

# Reaper Toolhead

## Assembly Manual

Version: 2024-07-15

<u>INTRODUCTION</u>	03
<u>HARDWARE</u>	07
<u>OVERVIEW</u>	09
<u>X-CARRIAGE</u>	10
<u>EXTRUDER MOUNT</u>	16
<u>HOTEND ASSEMBLY</u>	24
<u>DUCTS AND GRILL</u>	30



Thanks for choosing Reaper, as you start this process please read the manual thoroughly. If you don't, then complain, we will have much less sympathy for you.

Attempt this mod at your own risk. We advise that you have a well tuned printer and some knowledge of what you are doing, we assume no liability for any potential injuries sustained.



If you see the yellow warning symbol anywhere in these pages, read them carefully! They will prevent a lot of headaches.

Thank you kindly and have some fun with it!

**THE APDM TEAM**



## INTRODUCTION

<https://apdm.tech/>

### **HAVE FUN WITH IT!**

Reaper is a highly configurable Toolhead for your 3d printer. You can customize the looks using multiple color variations to suit your individual wants. You can also create your own logo and grill insert for even more freedom. Blanks are available on the GitHub

### **CHOOSING STLS**

Reaper needs to be thought of as sub assemblies, once that is done it is much easier to understand how to manually select part stls for varying configurations. Please use the configurator on [apdm.tech/](https://apdm.tech/) to find your specific stls faster.

### **NEED HELP?**

If you need any help at all or have any questions during your build, we are here to help. Join us over on the Discord, link is on the website, we have a growing community of users from around the globe who can help address any issues.



### **IDEAS?**

If you have any issues or criticism, ideas for improvement, feature requests for upgrades, please visit the Discord and let us know. We will try to help in any way we can.

### **THIS IS A REFERENCE**

This manual is not a full fledged explanation and is meant to be a visual reference manual to aid you in assembly. It does not account for every single variable for all potential configurations and some assembly was left out on purpose. We have an entire channel of tips and tricks on the Discord to further explain some of the missing items.

If you need more visual help please download the Example CAD file from the GitHub repository to further understand the assembly.



## RECOMMENDED PRINT SETTINGS

These print settings follow the Voron Design recommended settings. Why mess with something that works?

### 3D PRINTING PROCESS

Fused Deposition Modeling (FDM)

### MATERIAL

ABS or ASA

### LAYER HEIGHT

Recommended: 0.2mm

### EXTRUSION WIDTH

Recommended: forced 0.4mm

### INFILL TYPE

Grid, Gyroid, Honeycomb, Triangle, Cubic

### INFILL PERCENTAGE

Recommended: 40%

### WALL COUNT

Recommended: 4

### SOLID TOP/BOTTOM LAYERS

Recommended: 5

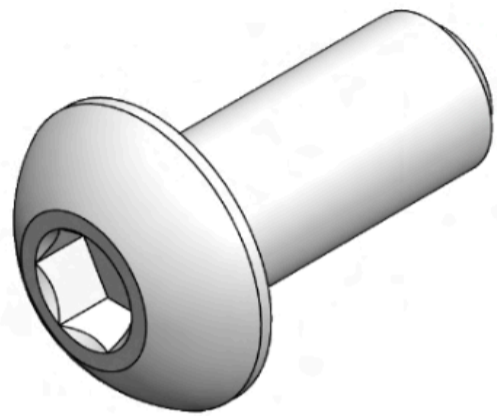
1: The use of different materials or blends may negatively affect the fit and finish of your parts, you do so at your own risk.

2: We have seen some slicers mis-behaving when slicing with Classic wall generation. Please check to make sure there are no errors prior to printing.



**PLEASE PRINT THE FITNESS BENCHMARK TEST ON GITHUB BEFORE PRINTING ANY REAPER PARTS:**  
Parts tolerance is very important. There are multiple interlocking features that can cause assembly issues if not printed properly.

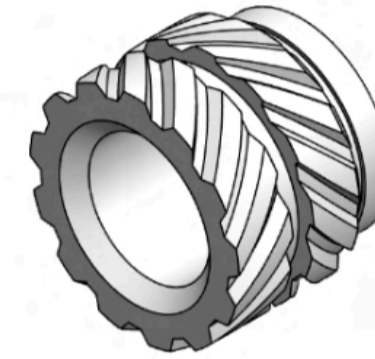




## **BUTTON HEAD CAP SCREW BHCS**

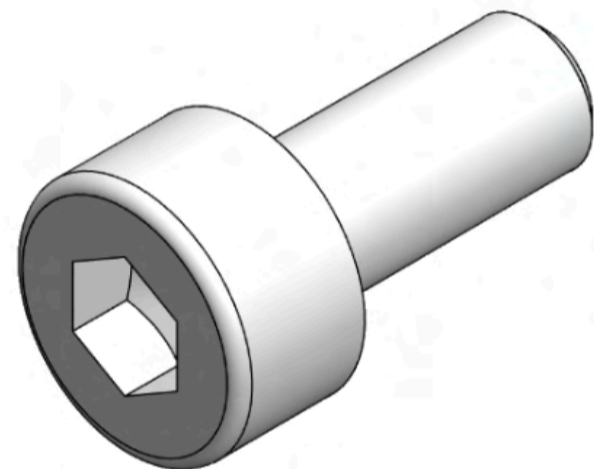
Metric fastener with a dome shaped head and hex drive. Commonly used for lower clearance areas.

**ISO 7380-1**



## **HEAT SET INSERTS**

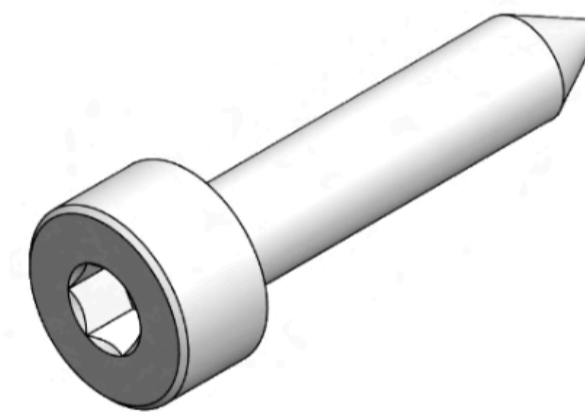
M3x5x4mm Threaded Brass inserts that are installed with a soldering tool that will melt the plastic when installed. The knurls hold into the melted plastic and the Brass threads are much stronger than plastic.



## **SOCKET HEAD CAP SCREW SHCS**

Metric fastener with a cylindrical head and hex drive. Commonly used for higher holding power.

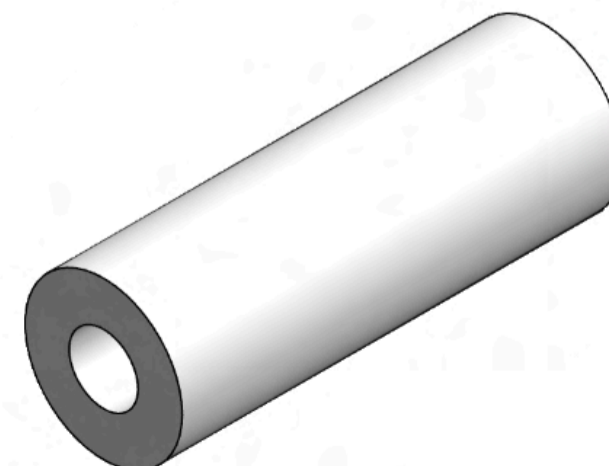
**ISO 4762**



## **SELF TAPPING SCREW**

Fastener for directly screwing into plastic.

\*only used when using carriage mounted X Endstop micro switch.



