



Lineux Toolchanger



LINEUX

- lee-knee-yurks
(noun)

toolchanger that print things you never know
you need in a way you never imagine

- see also wizardry, mesmerizing

Lineux Stealth Carriage Build Guide

2025-02-06



<https://discord.gg/Xwqbjj4VjH>



<https://github.com/Bikin-Creative/Lineux-Toolchanger>

**A big thank you to everyone who
made this project possible.**



CAUTION



- Please take careful precautions with safety in mind when attempting to build Lineux.
- Only attempt the build if you are knowledgeable with 3d printer mechanics and electronics.
- Failure to follow safety precautions may result in things going against you, or even harm you.
- Magnets are extremely strong and may cause injuries. Please handle them with extra care.
- If things start to get confusing or you're stuck at some point during the build, do ask questions on our discord.
- We try to keep things as simple and as clear as possible for a fun and enjoyable build for everyone.
- We are humans and are prone to mistakes. If you encounter any issues/faults with the build guide, please raise them on our Discord.

<u>Introduction</u>	05	<u>Carriage Voron (CNC)</u>	35
<u>Hardware</u>	07	<u>Carriage Voron (Fysetc CNC Tap)</u>	51
<u>Preparation</u>	09	<u>Carriage Vzbot</u>	69
<u>Carriage Voron (Printed)</u>	16	<u>Completion</u>	91

Part Printing Recommendations

Recommended setting/material to print your parts.

Material
ABS

Layer Height
0.2mm

Extrusion Width
0.4mm

Infill
40% (Grid, Gyroid, Honeycomb, Triangle, Cubic)

Number of Walls
4

Number of Top/Bottom
5

Parts Filename Guide

Primary Colour

Eg. carriage_A.stl

These are to be printed with your primary/base colour.

Accent Colour

Eg. [a]_locking_plate.stl

Files with [a] in front are to be printed with your secondary/accent colour. Parts will be indicated with the Lineux Logo beside it in this guide.

Quantity Required

Eg. belt_tensioner_x2.stl

Files ending with x# indicate the quantity required to be printed

To make your build easier, we recommend you to download the cad from our github to enable you to visualize the whole assembly.



Button Head Cap Screw
(BHCS)



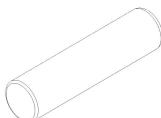
Socket Head Cap Screw
(SHCS)



Heat Insert



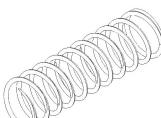
n52 Magnet



Dowel Pin



Stainless Steel Spacer /
Bushing



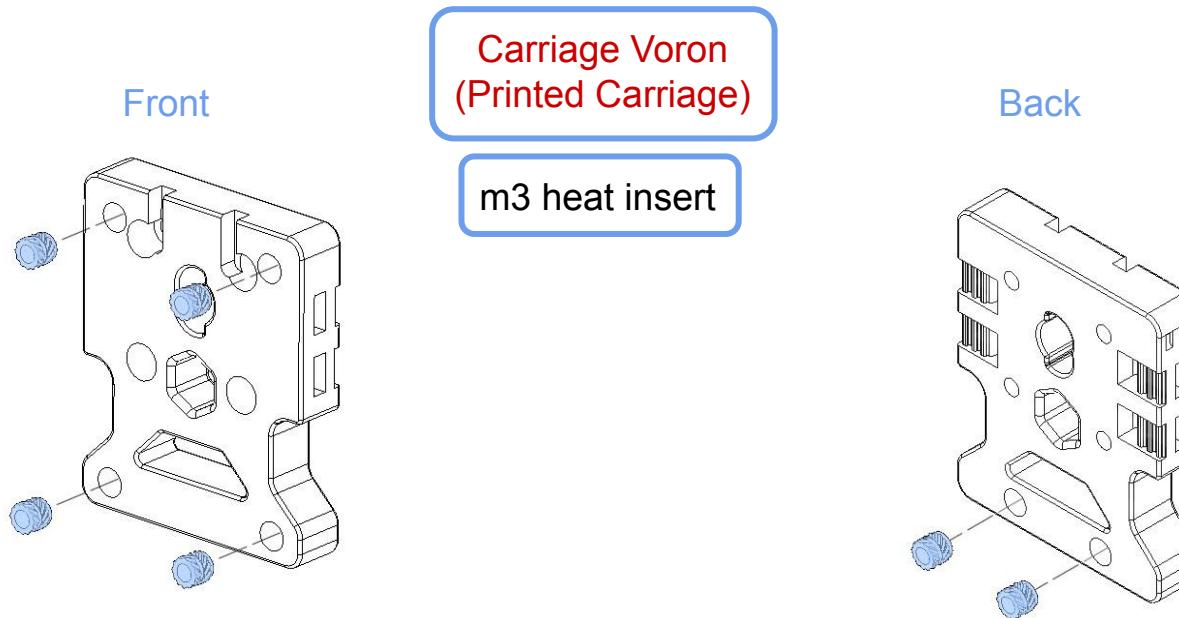
Compression Spring



Hex Nut

Lineux was first developed on a Vzbot 330 printer.

It is recommended to install all heat inserts first on all the parts prior to starting the build.

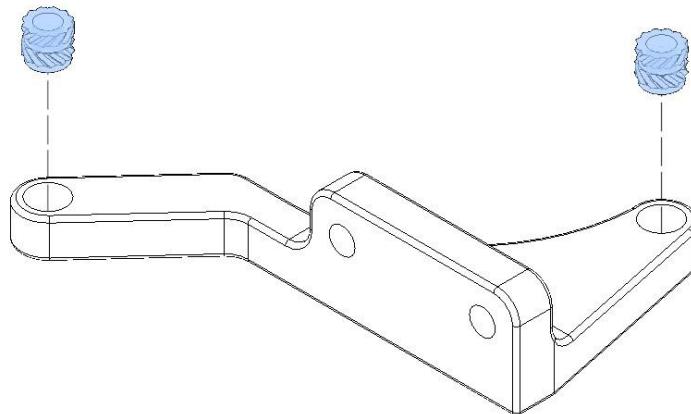


Preparation

Insert the heat insert to Voron Printed Carriage in the respective slots as shown.

Carriage Voron
(Printed Carriage)

m3 heat insert

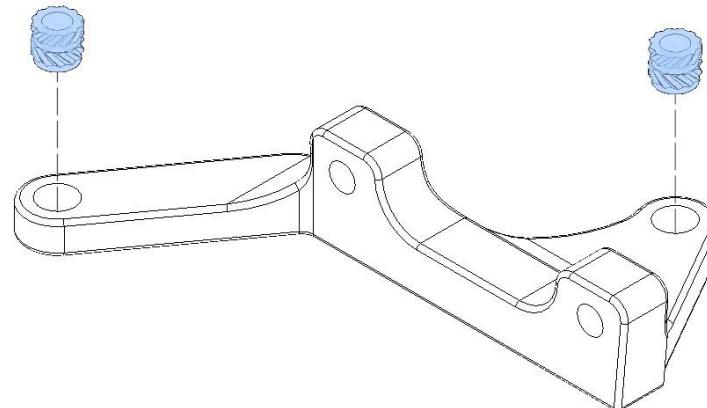


Preparation

Insert heat inserts to the 5015
Mount.

Carriage Voron
(CNC Carriage)

m3 heat insert

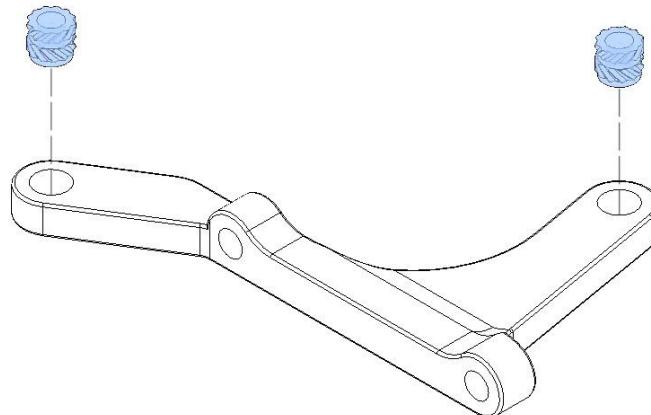


Preparation

Insert heat inserts to the 5015
Mount.

Carriage Voron
(Fysetc CNC Tap)

m3 heat insert

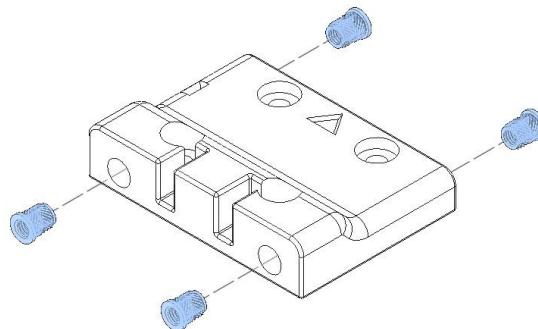


Preparation

Insert heat inserts to the 5015
Mount.

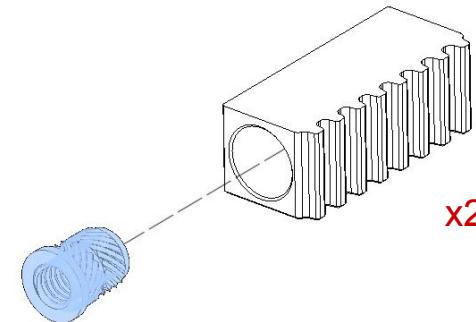
Carriage Vzbot

m3 heat insert



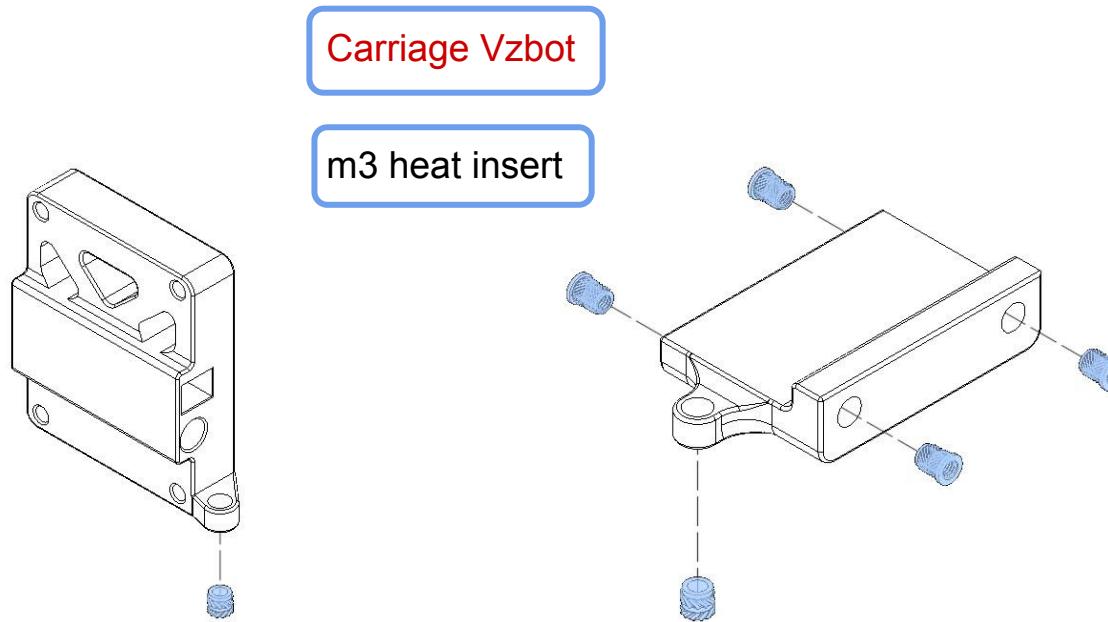
Preparation

Insert the heat insert to Carriage Top in the respective slots as shown.



Preparation

Insert the heat inserts to both Belt Tensioners.

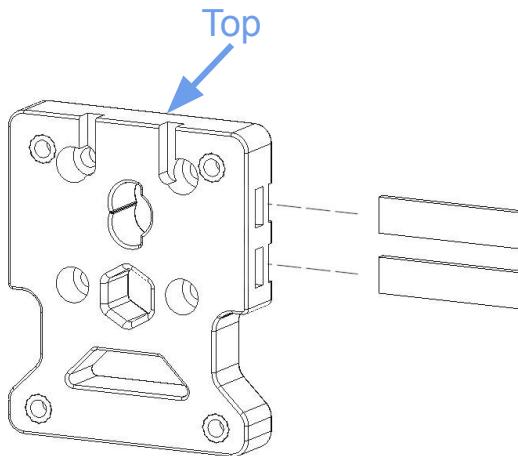


Preparation

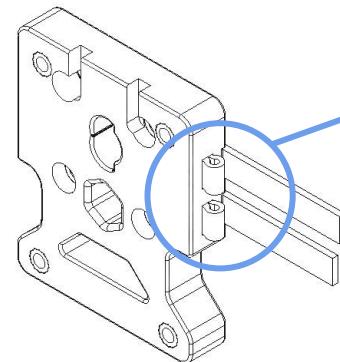
Insert the heat insert to Carriage Rear and Carriage Bottom in the respective slots as shown.

Lineux originally started with a modified Dragonburner toolhead, but has since transitioned to using its own **Lineux One** toolhead.

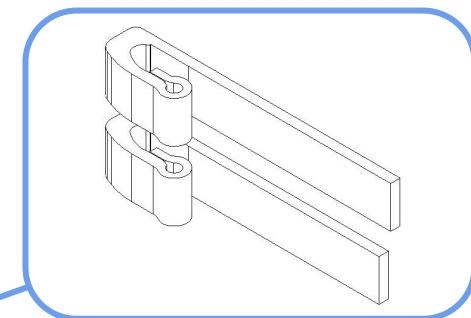


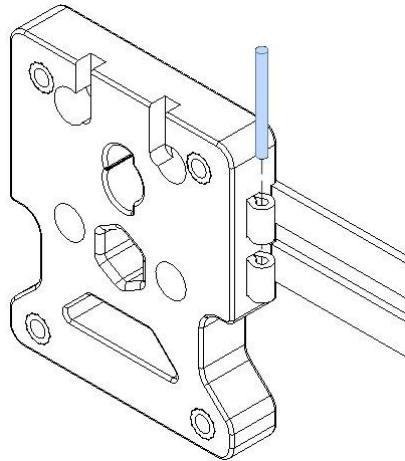


Thread both A belt and B belt from the right through the back of Carriage and into the belt slots. The 2 indentation will be at the top.

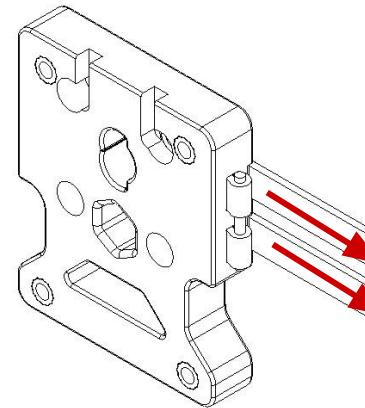


Make a loop and thread it back into the slots.

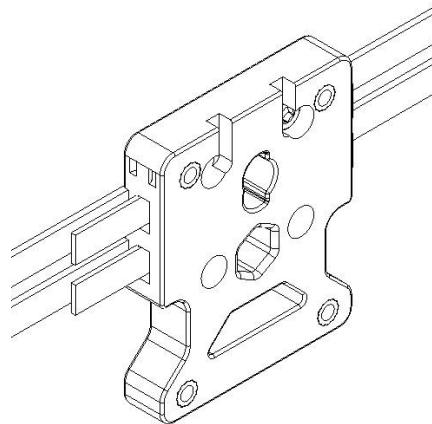




Cut a filament about 18mm and insert it through the belt loop.

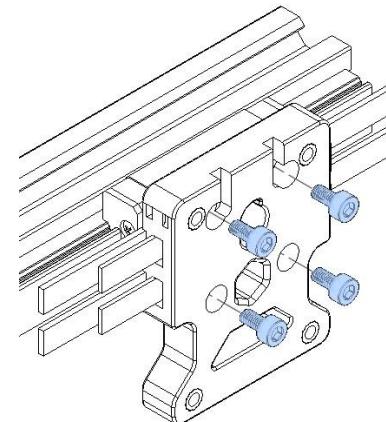


Pull the belt tight and the belt will be secured.

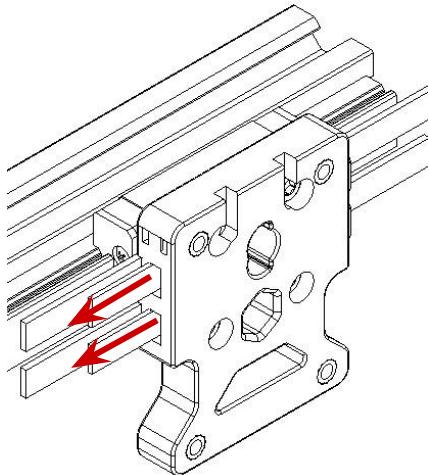


Thread both belts on the left the same way you did for the right side. This time, you don't have to make a loop. Do not cut the belts yet and leave them as is for now.

