Darkly Labs

Emblaser

-Assembly Guide-

For Kit Version 1.5

Revision 7.4

The Emblaser contains many 3D printed parts.

Over-tightening of screws and bolts could lead to cracking within these parts.

Please follow these instructions carefully and treat all components delicately during assembly.

The Darkly Labs Team

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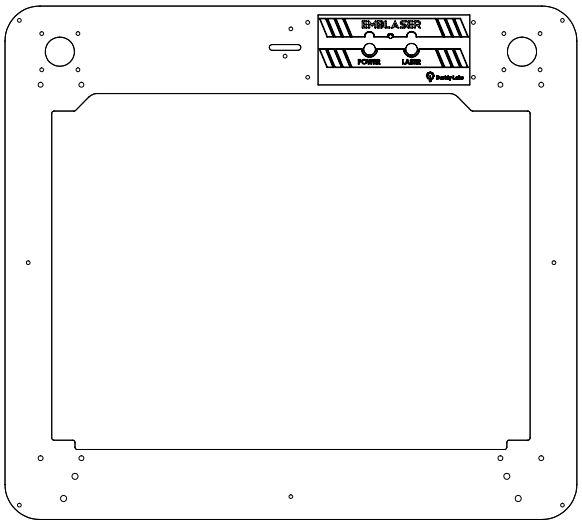
1. Top Panel Assembly

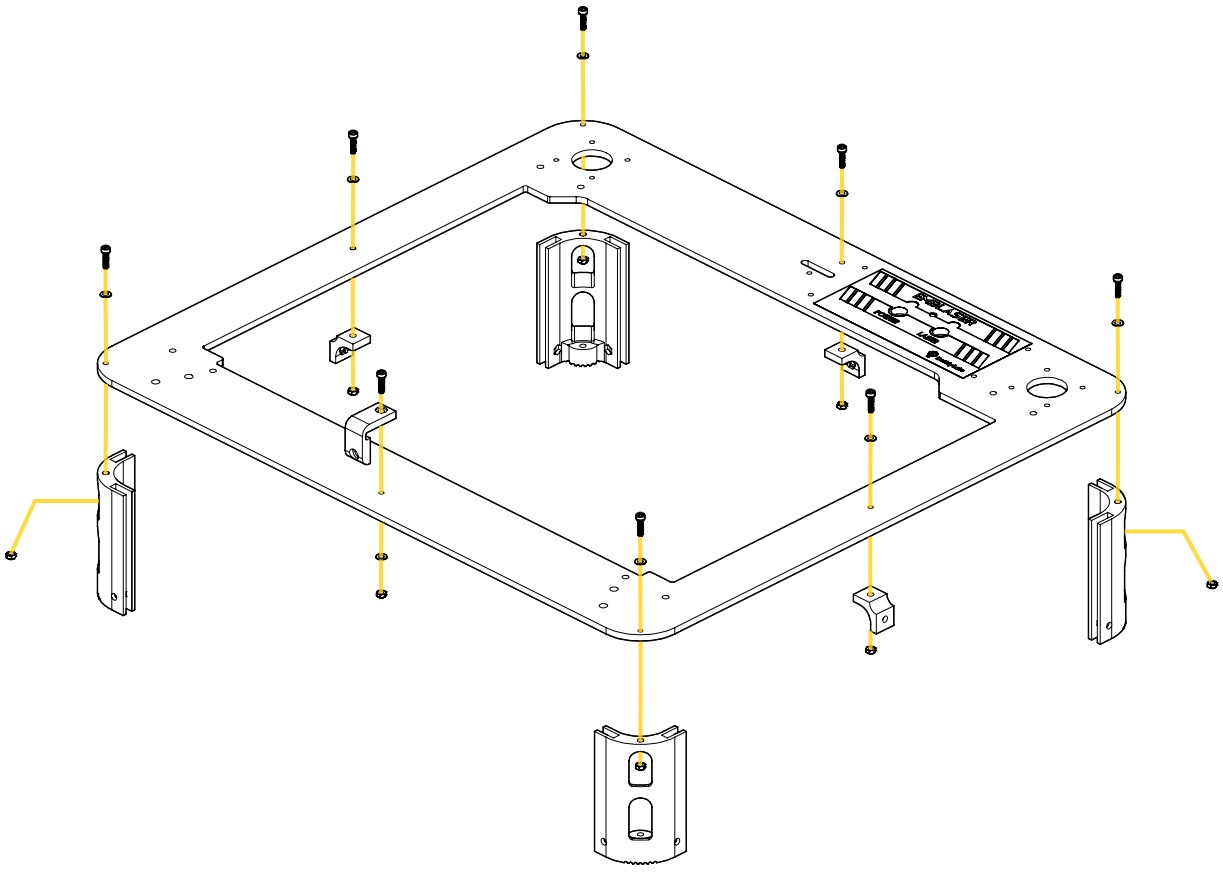
Prepare Top Panel

Remove the protective film from the chassis Top Panel.
Ensure the panel is oriented correctly with the side shown in the image facing up before continuing.



Attach Chassis Corners & Brackets

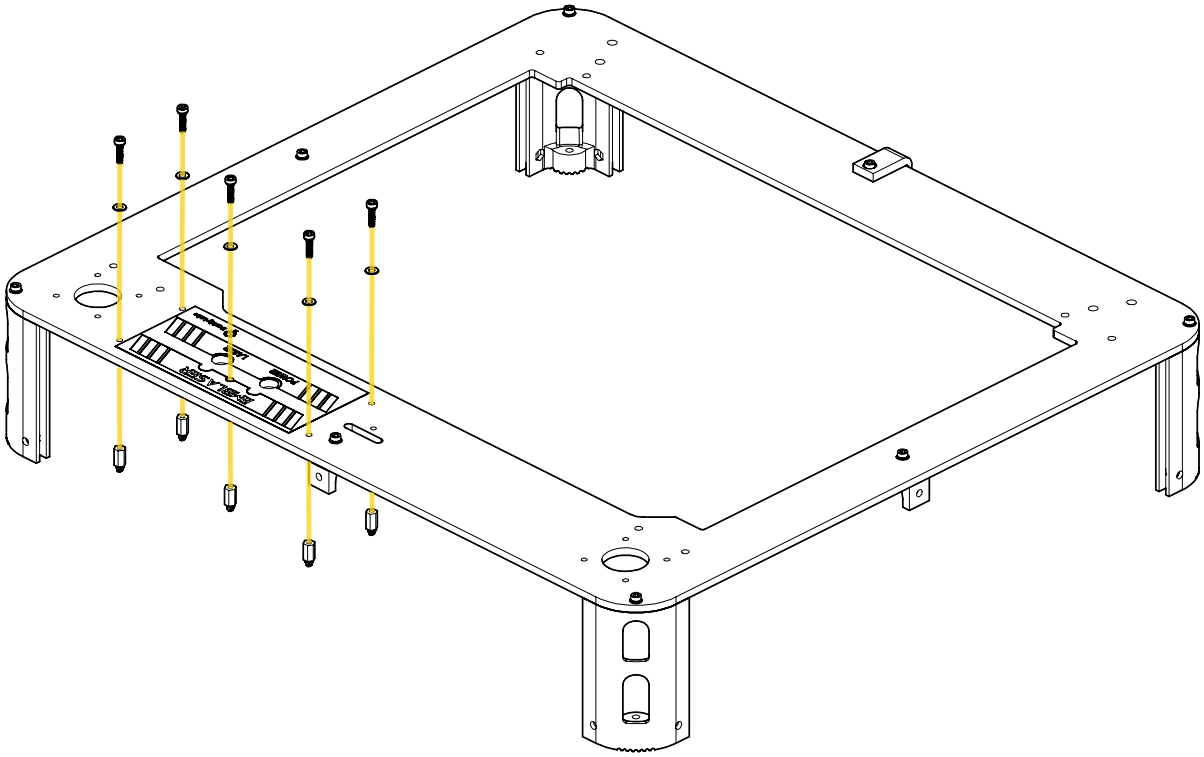
Attach the four (4) Chassis Corners and three (3) Chassis Brackets to the underside of the Top Panel using M3x12 Bolts, washers and nuts.
Attach one (1) Front Chassis Bracket to the upper side using an M3x12 bolt, washer and nut.
.



Top Panel Assembly Continued

Attach PCB Spacers to Top Panel

Attach five (5) PCB spacers to Top Panel using M3x12 Bolts and Washers.

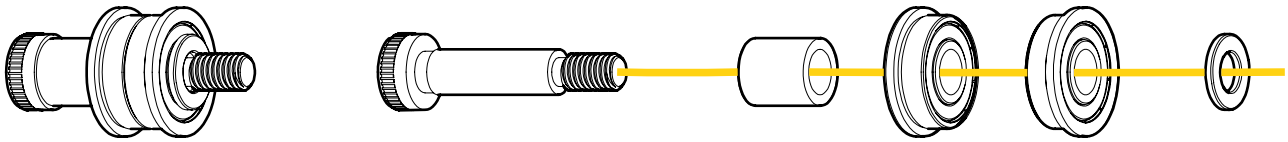


Belt Pulley Configurations

Assemble four (4) belt pulleys (2x Configuration A & 2x Configuration B) as follows:

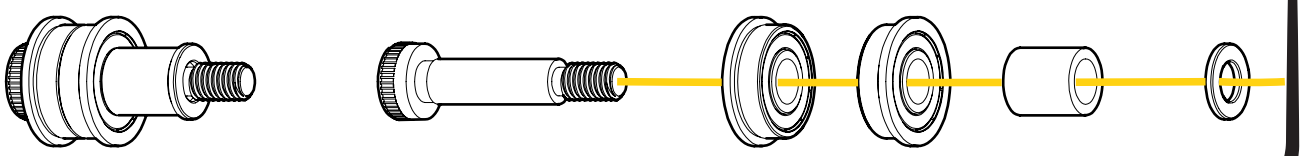
Belt Pulley Configuration A

Shoulder bolt, Nylon Spacer, Flange Bearing, Flange Bearing, M5 Washer.



Belt Pulley Configuration B

Shoulder bolt, Flange Bearing, Flange Bearing, Nylon Spacer, M5 Washer.

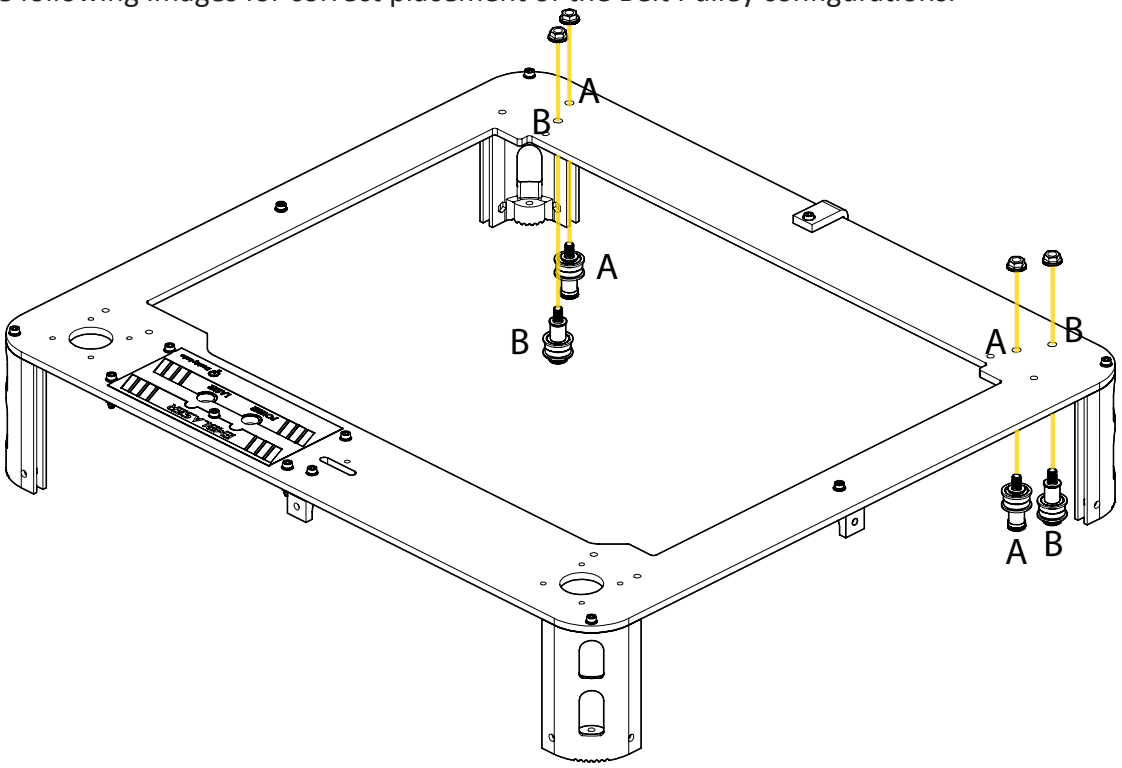


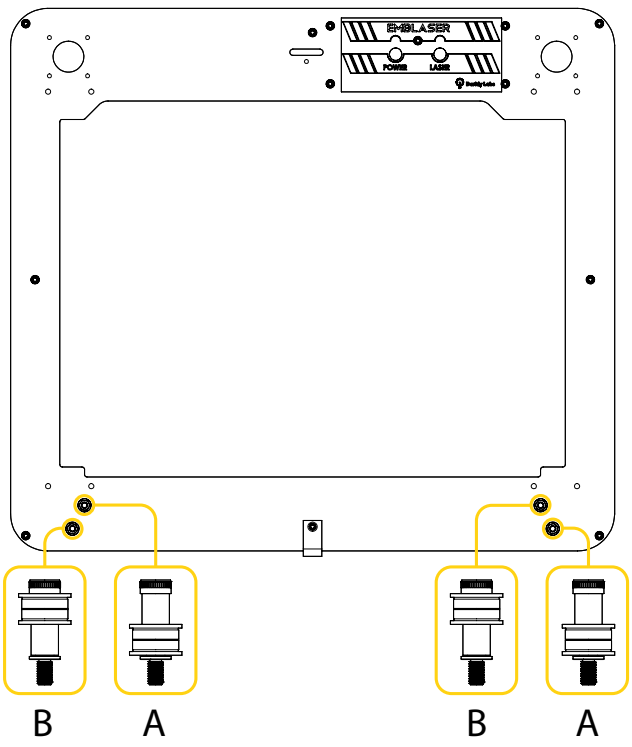
Top Panel Assembly Continued

Attach Belt Pulleys to Top Panel

Attach the Belt Pulley assemblies to the underside of the Top Panel using the M5 Lock Nuts. These nuts are designed to grip the panel so ensure there is no washer between the nut flange and the panel, in this case only.