## **PTFE TUBE**

4x2mm recommended





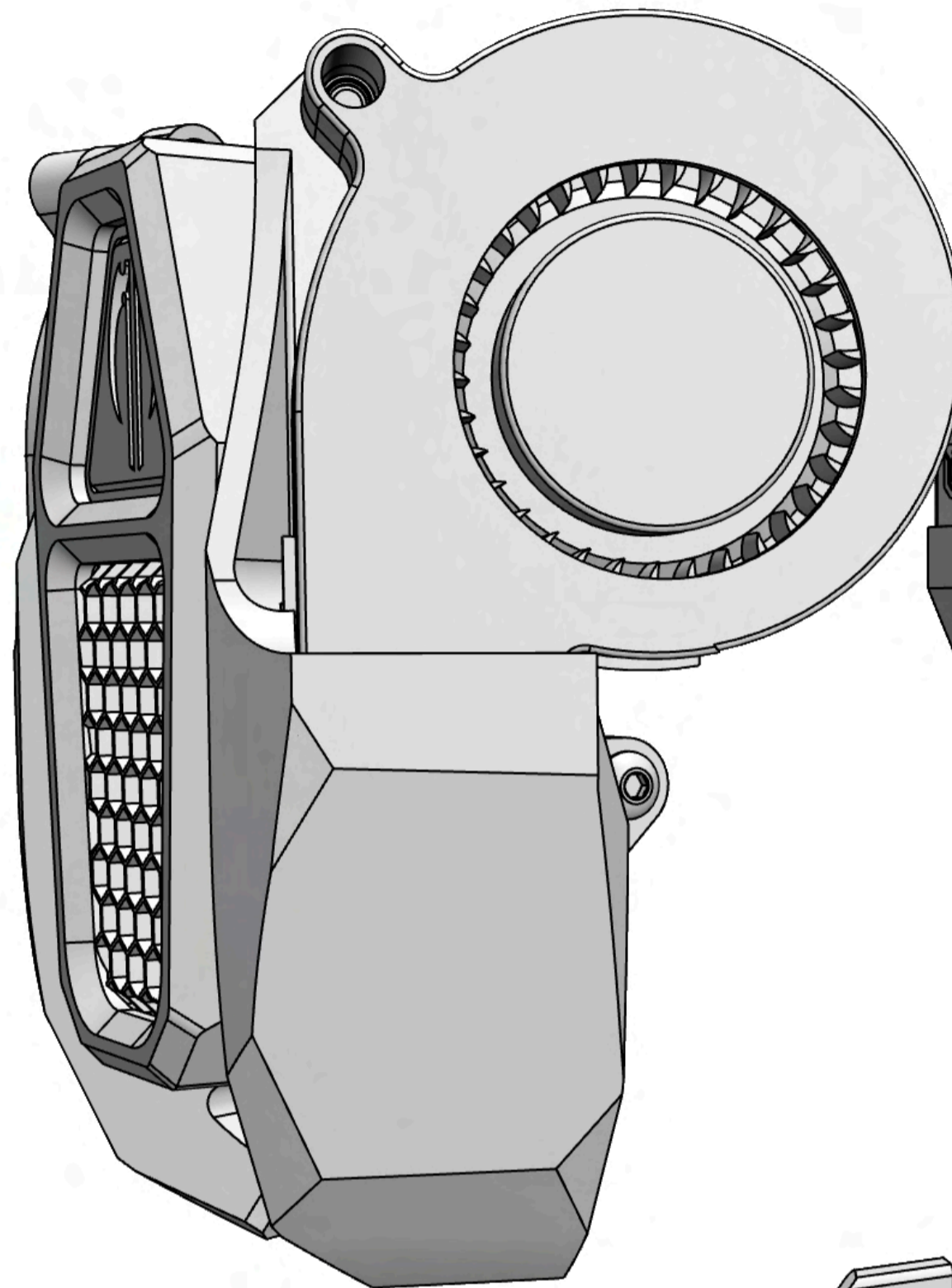


# OVERVIEW

<https://apdm.tech/>

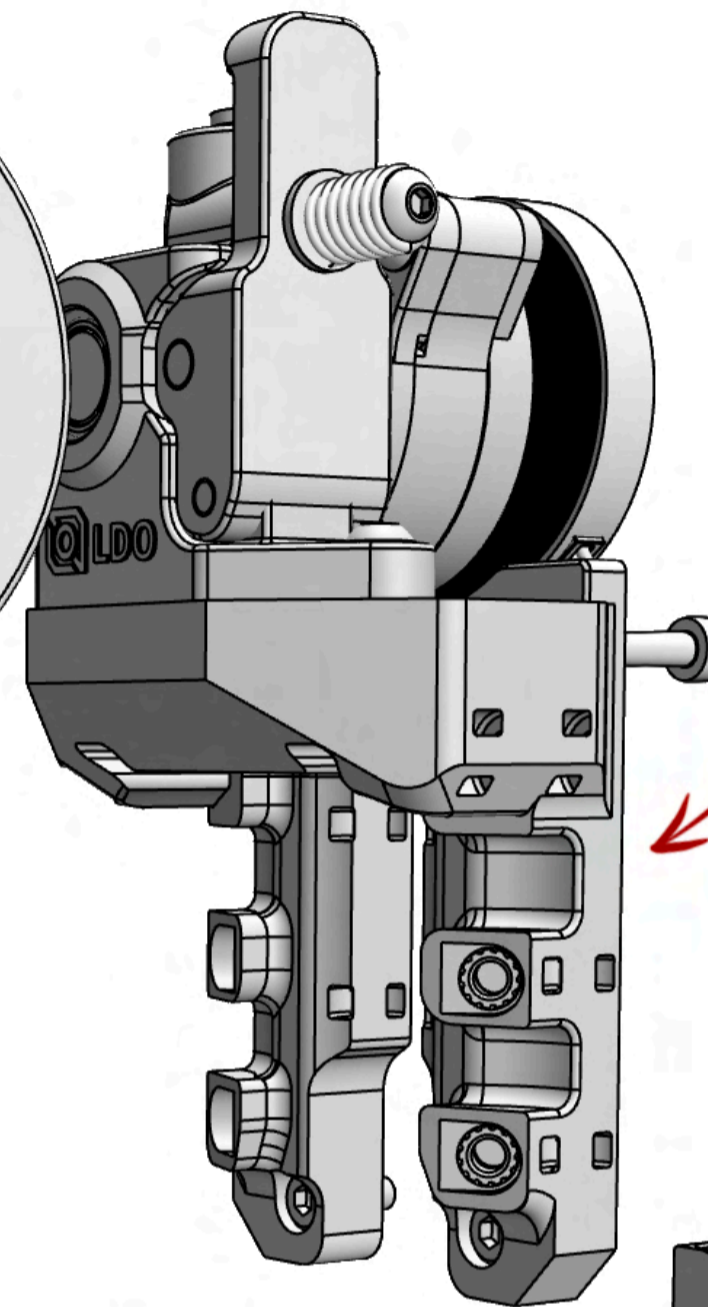
## GRILL/DUCT SUBASSEMBLY

- 5015 Fans
- Ducts\*
- Grill Shell\*
- Grill Insert\*
- Light Plate\*
- Logo\*



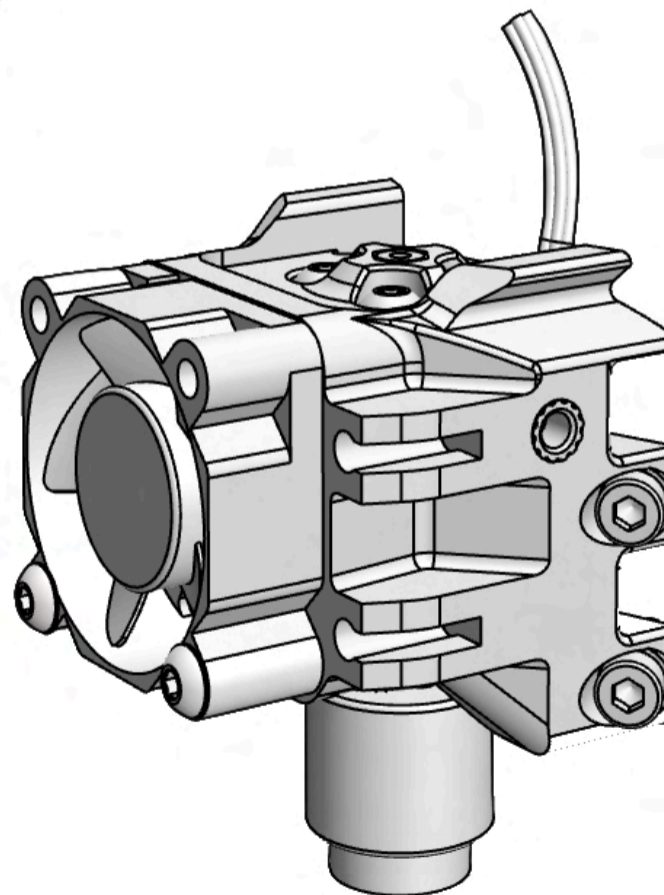
## EXTRUDER SUBASSEMBLY

- Extruder
- Extruder Mounting Plate\*
- PTFE



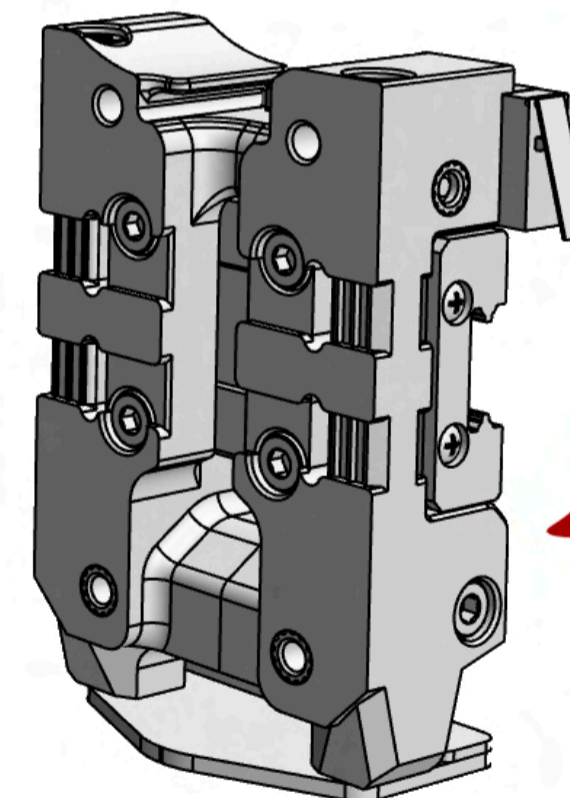
## HOTEND SUBASSEMBLY

- Hotend
- Hotend Mount\*
- 3010 Fan
- PTFE



## X-CARRIAGE SUBASSEMBLY

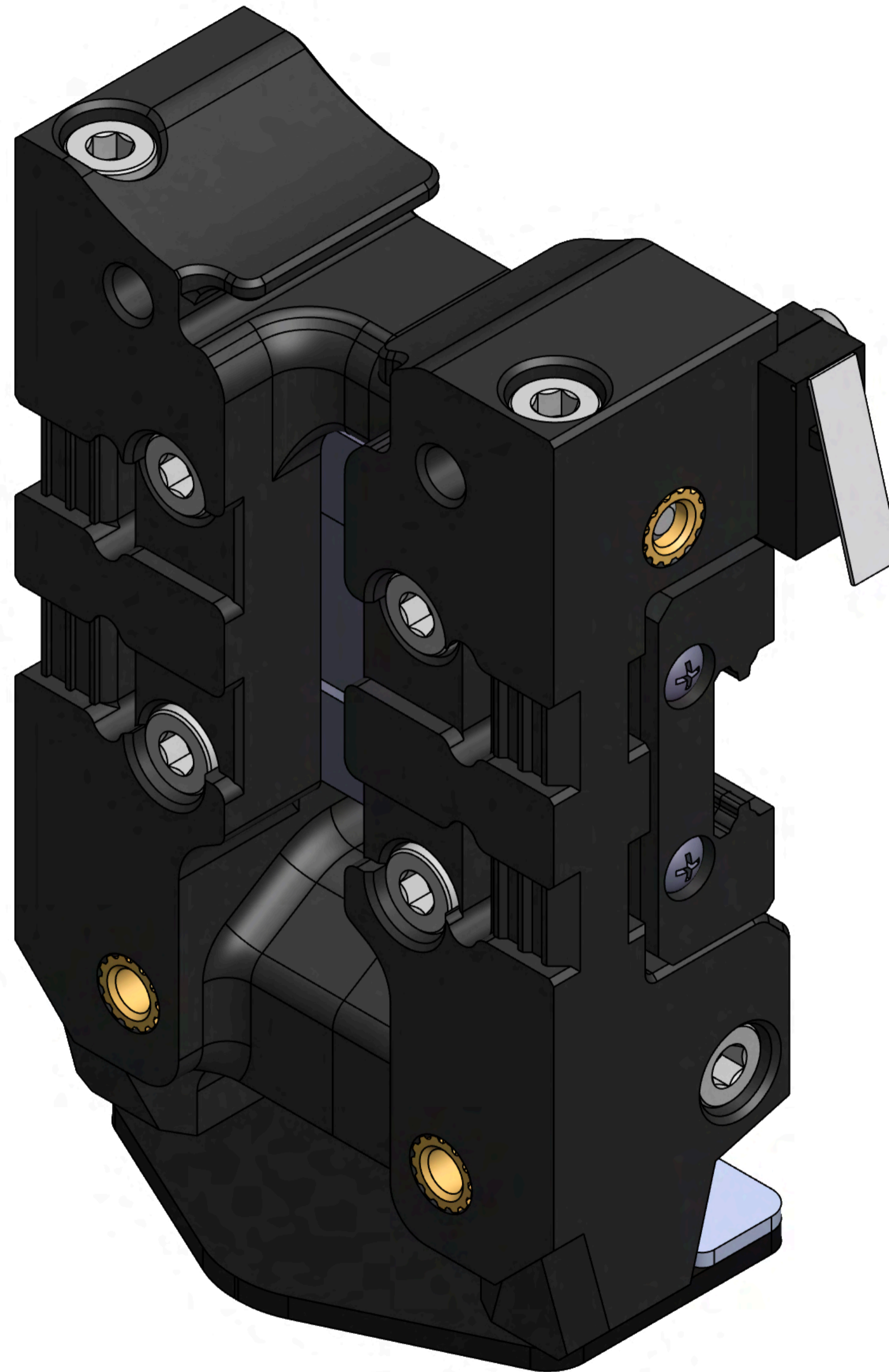
- Carriages\*
- Limit Switch (optional)
- Probe



Parts marked with \* indicate printed parts.

