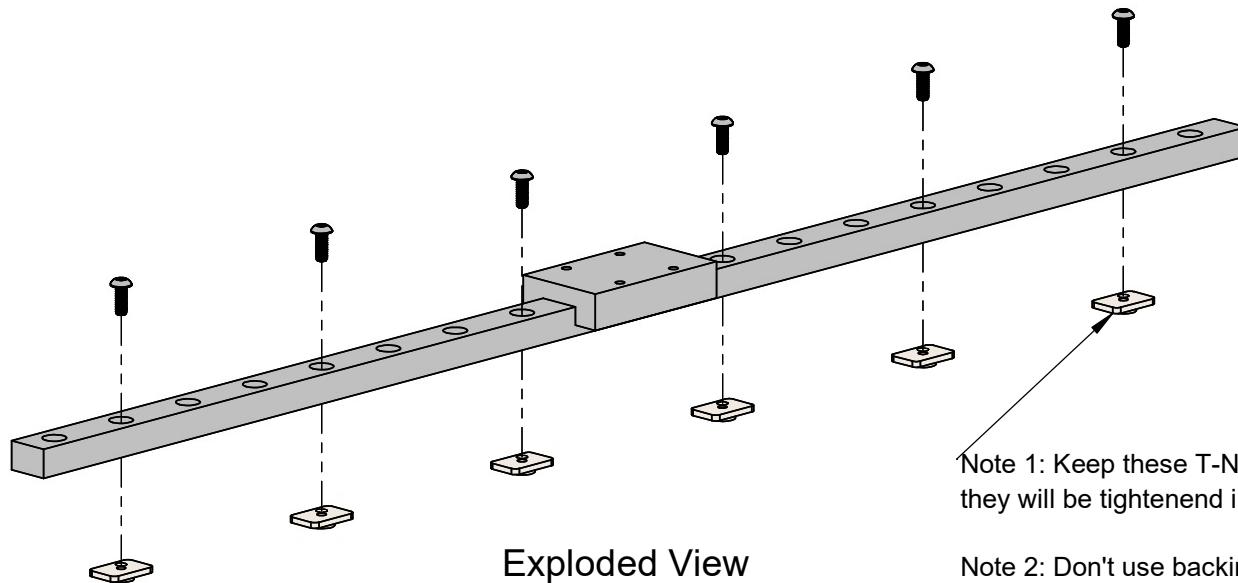
## DETAIL SCALE 1 : 1

ITEM NO.	DESCRIPTION	
1	Crossbar Assembly	1
2	Carriage Center Assembly	1
3	M3 Buttonhead Screw, 8mm long	4

Carriage Center Installation			
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SCALE: 1:4		SHEET 4 OF 18	

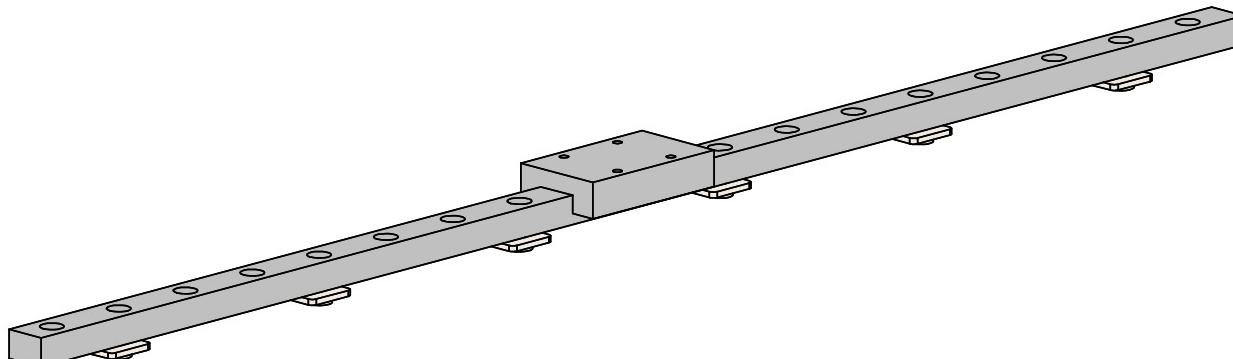
Securely fasten the center carriage to the crossbar, ensuring that the clearances below are met.

Make 2 Assemblies.



Note 1: Keep these T-Nuts loose, only 2-3 full turns; they will be tightened into the frame later.

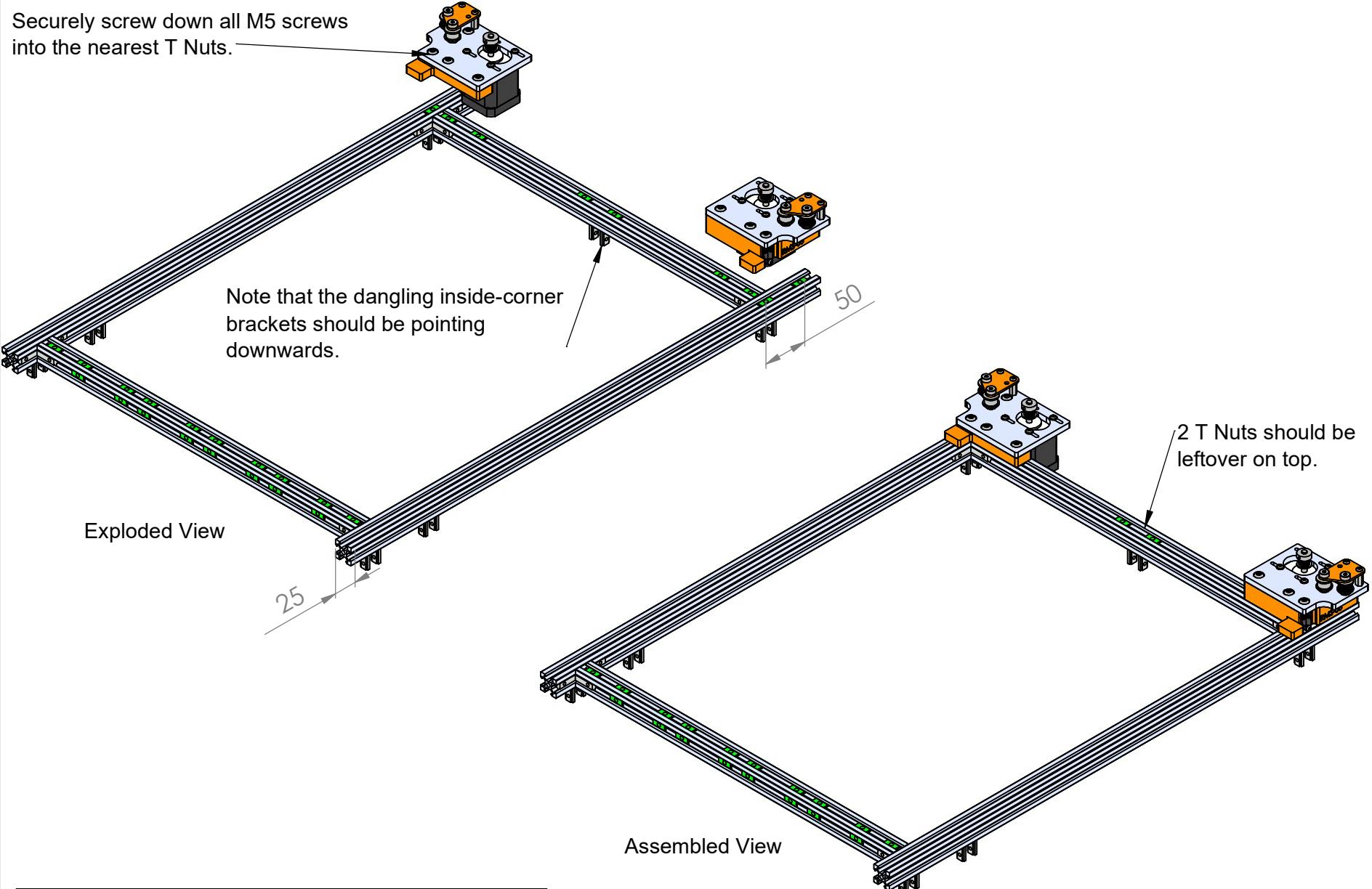
Note 2: Don't use backing springs on these T Nuts.