See the following images for correct placement of the Belt Pulley configurations.

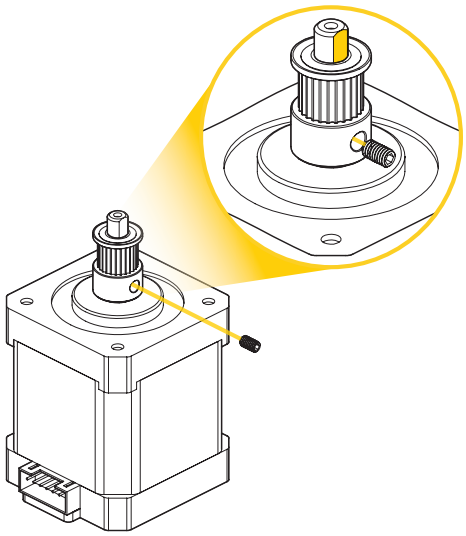




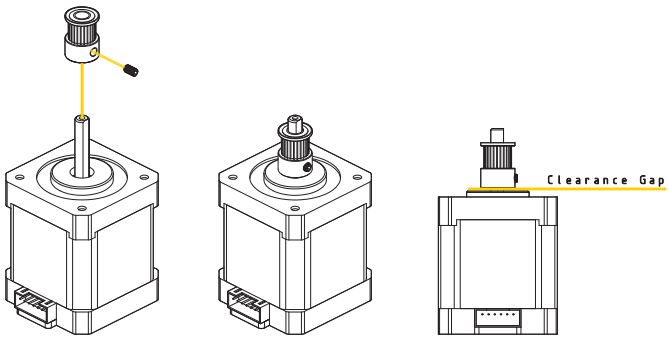
Top Panel Assembly Continued

Motor Pulley Sub-Assembly

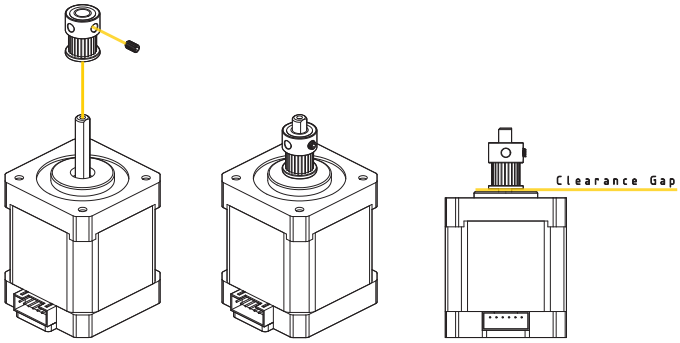
Assemble Motor Pulleys onto each stepper motor shaft as shown in Configuration A & B.
Make sure the set screw is aligned to the flat on the motor shaft.



Motor Pulley Configuration A
Pulley ribbed section is furthest from the motor.



Motor Pulley Configuration B
Pulley ribbed section is closest to the motor.



Pulleys should sit approximately 1mm from motor, along shaft.

Fasten Drive pulleys to motor shaft using set screws and 1.5mm Hex tool supplied.

Top Panel Assembly Continued

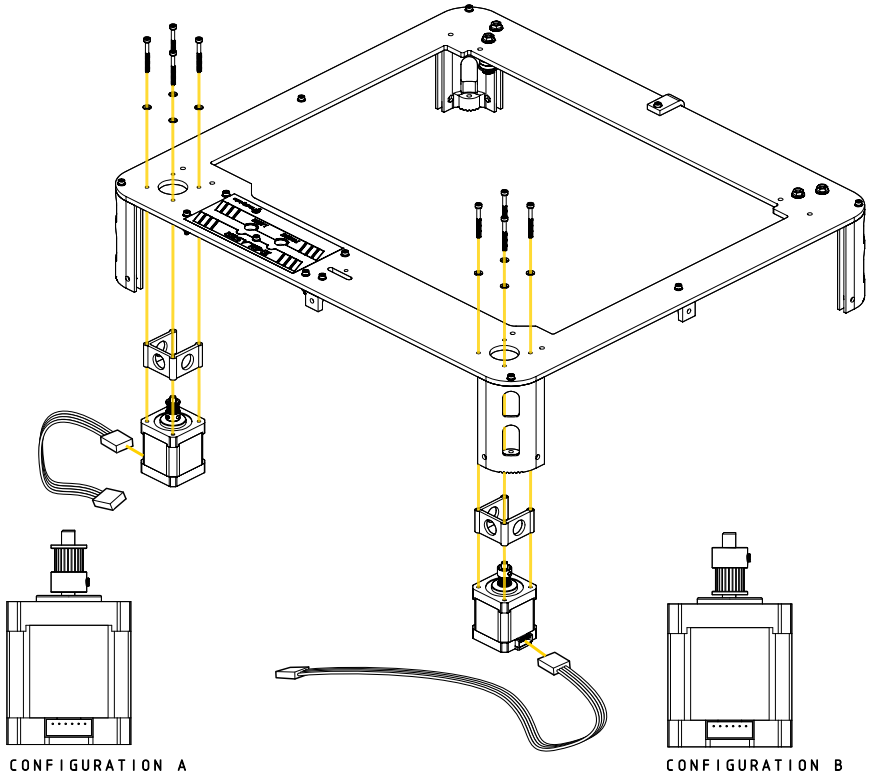
Attach Motors to Top Panel

Plug in the motor cables.
The shorter cable connects to motor Configuration A and the longer to Configuration B.

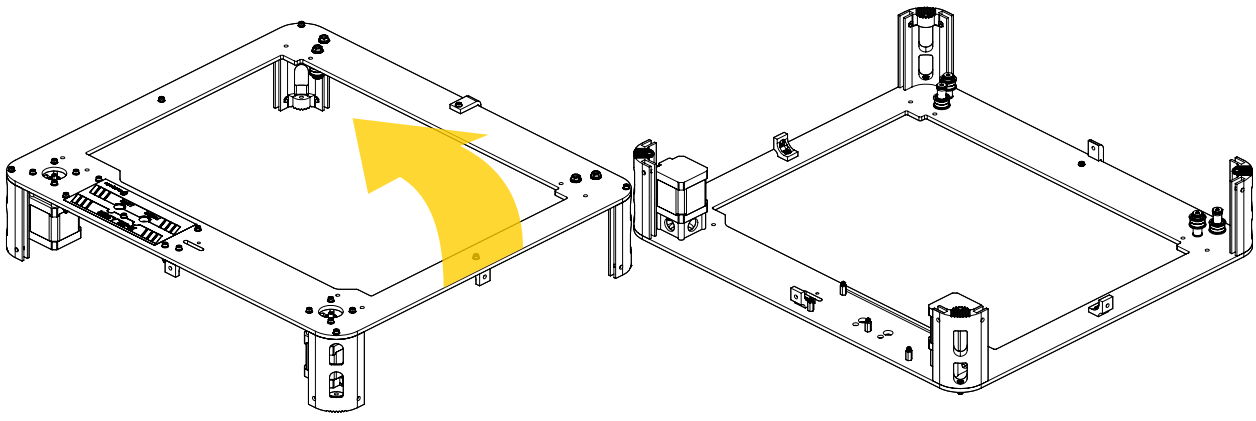
Attach Stepper Motors using Motor Brackets to underside of the Chassis Top Panel using M3x30 Bolts and Washers.

Ensure that open side of the Motor Bracket faces forward, as shown in the image below.

Ensure the connector on the Stepper Motor faces towards the side



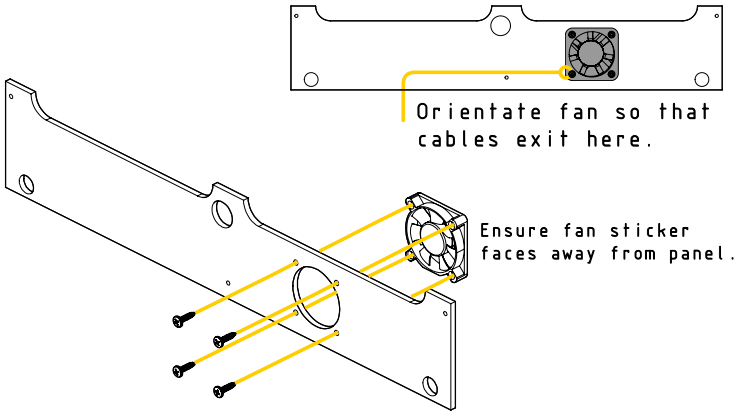
Turn Top Panel Assembly Over Carefully



2. Side Panels

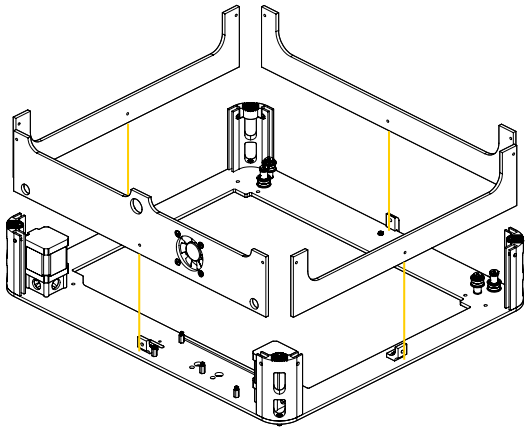
Attach Fan to Rear Panel

Remove protective film from chassis Rear Panel.
Attach 50mm Fan to the inside of Rear Panel using 16mm Self Tap Screws. See image below for correct orientation.



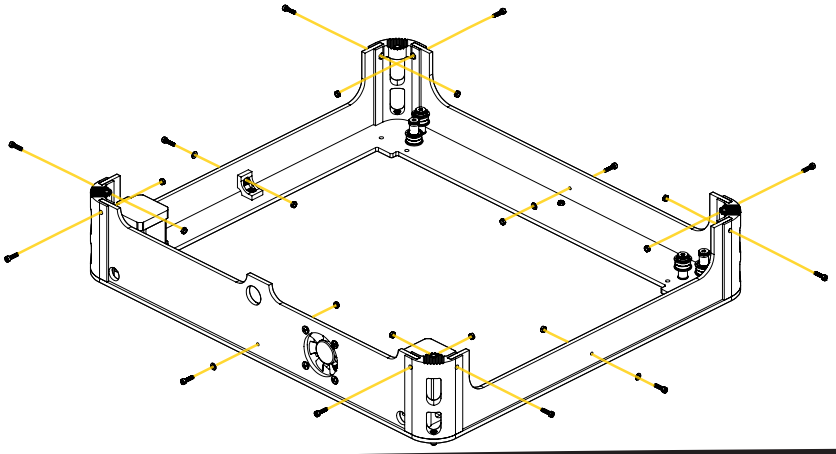
Slide Side Panels into Position

Remove protective coating from Chassis Side and Front Panels. Carefully slide panels into the Chassis Corner slots.



Attach Side Panels

Fasten each panel to the chassis corners and brackets using M3 x 12 bolts, M3 washers and M3 nuts.



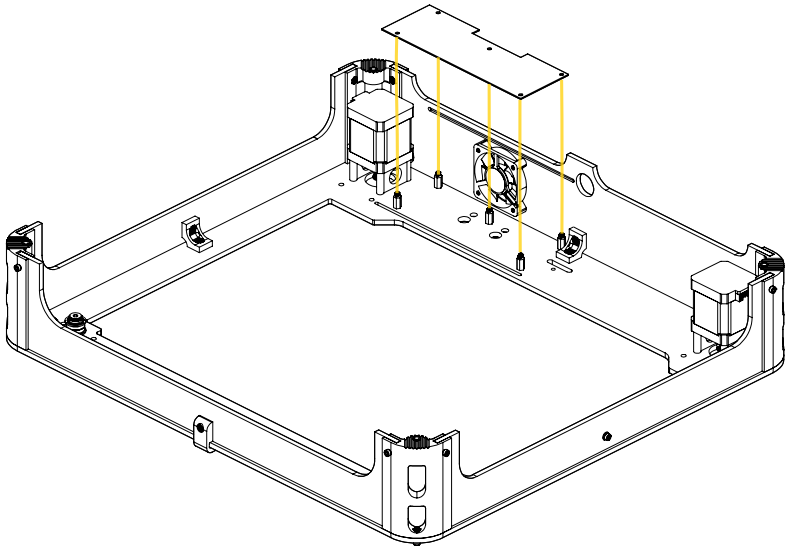
3. PCB

Attach PCB

The Emblaser PCB is a delicate component and static sensitive.
By following these steps, you will reduce the chance of damaging your electronics.