# X-CARRIAGE

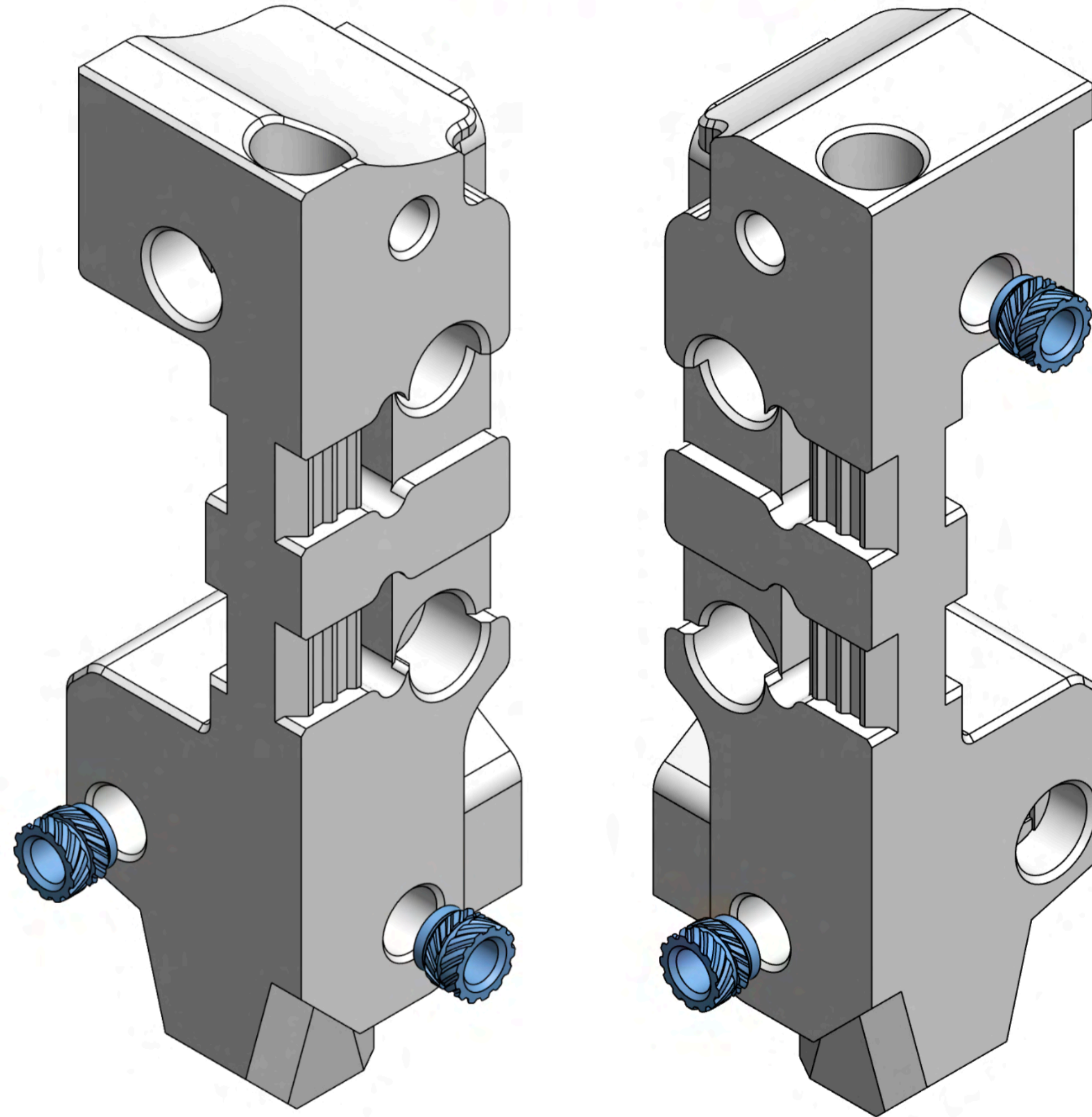
<https://apdm.tech/>



# X-CARRIAGE

<https://apdm.tech/>

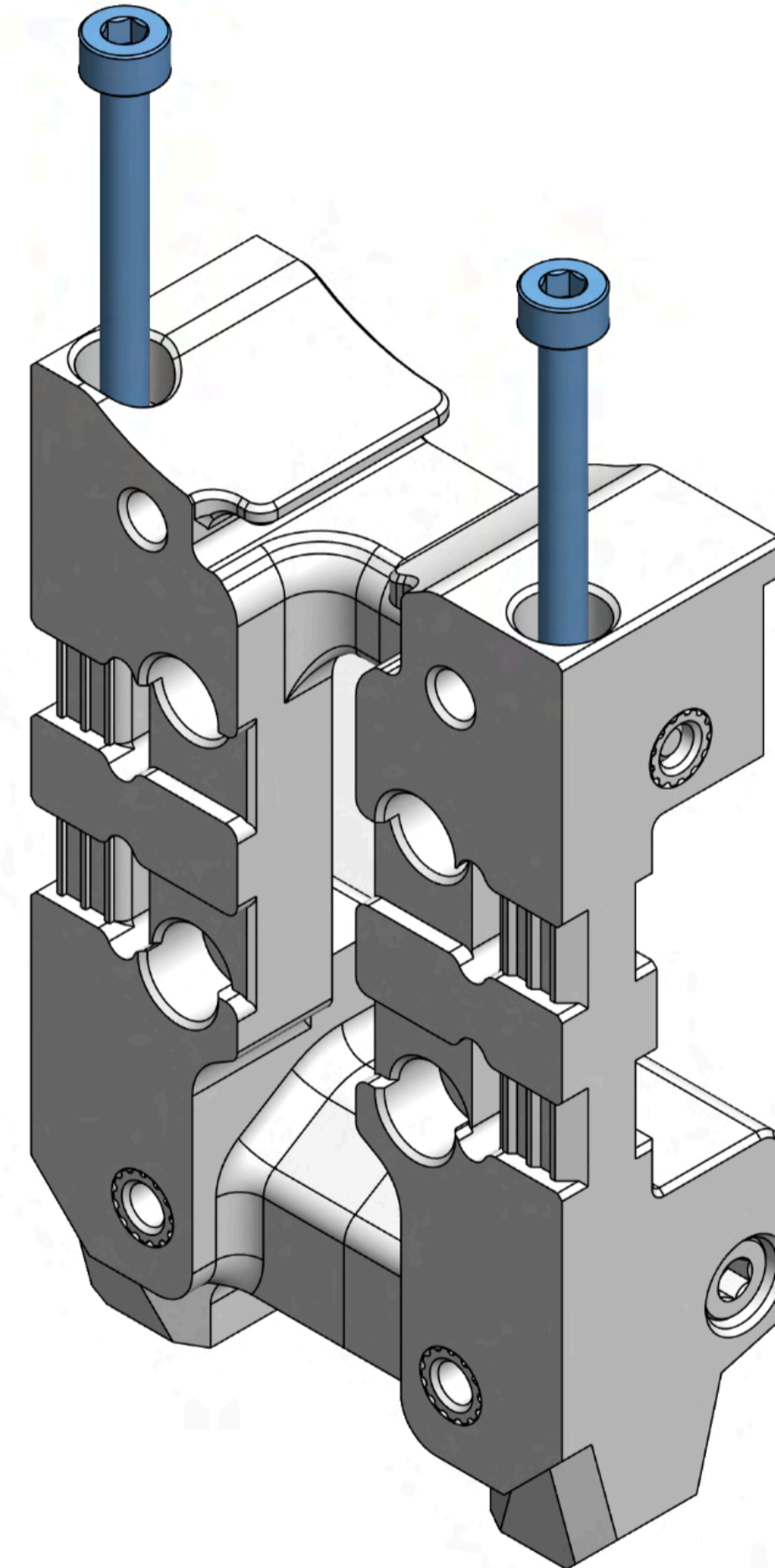
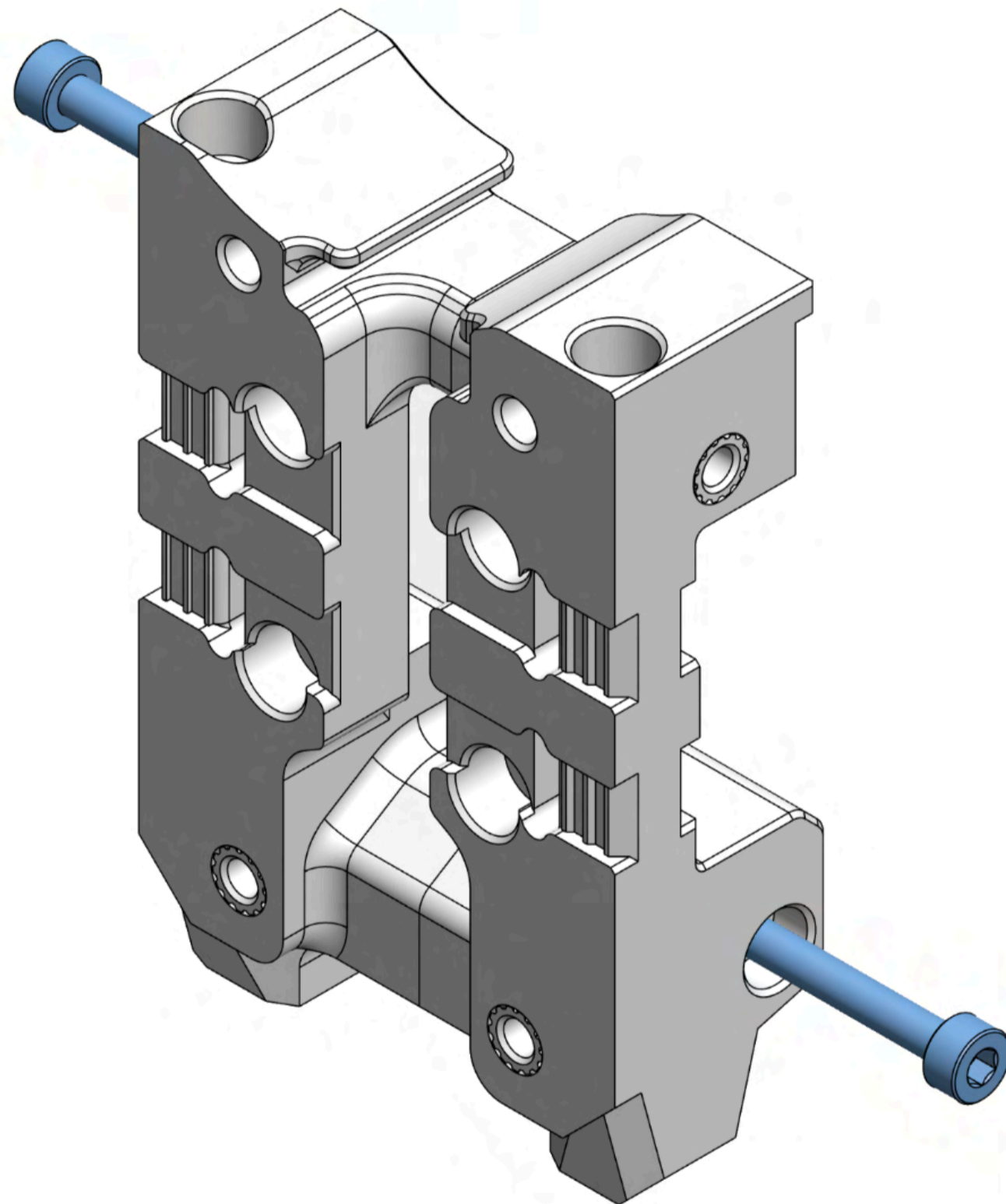
4x HEAT SET INSERTS