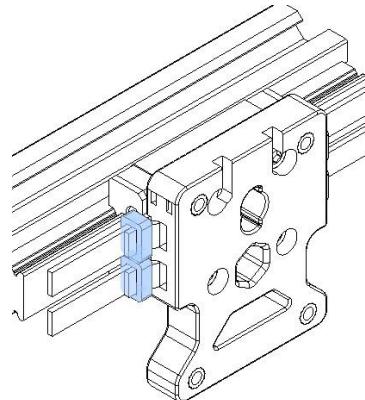
m3x6mm bhcs



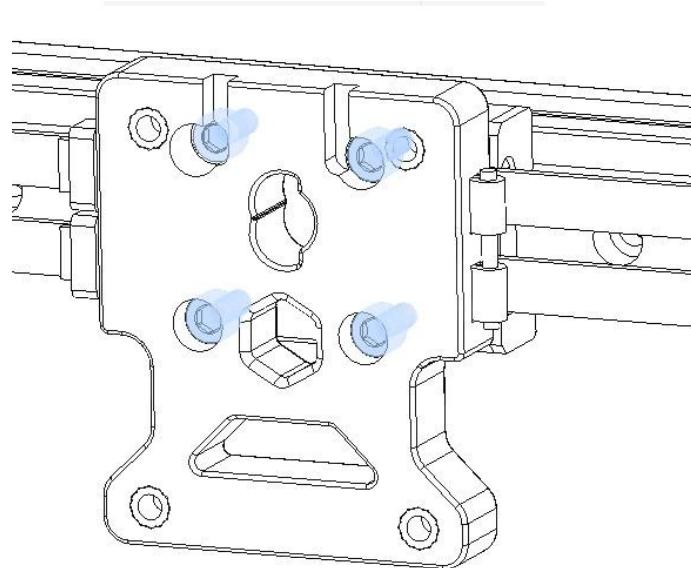
Screw in the bolts but leave them loose for now.



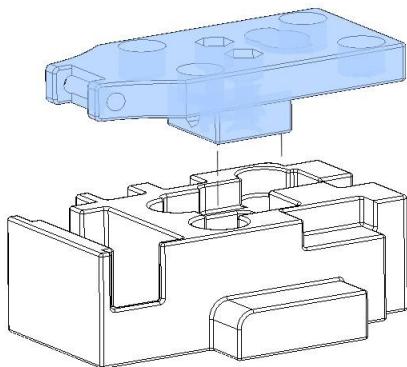
Pull the ends of both belts tightly.



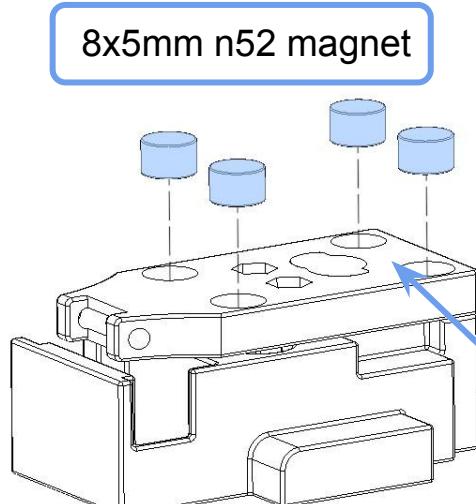
Tie each belts with cable tie.



Tighten all 4 bolts now.



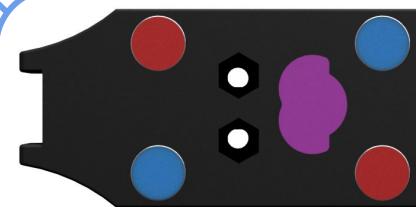
Place the Lock Plate on the Magnet Helper. This will make installing the magnets easier.



Insert the magnets in the respective slots. Apply a bit of epoxy or glue before inserting the magnets. You may use a mallet or a wrench to push the magnets in and ensure they are flushed with the top surface. **Take note of the magnet polarity configuration.**

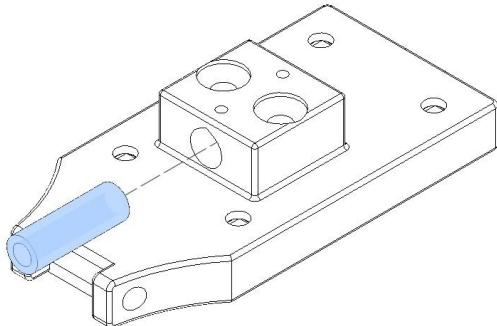


Magnet Helper



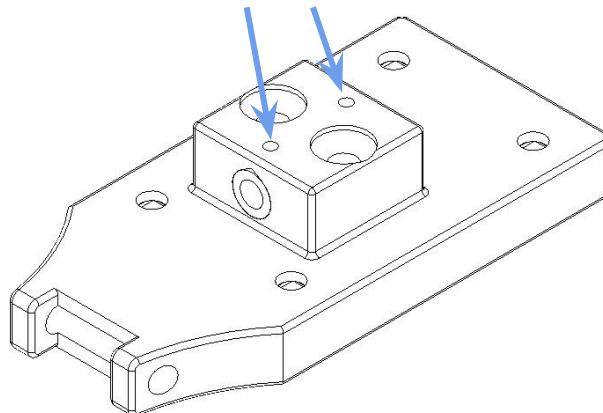
Magnet Polarity Configuration

ID3 OD5 15mm
Stainless Steel
Bushing

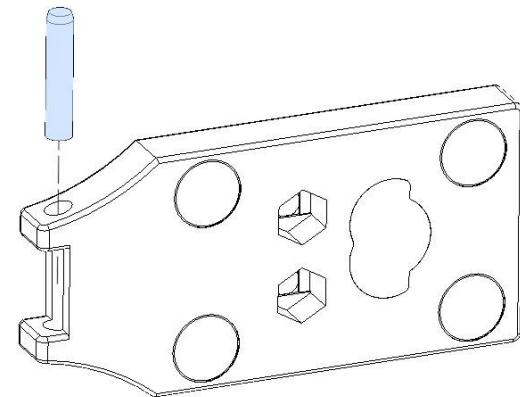


Slide in and keep
both ends flushed.

Apply drop of glue here.

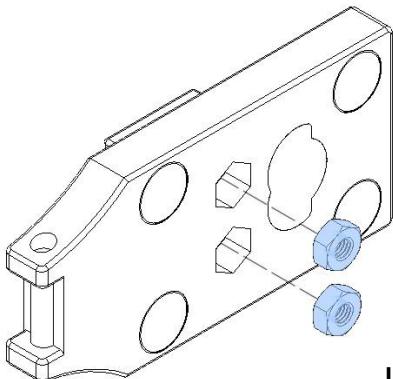


m3 x 14mm
Dowel Pin



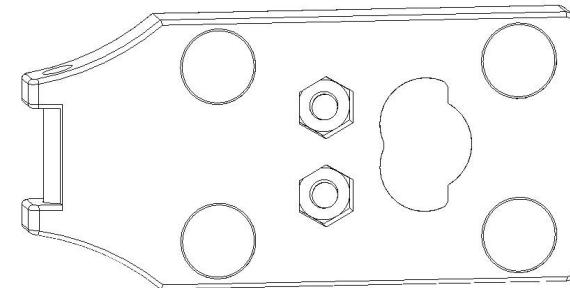
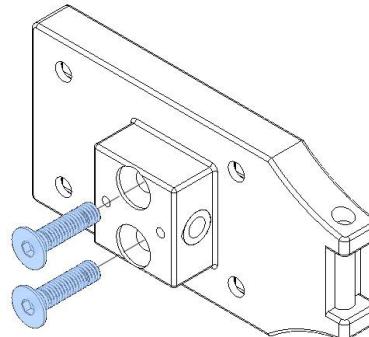
Slide in the dowel pin
and keep both ends
equal.

m3 hex nut

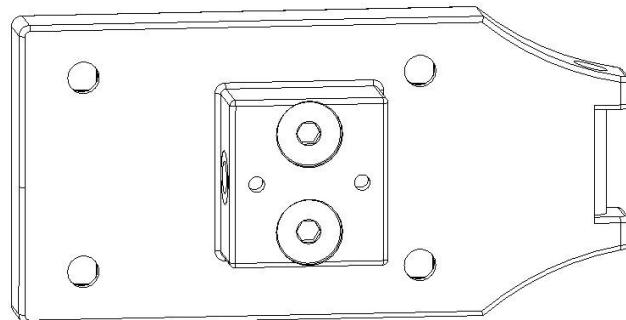


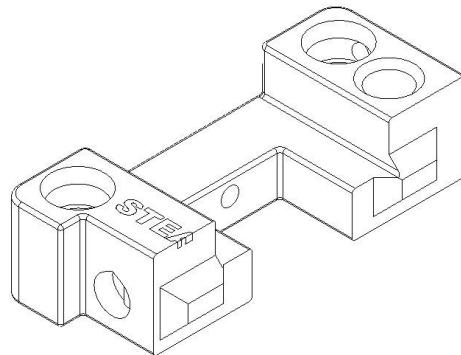
Insert and tighten the screw.

m3 x 12mm
fhcs



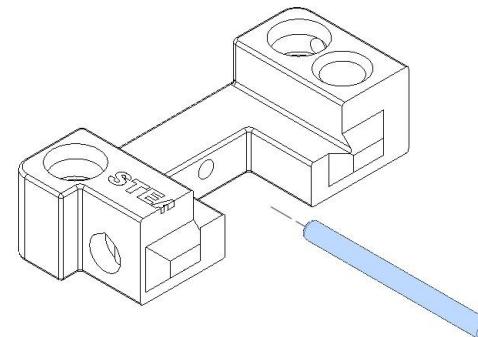
Completed Locking Plate Assembly



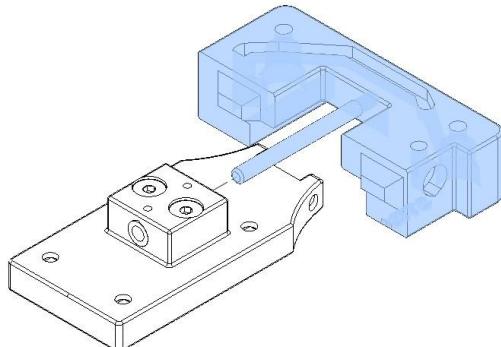


Place Carrier Left on its back
on a flat surface.

m3 x 35mm
Dowel Pin

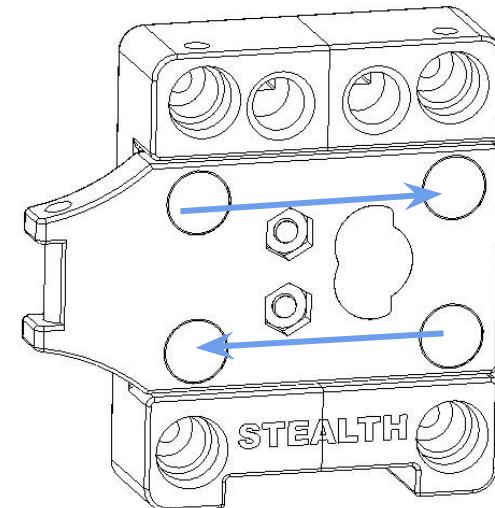
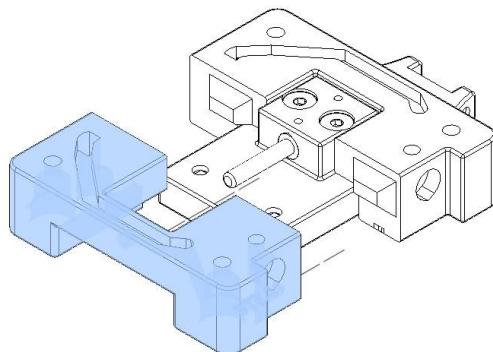


Push the dowel all the way in. It
should be a tight fit.



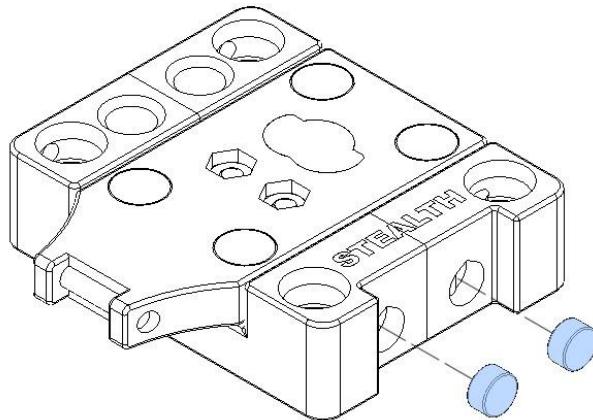
Turn the assembly over. Apply some grease/lubricant on the dowel pin before sliding the Lock Plate in.

Join Carrier Right together with the assembly. The tabs should aligned and the parts should be flushed together.



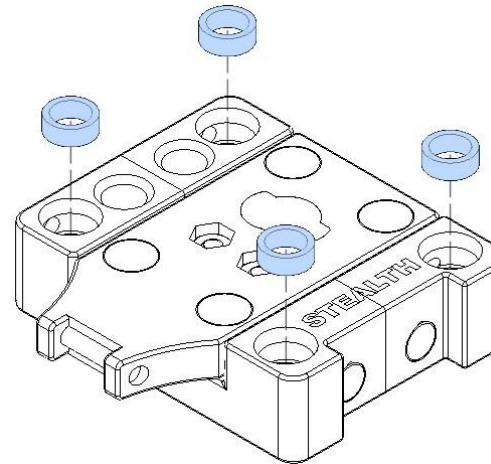
The Lock Plate should be able to slide freely.

6x3mm n52 magnet



Apply glue before pushing in the magnets. Ensure they sit flushed in the slots. **We recommend to reverse the polarity of both magnet to each other.**

od8 id6 3mm stainless steel bushing



Apply glue before pushing in the bushings. Ensure they sit all the way in the slots. There should be some space left in the slots for the shcs screw heads.

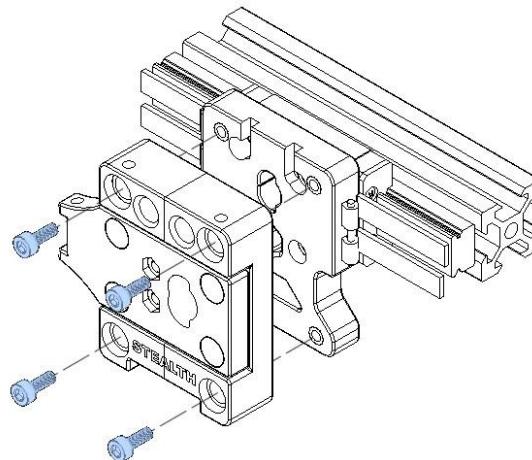
od6 id5 spring 10mm



Preparation

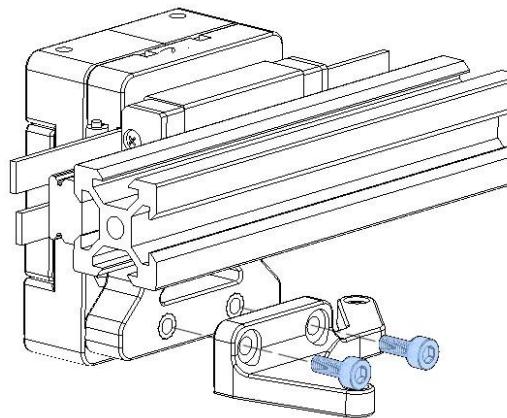
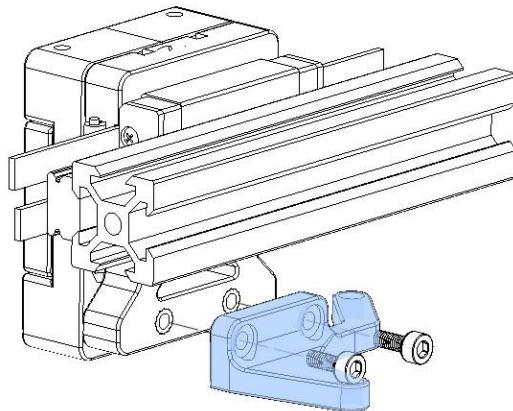
Solder about 50mm red and black wire to the end of both springs. Stainless steel solder flux will help to make the soldering easier.

m3 x 8mm shcs

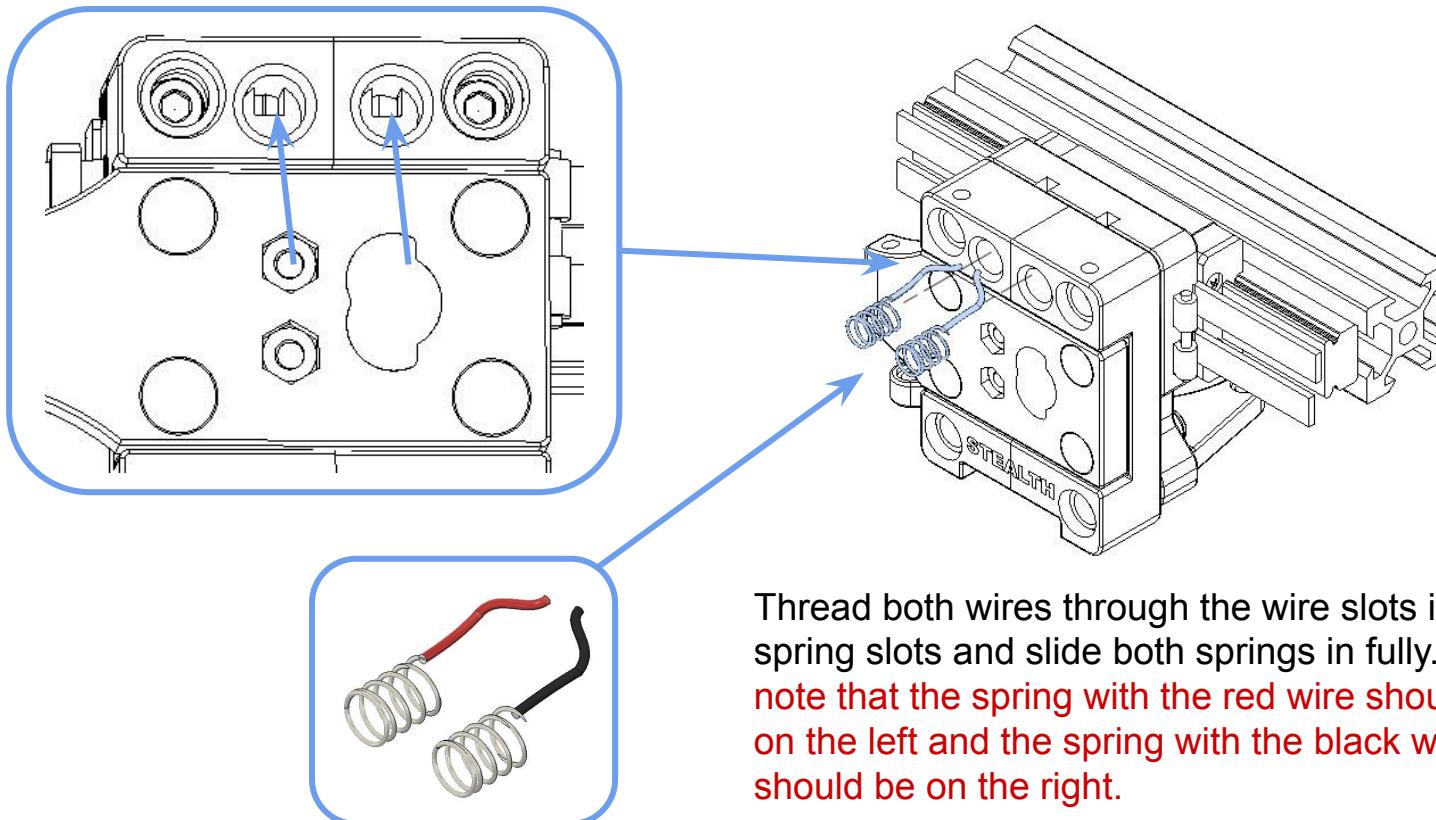


Attach Carrier to the carriage as shown. Ensure the Lock Plate can still slide freely after tightening the screws.