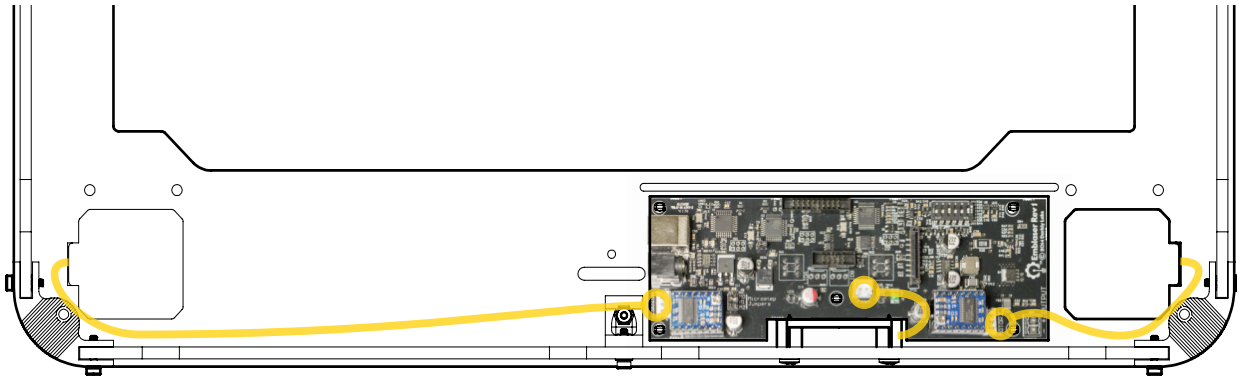
Caution: This is a delicate, static sensitive component.
Follow these steps carefully..

Carefully remove the board from its antistatic bag, making sure to hold it from its sides.
Make sure the buttons are aligned to the holes on the chassis top panel.
Snap the PCB onto the corresponding PCB spacers.



Attach Motor & Fan Cables

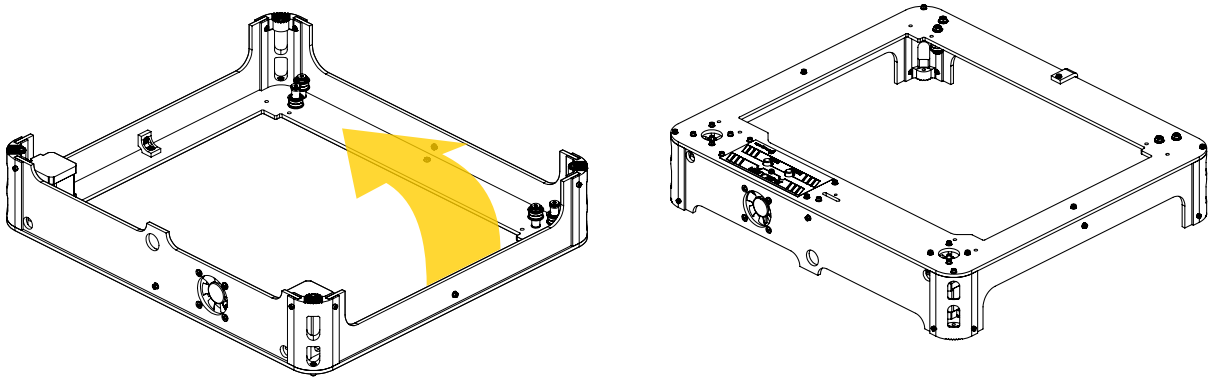
Connect the motor cables between the motor and its corresponding 4-way connector on the PCB.
Connect 50mm fan cable into its corresponding 2-way connector on the PCB.
See following images for details.



4. Laser Unit

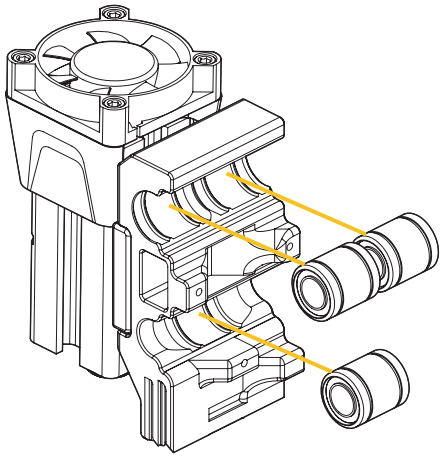
Turn Assembly Over Carefully

Carefully flip device over to the upright position.



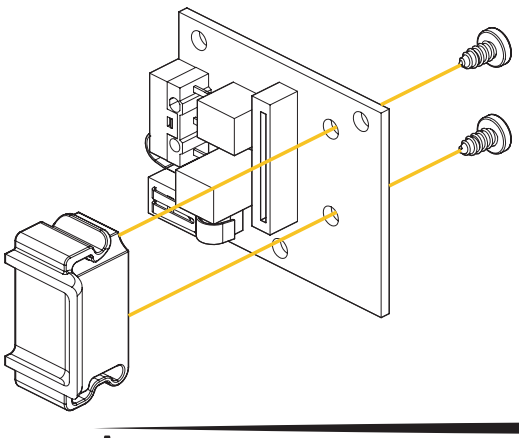
Clip in Linear Bearings

Clip three Linear Bearings into the Laser Carriage Module. Be careful to align the bearing grooves with their corresponding location. Some pressure will be required to snap the bearings in place.



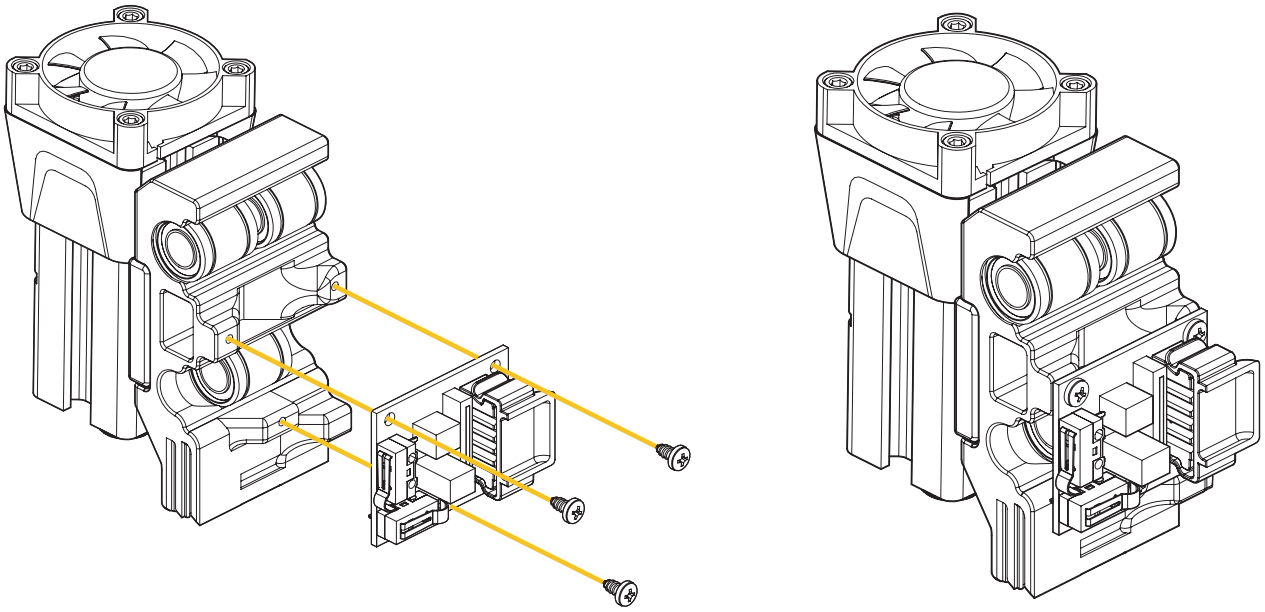
Attach FFC Clip to PCB - Laser Head

Attach the FFC Clip onto the PCB - Laser Head using two (2) 8mm Self Tap Screws. Do not overtighten.



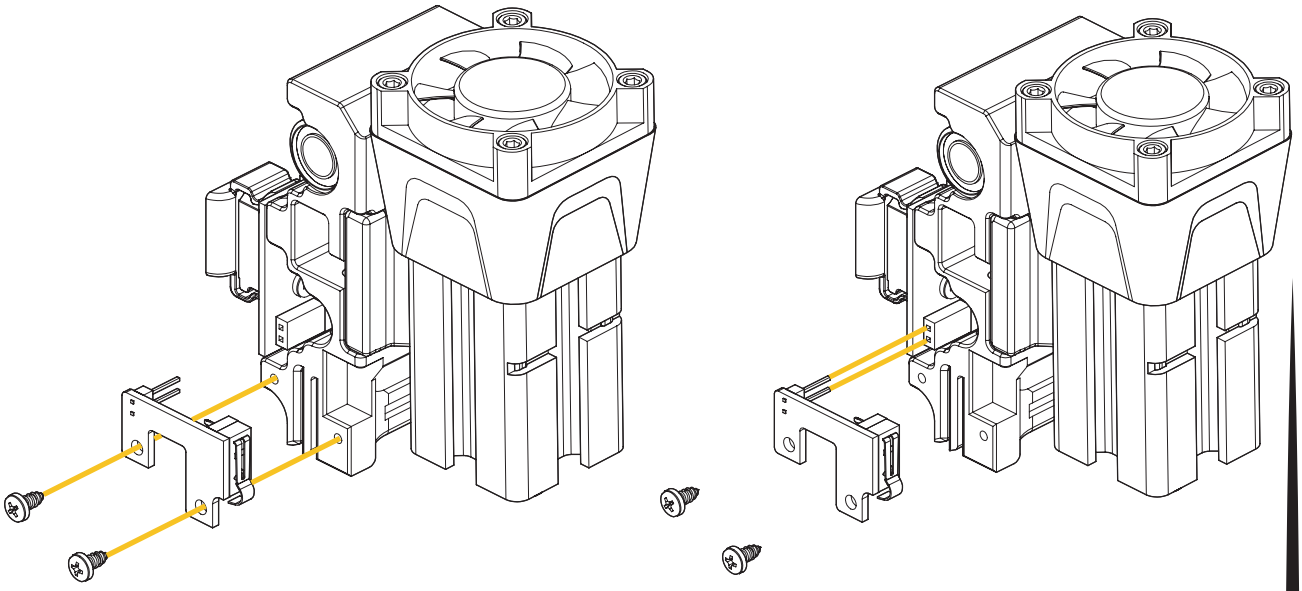
Attach Laser Head PCB to Laser Carriage

Attach the PCB - Laser Head to the Laser Carriage using three (3) 4 x 1/4 self tap screws.



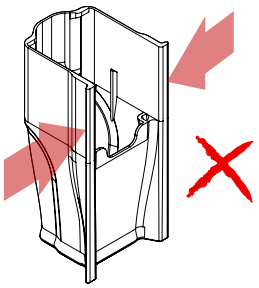
Attach Laser Guard PCB to Laser Carriage

Attach PCB - Laser Guard to the Laser Carriage using two (2) 4 x 1/4 self tap screws.
Make sure the two-pin connector is inserted correctly into the socket on the PCB - Laser Head.

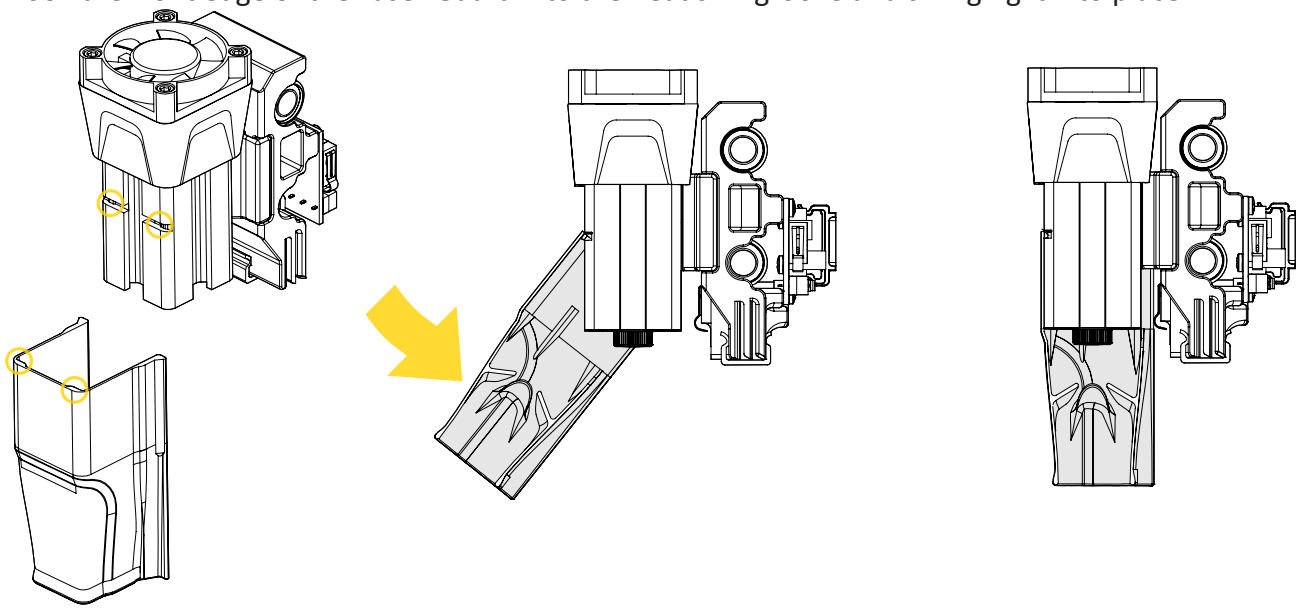


Attach Laser Guard

Caution: Until installed, the laser guard is easily damaged. Do not apply pressure to the sides as shown in this image.