## X-CARRIAGE

<https://apdm.tech/>

4x m3x40 SHCS



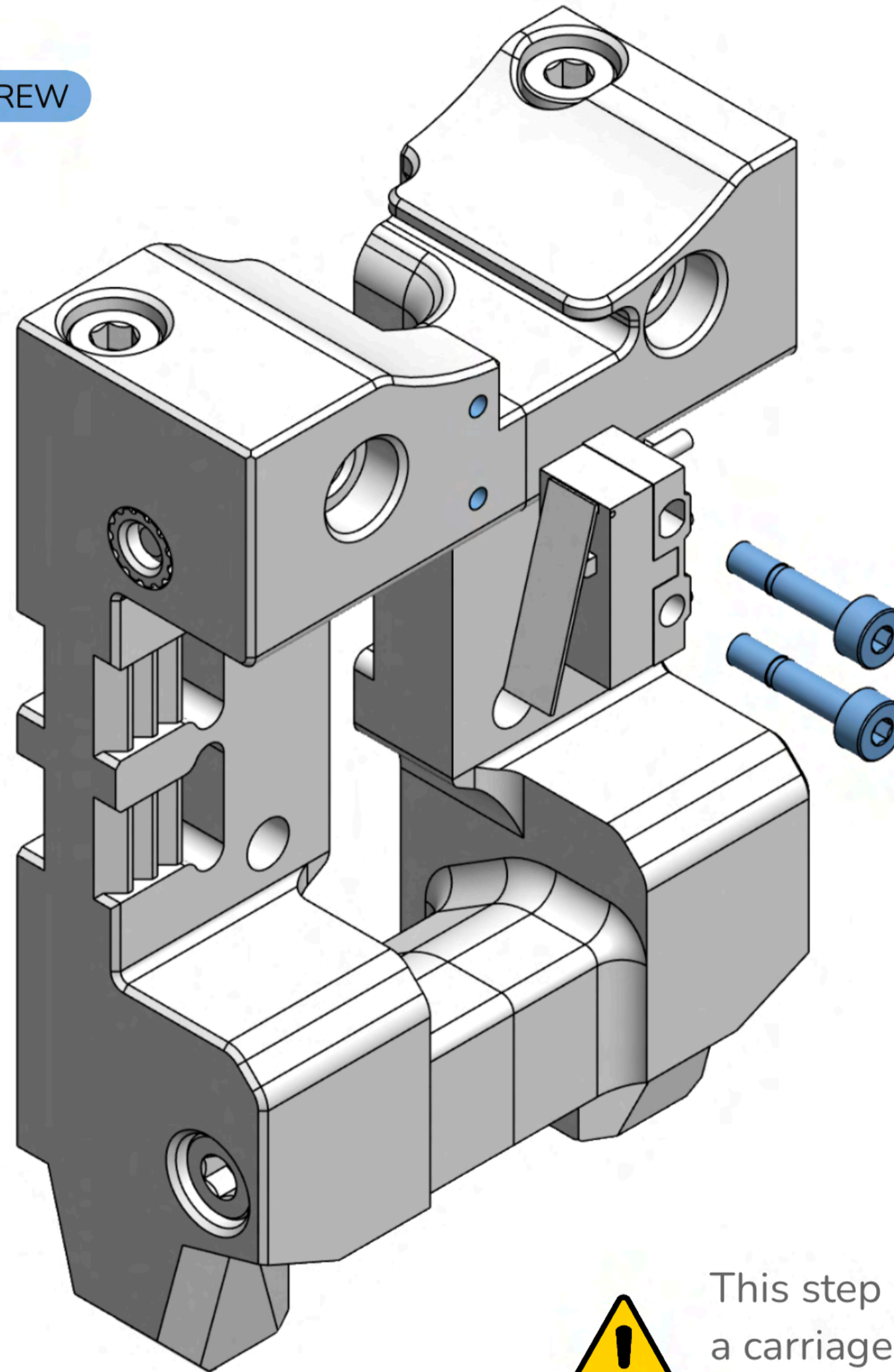
These are screwed into the plastic.  
They are reinforcement and a last resort backup.



## X-CARRIAGE

<https://apdm.tech/>

2x m2x10 SELF TAPPING SCREW



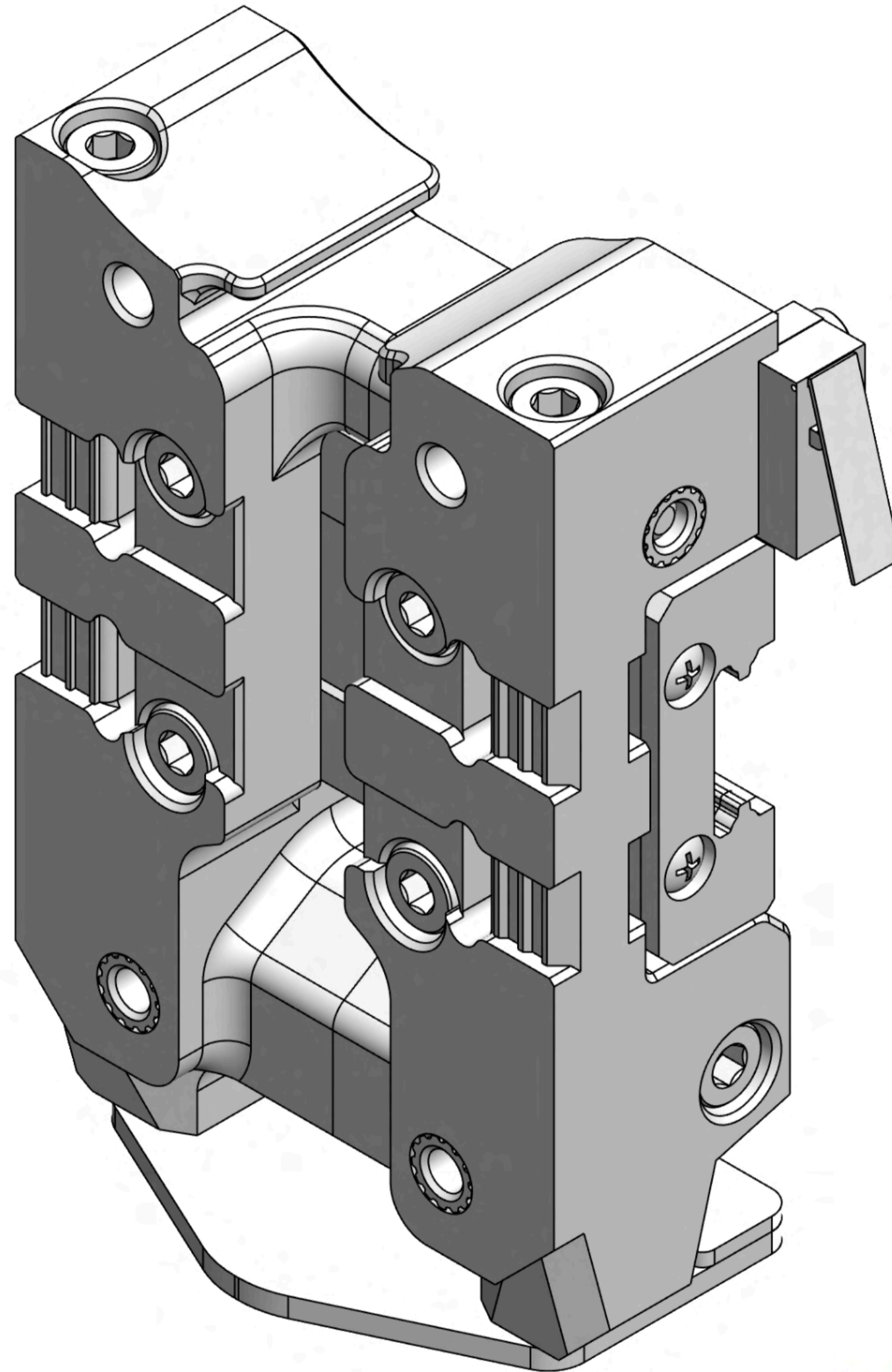
This step is only for those running a carriage mounted microswitch X Endstop



## X-CARRIAGE

### MOUNT PROBE

Yea yea, the rail block is visible. Do this before installation.



Use the mounting hardware and matching heat set inserts specified for your probe.