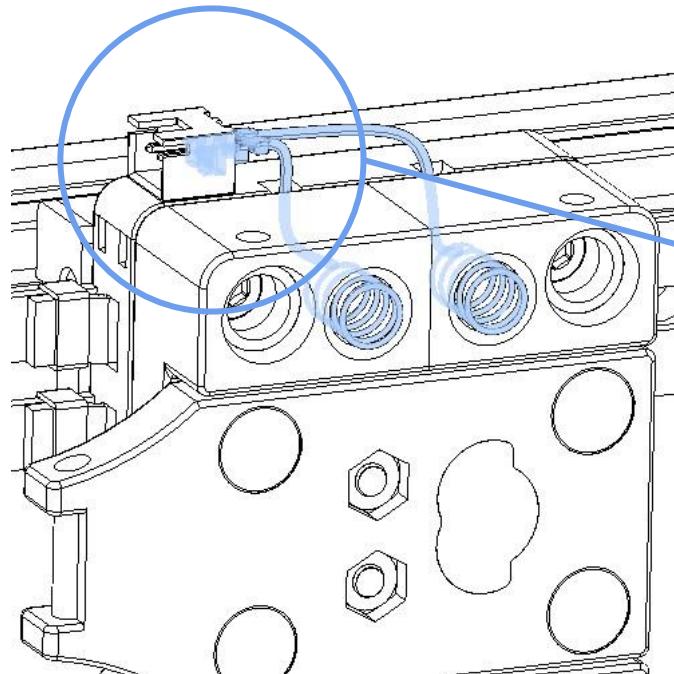
m3 x 8mm shcs



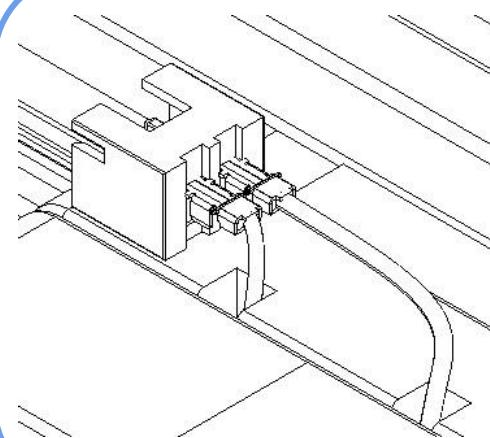
Attach the 5015 Mount to the back of Carriage A as shown.



Thread both wires through the wire slots in the spring slots and slide both springs in fully. **Take note that the spring with the red wire should be on the left and the spring with the black wire should be on the right.**

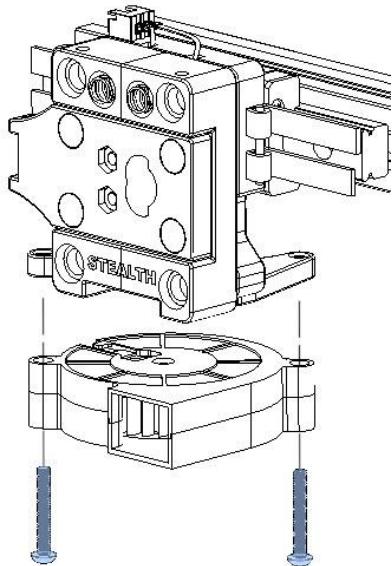


2-pin JST XH2.4 female connector



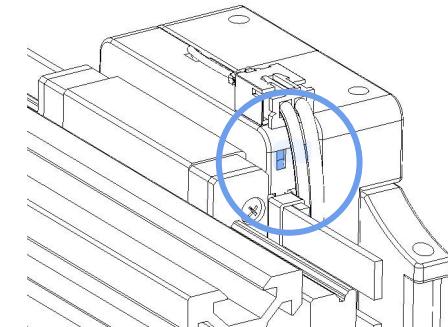
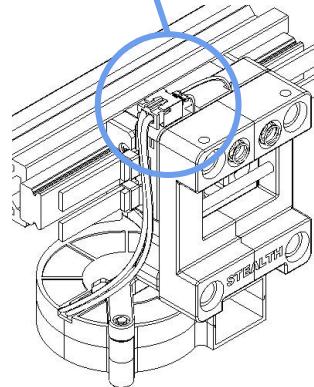
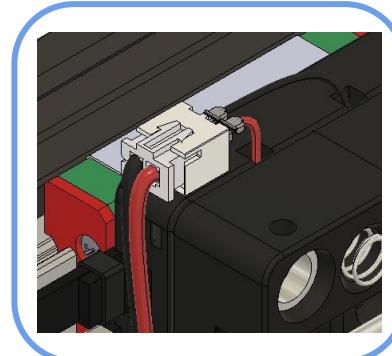
Cut the spring wires to length and crimp them with the appropriate connector. (You may crimp them first prior to inserting them into the slots). Insert them into the jst female connector. Place the connector in position on the Carriage.

m3 x 20mm bhcs



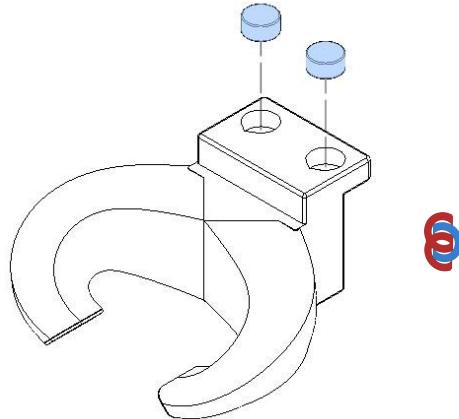
Attach the 5015 fan to the Carriage as shown.

Connect 5015 fan connector.
Ensure the wire colours matched.

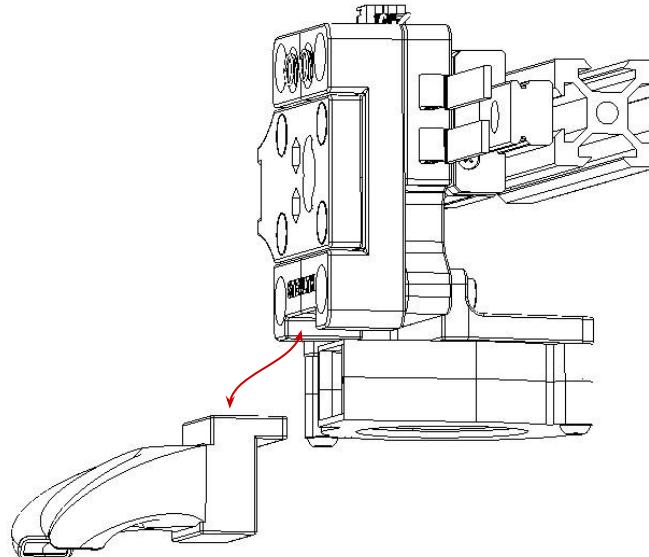


You may secure the fan wire to the Carriage using the cable tie slot.

6x3mm n52 magnets



Apply glue before inserting the magnets in the Duct. Push them in until they are flushed in the slots. **Take note of the polarity of the magnets. Make sure they matched the polarity on the Carrier that you installed earlier.**



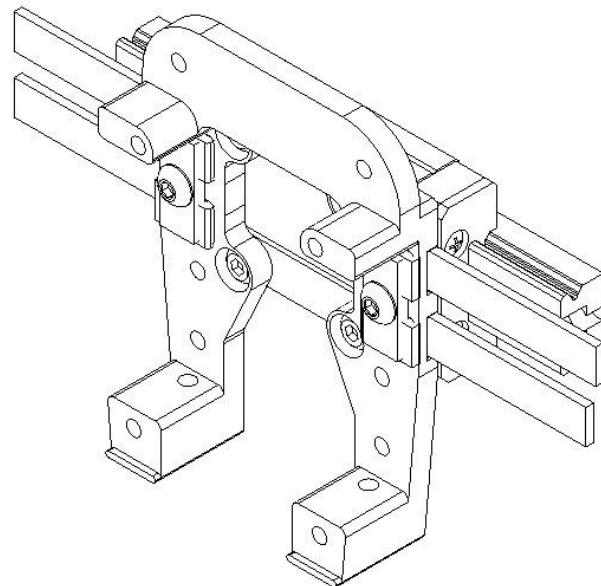
Align the intake of the Duct to the 5015 Fan. The magnets will automatically pull them together and hold them in place. You can tilt the Duct slightly to help attaching it in place.



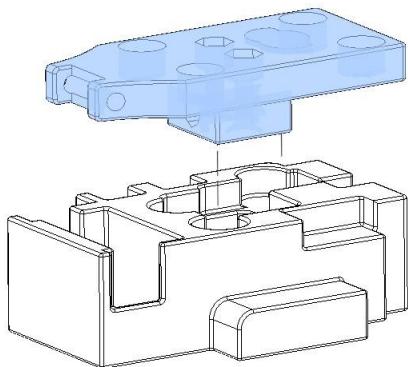
Completed Voron Printed Carriage Assembly

Lineux is a derivative of 2 words, Linear and Flux.

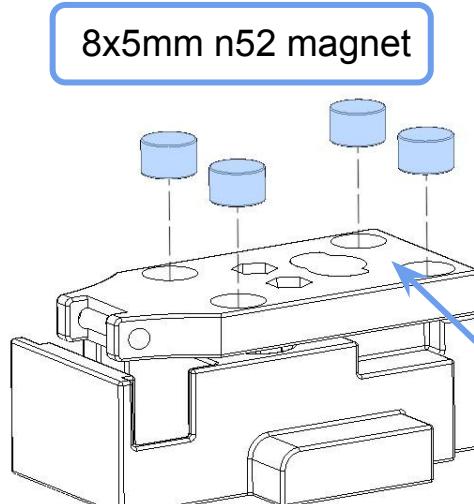




Start off by stripping the CNC Carriage to its bare. You can leave the belts as is.



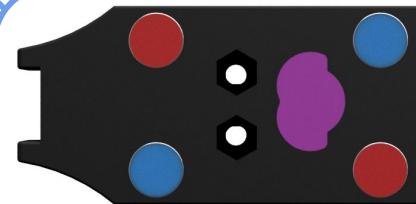
Place the Lock Plate on the Magnet Helper. This will make installing the magnets easier.



Insert the magnets in the respective slots. Apply a bit of epoxy or glue before inserting the magnets. You may use a mallet or a wrench to push the magnets in and ensure they are flushed with the top surface. **Take note of the magnet polarity configuration.**

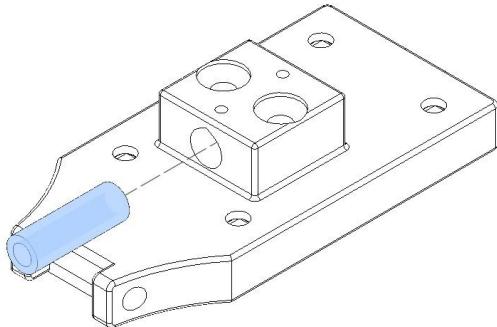


Magnet Helper



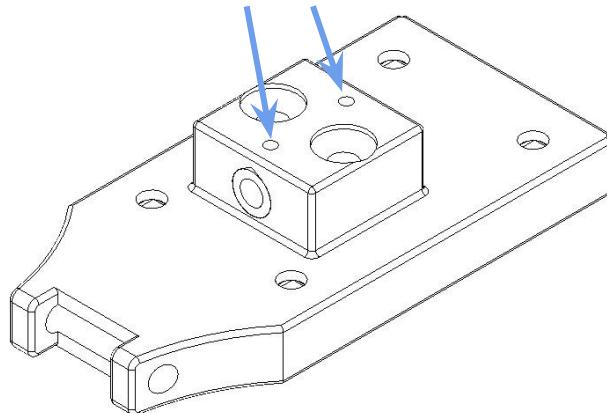
Magnet Polarity Configuration

ID3 OD5 15mm
Stainless Steel
Bushing

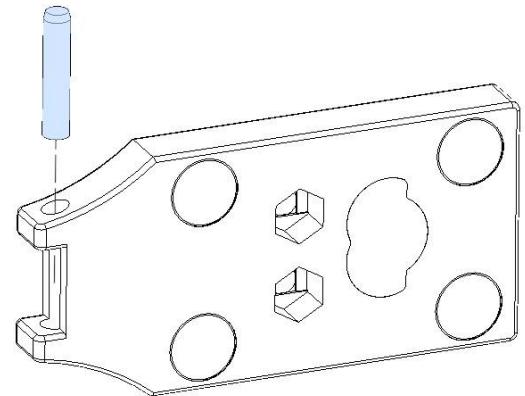


Slide in and keep
both ends flushed.

Apply drop of glue here.

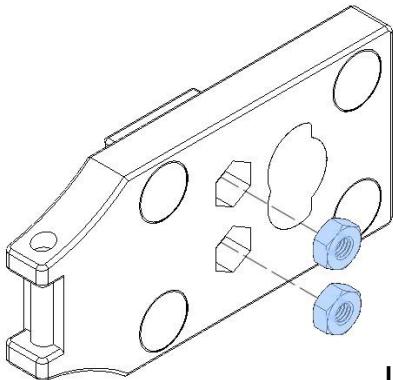


m3 x 14mm
Dowel Pin



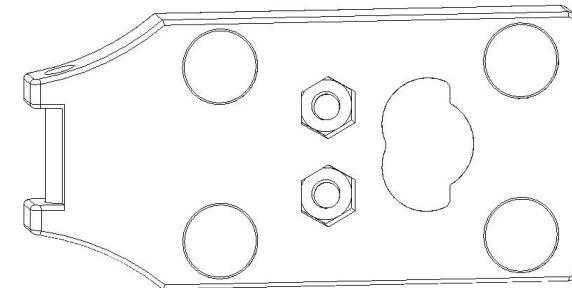
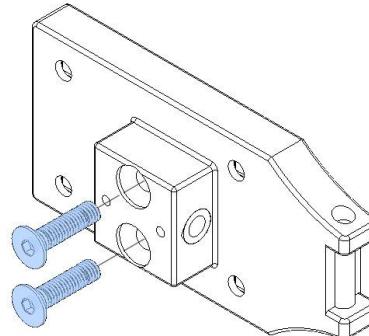
Slide in the dowel pin
and keep both ends
equal.

m3 hex nut

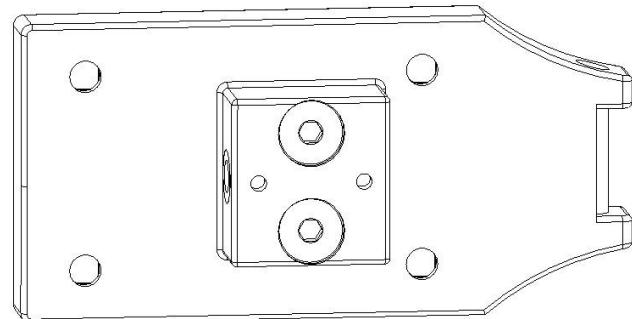


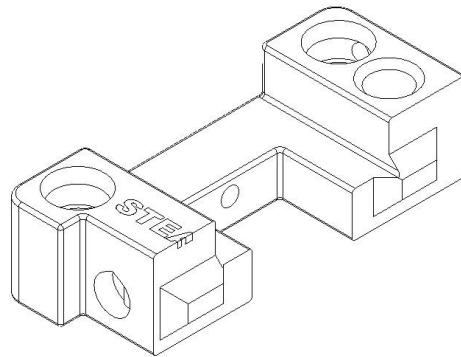
Insert and tighten the screw.

m3 x 12mm
fhcs

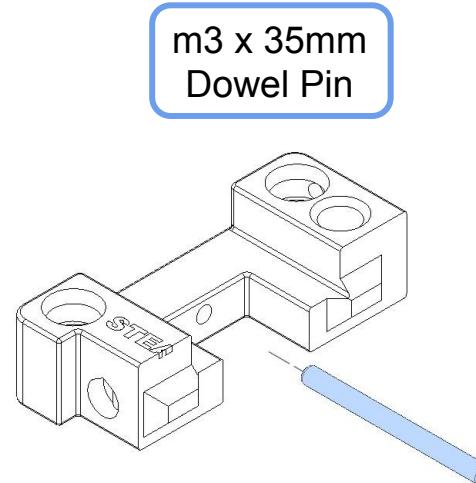


Completed Locking Plate Assembly

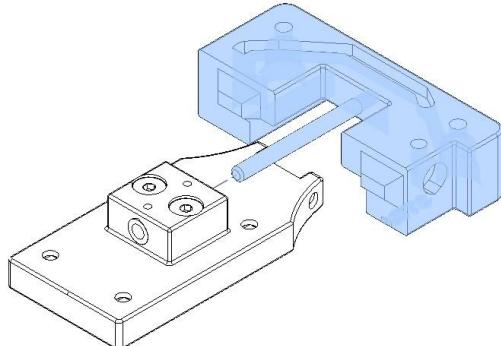




Place Carrier Left on its back
on a flat surface.