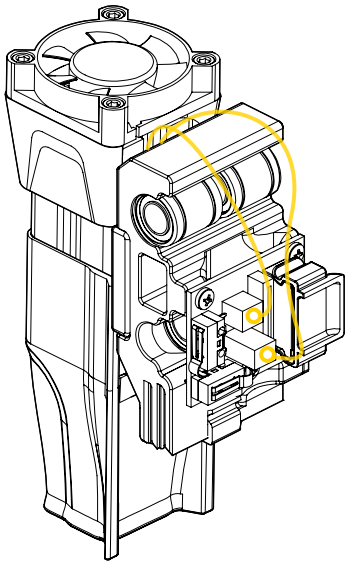


Hook the front edge of the Laser Guard into the heat sink groove and swinging it into place.



Connect Cables

Connect Fan and Laser Diode cables to appropriate sockets on the PCB - Laser Head as shown.

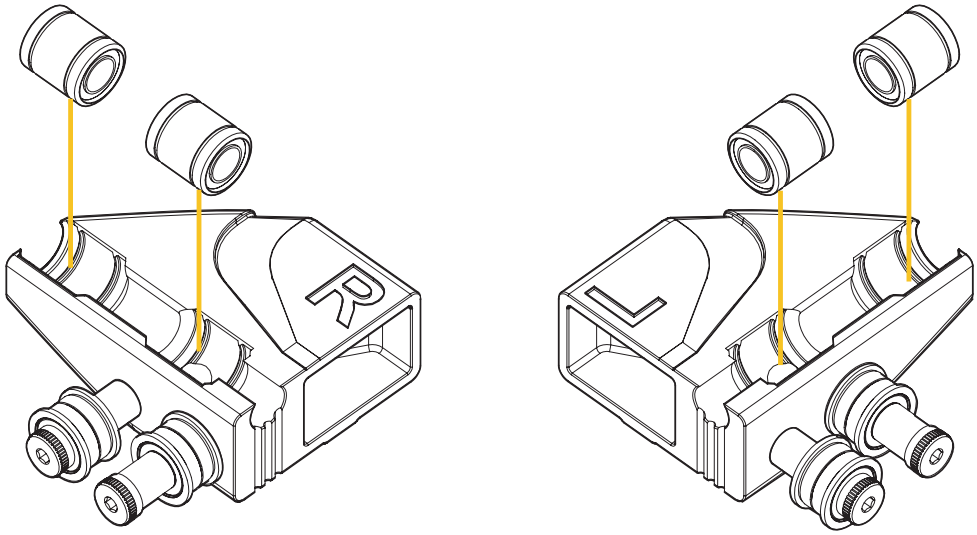


5. GANTRY

Assemble Left & Right Gantry Carriages

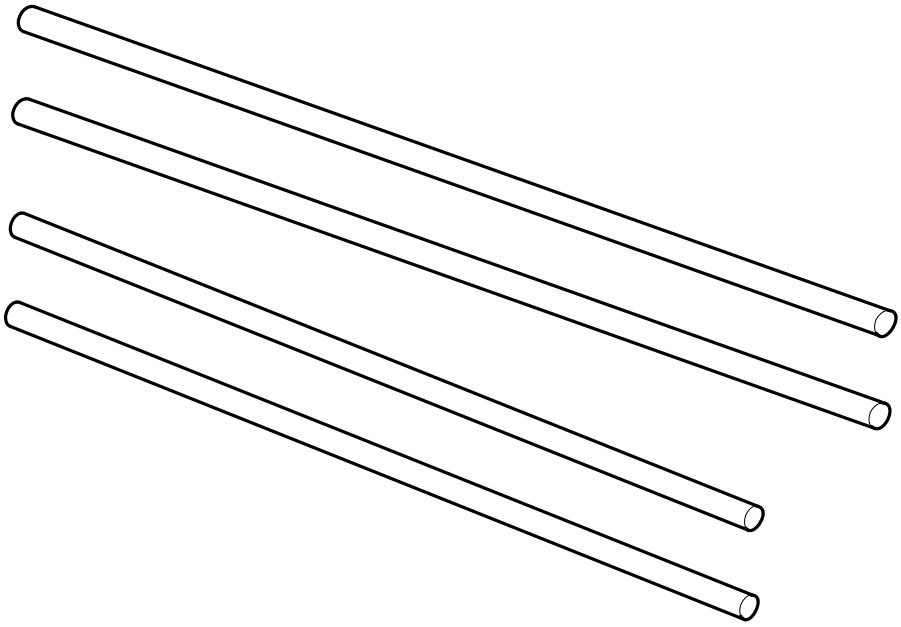
Insert Linear Bearings into the Gantry Carriages as shown.
Some pressure will be required to snap the Linear Bearings in place.

Note: Newer kits will have these parts pre-assembled.



Linear Rails

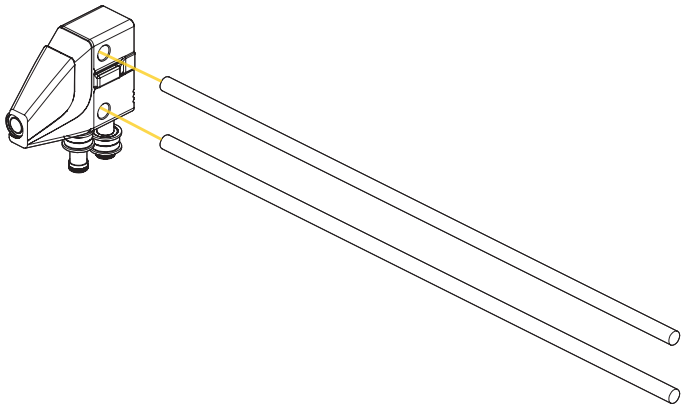
The gantry contains four (4) Linear Rails. The two (2) longer rails support the Laser Carriage, the two (2)shorter rails support the Gantry.



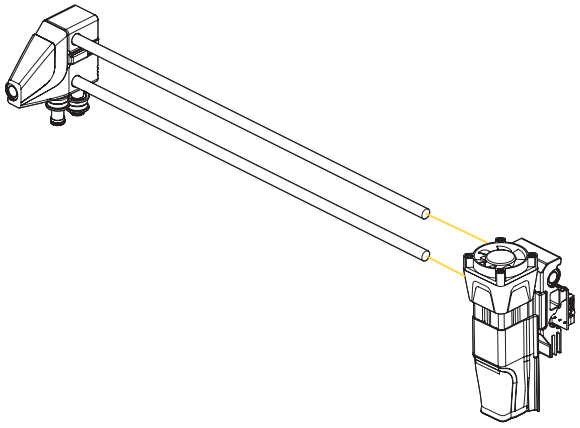
Gantry Continued

Assemble Linear Rails

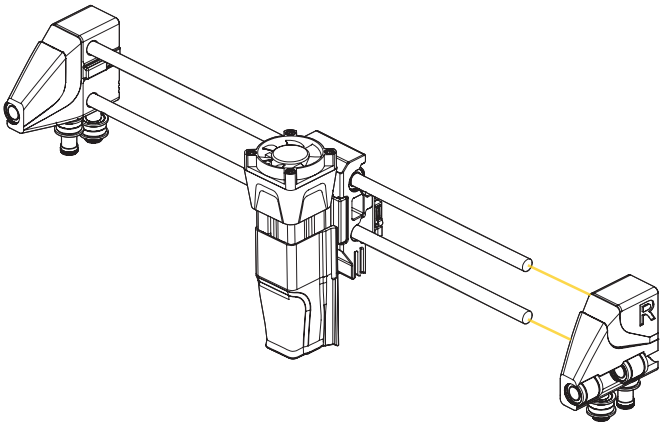
Insert the two (2) longer linear rails into Gantry Left Carriage. These should slide in approximately 12mm.



Carefully slide the laser carriage onto the longer linear rails.
Do this slowly or you may damage the linear bearings.

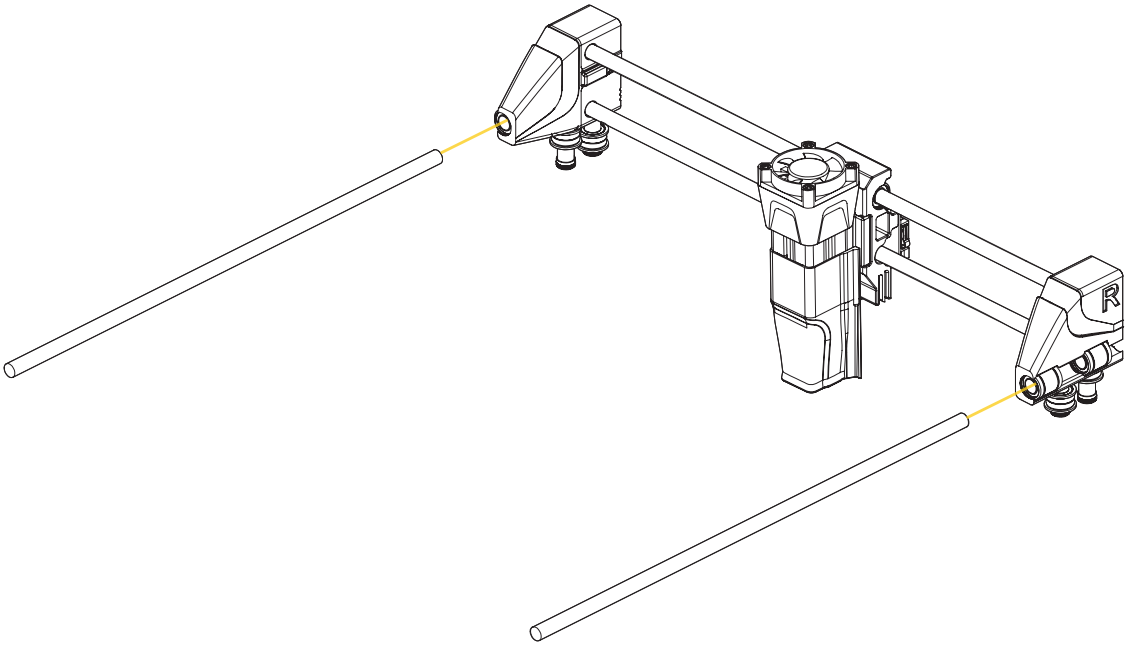


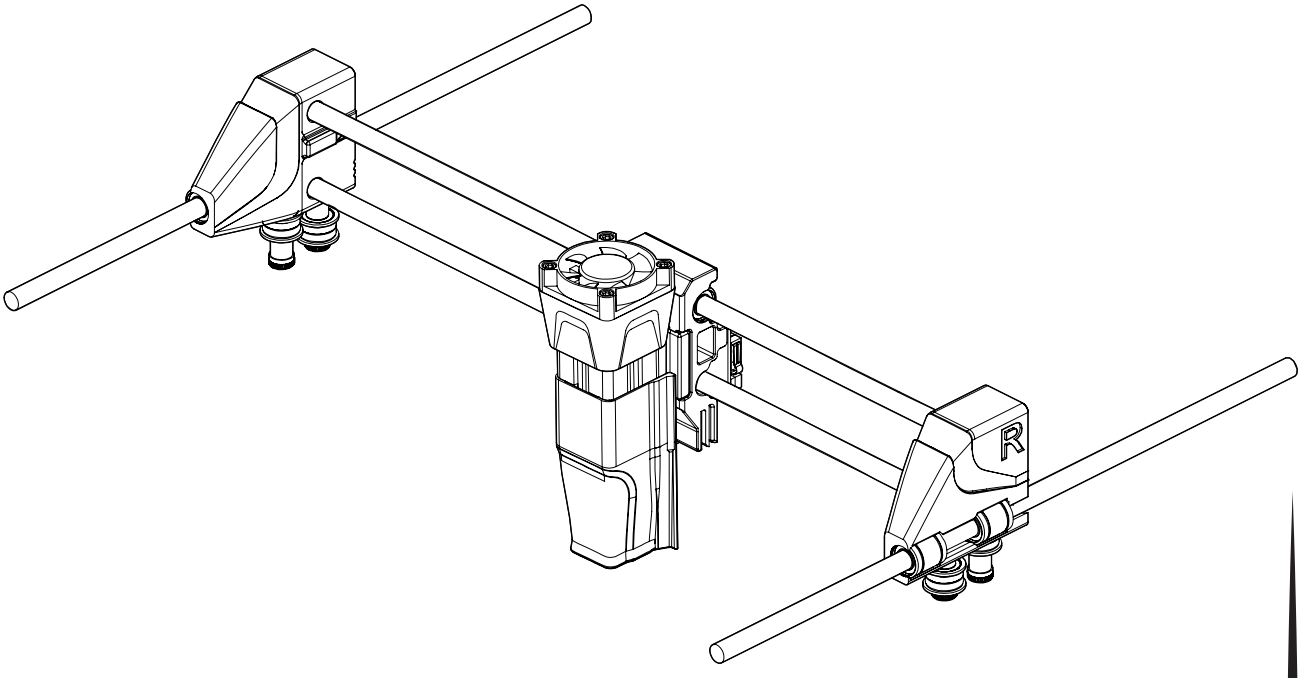
Insert Gantry Right Gantry Carriage onto the rails..
Once again these should slide in approximately 12mm.