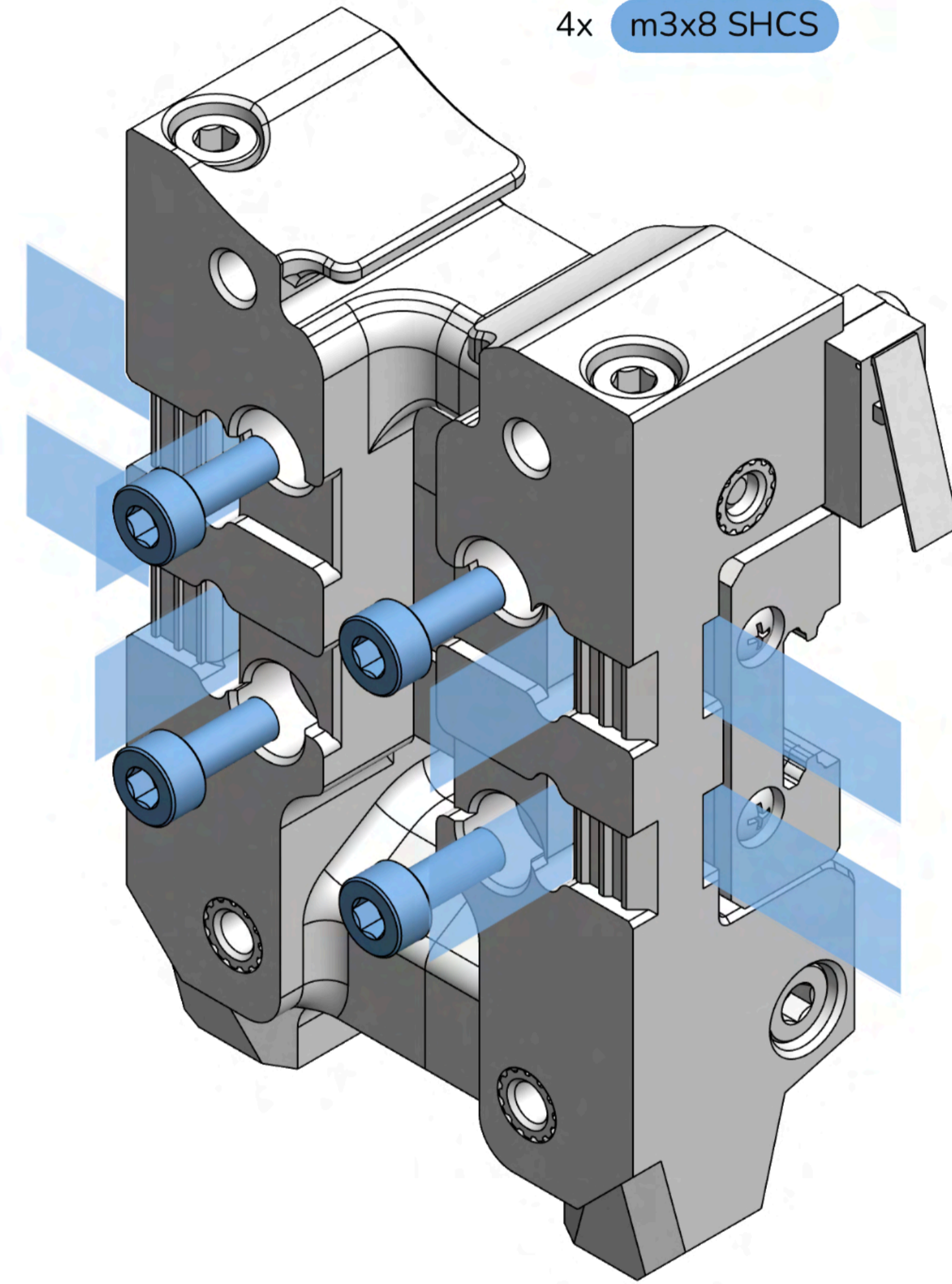
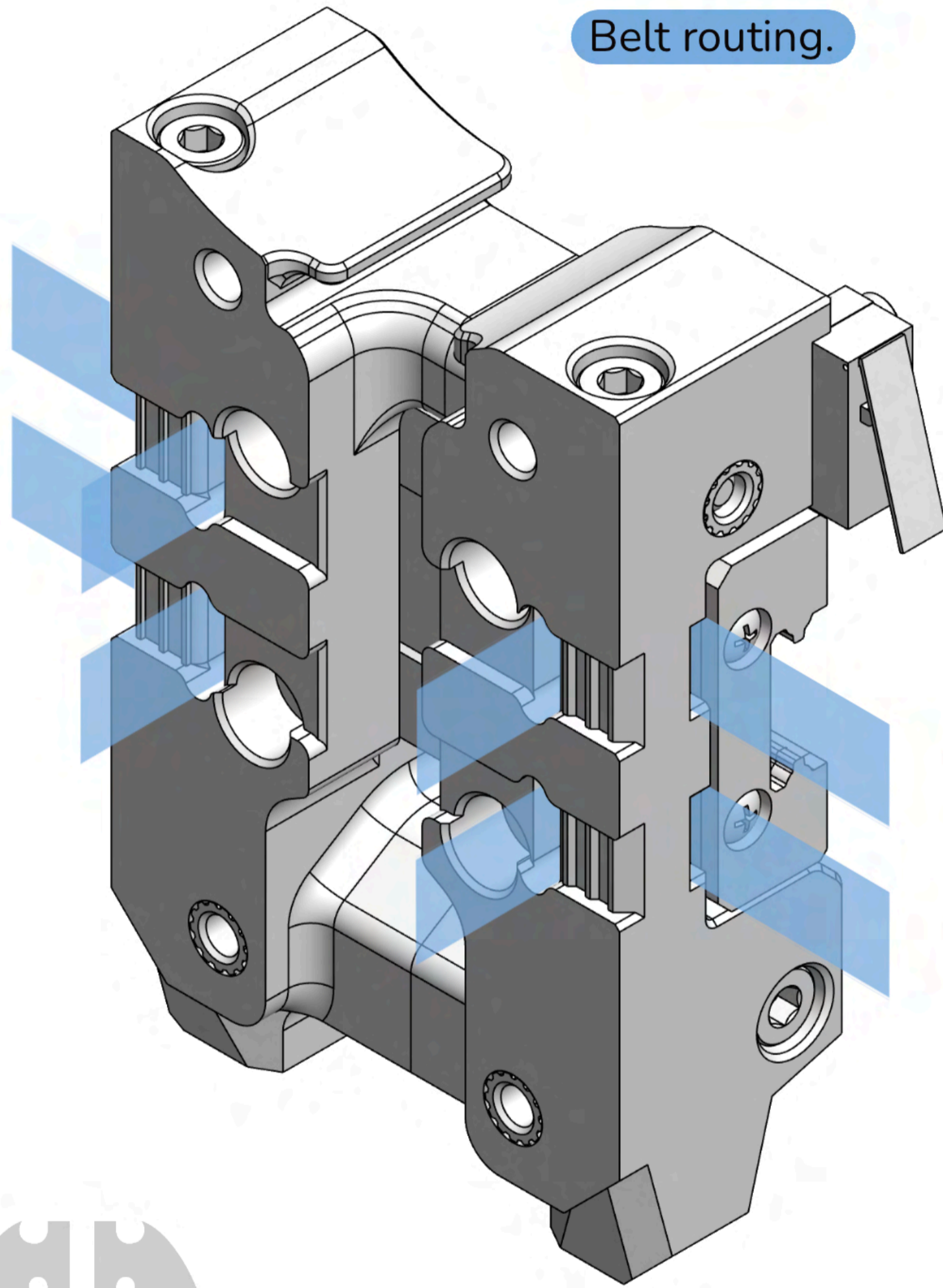


# X-CARRIAGE

<https://apdm.tech/>

Belt routing.

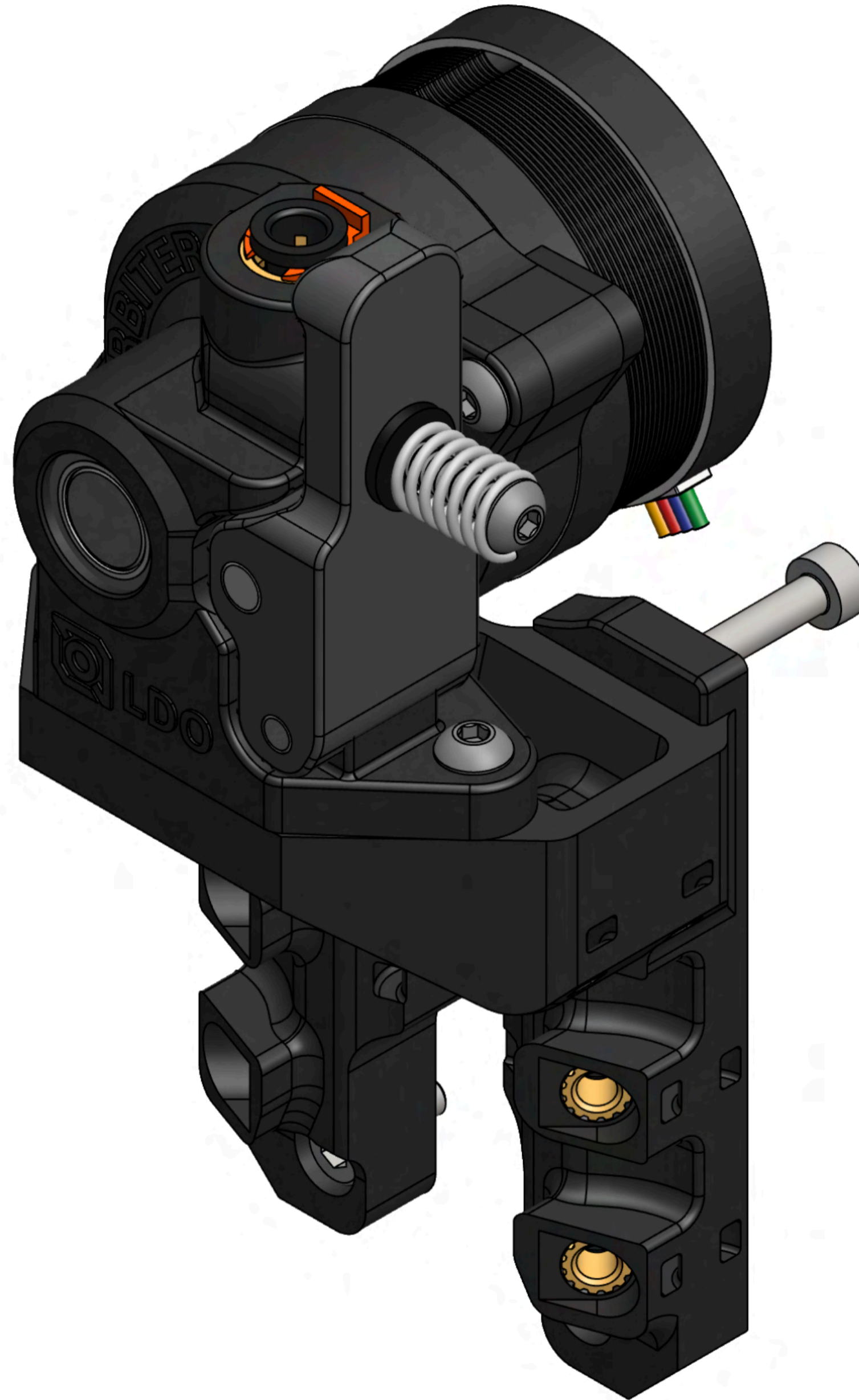
4x m3x8 SHCS



Some carriages do not meet spec and may need m3x6 screws.