Assembled View

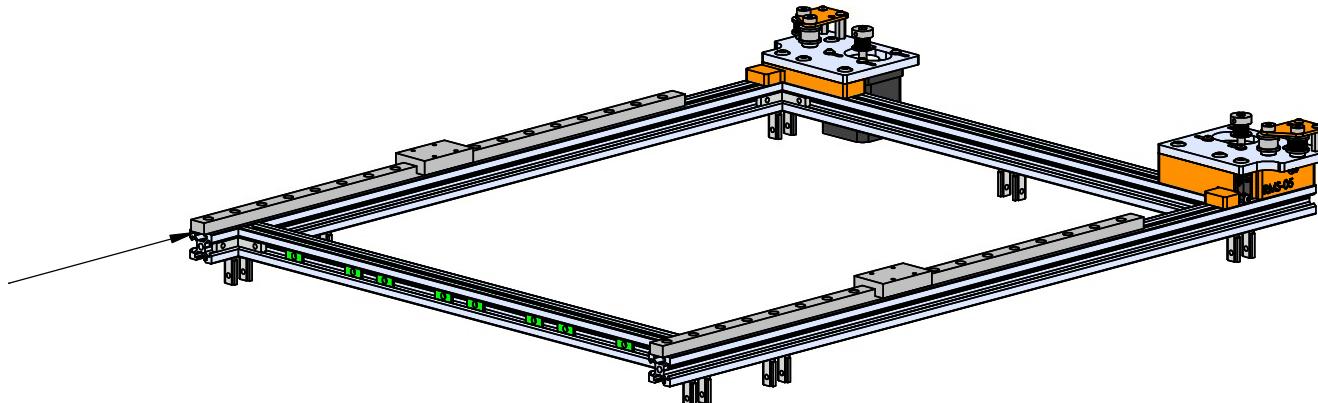
ITEM NO.	DESCRIPTION	QTY.
1	450mm long MGN12 Rail	1
2	MGN12H Carriage Block	1
3	M3 Buttonhead Screw, 8mm long	6
4	M3 Stamped Slide-In T Nuts	6

Y Rail Assembly		
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	SCALE: 1:2	SHEET 5 OF 18

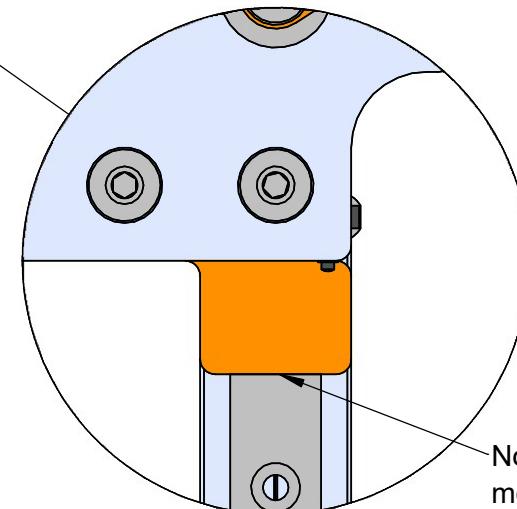
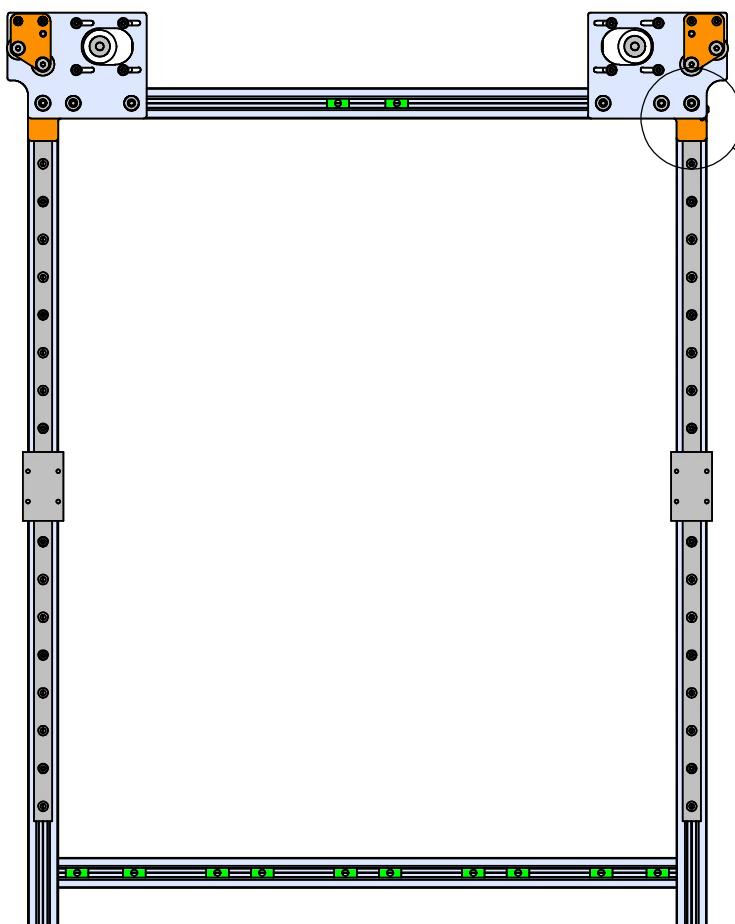


ITEM NO.	DESCRIPTION	QTY.
1	CoreXY Frame Assembly	1
2	Left Motor Plate Assembly	1
3	Right Motor Plate Assembly	1

Plate Installation 1/2		
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	SCALE: 1:5	SHEET 6 OF 18



Slide in the Y rails from the front and loosely fasten them to the frame. Don't fully tighten them yet.  
Also **don't** use Backing Springs here.



Note that the rails are flush with the motor brackets.