Gantry Continued

Slide Gantry Linear Rails through Gantry Carriage Bearings
Do this slowly or you may damage the linear bearings.



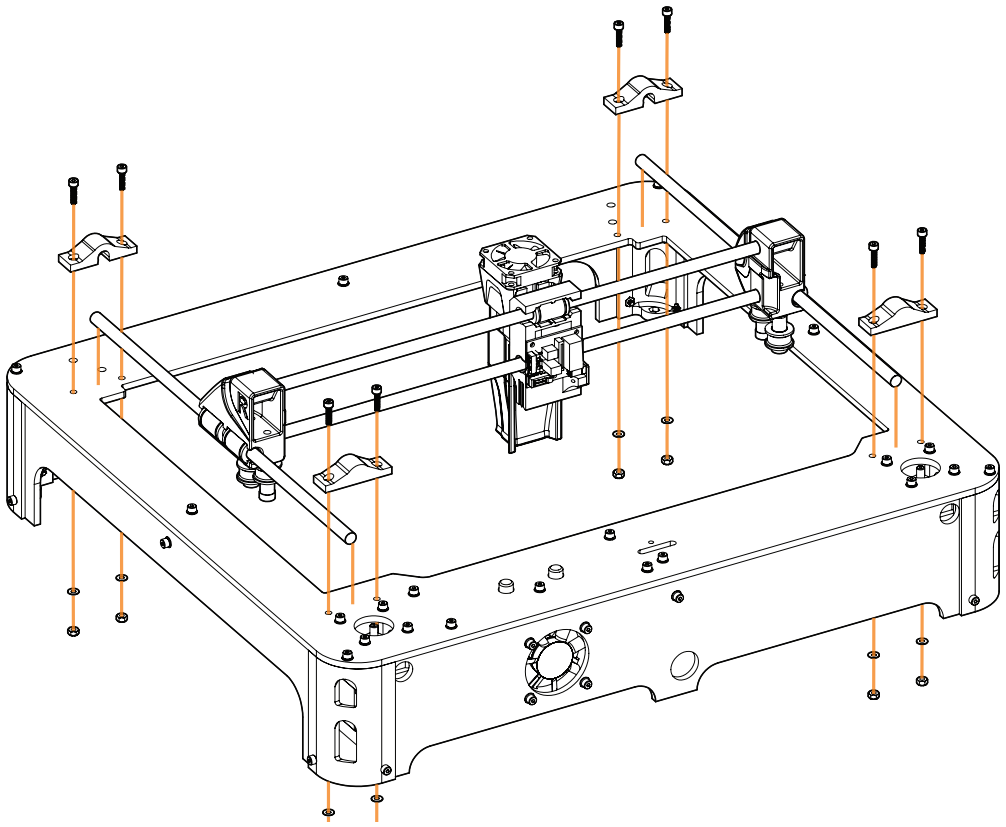


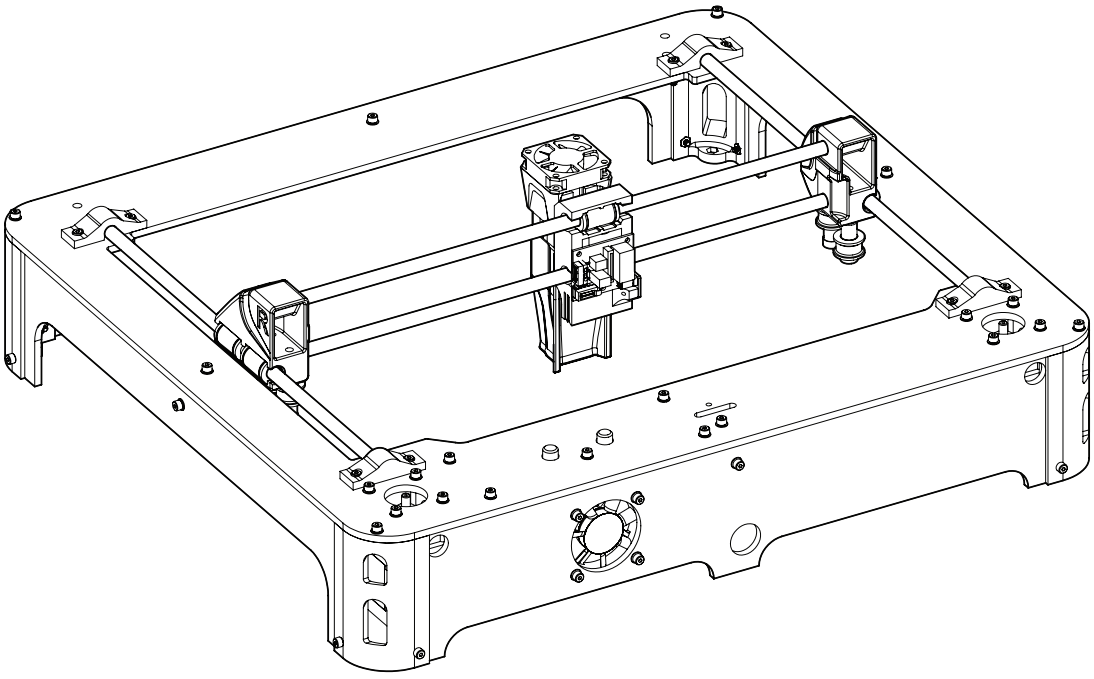
Gantry Continued

Attach Gantry to Top Panel

Place gantry in position on Top Panel
Secure Gantry to Top Panel with Rail Brackets using M4 bolts, washers and nuts.

Caution: Do not over tighten bolts!



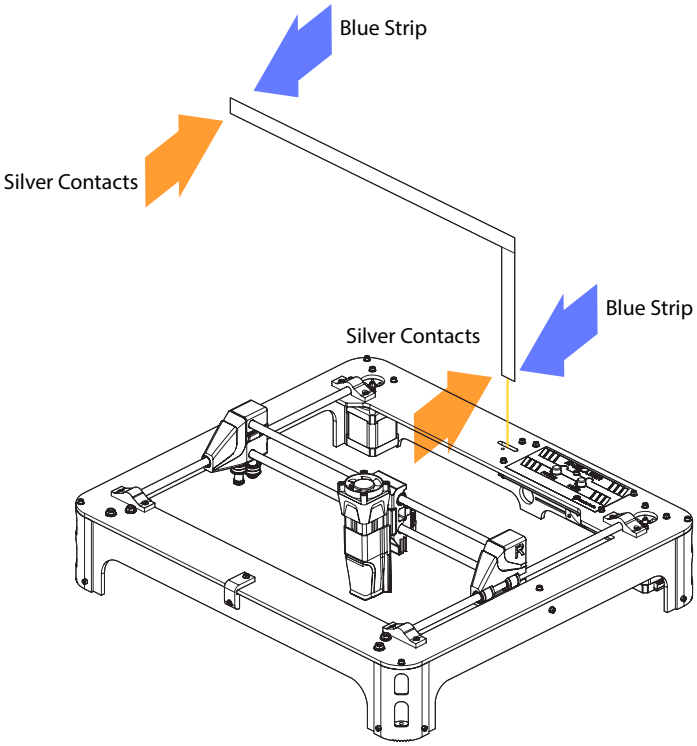


6. Flat Flexible Cable (FFC)

Insert Flat flex Cable (FFC)

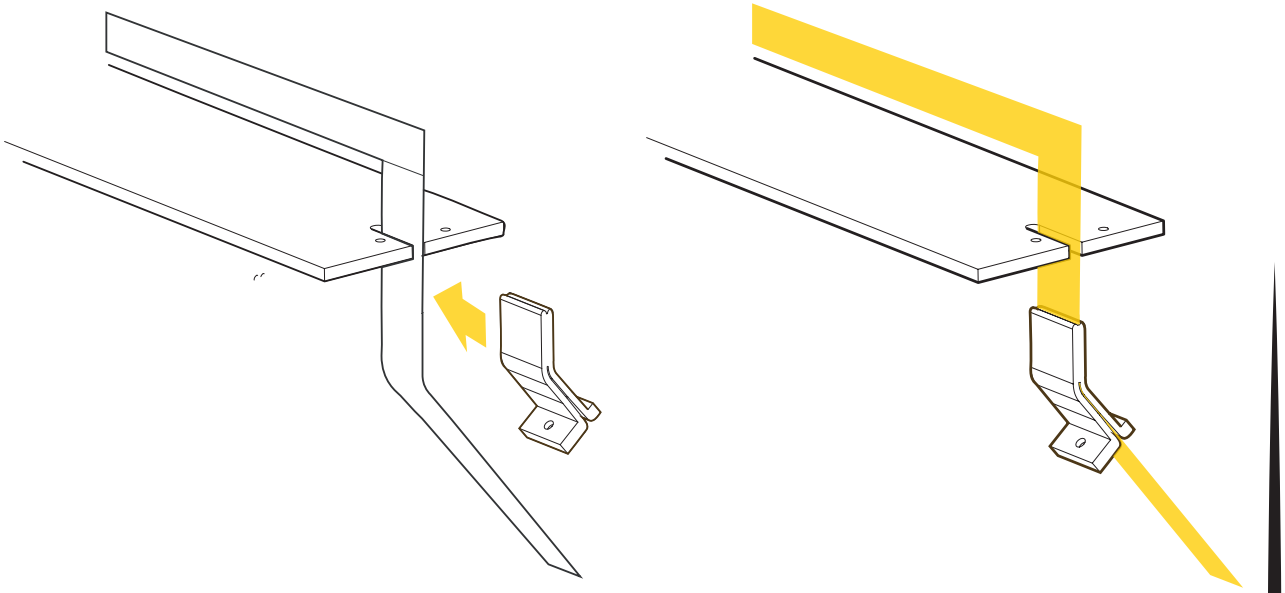
Important: The FFC is a delicate component that should be handled with care. It has been prefolded in the correct location for you. Avoid adding any bends, folds or kinks.

Identify the short arm of the FFC, insert this length into the indicated slot in the Chassis Top.



Slide Laser FFC Support onto FFC

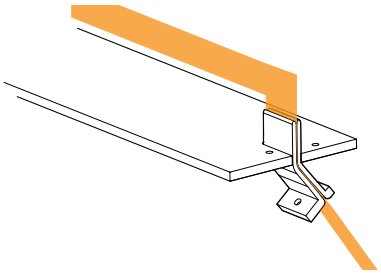
Once through the slot, slide Laser FFC Support over the FFC.



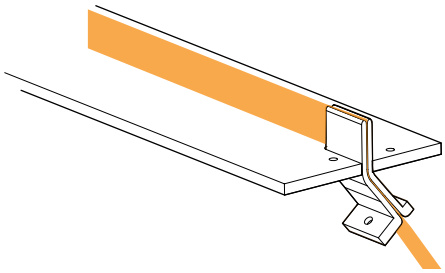
Flat Flexible Cable (FFC) Continued

Insert FFC Support into Top Panel

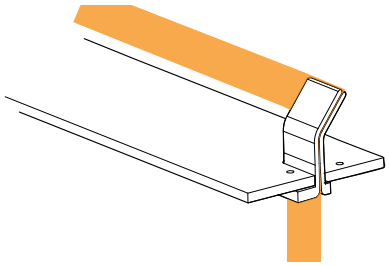
Insert the tip of the Laser FFC Support into the Top Panel. Slide the Laser FFC Support and FFC cable half way up into the slot. Remove the paperclip and discard.



Before inserting the support all the way into the top panel, carefully slide the FFC the rest of the way until it is flush with the top of the support.

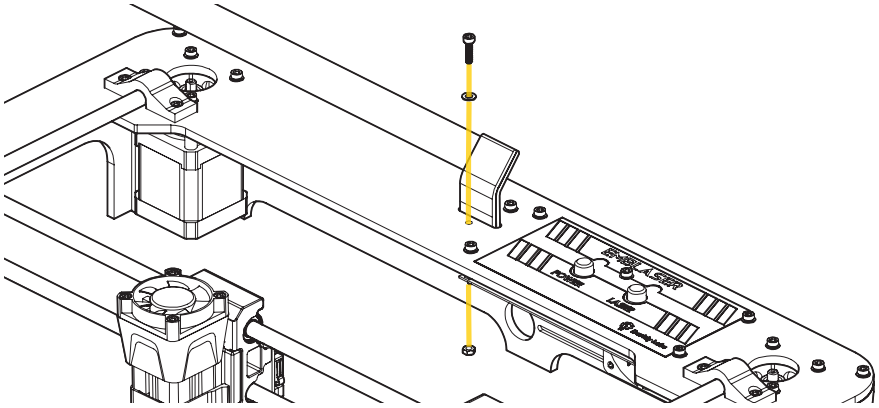


Insert FFC support all the way into top panel (this may require some gentle force).