## EXTRUDER MOUNT

<https://apdm.tech/>



Some extruders require changing the tension screw and/or spring.

These items are outside the scope of Reaper and will need to be sorted on a user basis.

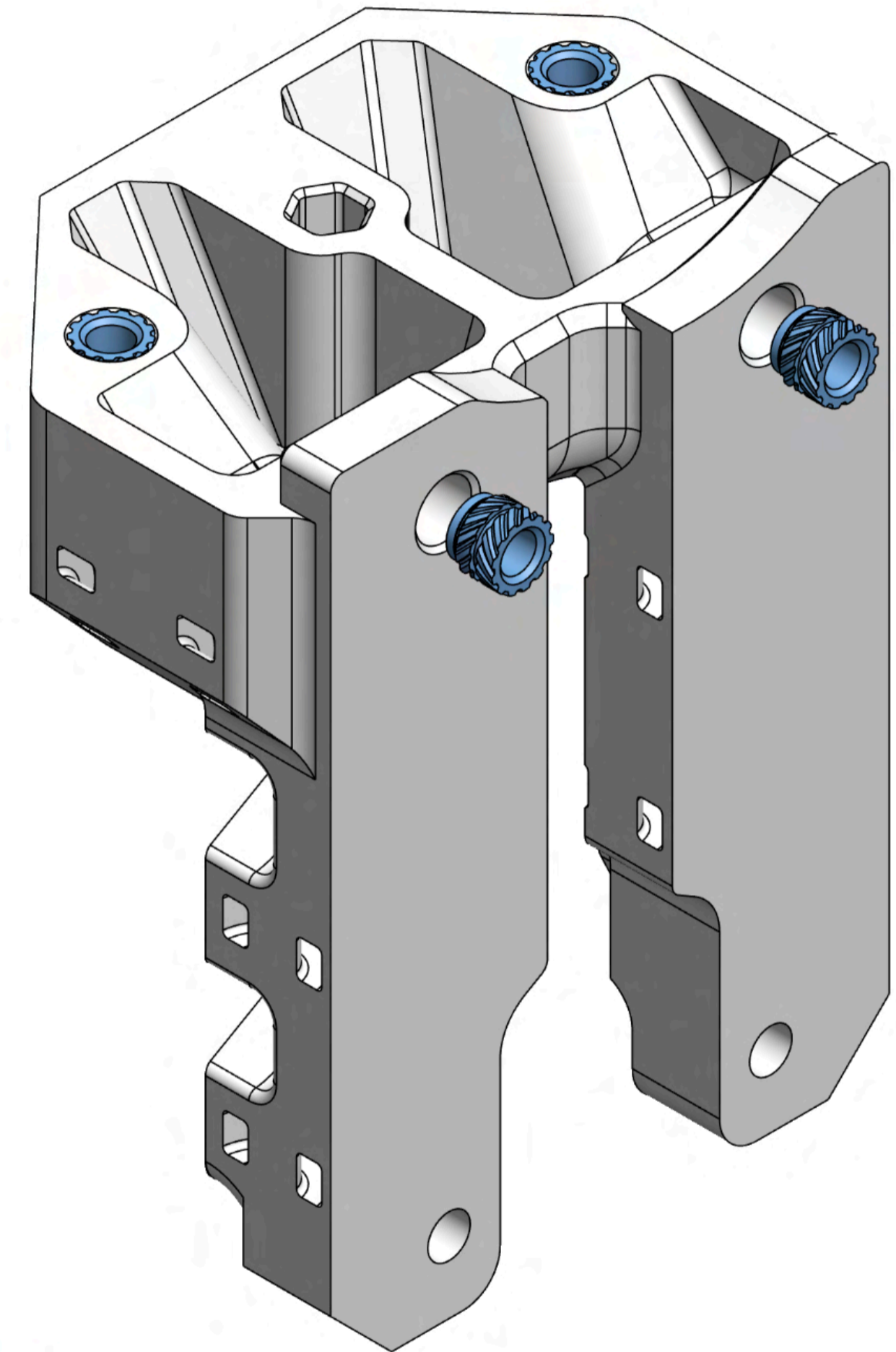
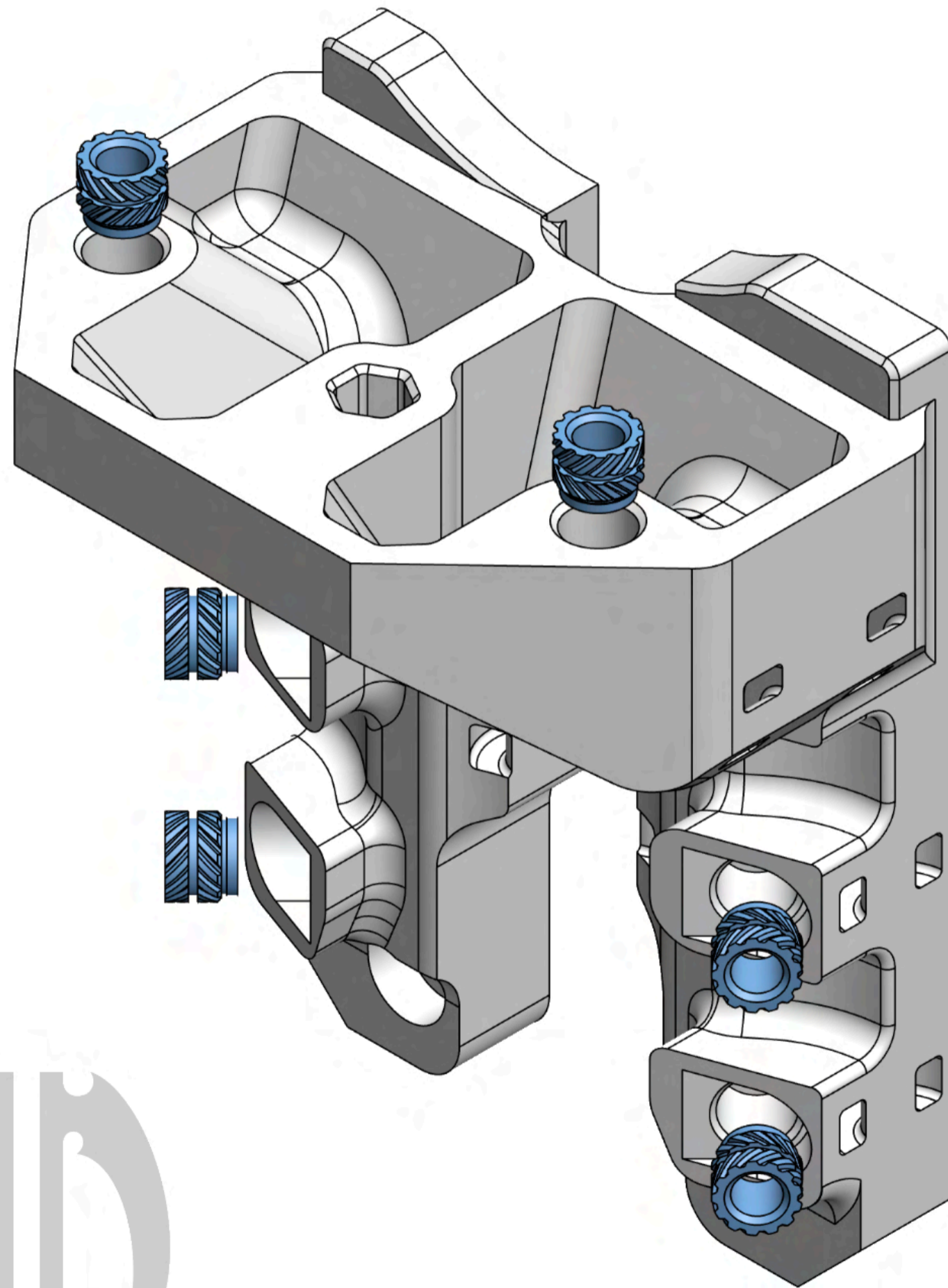