### Y Rail Installation

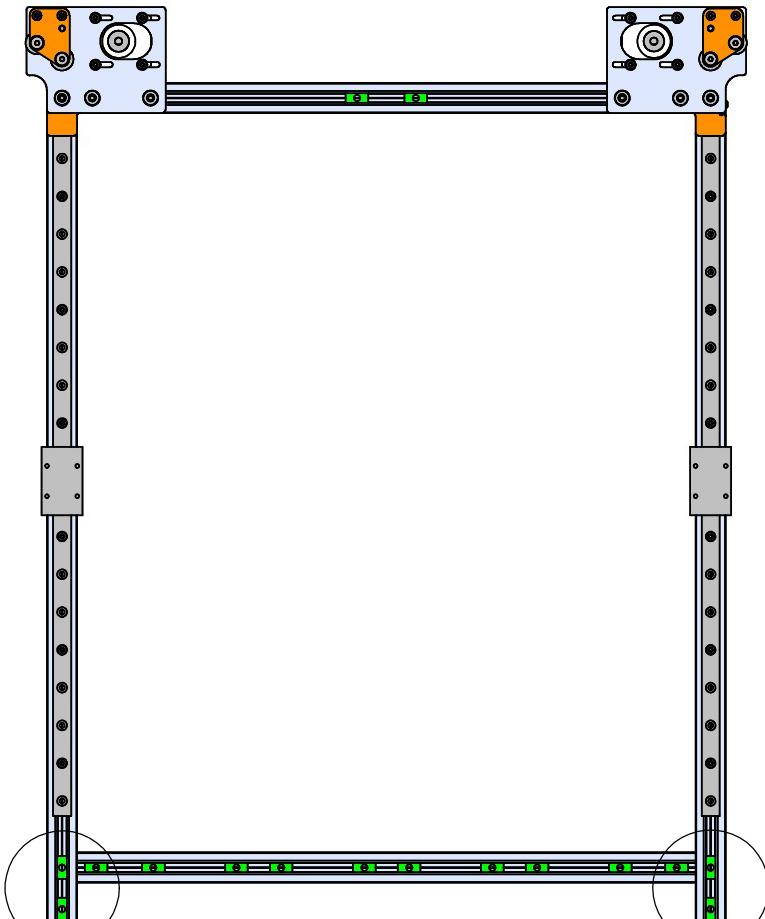


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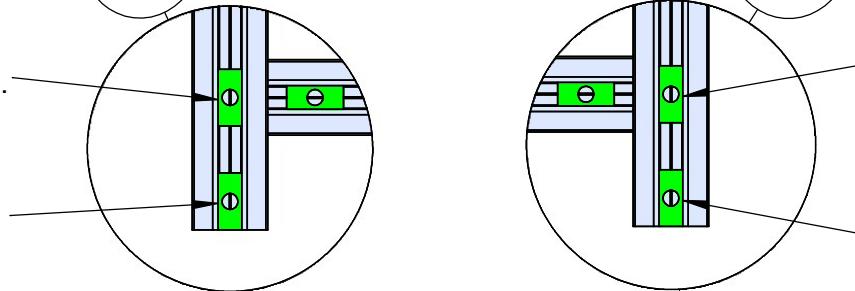
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SCALE: 1:5

SHEET 7 OF 18



Slide an M5 T Nut into each location shown here.



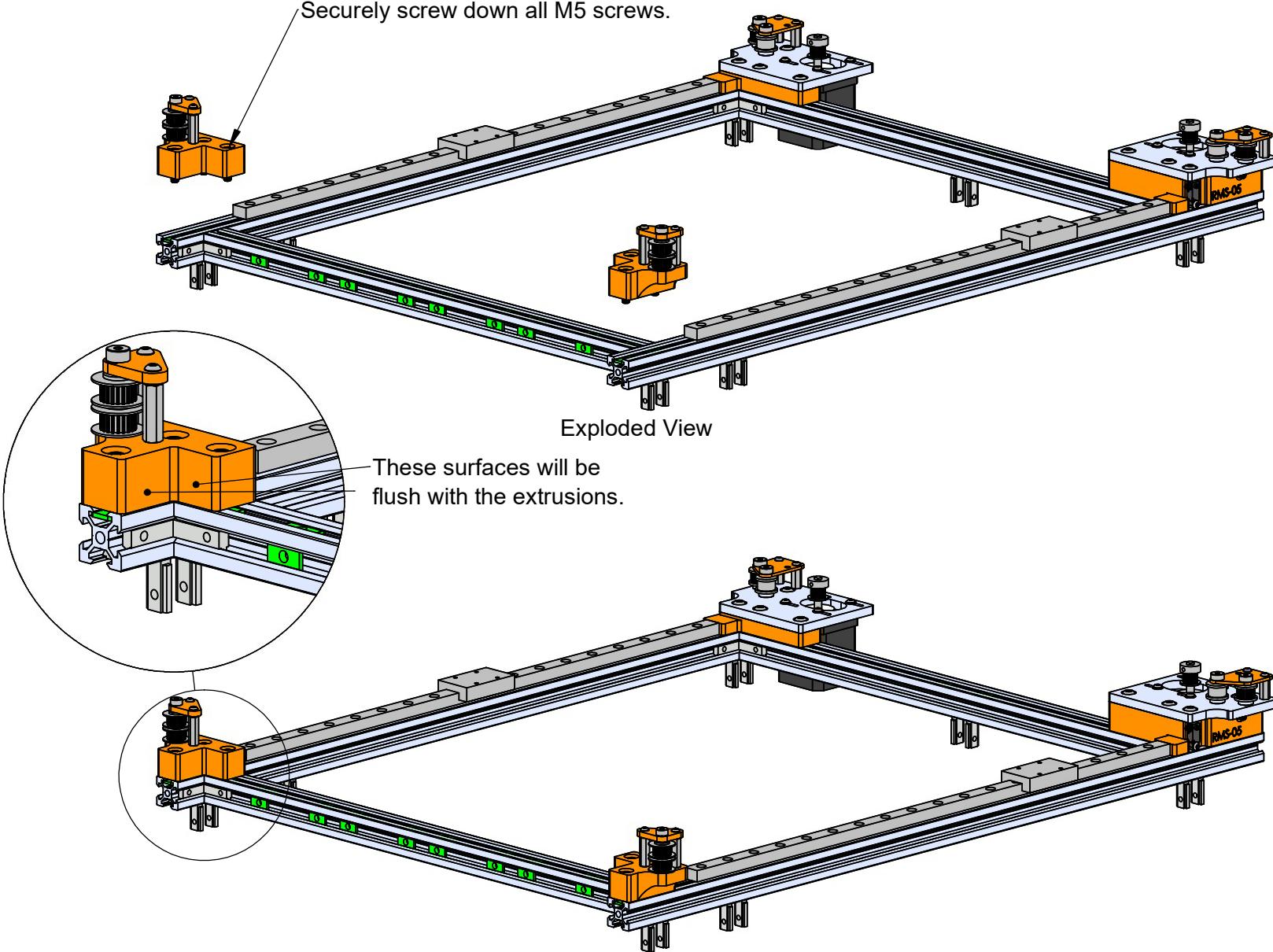
ITEM NO.	DESCRIPTION	QTY.
5	M5 Stamped Slide-In T Nuts	4
6	T Nut Backing Spring	4

#### Corner Bracket T Nut Install



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SCALE: 1:5 SHEET 8 OF 18



ITEM NO.	DESCRIPTION	QTY.
1	CoreXY Frame Assembly	1
2	Left Corner Pulley Assembly	1
3	Right Corner Pulley Assembly	1