Attach FFC support

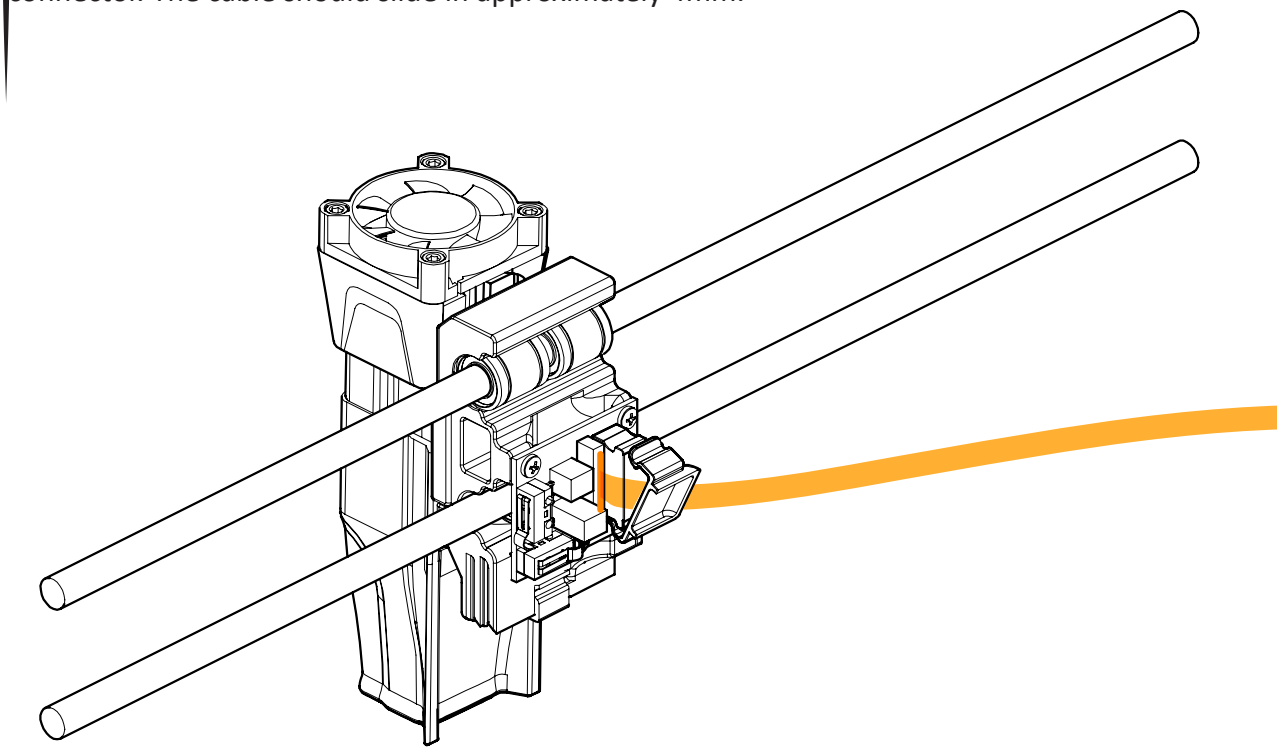
Connect Laser FFC Support to Top Panel with an M3x12 bolt, washer and nut.



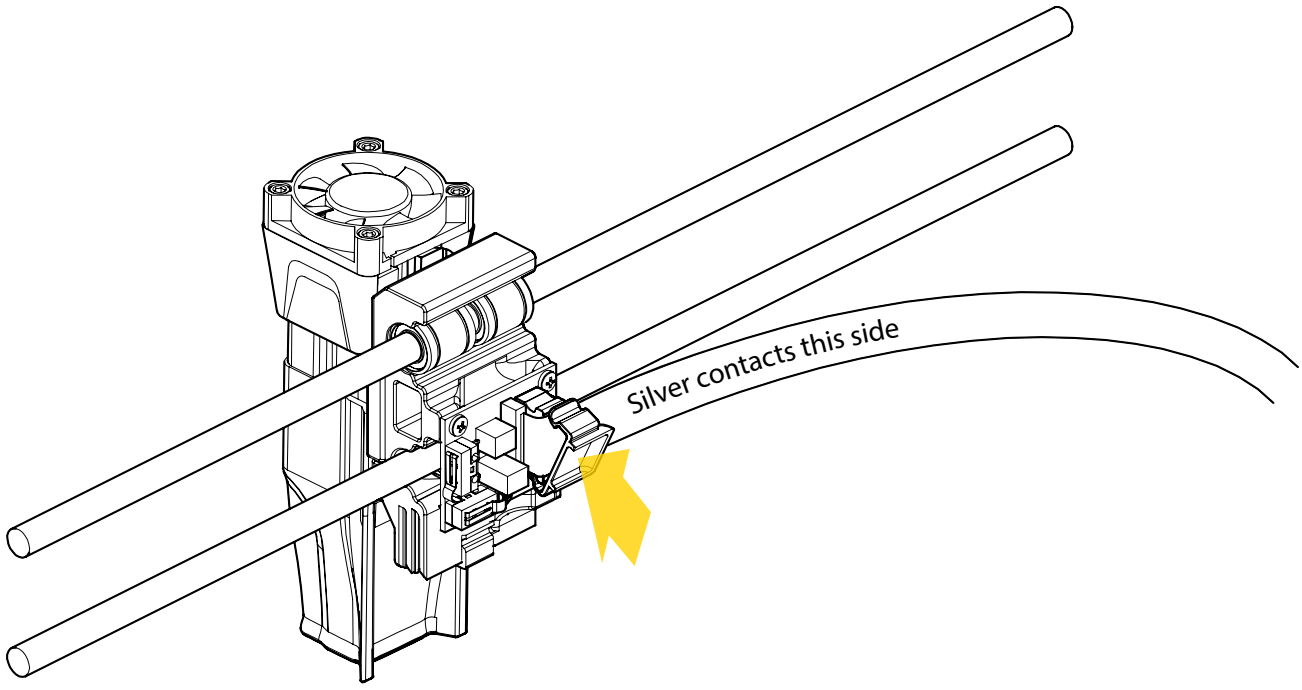
Flat Flexible Cable (FFC) Continued

Connect FFC to Laser Head

Pass the loose end of the Flat Flexible Cable (FFC) through the Laser FFC Support Clip and insert it into the appropriate socket on the PCB - Laser Head. There will be a little friction as you insert the FFC into its connector. The cable should slide in approximately 4mm.



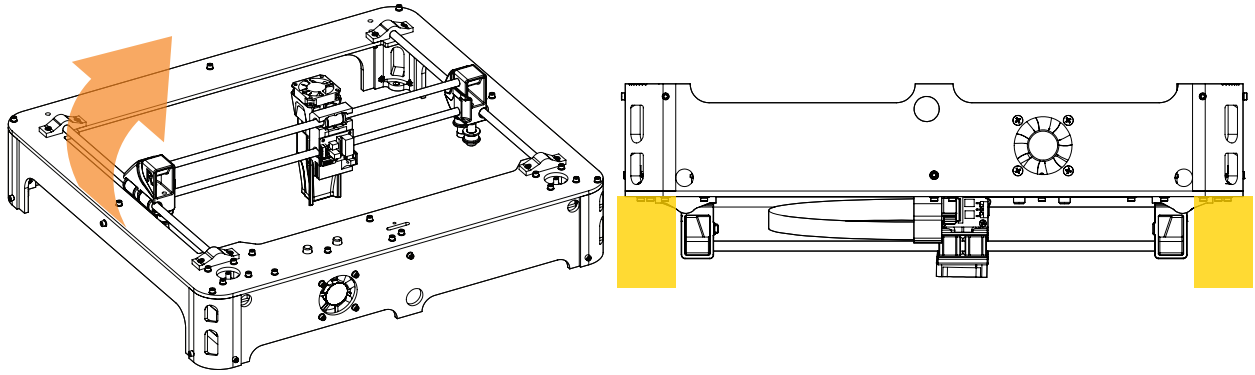
Clamp the FFC in place using the Laser FFC Support Clip.



Flat Flexible Cable (FFC) Continued

Turn over the machine

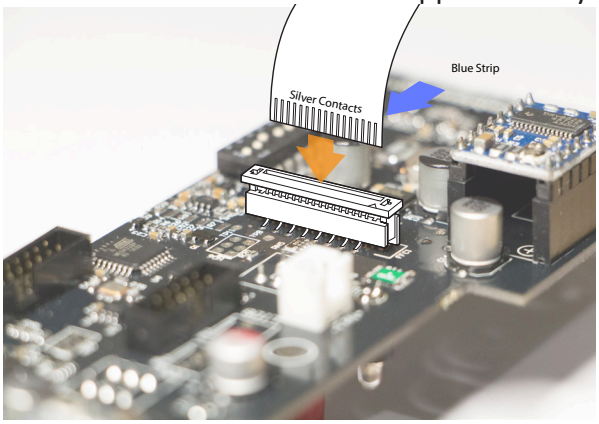
Carefully turn the machine over and stand it on four spacers to make it easier to work on. Cups make a good spacer.



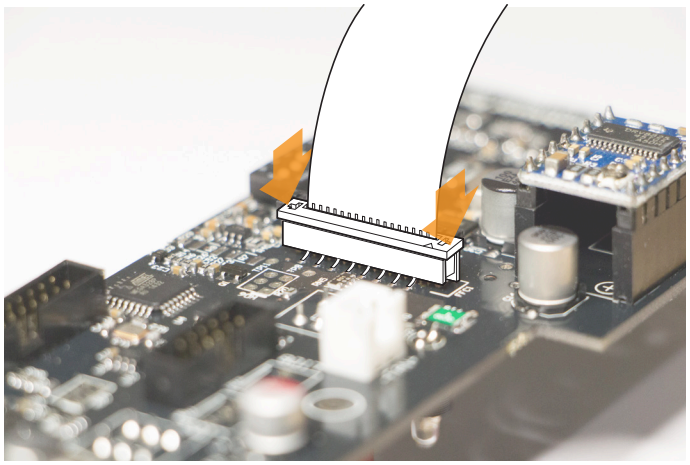
Connect FFC to PCB - Emblaser

Locate the FFC connector on the Emblaser PCB. Gently lift the locking mechanism.

Taking the short end of the FFC (the end previously inserted through the Top Panel), gently and evenly insert the FFC into the connector. It should slide in approximately 5mm.



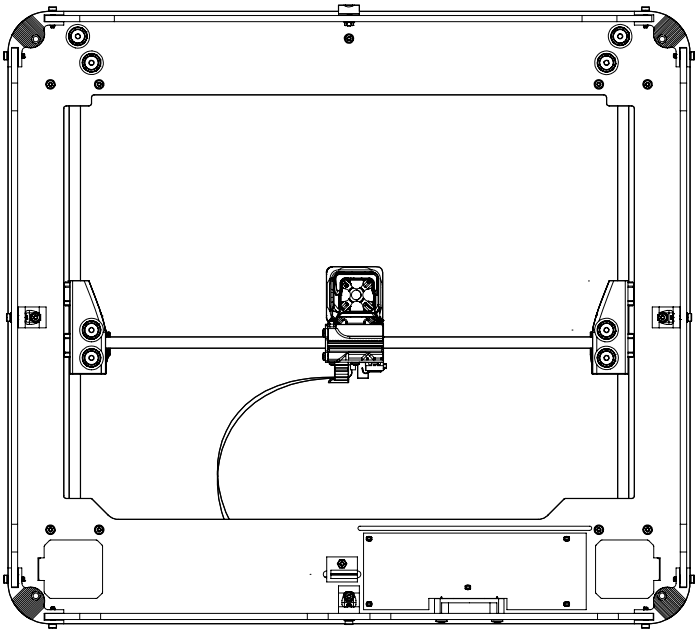
Push down the locking mechanism to lock in the FFC



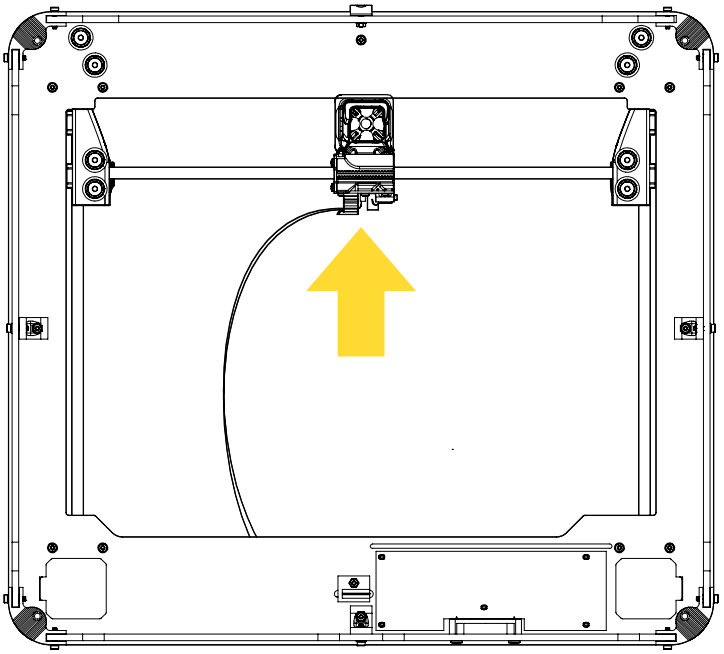
7. Belt System

Attach the first belt

With the machine still resting on its spacers, orient the machine so the control panel and motors are closest to you.