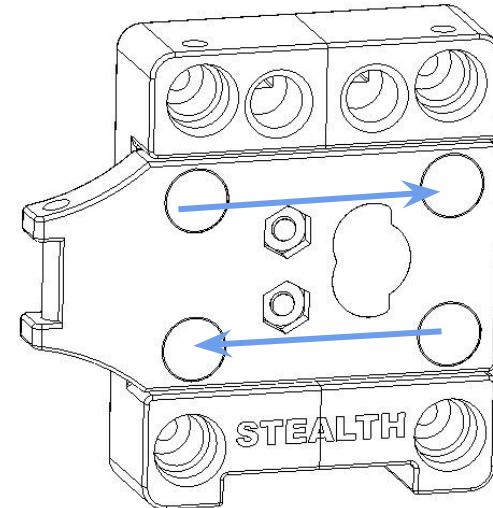
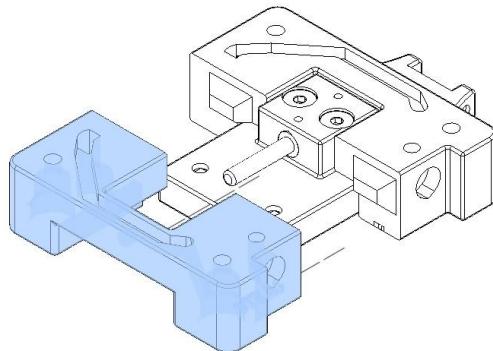


Push the dowel all the way in. It
should be a tight fit.



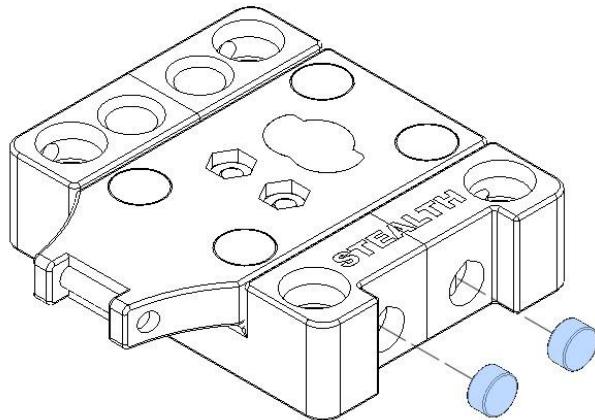
Turn the assembly over. Apply some grease/lubricant on the dowel pin before sliding the Lock Plate in.

Join Carrier Right together with the assembly. The tabs should aligned and the parts should be flushed together.



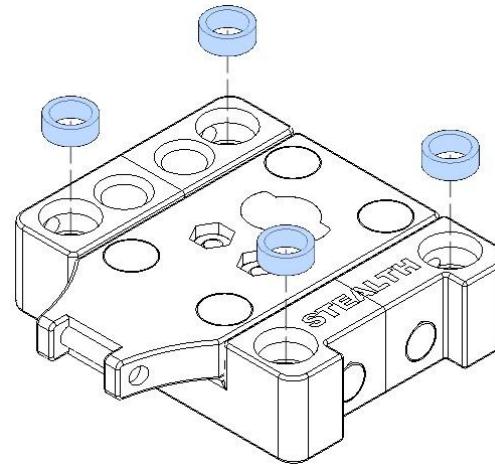
The Lock Plate should be able to slide freely.

6x3mm n52 magnet



Apply glue before pushing in the magnets. Ensure they sit flushed in the slots. **We recommend to reverse the polarity of both magnet to each other.**

od8 id6 3mm stainless steel bushing

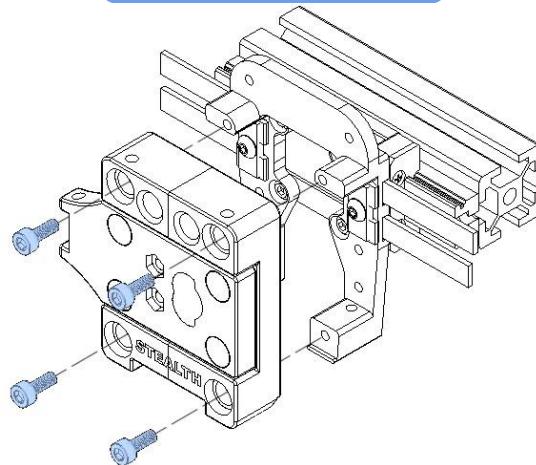


Apply glue before pushing in the bushings. Ensure they sit all the way in the slots. There should be some space left in the slots for the shcs screw heads.

od6 id5 spring 10mm



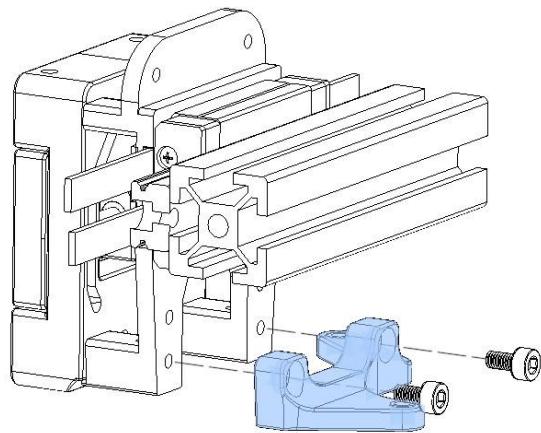
m3 x 8mm shcs



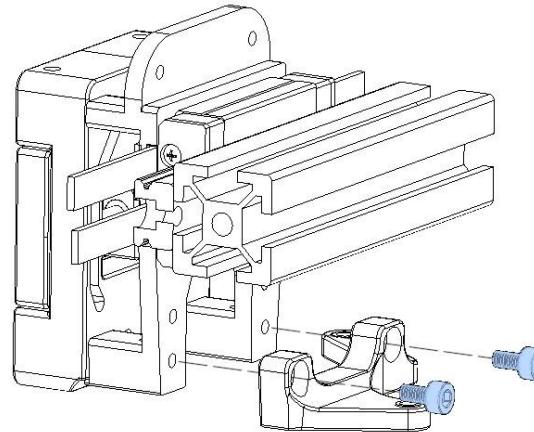
Preparation

Solder about 50mm red and black wire to the end of both springs. Stainless steel solder flux will help to make the soldering easier.

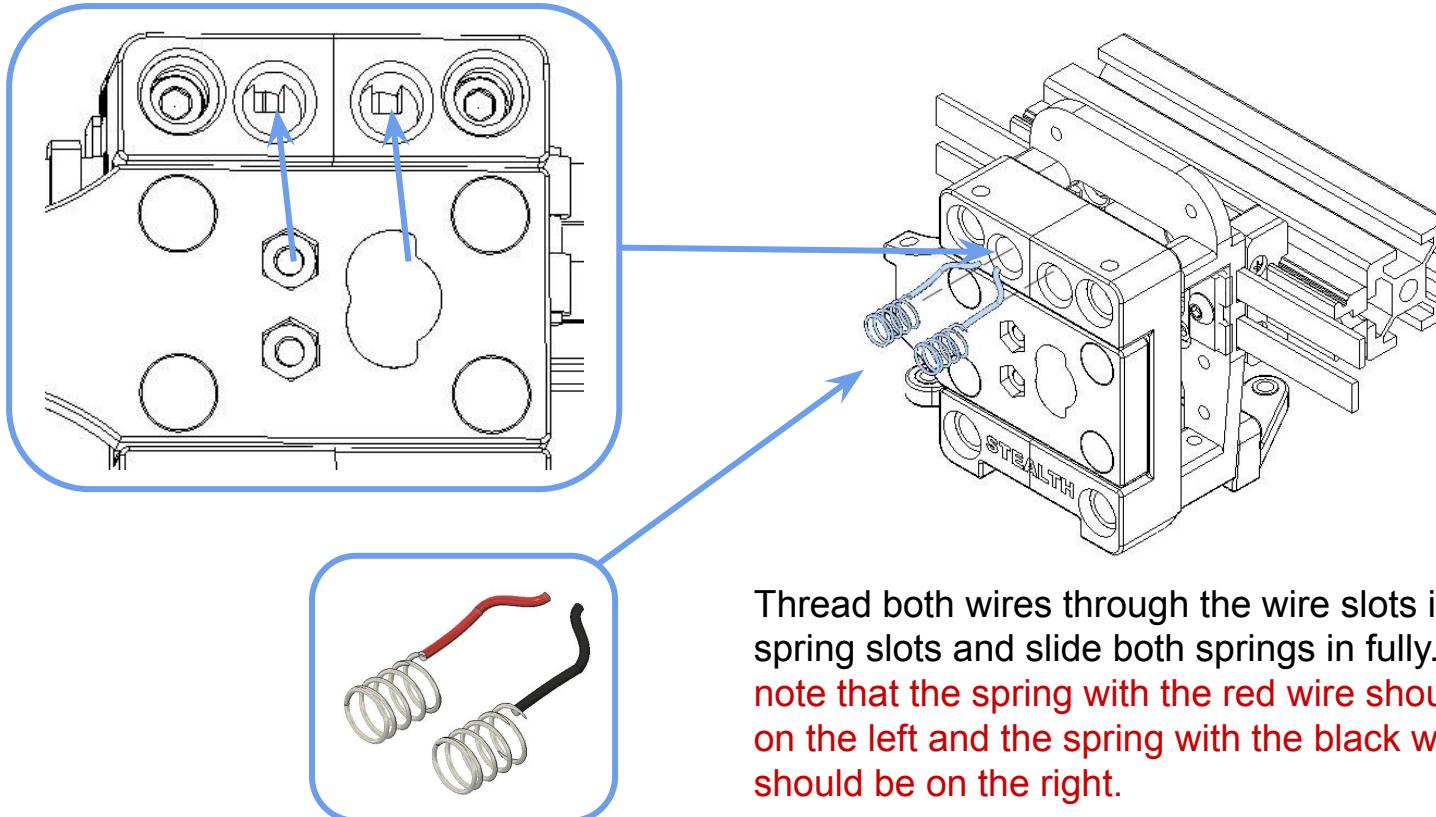
Attach Carrier to the CNC Carriage as shown. Ensure the Lock Plate can still slide freely after tightening the screws.



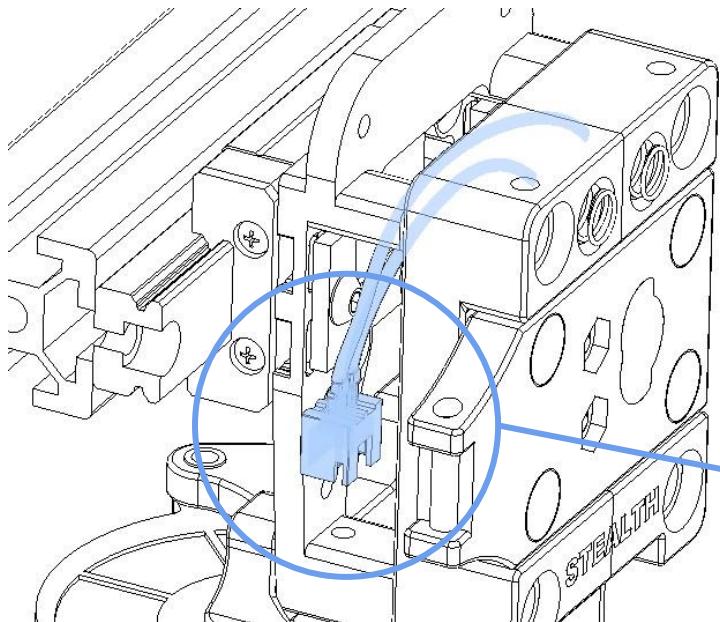
m3 x 6mm shcs



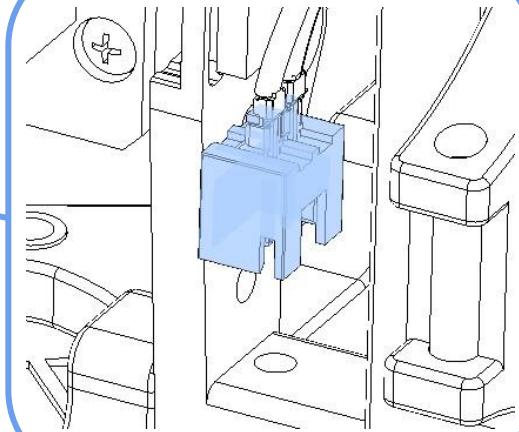
Attach the 5015 Mount to the back of Carriage A as shown.



Thread both wires through the wire slots in the spring slots and slide both springs in fully. **Take note that the spring with the red wire should be on the left and the spring with the black wire should be on the right.**

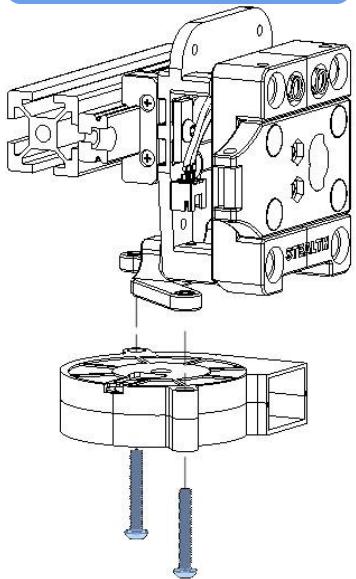


2-pin JST XH2.4 female connector



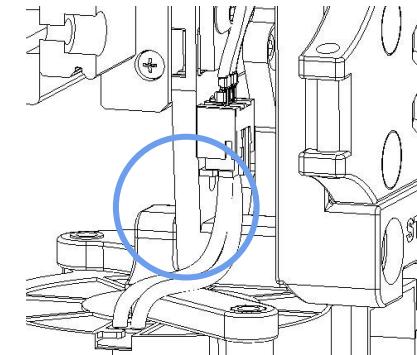
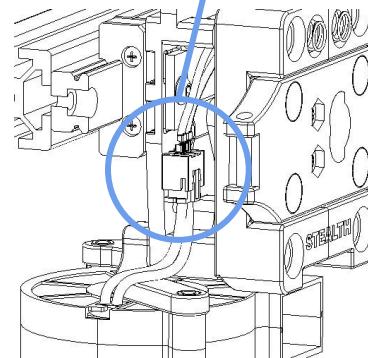
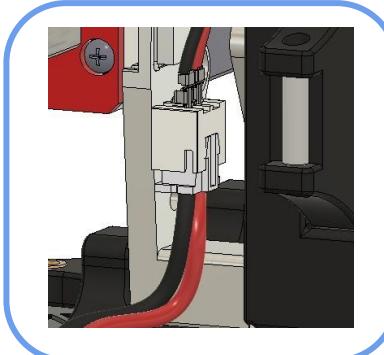
Cut the spring wires to length and crimp them with the appropriate connector. (You may crimp them first prior to inserting them into the slots). Insert them into the jst female connector. Place the connector in position on the Carriage.

m3 x 20mm bhcs



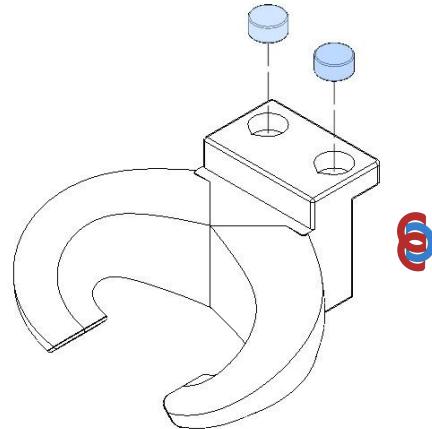
Attach the 5015 fan to the Carriage as shown.

Connect 5015 fan connector.
Ensure the wire colours matched.

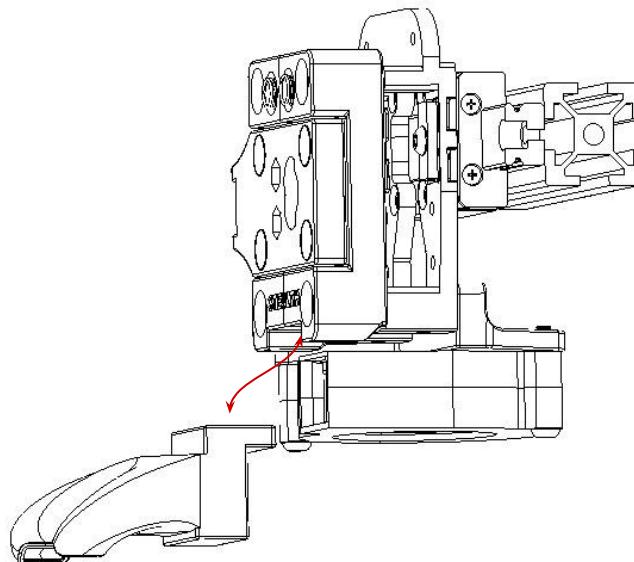


You may secure the fan wire to the Carriage post using a cable tie.