### Assembled View

### Plate Installation 2/2

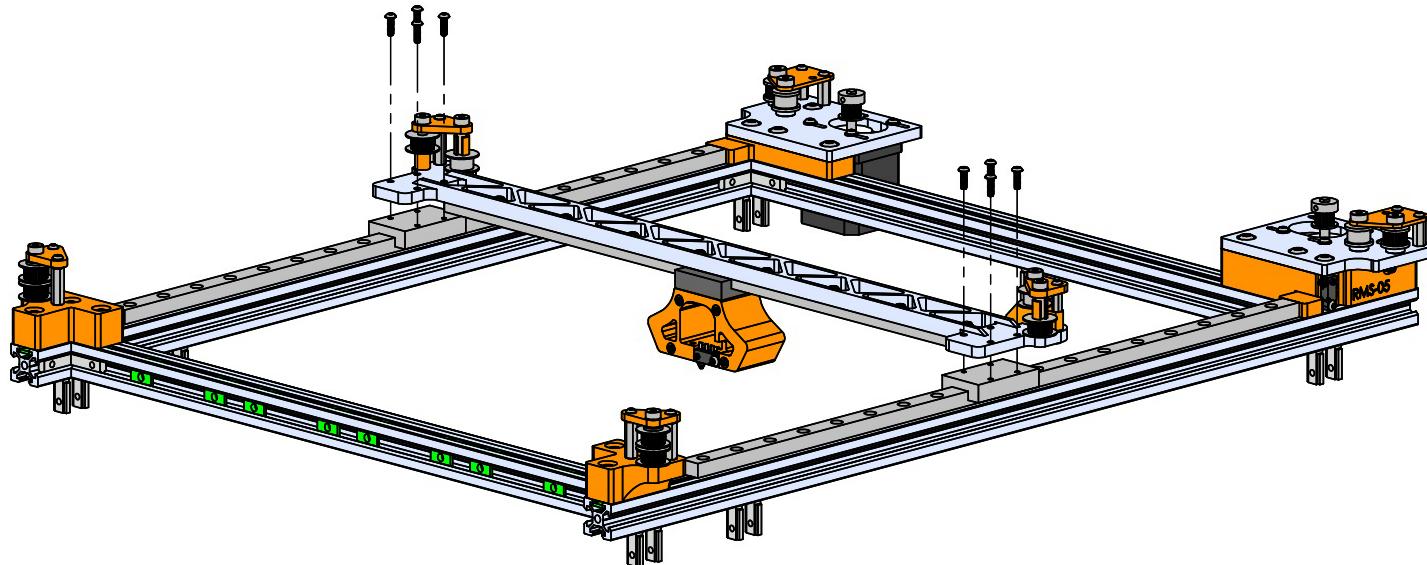


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SCALE: 1:4

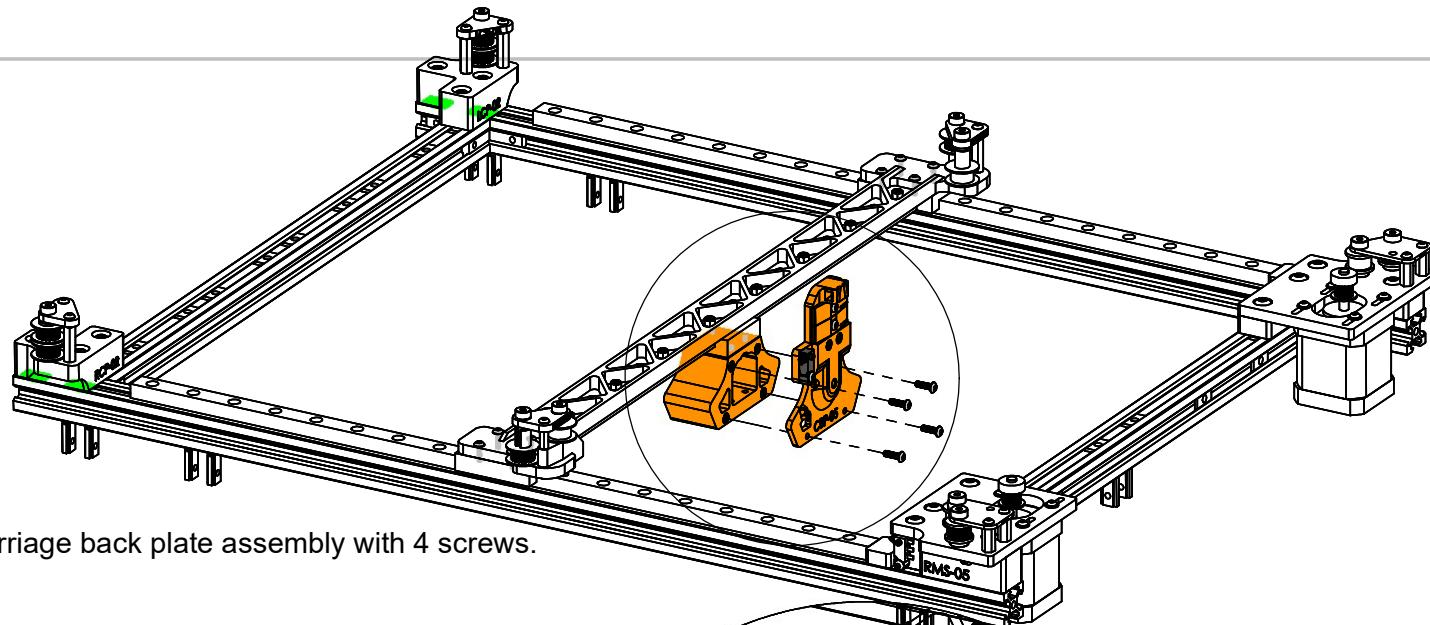
SHEET 9 OF 18



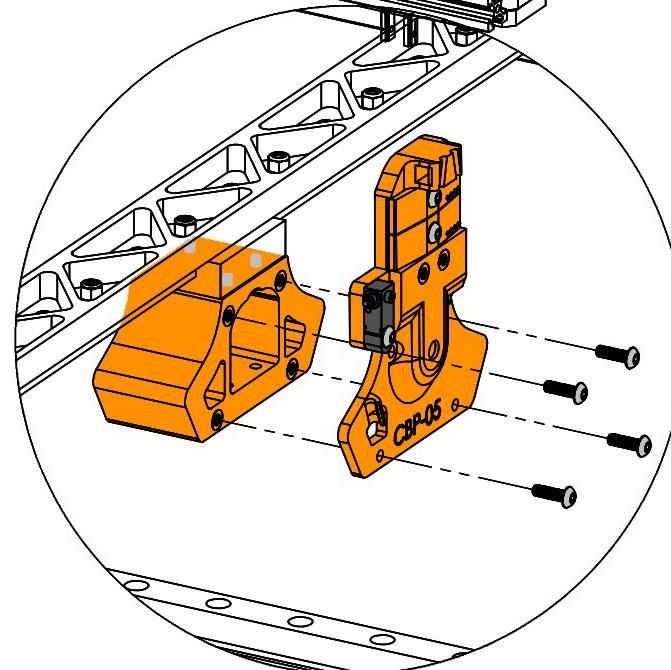
Install the Crossbar in the orientation shown above. Secure it with fasteners snugly, but do not fully tighten it.

ITEM NO.	DESCRIPTION	QTY.
1	CoreXY Frame Assembly with Y Rails	1
5	M3 Buttonhead Screw, 10mm long	8
6	Crossbar Assembly with Carriage Center	1

Crossbar Installation		
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	SCALE: 1:4	SHEET 10 OF 18



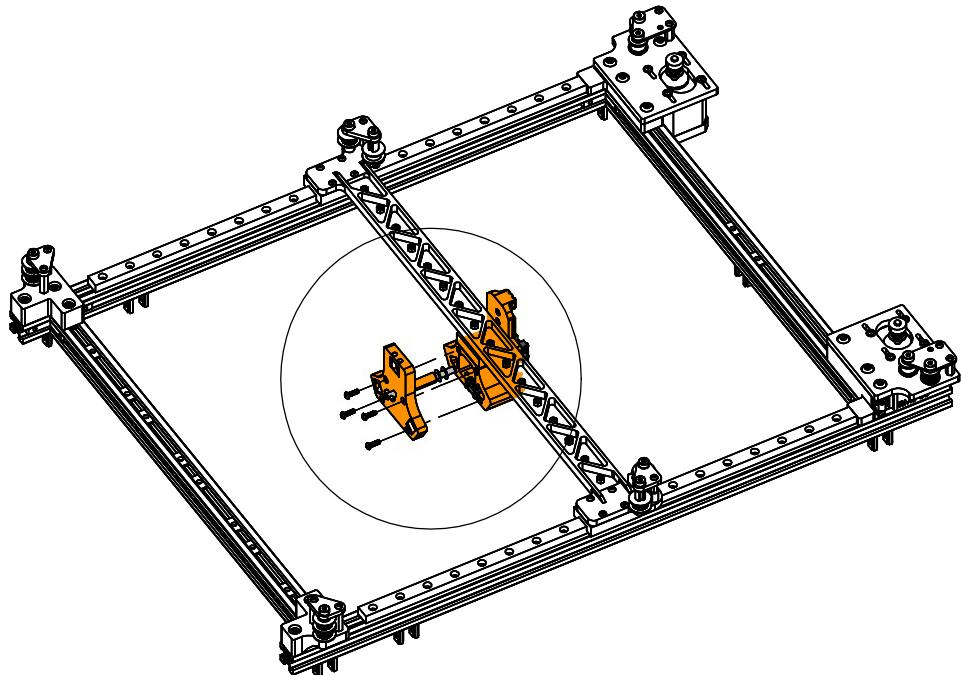
Install the carriage back plate assembly with 4 screws.