## EXTRUDER MOUNT

<https://apdm.tech/>

8x **HEAT SET INSERTS**



### **WATCH OUT!**

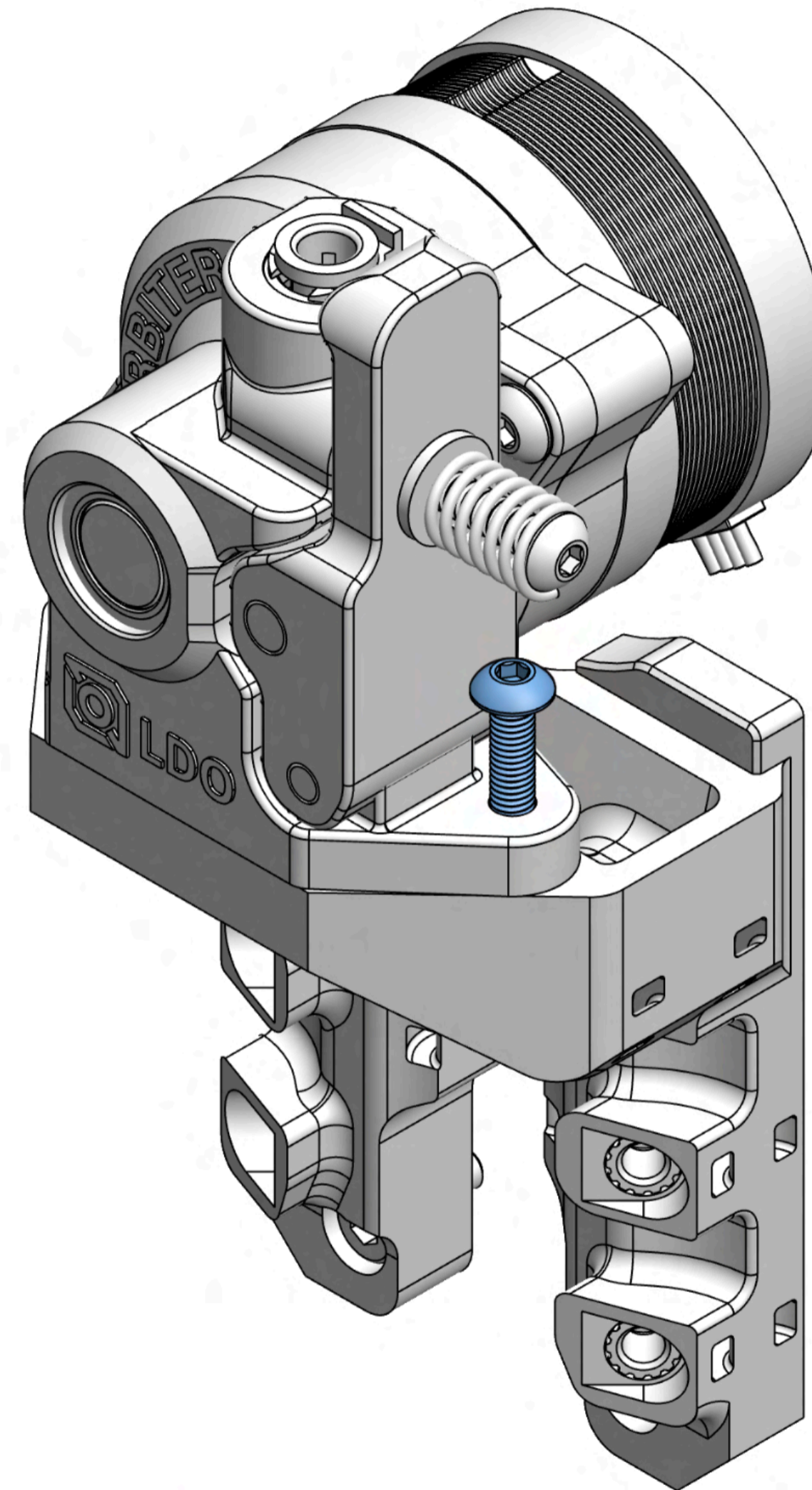
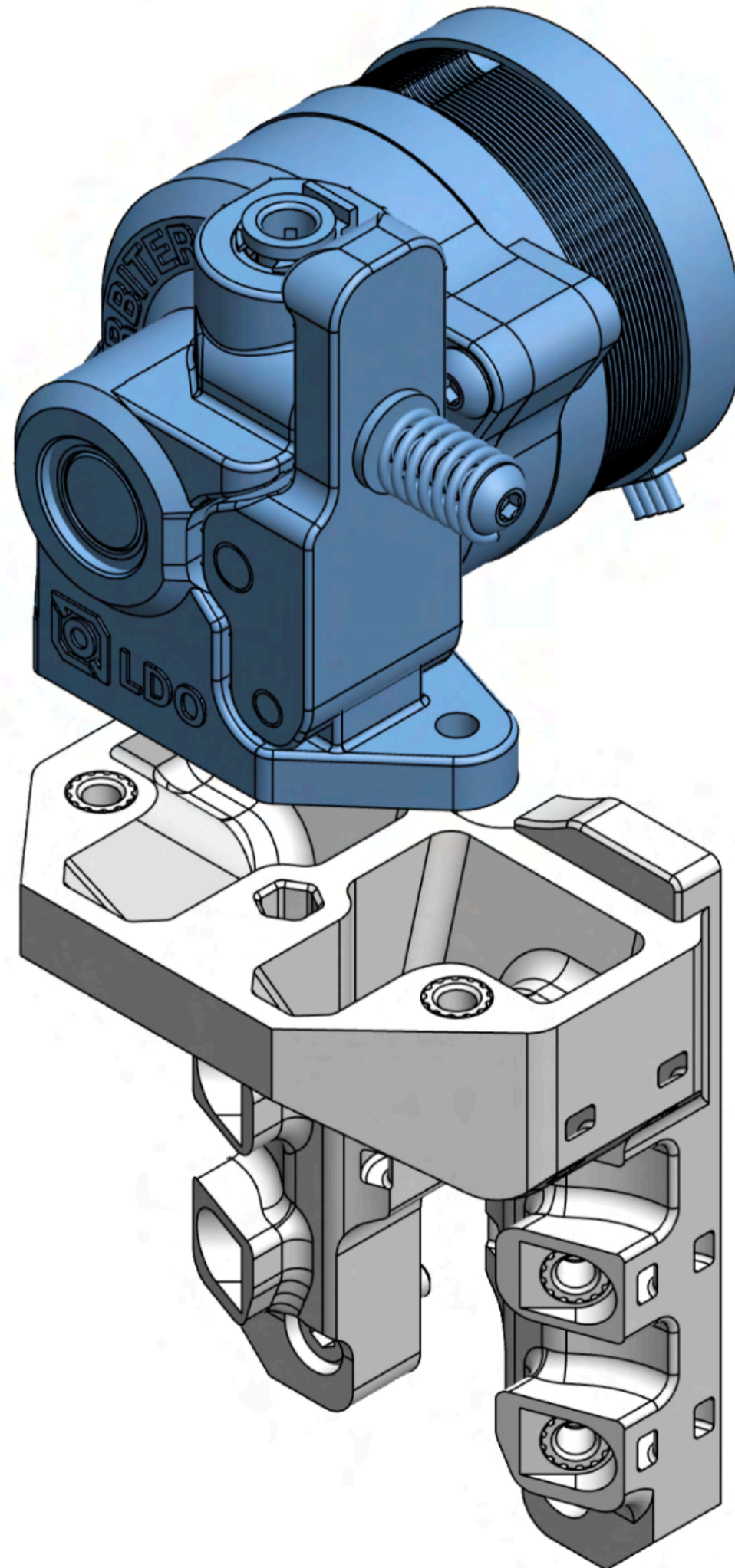
These inserts are installed at an angle and inset so beware of your iron to not burn the plastic surrounding them.



## EXTRUDER MOUNT

<https://apdm.tech/>

### MOUNT EXTRUDER



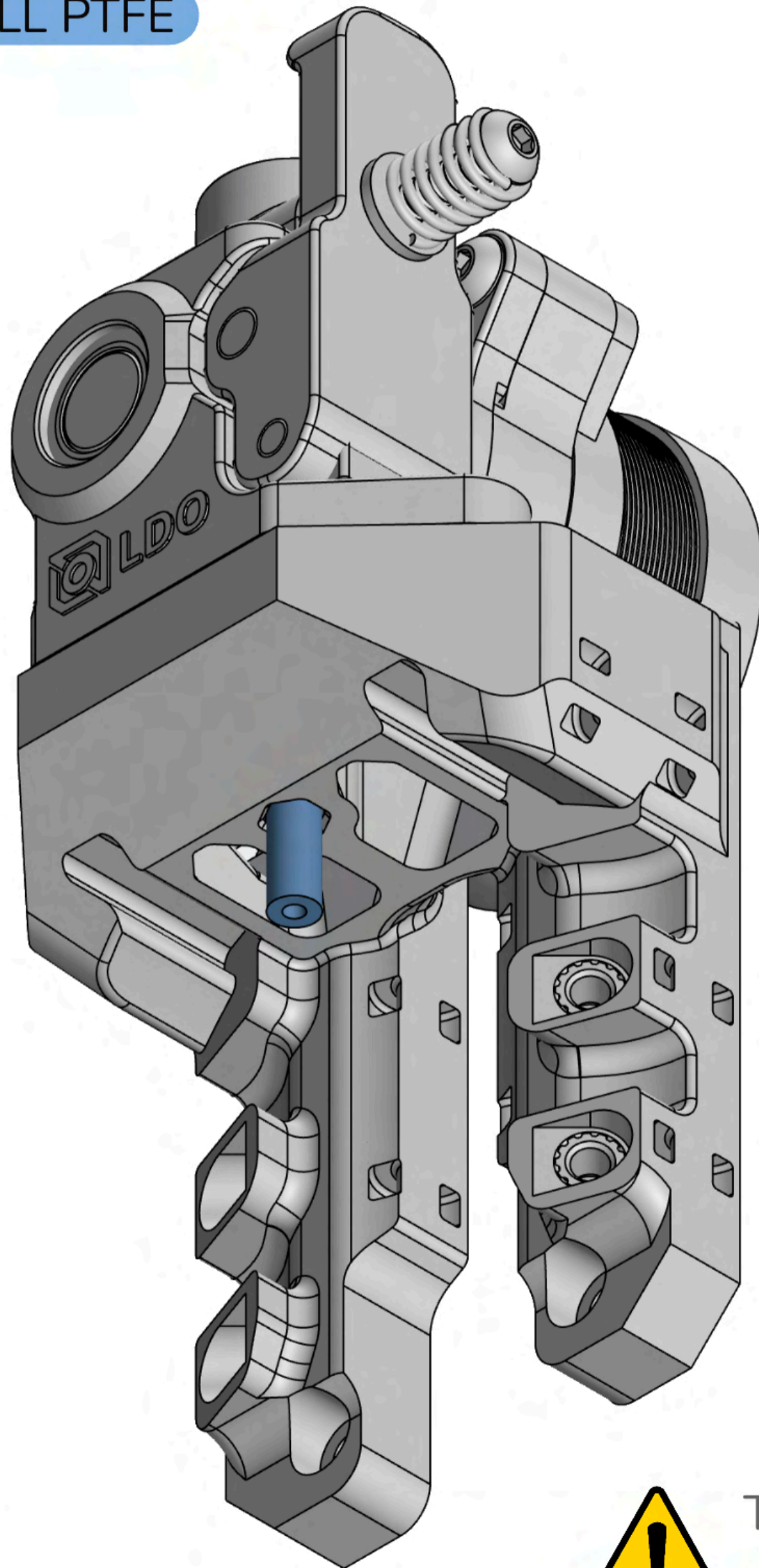
Use the mounting hardware specified for your Extruder and the positions needed.