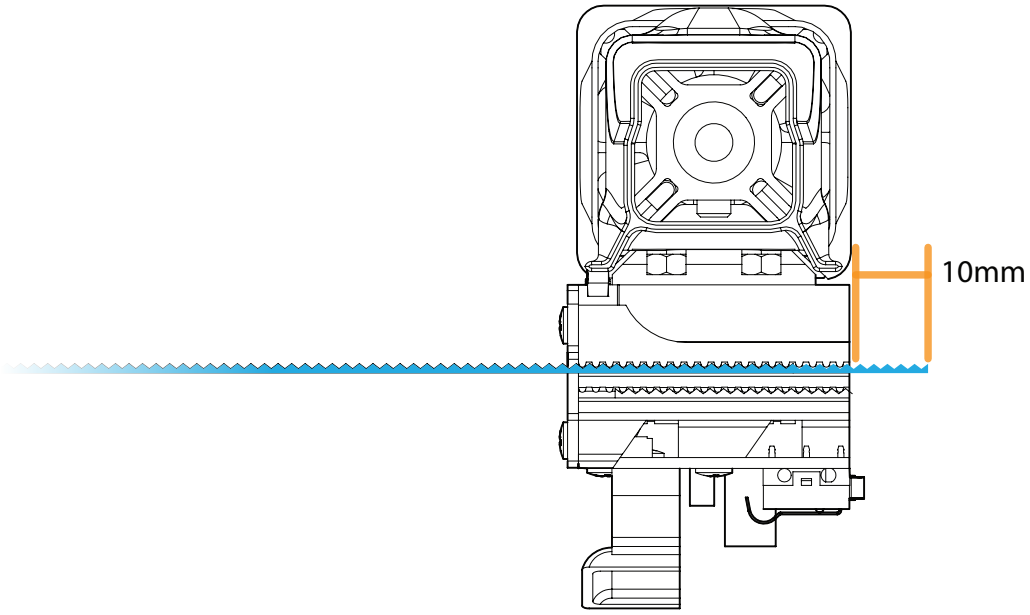


Then push the gantry all the way so it touches its end stops.

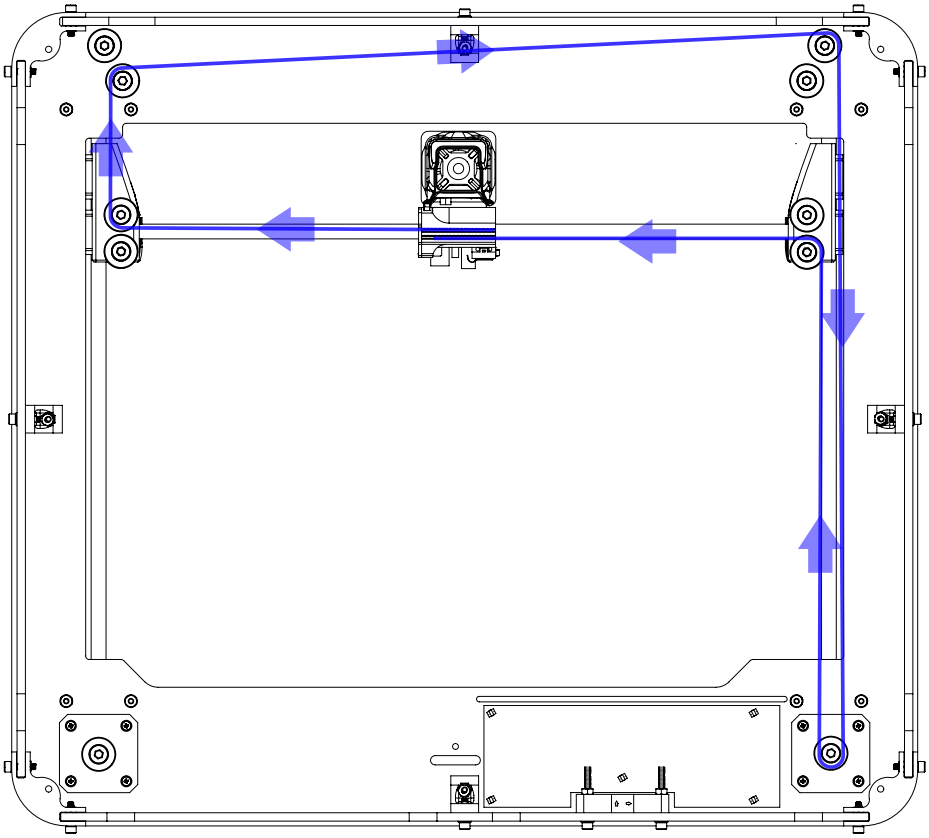


Belt System Continued

Place the end of the first belt into the TOP belt slot, allowing 10mm of overhang as shown in the image.



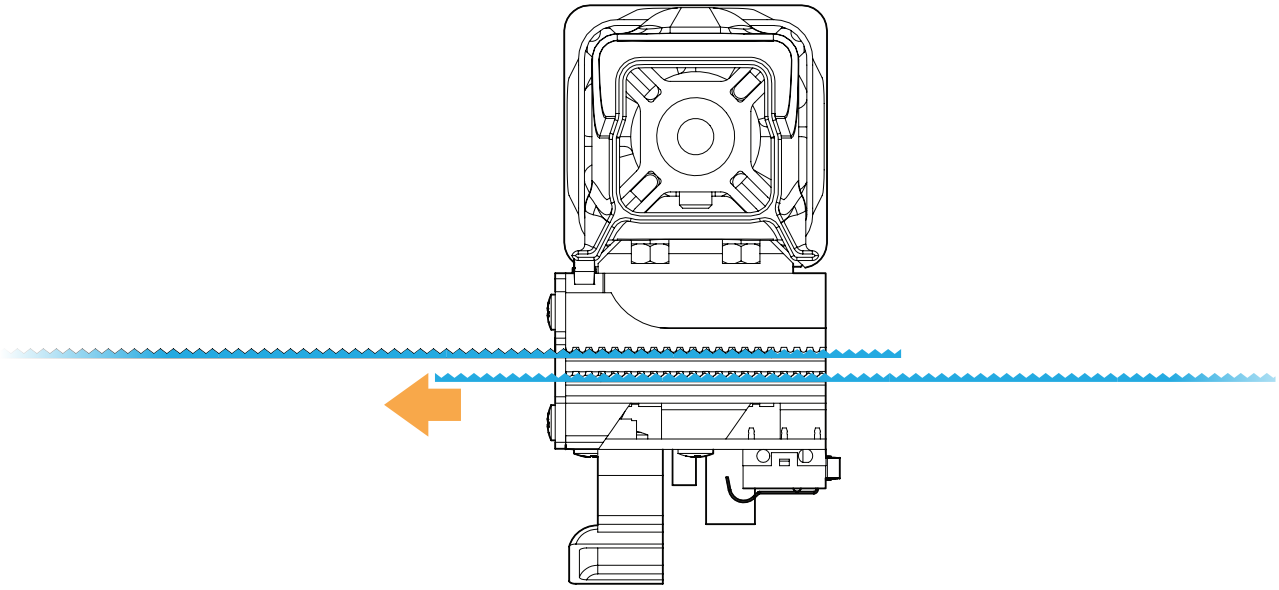
Slide the belt all the way down into the slot and wind around the pulleys as shown in the diagram.



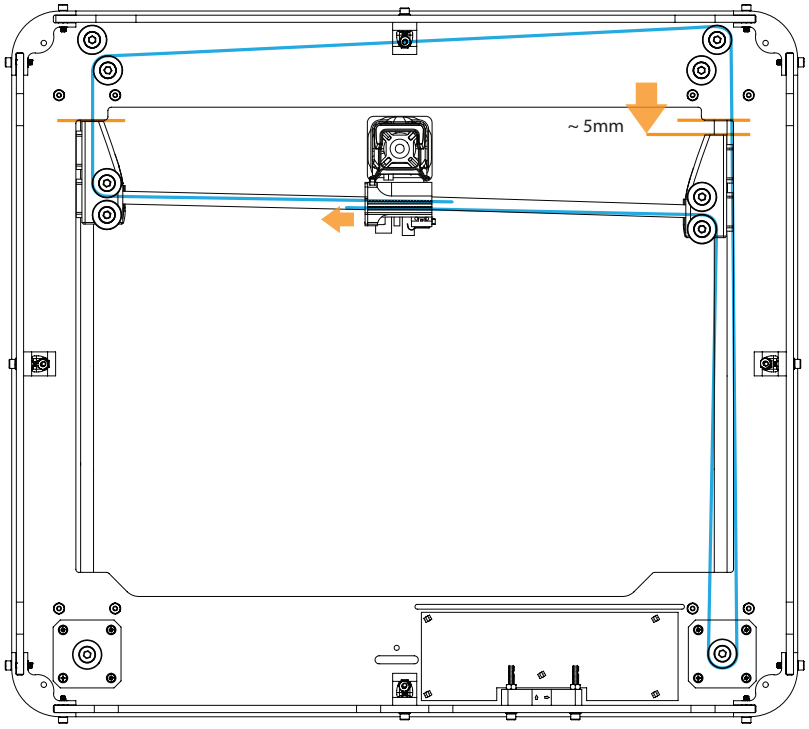
Important: Make sure the belts are sitting in all the pulleys!

Belt System Continued

Slide the end of the first belt into the BOTTOM belt slot, being sure to push it all the way down.



Correct belt tension is achieved when the left hand side gantry carriage is touching its end stop and there is a 5mm gap in the right hand side.

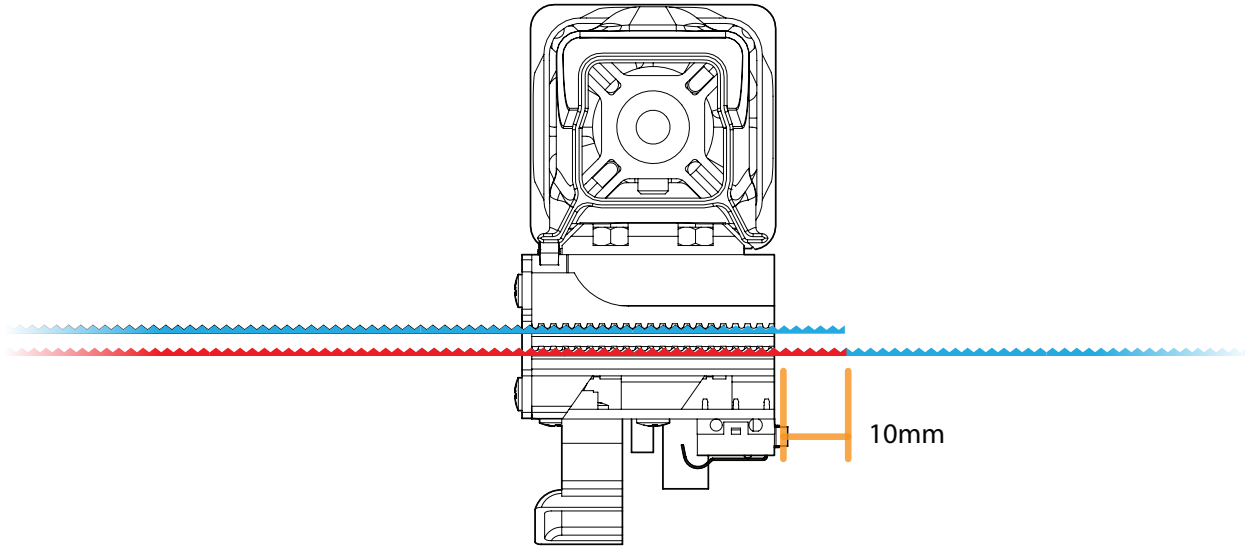


Take your time with this and ensure you keep a constant tension in the belts to prevent them from being slack. Adjust the belt one tooth at a time in its slot until you achieve the 5mm gap.