DETAIL  
SCALE 1 : 2

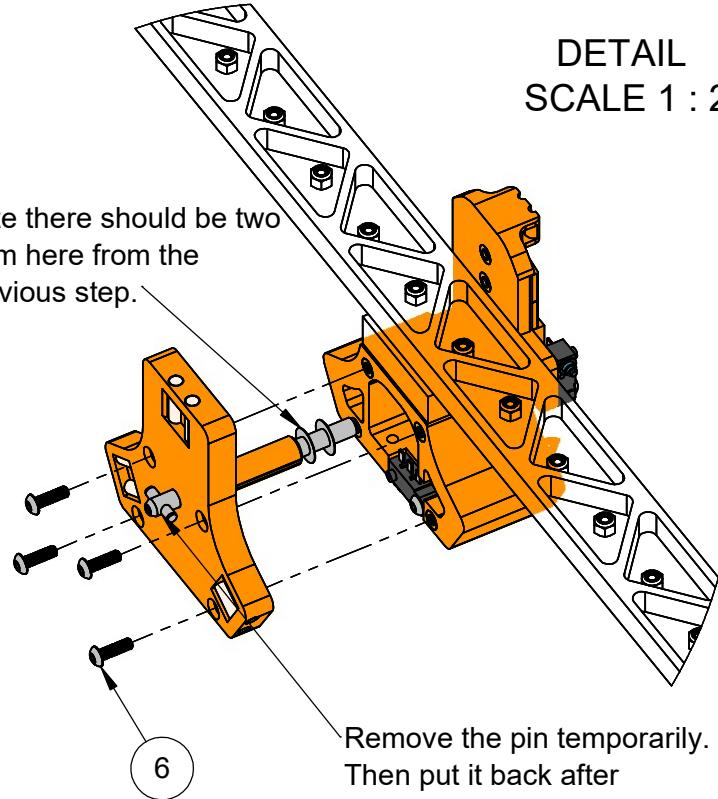
ITEM NO.	DESCRIPTION	QTY.
1	CoreXY Frame with Carriage Center Assembly	1
5	M3 Buttonhead Screw, 10mm long	4
7	Carriage Back Plate Assembly	1

Carriage Back Installation		
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	SCALE: 1:4	SHEET 11 OF 18



DETAIL  
SCALE 1 : 2

Note there should be two  
shim here from the  
previous step.



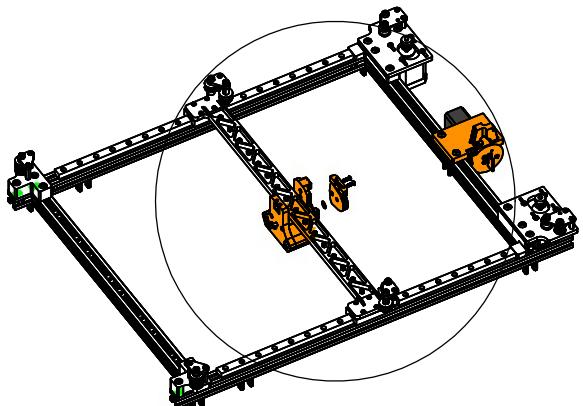
ITEM NO.	DESCRIPTION	QTY.
6	M3 Buttonhead Screw, 10mm long	4
7	Toolchanger Twist Lock Assembly	1
8	Toolchanger Coupling Plate Assembly	1

#### Front Carriage Assembly



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SCALE: 1:5 SHEET 12 OF 18



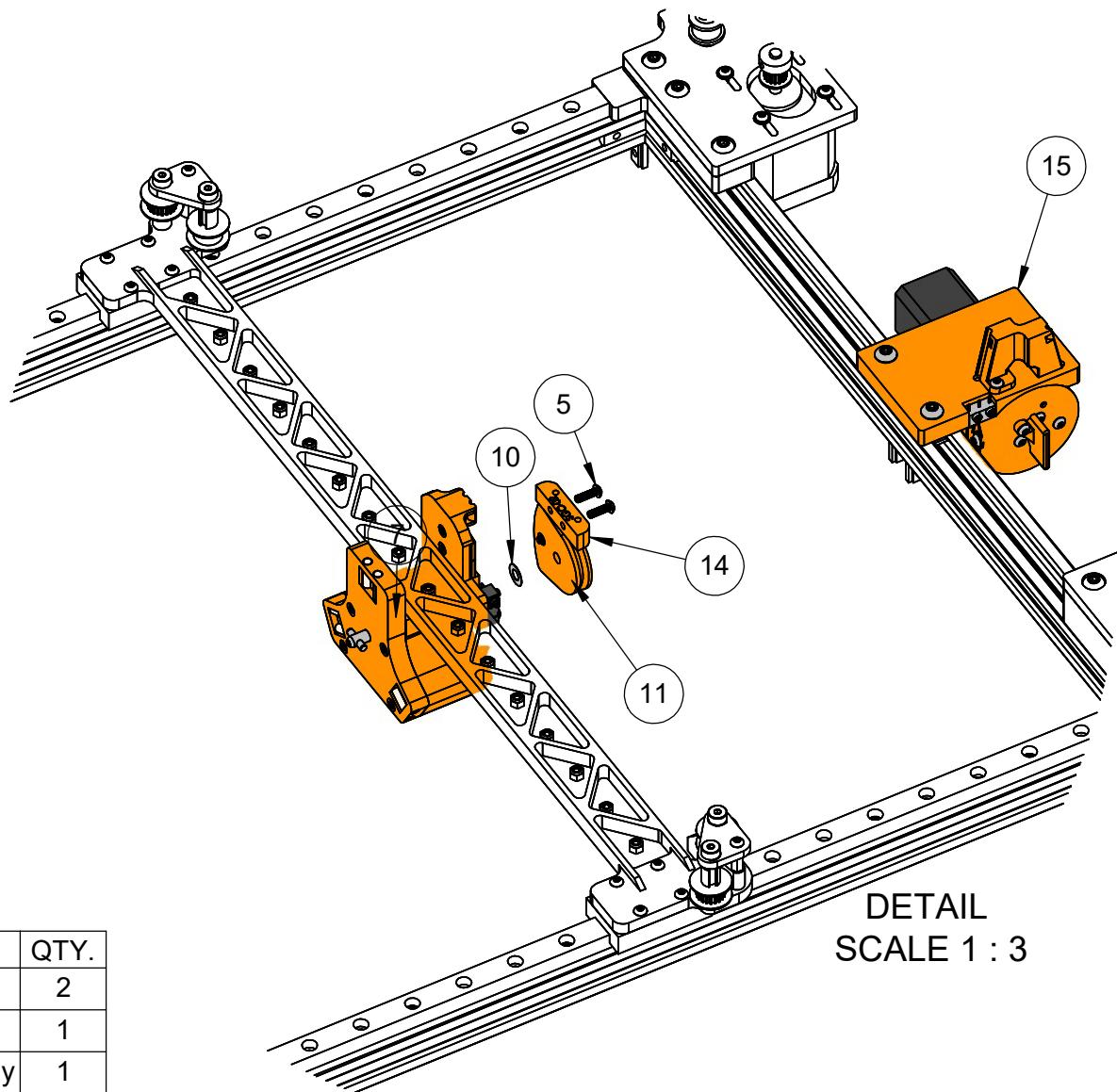
First screw in the Remote Elastic Lock (15) in the back of the frame.