6x3mm n52 magnets



Apply glue before inserting the magnets in the Duct. Push them in until they are flushed in the slots. **Take note of the polarity of the magnets. Make sure they matched the polarity on the Carrier that you installed earlier.**

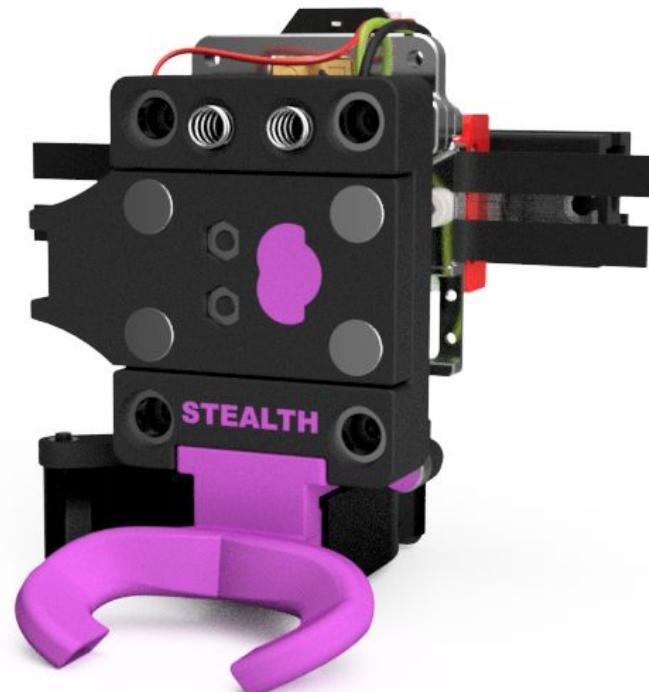


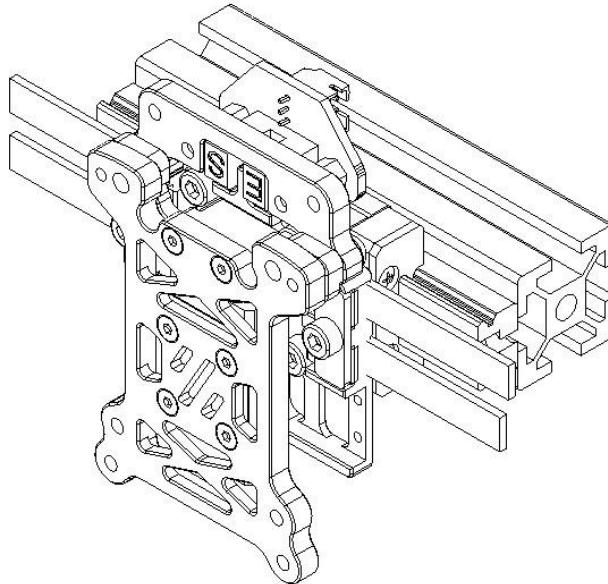
Align the intake of the Duct to the 5015 Fan. The magnets will automatically pull them together and hold them in place. You can tilt the Duct slightly to help attaching it in place.



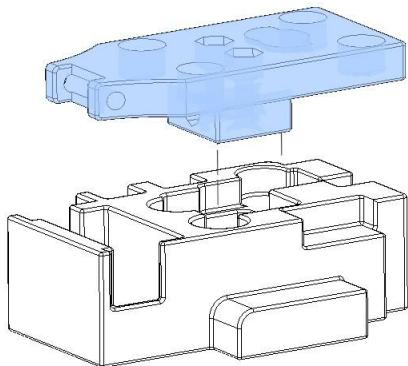
Completed Voron CNC Carriage Assembly

Lineux (toolchanger), BTC Klipper (macros), Dockslide (stowable dock) and Tubby (nozzle offset calibration tool) are created by Bikin Creative Team.

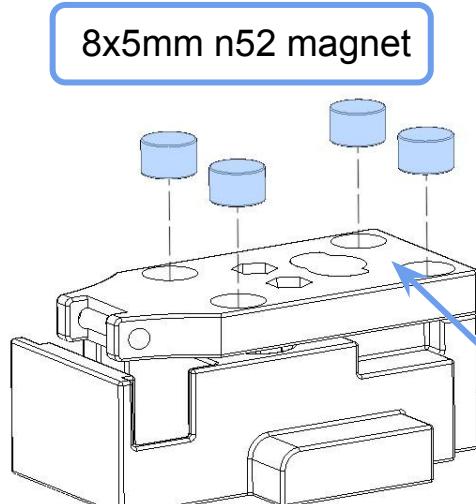




Start off by stripping the Fysetc CNC Tap to its bare. You can leave the belts as is.



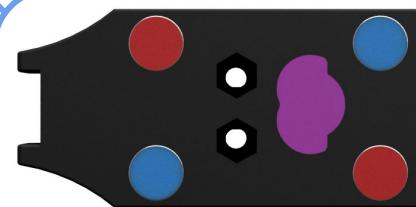
Place the Lock Plate on the Magnet Helper. This will make installing the magnets easier.



Insert the magnets in the respective slots. Apply a bit of epoxy or glue before inserting the magnets. You may use a mallet or a wrench to push the magnets in and ensure they are flushed with the top surface. **Take note of the magnet polarity configuration.**

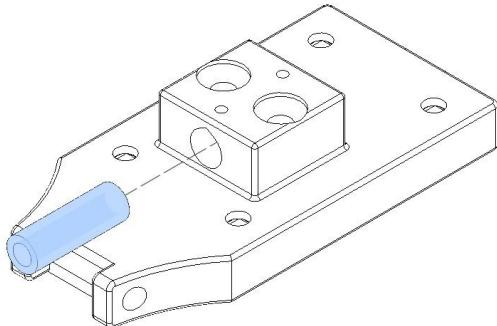


Magnet Helper



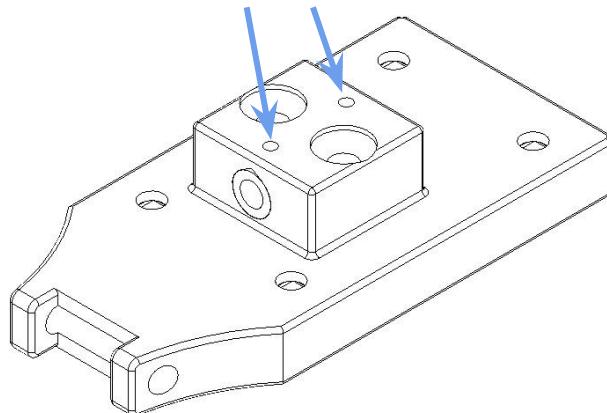
Magnet Polarity Configuration

ID3 OD5 15mm
Stainless Steel
Bushing

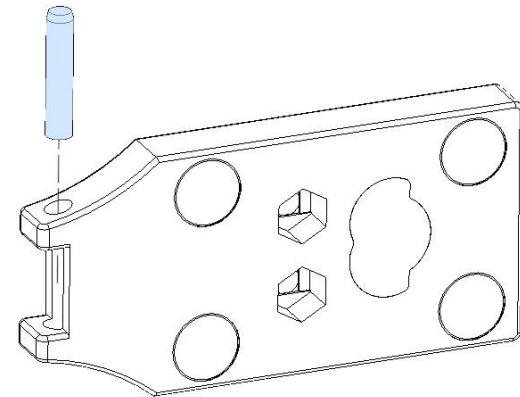


Slide in and keep
both ends flushed.

Apply drop of glue here.

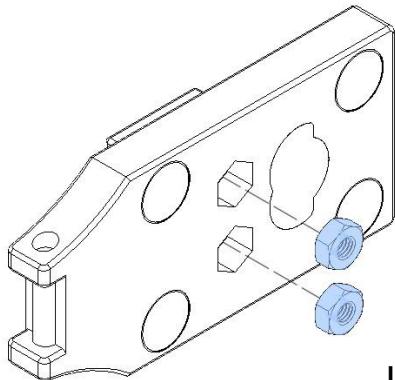


m3 x 14mm
Dowel Pin



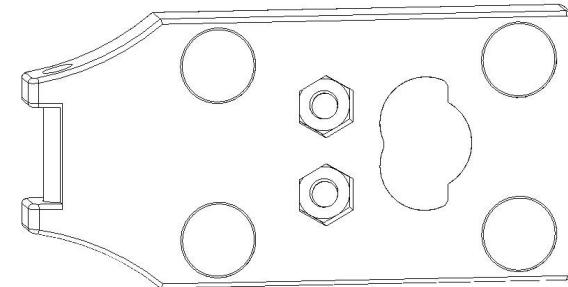
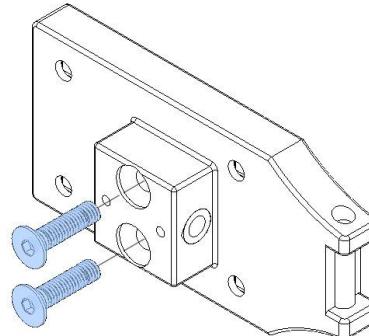
Slide in the dowel pin
and keep both ends
equal.

m3 hex nut

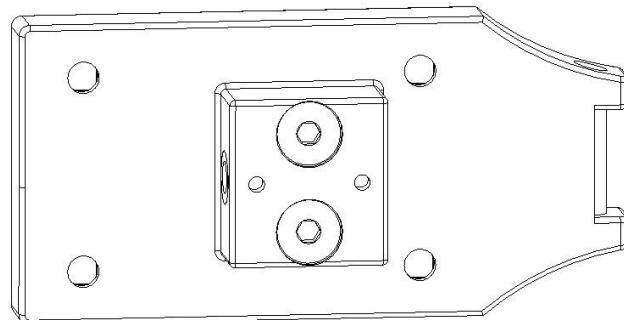


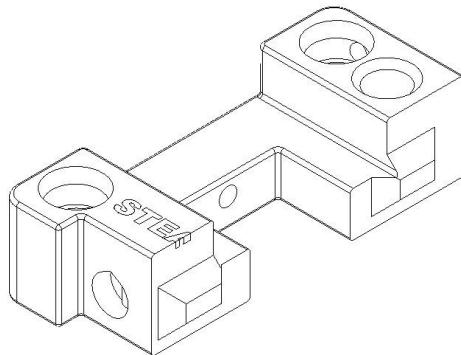
Insert and tighten the screw.

m3 x 12mm
fhcs

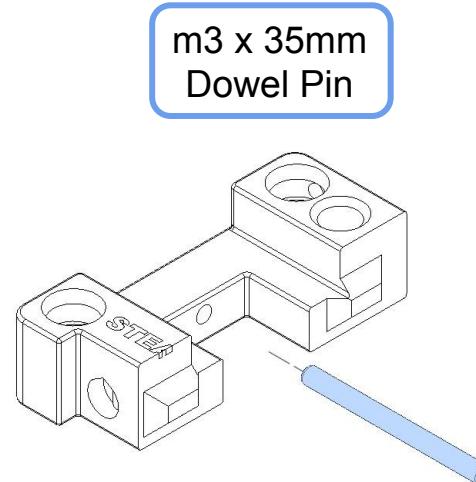


Completed Locking Plate Assembly

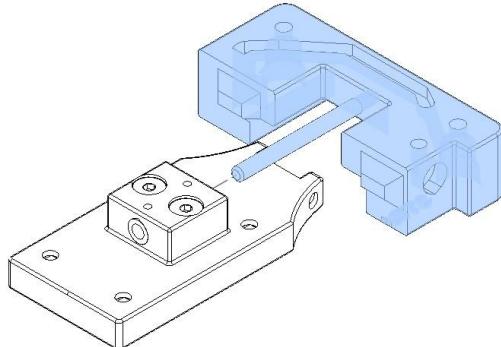




Place Carrier Left on its back
on a flat surface.

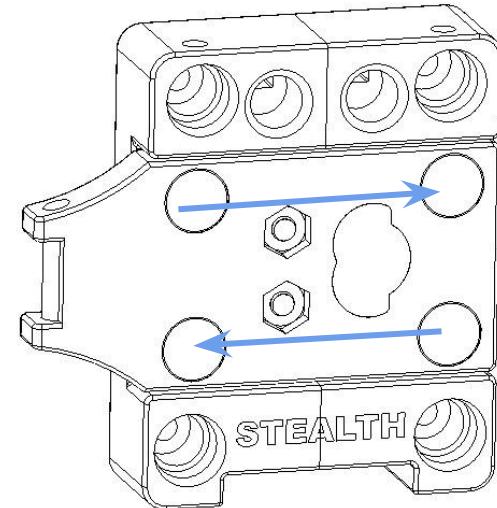
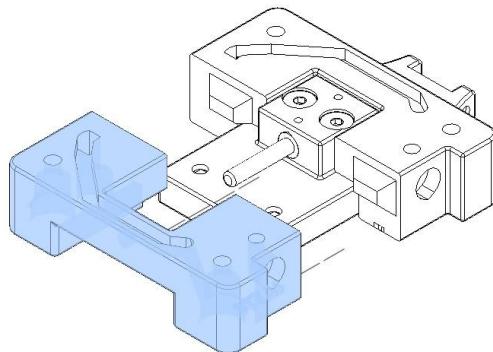


Push the dowel all the way in. It
should be a tight fit.

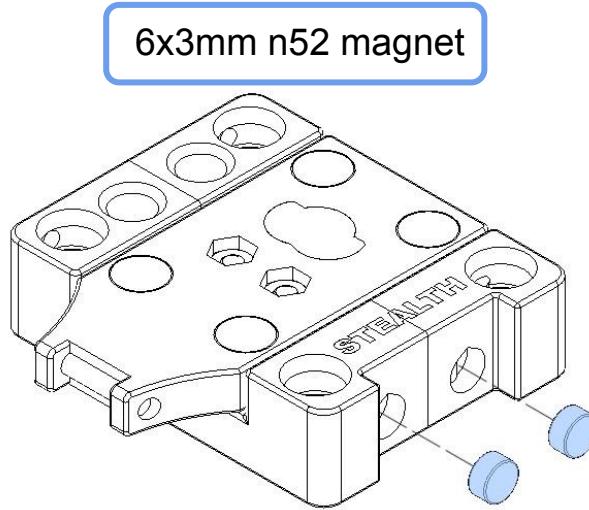


Turn the assembly over. Apply some grease/lubricant on the dowel pin before sliding the Lock Plate in.

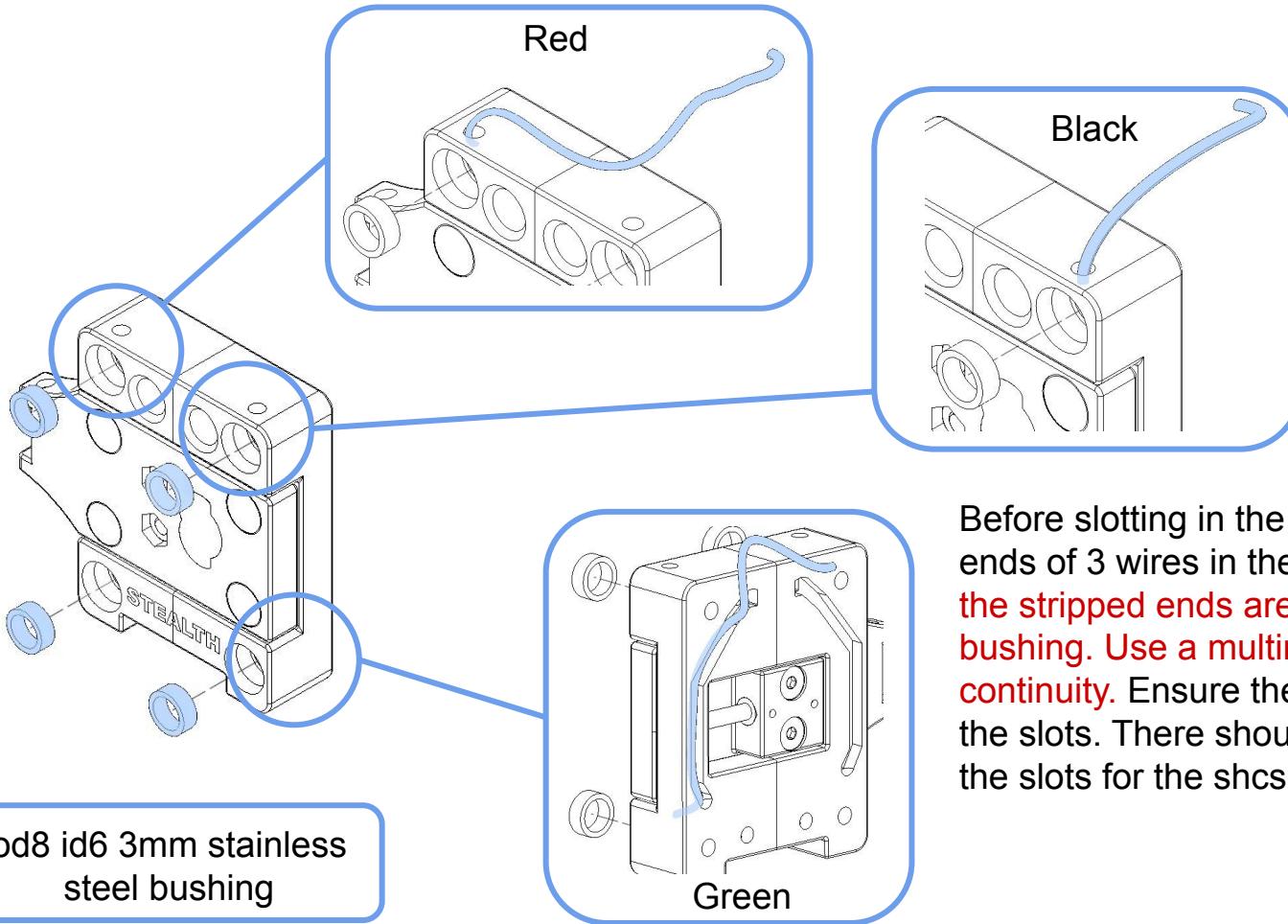
Join Carrier Right together with the assembly. The tabs should aligned and the parts should be flushed together.