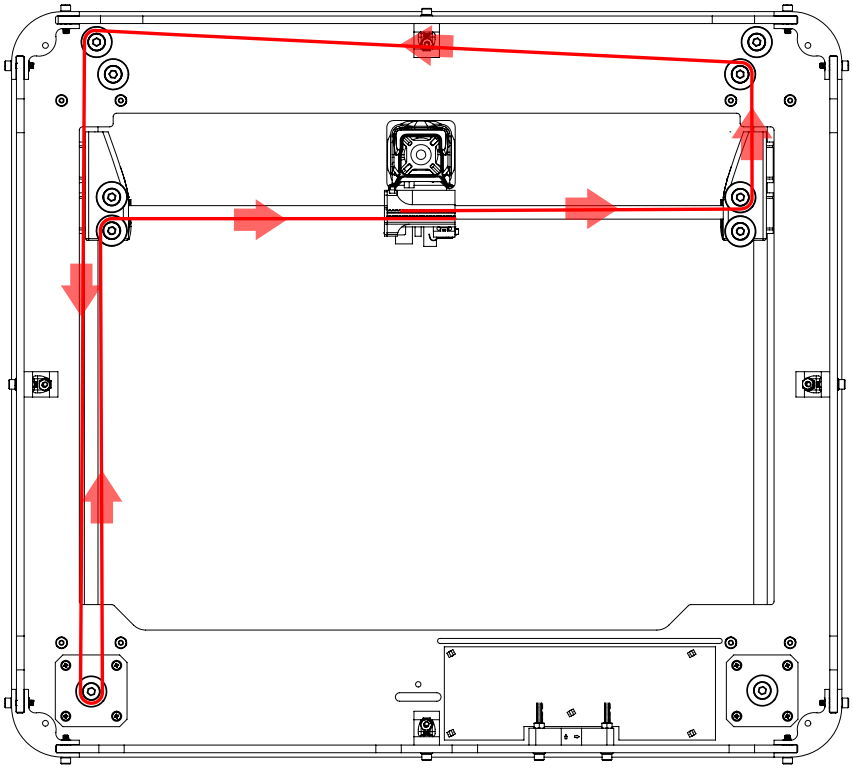
Belt System Continued

Attach the second belt

Place the end of the second belt into the BOTTOM belt slot, allowing 10mm of overhang as shown in the image.

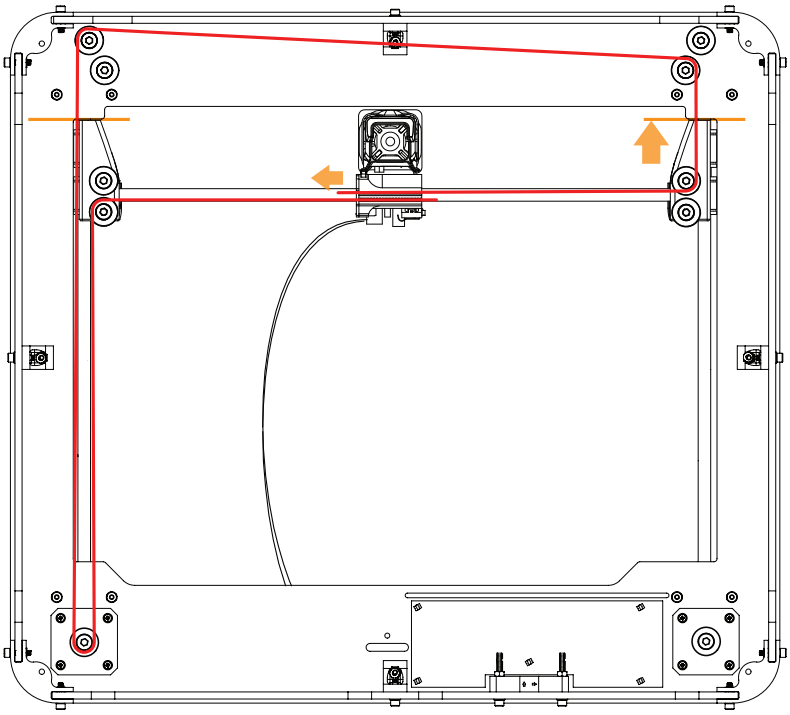


Wind the belt around the pulleys as shown in the diagram and slide it into the TOP belt slot.



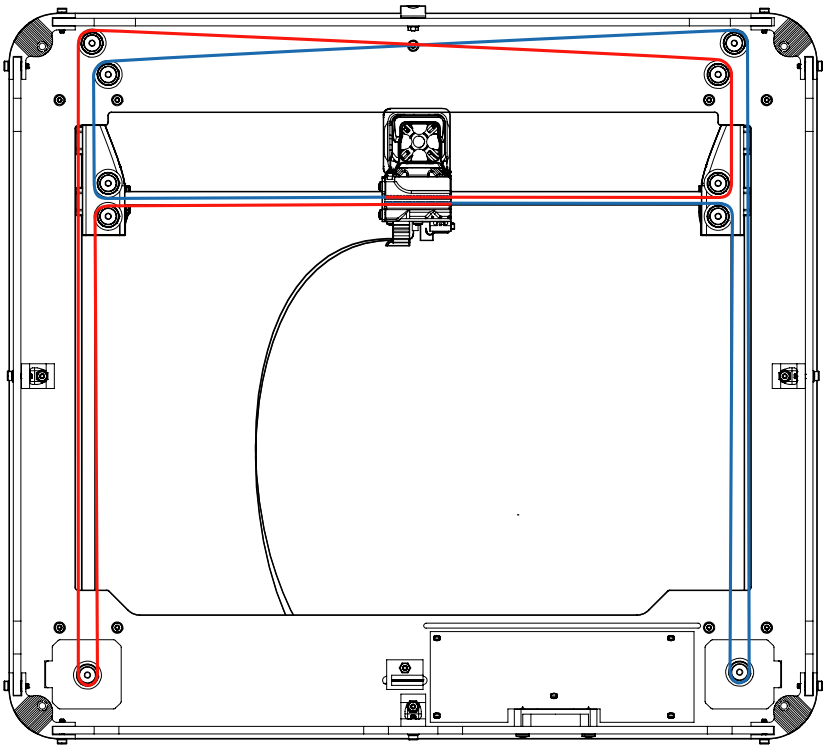
Belt System Continued

Adjust the belt, one tooth at a time, until both gantry carriages touch the end stops at the same time.



Check Belt Movement

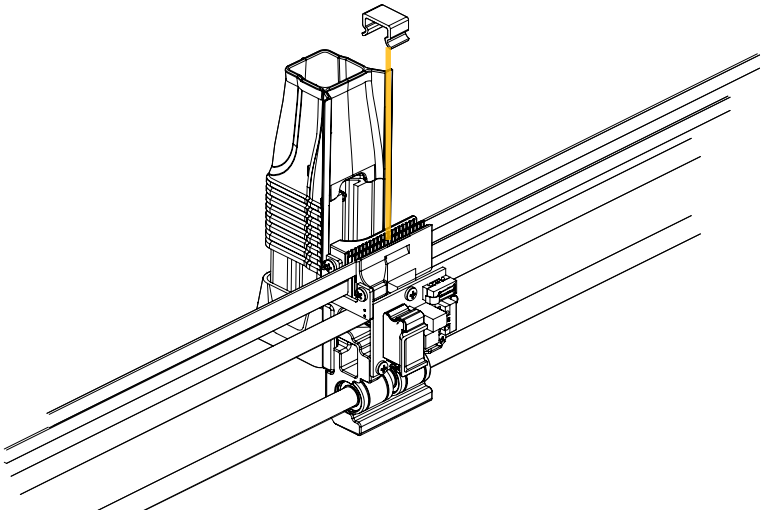
Once complete the belts should appear the same as the diagram below.
Ensure that belt does not switch between different Belt Pulley configurations or contain any twists.



Belt System Continued

Attach Belt Retention Clip

Attach the Belt Retention Clip to the Laser Carriage as shown below.

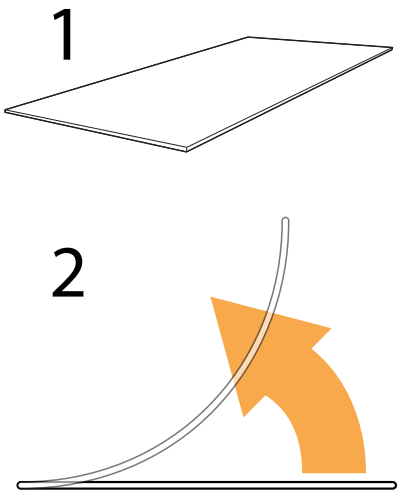


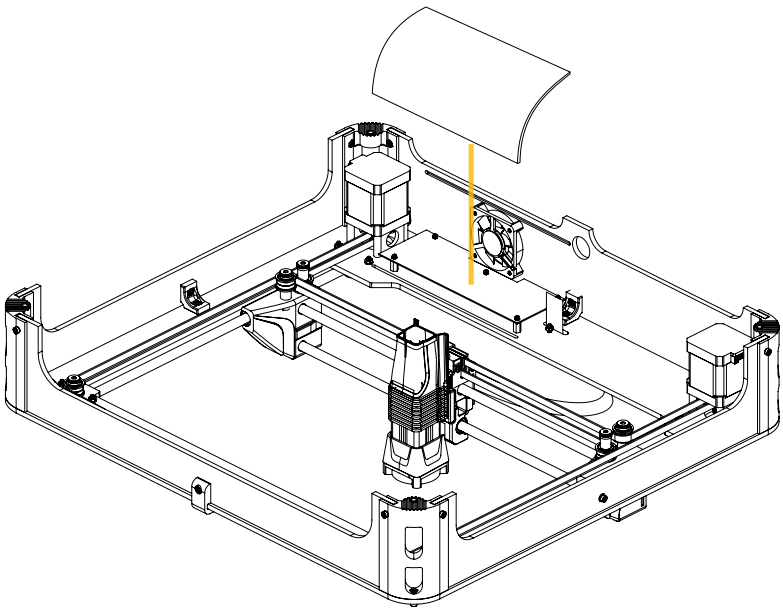
Cut Excess Belt

Your kit has been supplied with slightly longer belt lengths than required.
Once you have ensured both carriages are touching the end-stops at the same time, you can cut any excess belt, leaving approximately 10mm overhang from the Laser Carriage

Attach PCB Cover

Gently curl the PCB Cover panel to insert edges into the grooves located above and below the PCB.

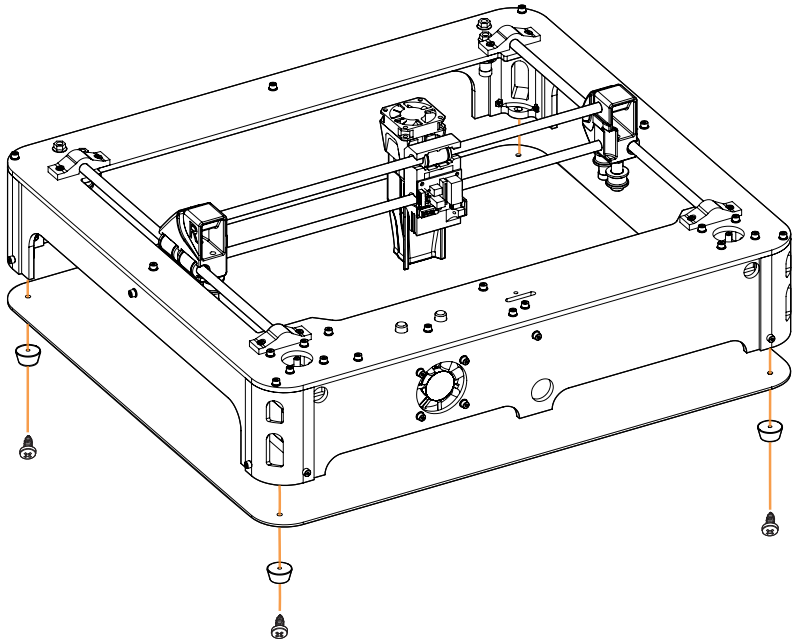




8. Finishing Up

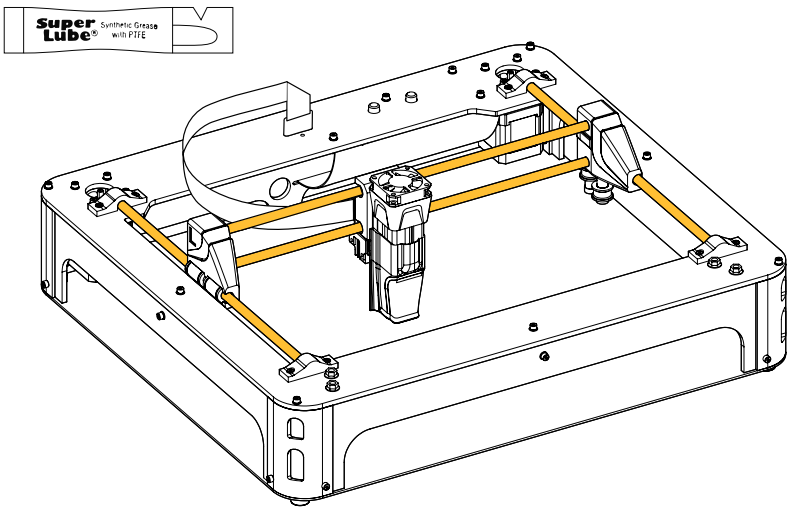
Attach Base Plate and Feet

Attach four (4) Rubber Feet to Base Plate and Chassis Corners using the 8 x 5/8 self tapping screws.



Lubricate Rails

Wipe down the rails with a clean lint-free cloth to remove any residue or dust and apply a small amount of the lubricant supplied to each rail.
SLOWLY move the gantry and laser unit back and forward to ensure the lubricant works its way into the linear bearings.



Done!

Congratulations, you have completed the Emblaser assembly.

It is now time to move onto the '**Emblaser User Manual**' which will take you through starting to use your Emblaser

9. NOTES

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