Then screw in the Spring Guide Capture (14) into the back of the carriage, ensuring that the Spring Guide is not twisted. Note that the actual spring guides are not shown in the render.

Finally, push the Carriage Pulley (11) into the back of the twist lock. Do not tighten it yet.

Note: Spring Guide isn't shown in the rendering on the right, but your real machine should have it!

ITEM NO.	DESCRIPTION	QTY.
5	M3 Buttonhead Screw, 10mm long	2
7	Toolchanger Twist-Lock Assembly	1
8	Toolchanger Coupling Plate Assembly	1
10	M5 Shim, 0.2mm thick, 10mm OD	1
11	Toolchanger Pulley Assembly	1
14	Spring Guide Capture	1
15	Remote Elastic Lock	1

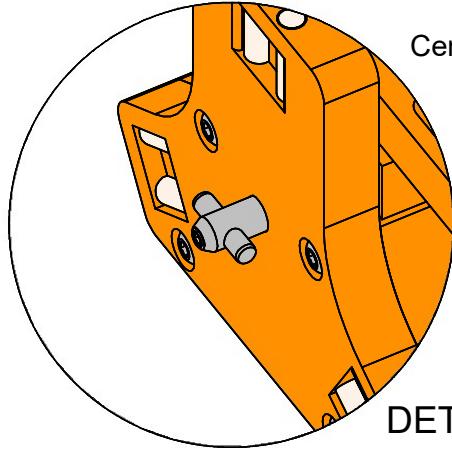
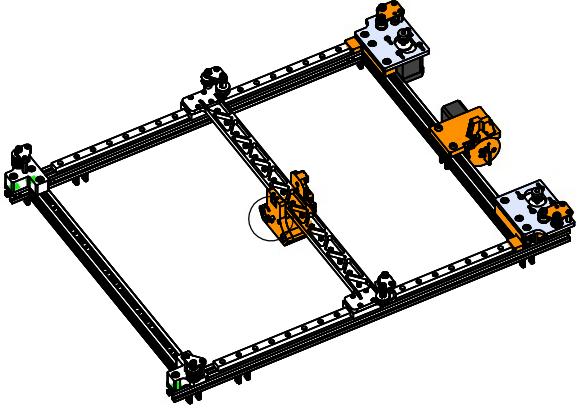


#### Remote Elastic Lock Installation



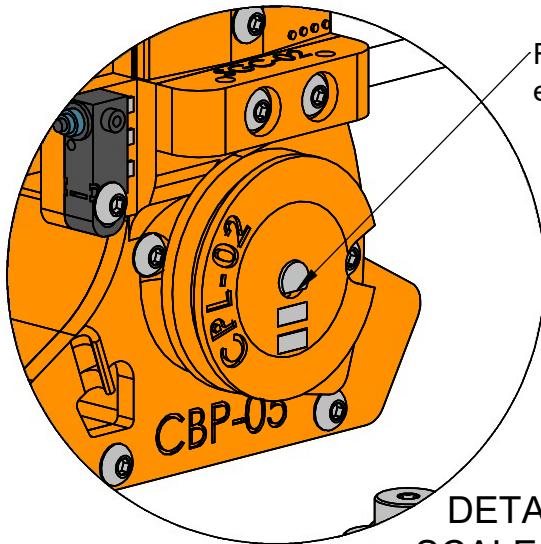
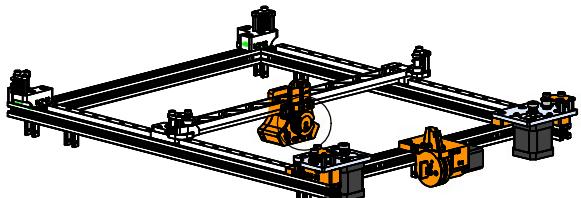
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SCALE: 1:4 SHEET 13 OF 18



Center the 3mm dowel pin and tighten it with the setscrew.

DETAIL  
SCALE 1 : 1



Fasten down the pulley setscrew ensuring that it engages the flat part of the twist-lock shaft.

DETAIL  
SCALE 1 : 1

#### Twist Lock Orientation Check

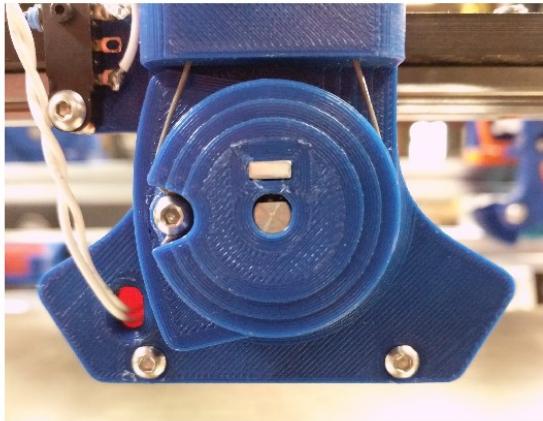


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SCALE: 1:4

SHEET 14 OF 18



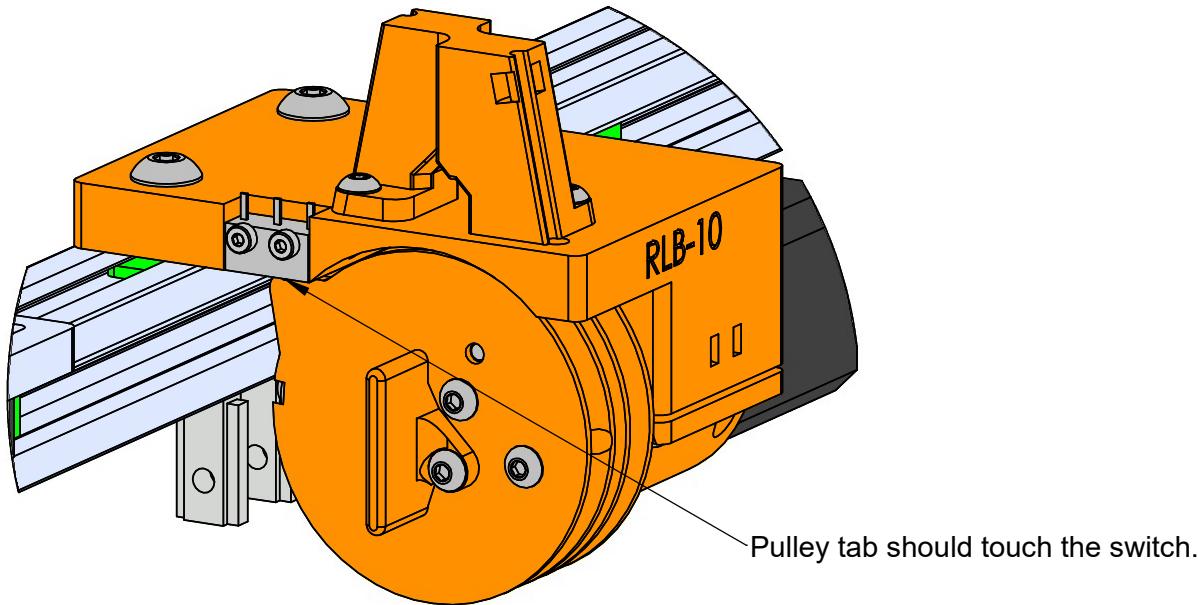
Hold the carriage-side pulley in this configuration.