The Lock Plate should be able to slide freely.

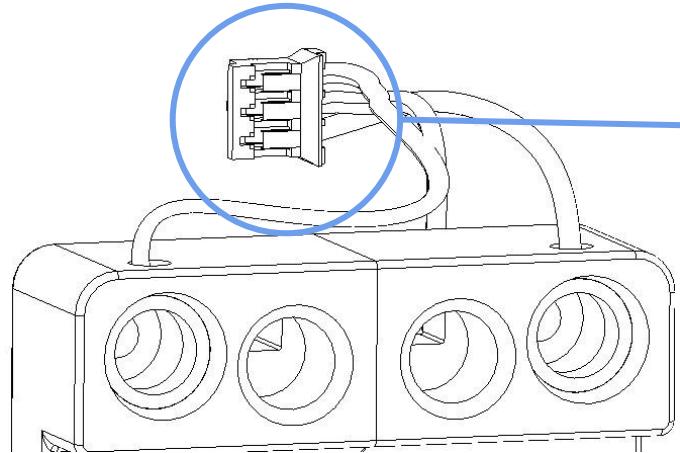


Apply glue before pushing in the magnets. Ensure they sit flushed in the slots. We recommend to reverse the polarity of both magnet to each other.

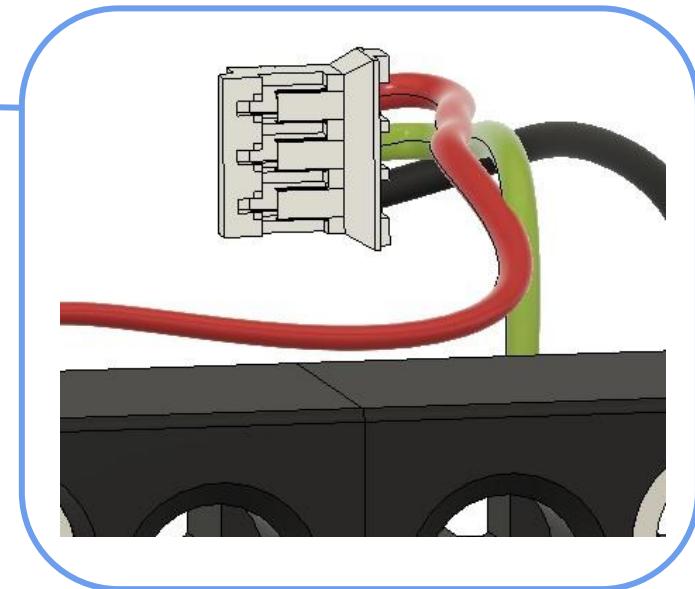


Before slotting in the bushing, insert stripped ends of 3 wires in the respective slots. **Ensure the stripped ends are being pinched by the bushing. Use a multimeter to check for continuity.** Ensure the bushing sit all the way in the slots. There should be some space left in the slots for the shcs screw heads.

jst ph 3pin connector



Connect the wires to a JST PH 3 pin connector as shown. Follow the correct wiring array as shown.

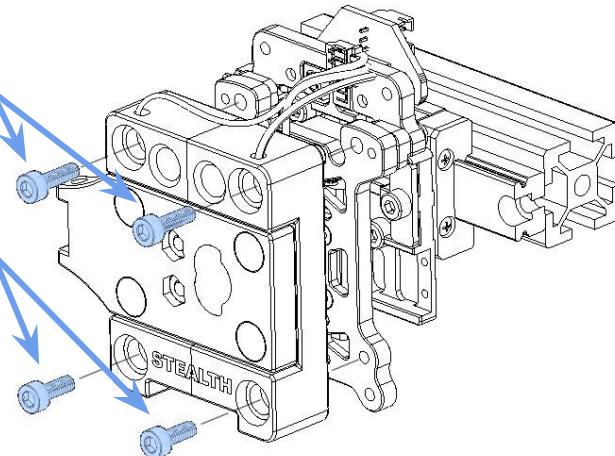


od6 id5 spring 10mm



m3 x 10mm shcs

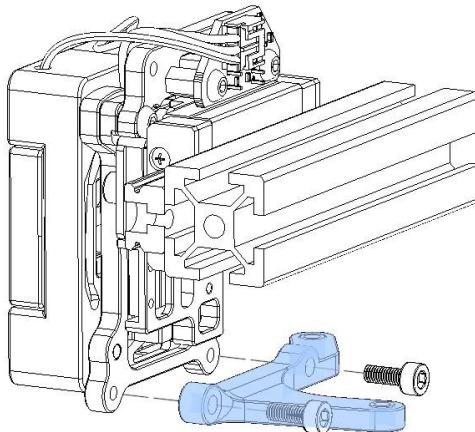
m3 x 8mm shcs



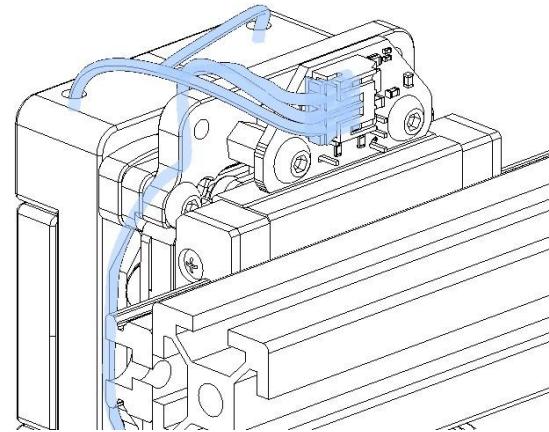
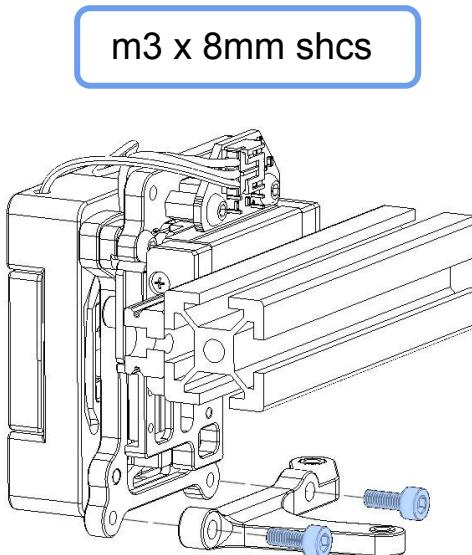
Preparation

Solder about 50mm red and black wire to the end of both springs. Stainless steel solder flux will help to make the soldering easier.

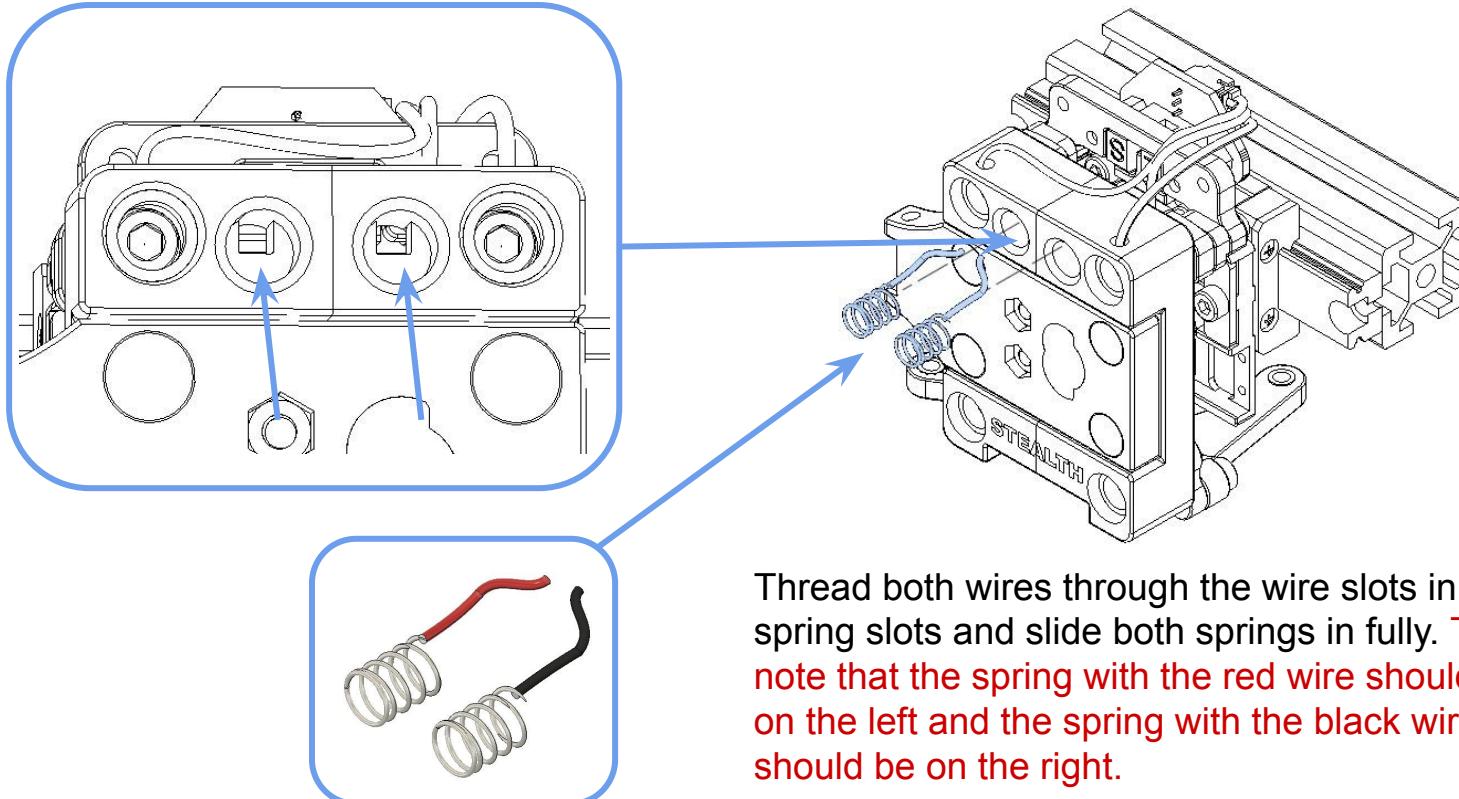
Attach Carrier to the Fysetc CNC Tap as shown. Ensure the Lock Plate can still slide freely after tightening the screws.



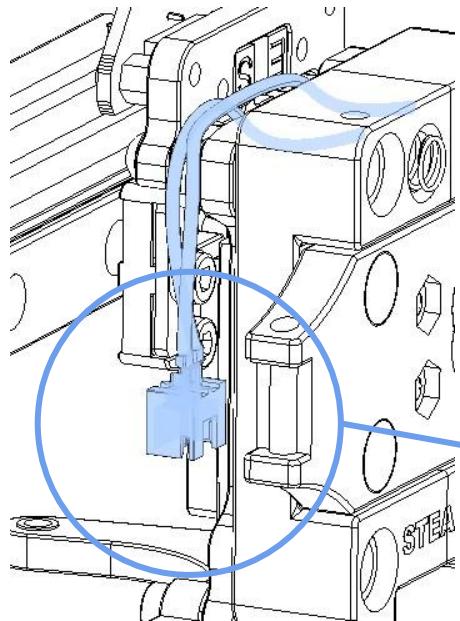
Attach the 5015 Mount to the back of Fysetc CNC Tap as shown.



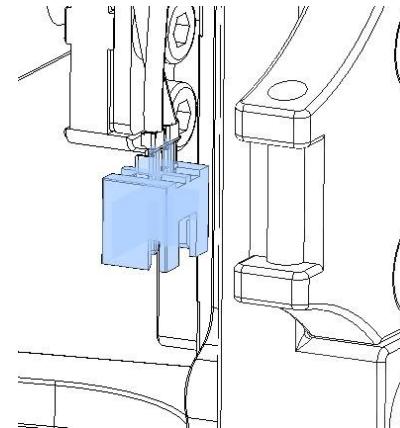
Connect the connector to the optotap on the carriage. Double checked and ensure the polarity is correct.



Thread both wires through the wire slots in the spring slots and slide both springs in fully. **Take note that the spring with the red wire should be on the left and the spring with the black wire should be on the right.**

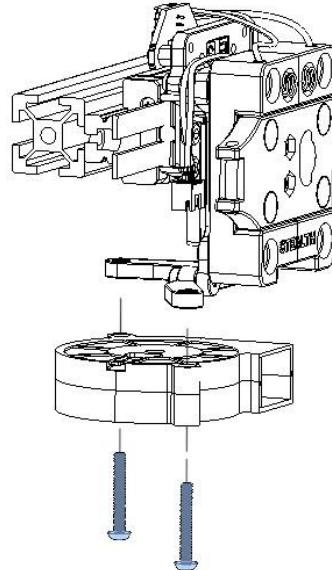


2-pin JST XH2.4 female connector

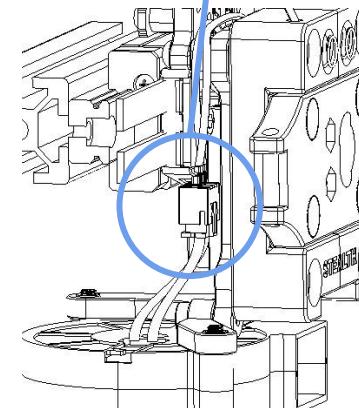
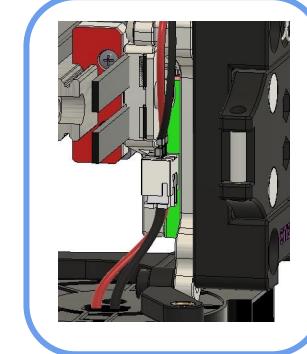


Cut the spring wires to length and crimp them with the appropriate connector. (You may crimp them first prior to inserting them into the slots). Insert them into the jst female connector. Place the connector in position on the Carriage.

m3 x 20mm bhcs

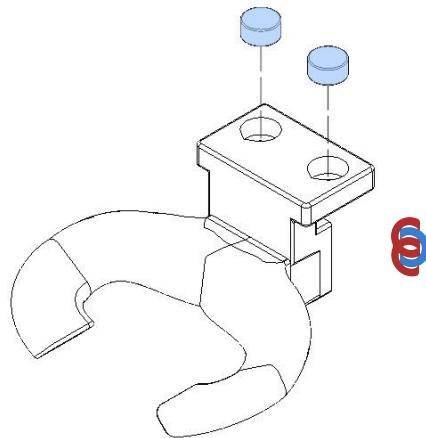


Attach the 5015 fan to the Carriage
as shown.

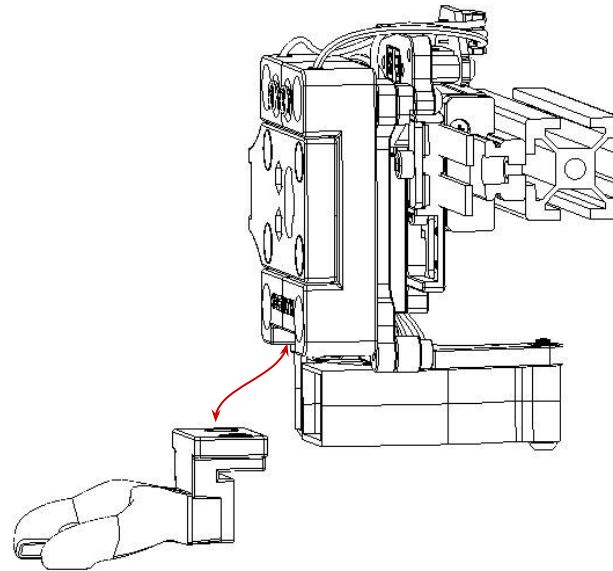


Connect 5015 fan connector.
Ensure the wire colours matched.

6x3mm n52 magnets



Apply glue before inserting the magnets in the Duct. Push them in until they are flushed in the slots. **Take note of the polarity of the magnets. Make sure they matched the polarity on the Carrier that you installed earlier.**



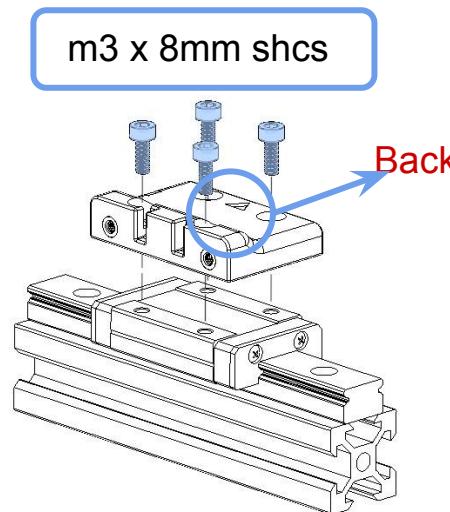
Align the intake of the Duct to the 5015 Fan. The magnets will automatically pull them together and hold them in place. You can tilt the Duct slightly to help attaching it in place.