By hand, manually twist the pulley on the carriage until it is in the fully unlocked position as shown on the left.

Put one hand on the pulley to hold it in this position and prevent it from rotating.

With one hand on the carriage-side pulley, rotate the lock actuator pulley until it clicks the external switch (lower left image). In this process, one wire rope should slip while the other one should stay under tension. Now let go of the carriage side pulley. Return the fixed pulley to a neutral position and tighten its cinching screw in this position. Then take in the slack on the floating pulley and tighten it too.

The result is that the rotating the twist lock knob back and forth should rotate the carriage pulley without any noticeable backlash. (i.e: the carriage pulley should move when the knob moves.).

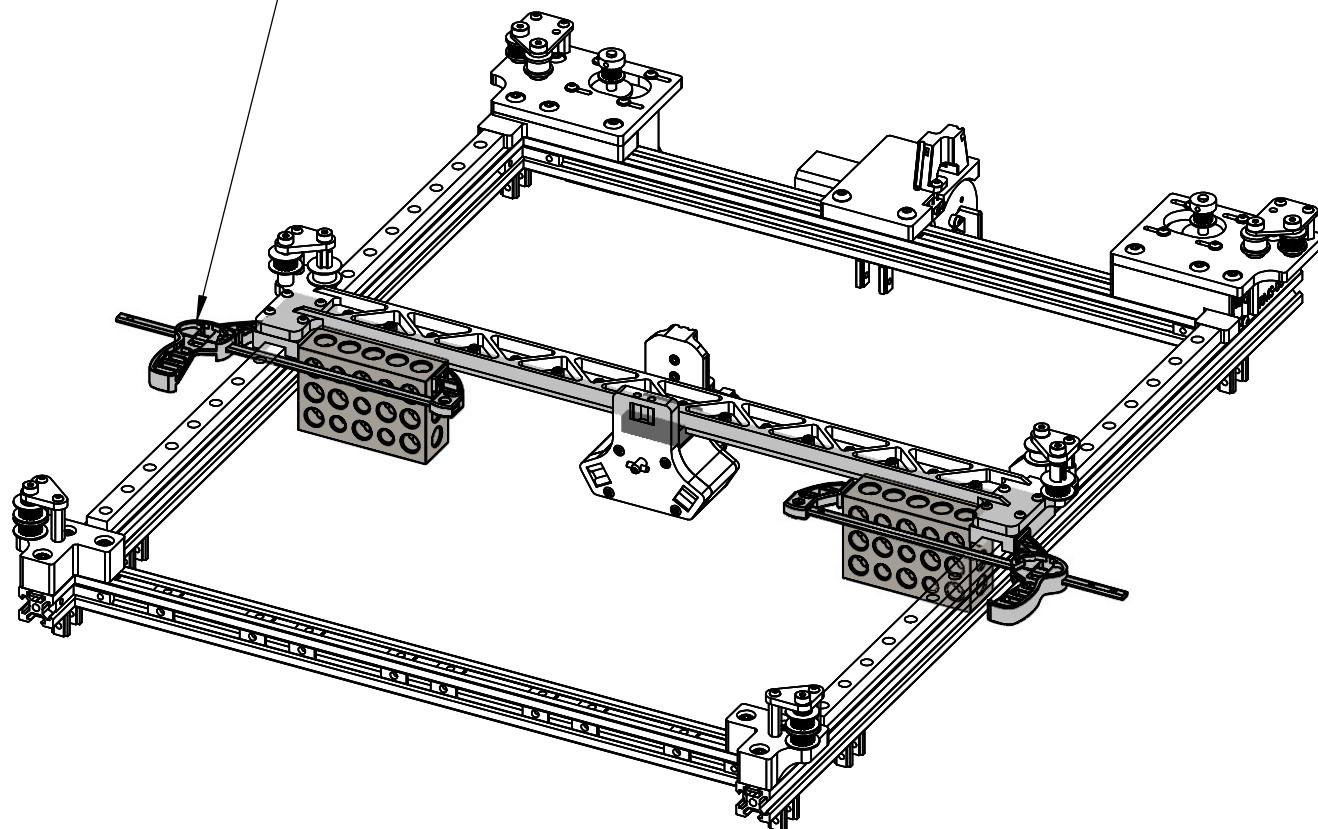


Put the Fixed Pulley in this configuration.

Lock Actuator Tension Check			
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	SCALE: 1:4	SHEET 15 OF 18	

Do this part on a table or other flat surface.

With two *1-2-3 blocks*, align the loose x-rail with the carriages on the y-rails by pushing both blocks into the corners ensuring that both contacting faces of all parts are fully flush to the *1-2-3 blocks*. Gently apply clamps to hold the blocks in this position. Fully-tighten all remaining loose screws in this configuration. When done, remove the blocks.