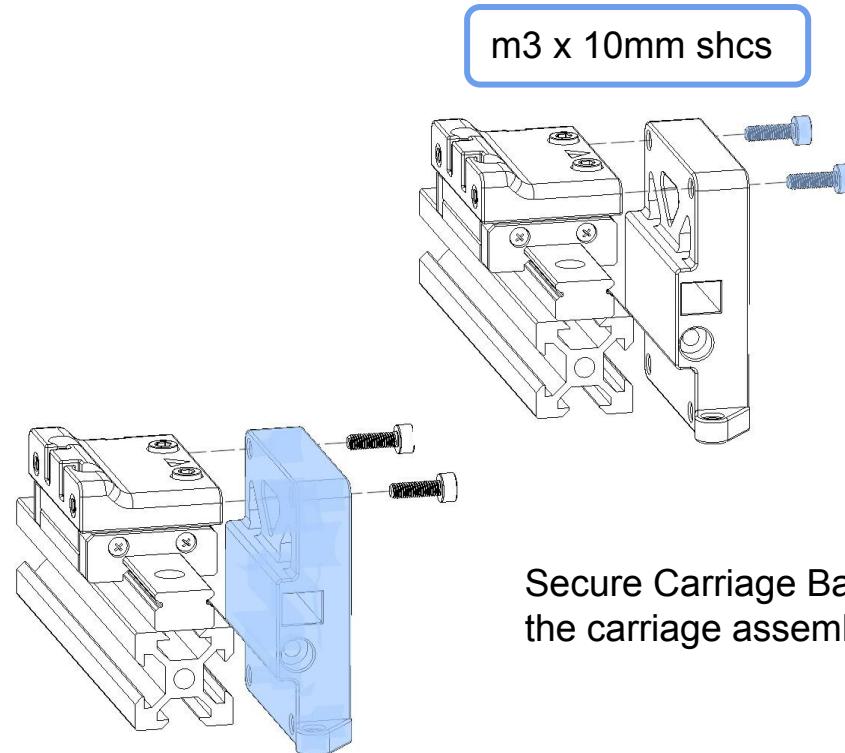
Completed Voron Fysetc CNC Tap Assembly

Lineux has since been adapted on different printers eg, Ratríg Vcore 3.1, Voron Trident, Voron 2.4, Ender 5, BLV Mgn Cube, Flatland, etc, by the community around the world.

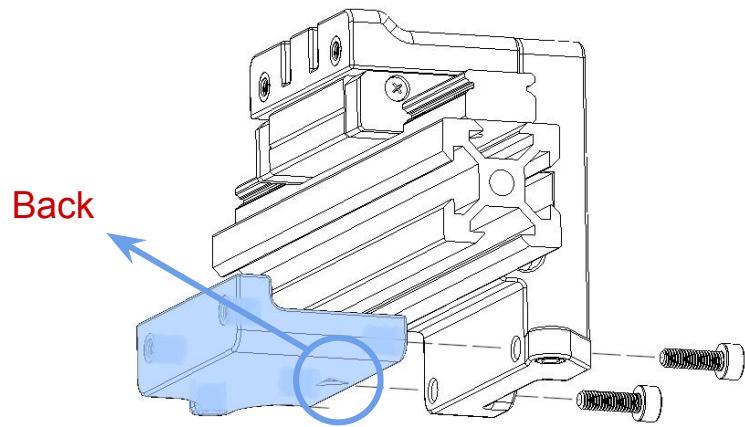




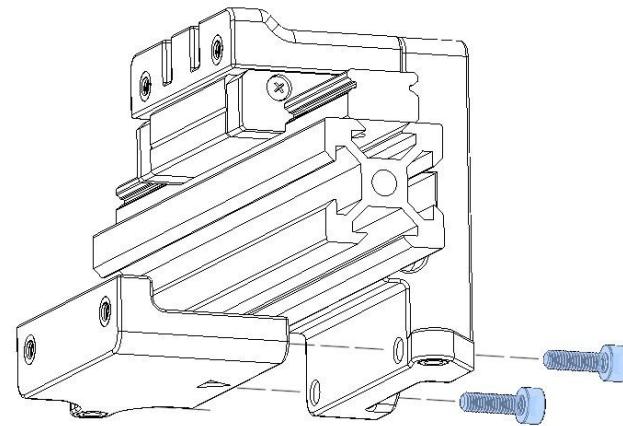
Secure Carriage Top to the mgn block.
The arrow will be pointing to the back.



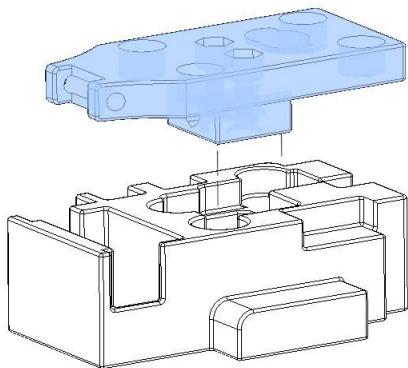
Secure Carriage Back to
the carriage assembly.



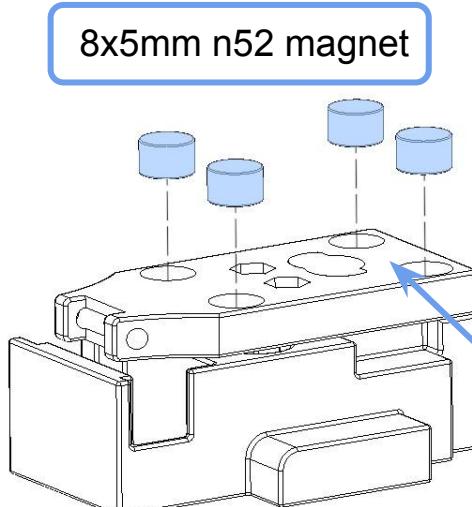
m3 x 10mm shcs



Secure Carriage Bottom to the carriage assembly. **The arrow will be pointing to the back.**



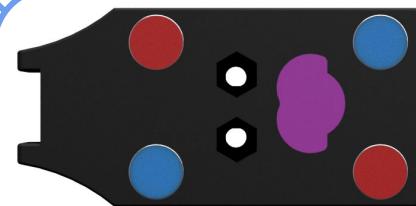
Place the Lock Plate on the Magnet Helper. This will make installing the magnets easier.



Insert the magnets in the respective slots. Apply a bit of epoxy or glue before inserting the magnets. You may use a mallet or a wrench to push the magnets in and ensure they are flushed with the top surface. **Take note of the magnet polarity configuration.**

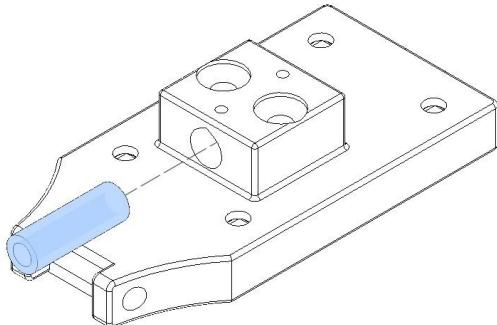


Magnet Helper



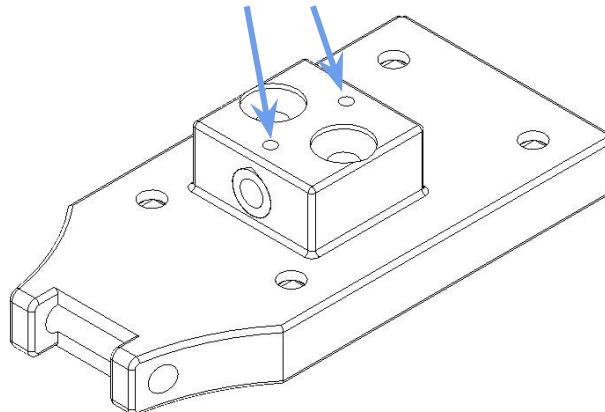
Magnet Polarity Configuration

ID3 OD5 15mm
Stainless Steel
Bushing

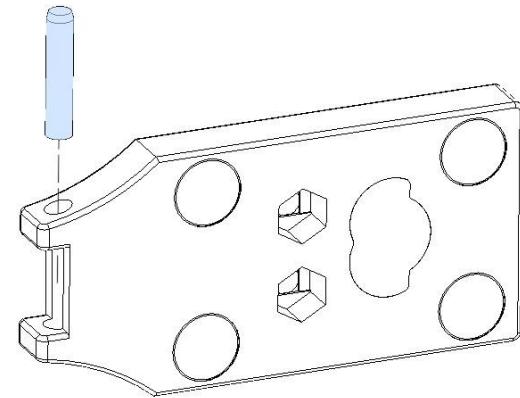


Slide in and keep
both ends flushed.

Apply drop of glue here.

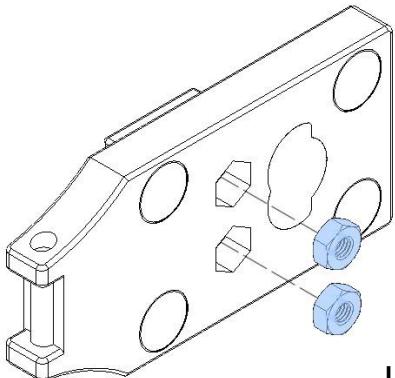


m3 x 14mm
Dowel Pin



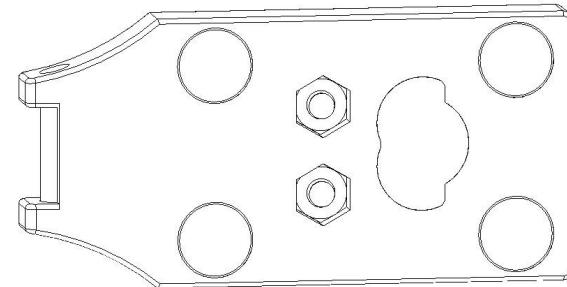
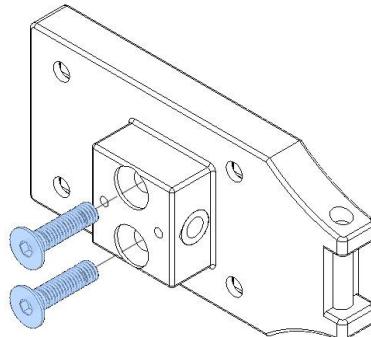
Slide in the dowel pin
and keep both ends
equal.

m3 hex nut

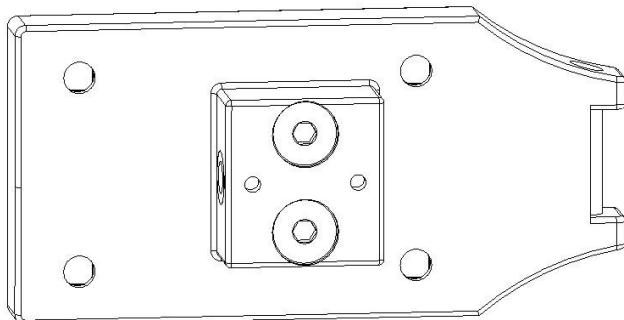


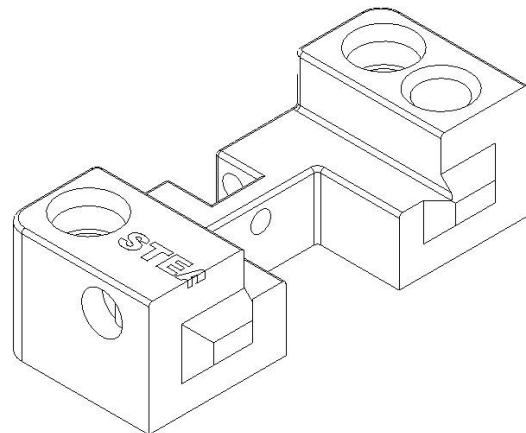
Insert and tighten the screw.

m3 x 12mm
fhcs

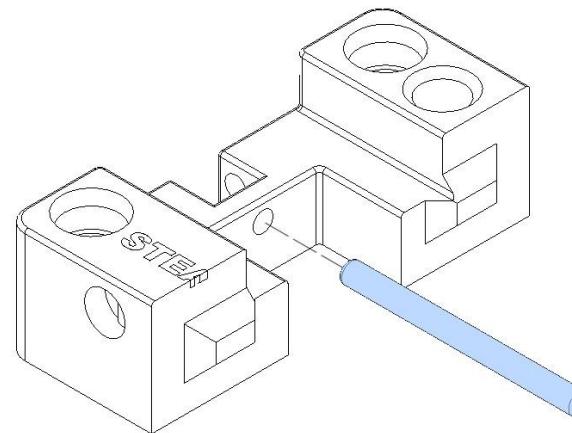


Completed Locking Plate Assembly

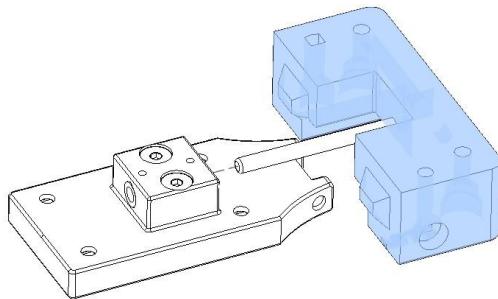




Place Carrier Left on its back on a flat surface.

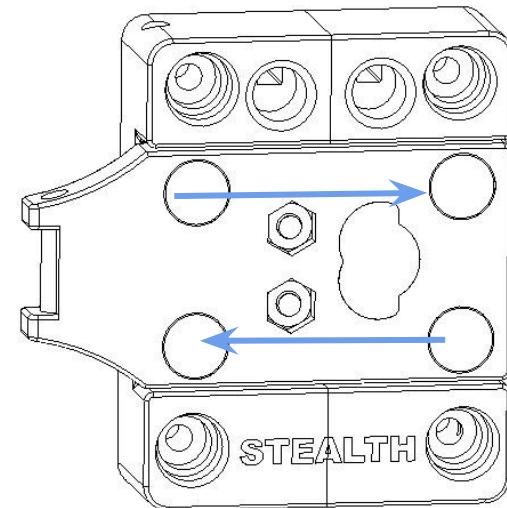
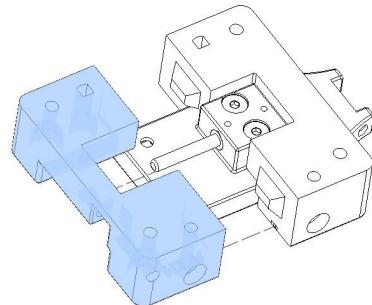


Push the dowel all the way in. It should be a tight fit.



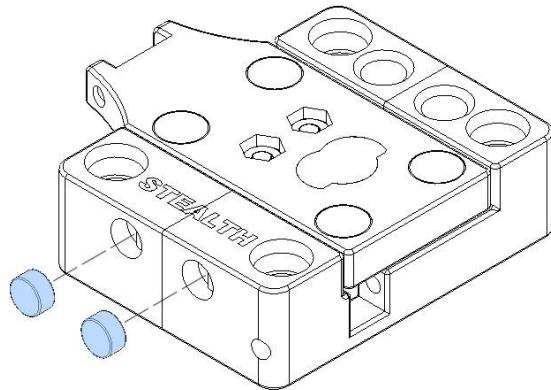
Turn the assembly over. Apply some grease/lubricant on the dowel pin before sliding the Locking Plate in.

Join Carrier Right together with the assembly. The tabs should aligned and the parts should be flushed together.



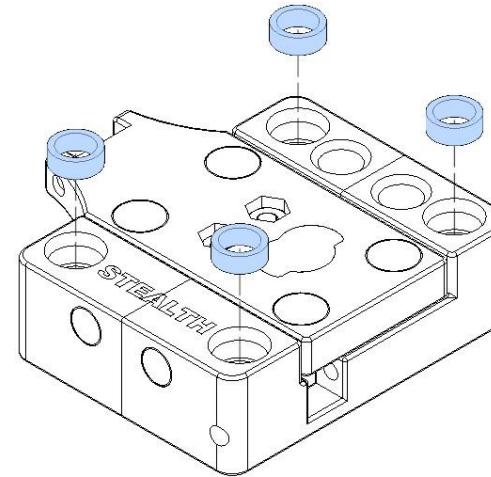
The Locking Plate should be able to slide freely.

6x3mm n52 magnet



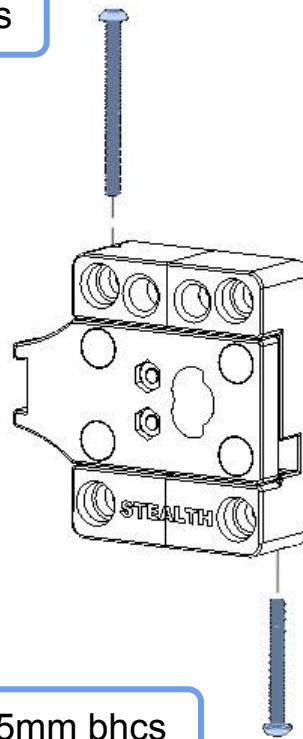
Apply glue before pushing in the magnets. Ensure they sit flushed in the slots. **We recommend to reverse the polarity of both magnet to each other.**

od8 id6 3mm Stainless steel bushing



Apply glue before pushing in the bushings. Ensure they sit all the way in the slots.

m3 x 35mm bhcs



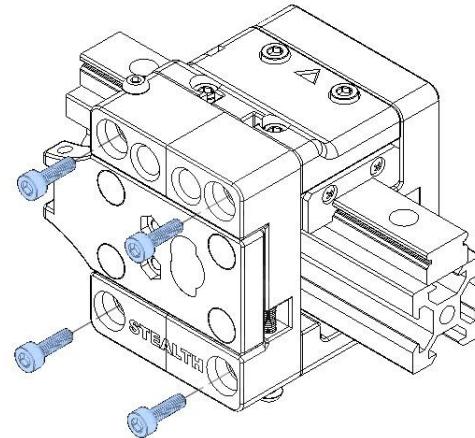
m3 x 25mm bhcs

Screw the bolts all the way in. **Be careful** as you will be screwing in to plastic towards the end of the bolt. Do not overtighten.

od6 id5 spring 10mm



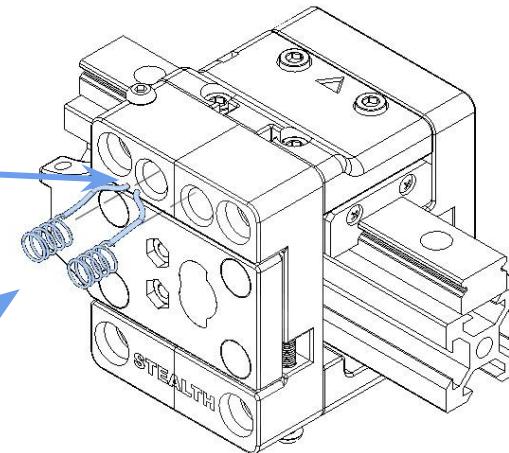
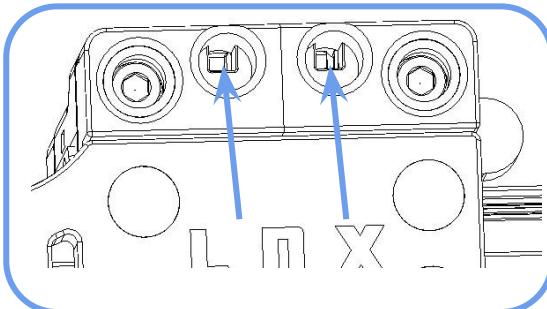
m3 x 10mm shcs



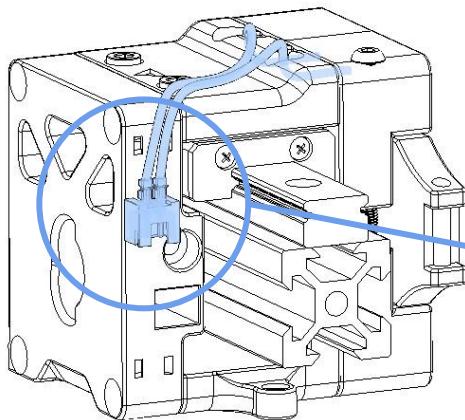
Preparation

Solder about 50mm red and black wire to the end of both springs. Stainless steel solder flux will help to make the soldering easier.

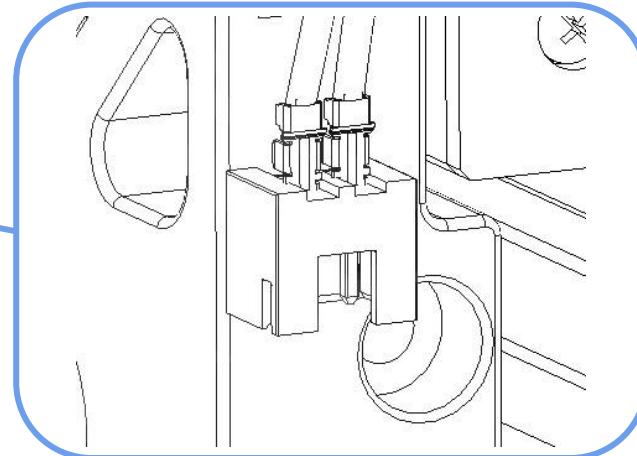
Attach Carriage B to the carriage as shown. Ensure the Locking Plate can still slide freely.



Thread both wires through the wire slots in the spring slots and slide both springs in fully. **Take note that the spring with the red wire should be on the left and the spring with the black wire should be on the right.**

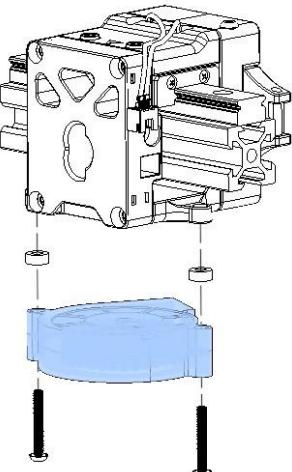
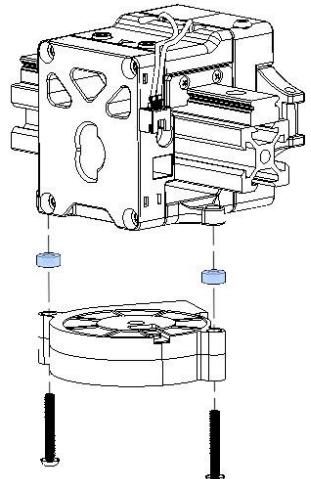


2-pin JST XH2.4 female connector

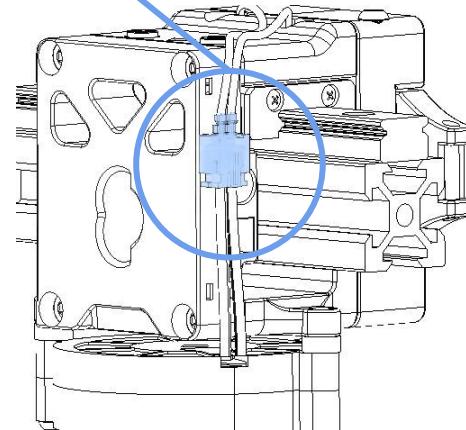
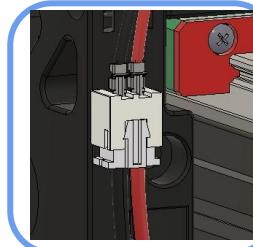
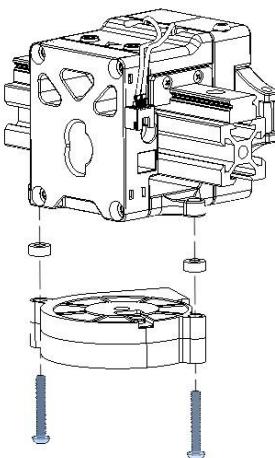


Cut the spring wires to length and solder them to the 2-pin jst connector. You may place them in the position shown temporary.

5015 printed spacers

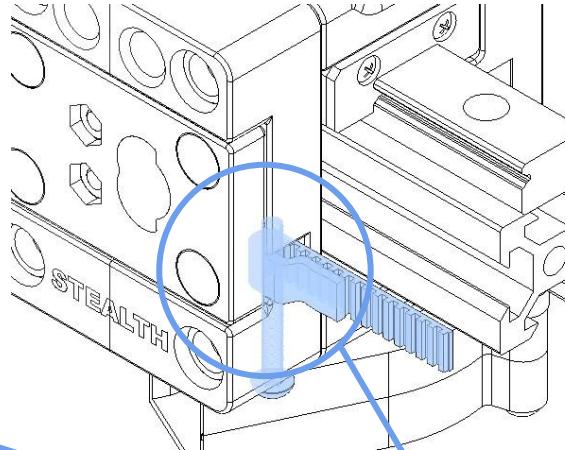
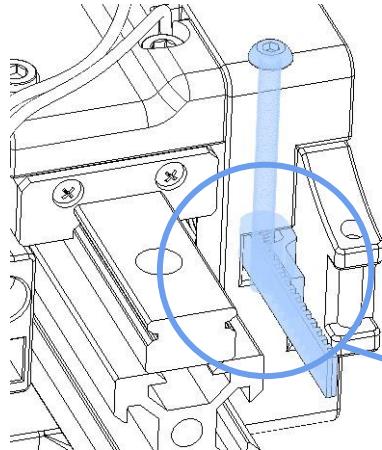


m3 x 20mm bhcs



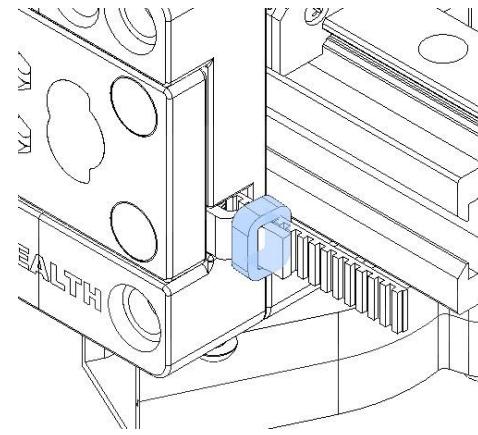
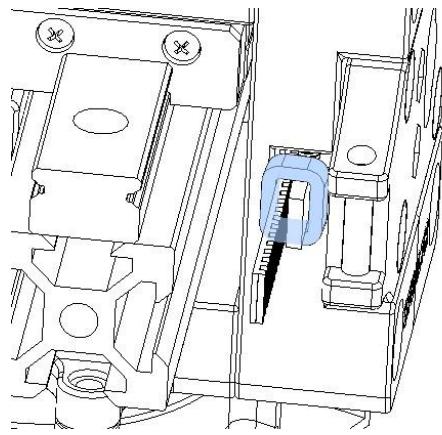
Attach the 5015 fan to the carriage as shown.

Connect 5015 fan connector to the Carrier JST connector. Use a cable tie to secure the wire to the Carriage Back. Ensure the wire colours matched.



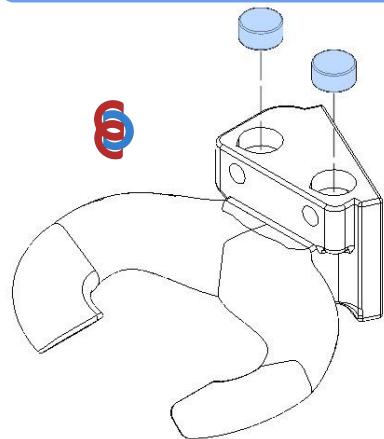
Thread both A and B front belts through the back of the bolts on the Carrier and back out making a loop. **You may unscrew the belt bolts first to make it easier and screw them back once the belt is in position.**



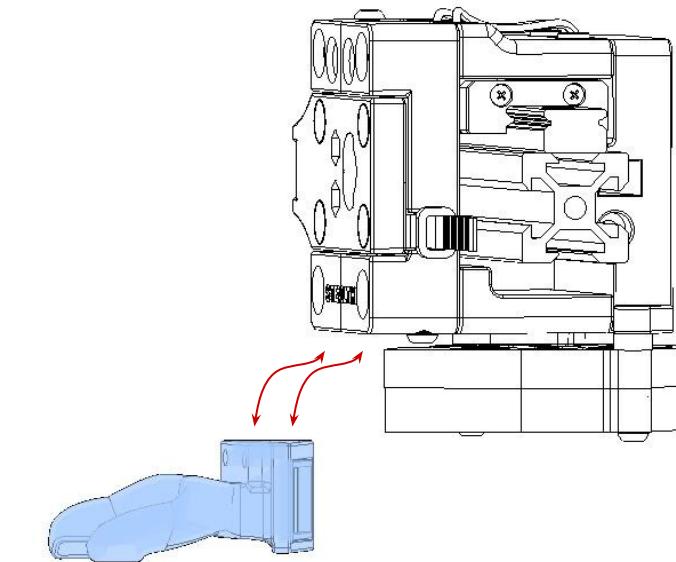


Secure both belts with cable tie.
Get the cable tie as close as
possible to the Carrier body before
tightening them. Cut any excess
belt if necessary.

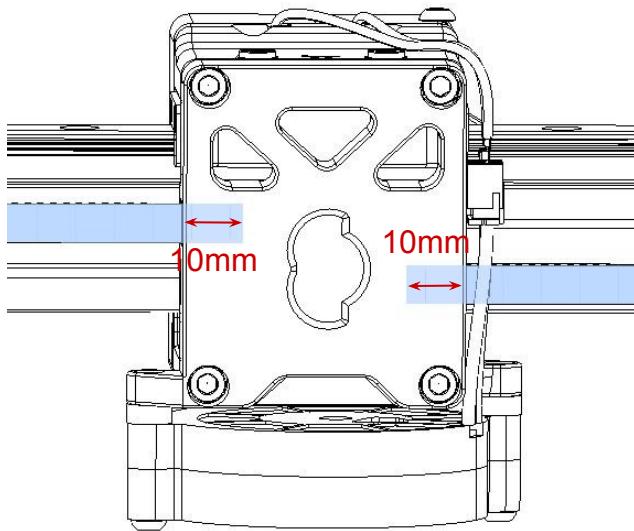
6x3mm n52 magnets



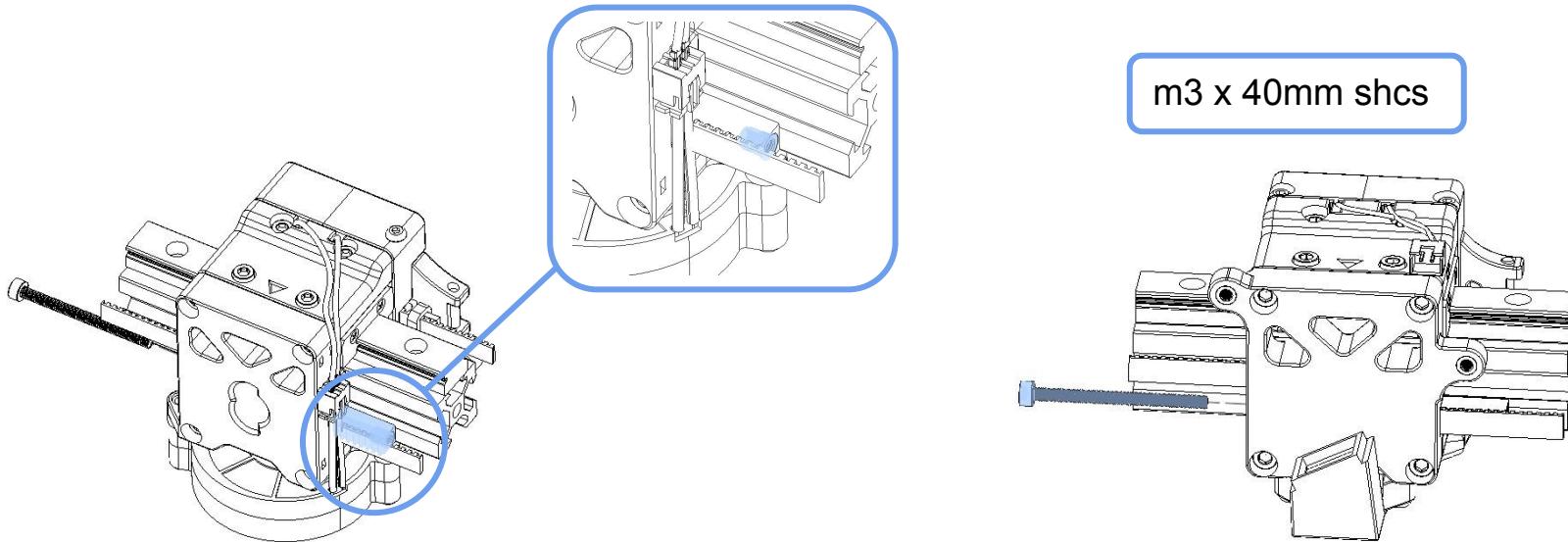
Apply glue before inserting the magnets in the Duct. Push them in until they are flushed in the slots. **Take note of the polarity of the magnets.** Make sure they matched the polarity on the Carrier that you installed earlier.



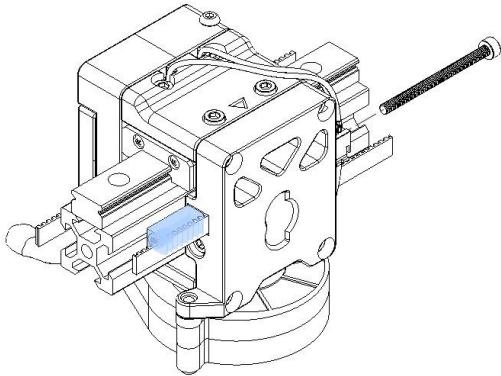
Align the intake of the Duct to the 5015 Fan. The magnets will automatically pull them together and hold them in place. You can tilt the Duct a bit to help make the assembly easier.



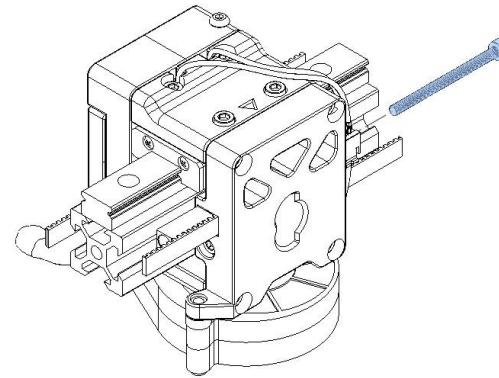
Cut the rear belts with an excess of about 10mm on both sides from the Carriage Back body. Ensure the belts are riding correctly on all the pulleys and idlers before committing to the cut.



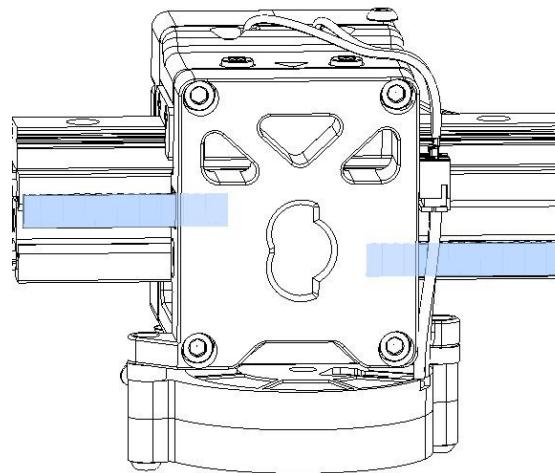
Align the Belt Tensioner at the slot with the teeth facing the belt teeth and secure them with the bolt. Keep them loose for now. **The heat insert should be facing outwards.**



m3 x 40mm shcs



Repeat the same step for the opposite side.



You can now tighten the belts as per your printer's recommended settings.



Completed Carriage Vzbot Assembly

We are humans and are prone to mistakes. If you encounter any issues/faults with the build guide, please raise them on our Discord with the relevant page number or a screenshot of the issues/fault.

This guide may be subjected to changes regularly based on feedbacks from the community.

Do join us on Discord if you need help or have any questions.



<https://discord.gg/Xwqbjj4VjH>



<https://github.com/Bikin-Creative/Lineux-Toolchanger>





Lineux Toolchanger