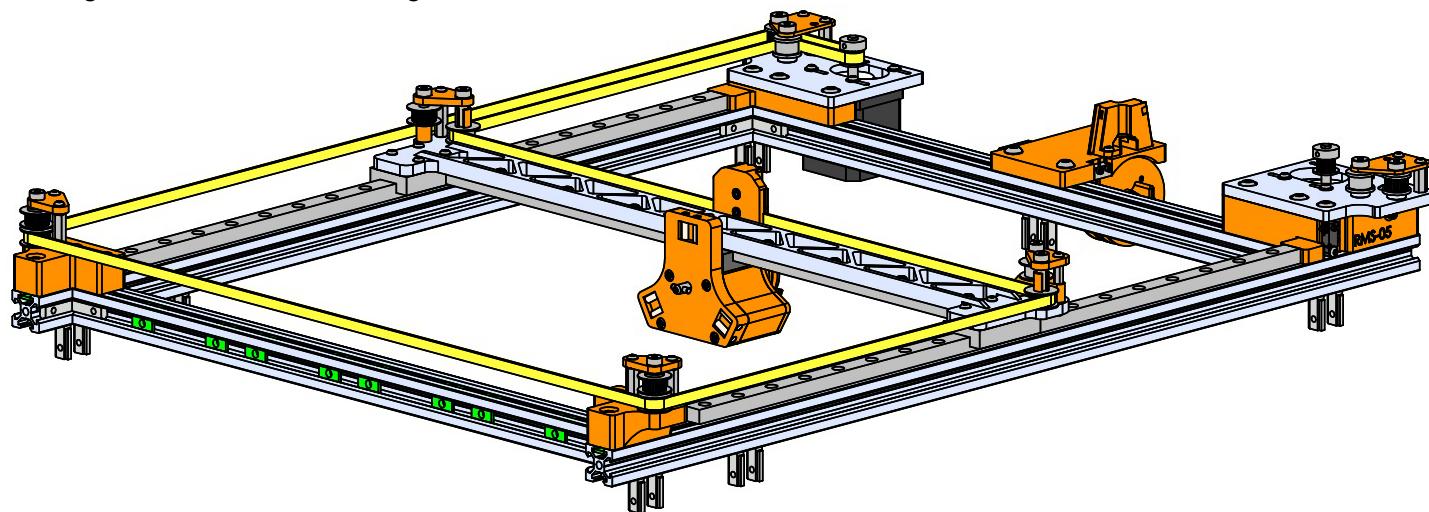
#### Crossbar Squaring



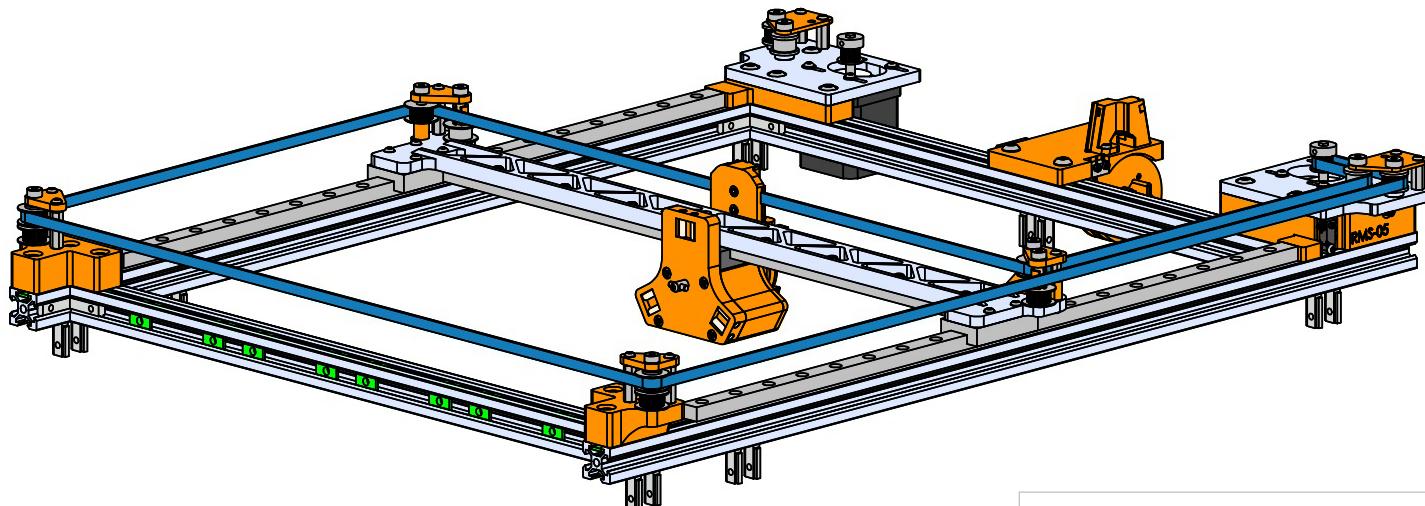
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SCALE: 1:4      SHEET 16 OF 18

If you are cutting belt from belt stock, start by cutting two lengths of about 2200mm long. Once the belt is loosely set in the machine, you can cut it to a final length of about 2155mm long.



Install the lower belt by following the pattern shown above and tightening both ends into the carriage. Only 5 timing belt teeth need to seat into the carriage, and the belt will feel extremely loose in this configuration. Then do the same for the upper belt pattern shown below.



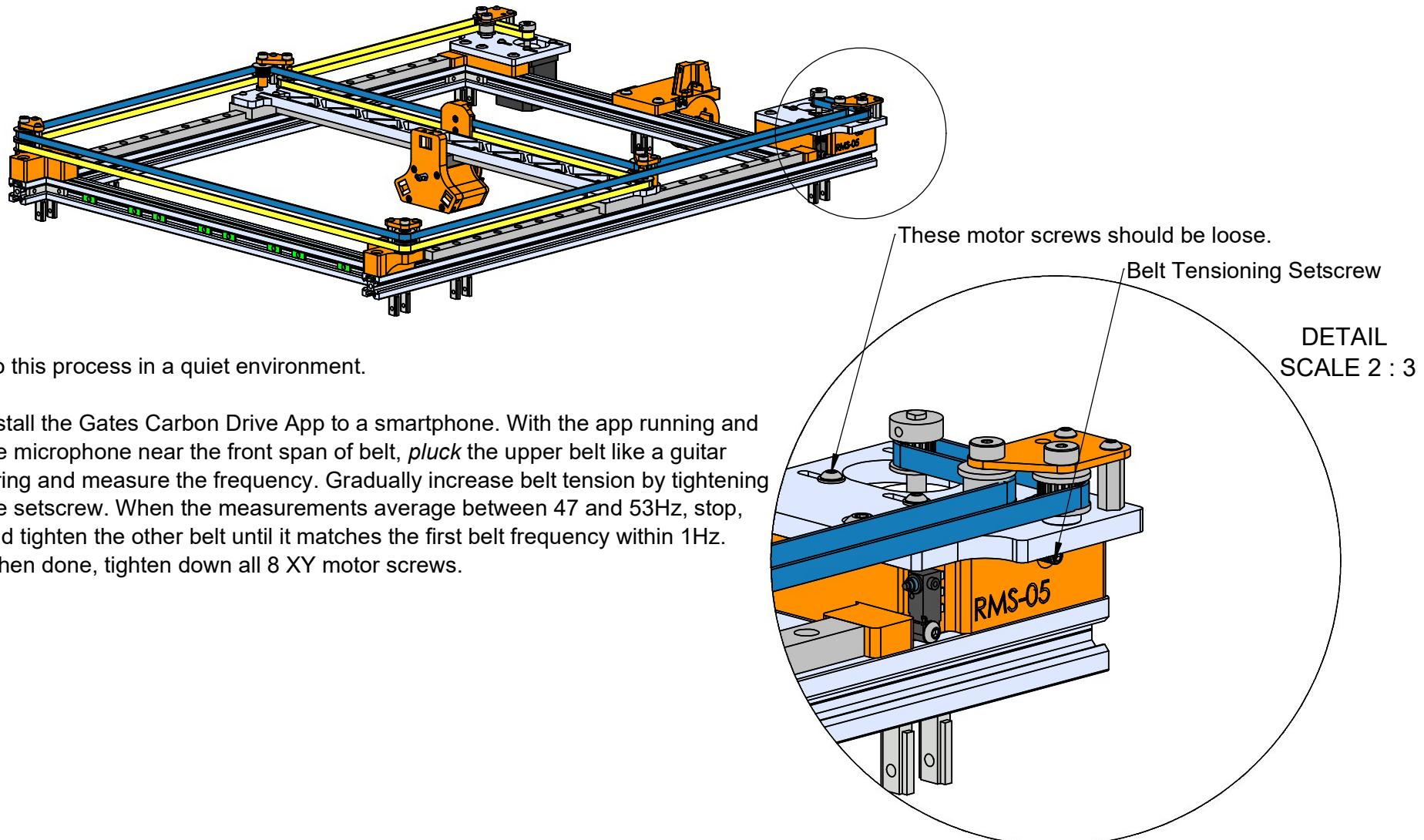
ITEM NO.	DESCRIPTION	QTY.
1	CoreXY Frame	1
2	2GT Timing Belt, 6mm wide, ≈2155mm long	2

### Belt Installation



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SCALE: 1:4	SHEET 17 OF 18

First center the carriage in the middle of the frame by eye. Belts may skip; that's ok while they're loose. Next, ensure that both drive motors are loose and can slide back-and-forth in their slots when pushed by-hand. Then locate the tensioning setscrews on each sides of the motor corner plates.



Do this process in a quiet environment.

Install the Gates Carbon Drive App to a smartphone. With the app running and the microphone near the front span of belt, *pluck* the upper belt like a guitar string and measure the frequency. Gradually increase belt tension by tightening the setscrew. When the measurements average between 47 and 53Hz, stop, and tighten the other belt until it matches the first belt frequency within 1Hz. When done, tighten down all 8 XY motor screws.

Your XY Frame is complete! Remove the short 74mm extrusions from the beginning if you left them installed.

Belt Tensioning		
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	SCALE: 1:4	SHEET 18 OF 18