## EXTRUDER MOUNT

<https://apdm.tech/>

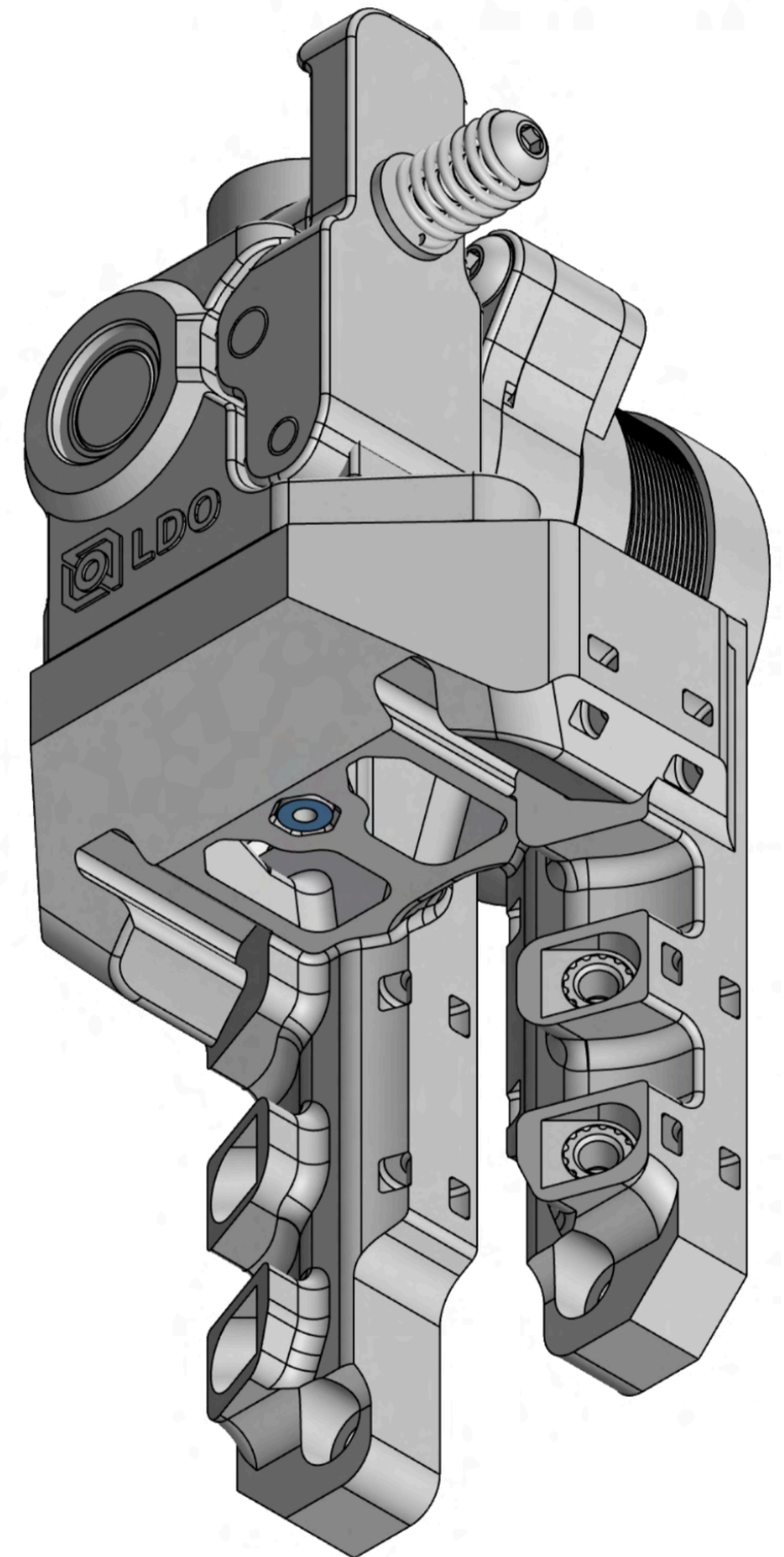
### INSTALL PTFE



### FLUSH IT UP!

Flush cut the PTFE with the Mount. Make sure it's square!

Flare the inside if necessary for a smooth filament path.



The PTFE is meant to be a tight fit so it won't fall out during maintenance. If necessary chase with a 2mm drill bit.



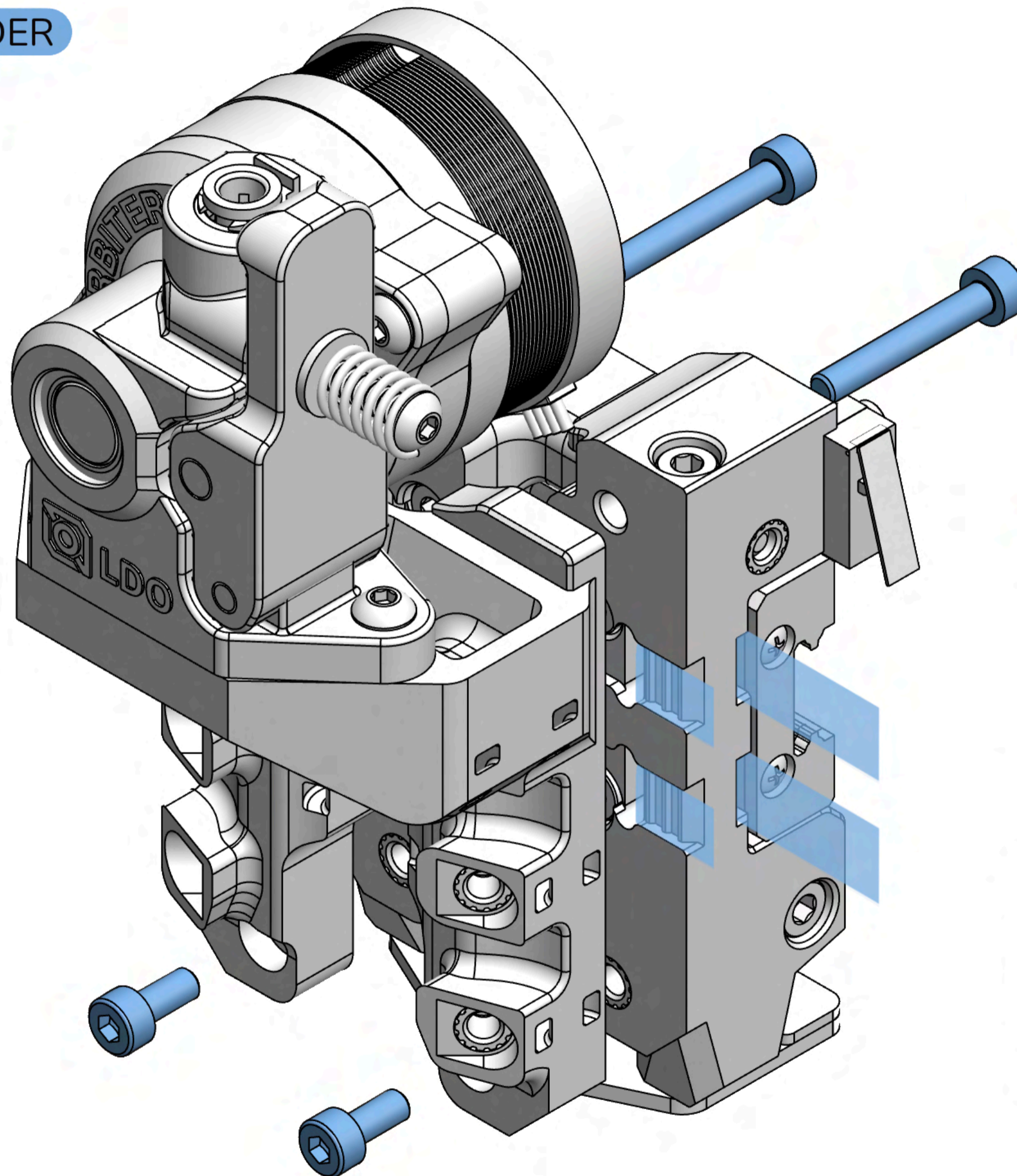
## EXTRUDER MOUNT

<https://apdm.tech/>

### MOUNT EXTRUDER

2x m3x8 SHCS

2x m3x20 SHCS



### TUCK YO BELTS!

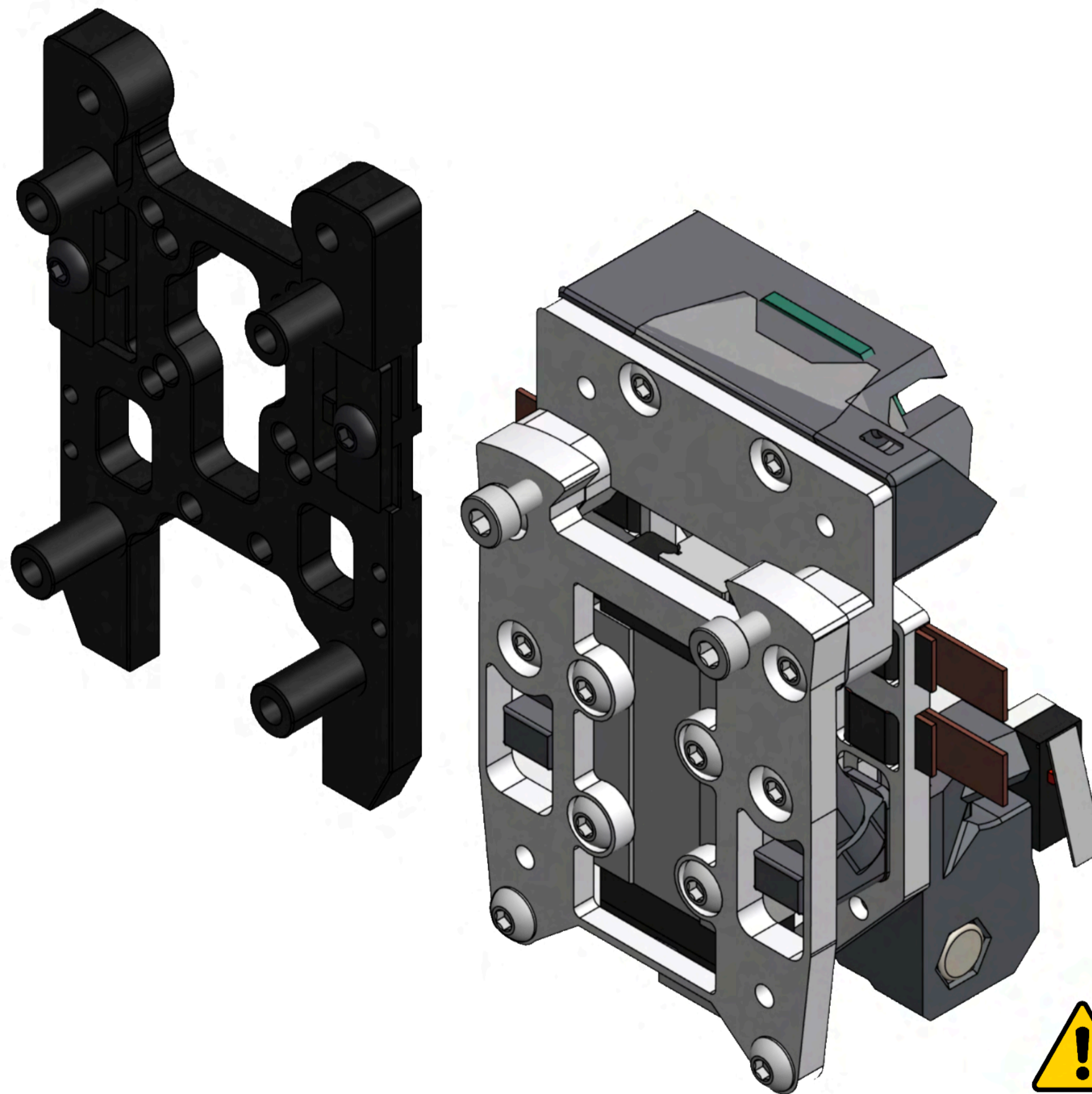
The Extruder Mount and the carriages extra teeth provide a secondary belt clamp to securely hold them in place.

\*Those m3x40 you installed through the top earlier, are the limp it home fail safe in case of stripped teeth or catastrophic failure.



## EXTRUDER MOUNT

TAP CNC VORON  
CARRIAGE

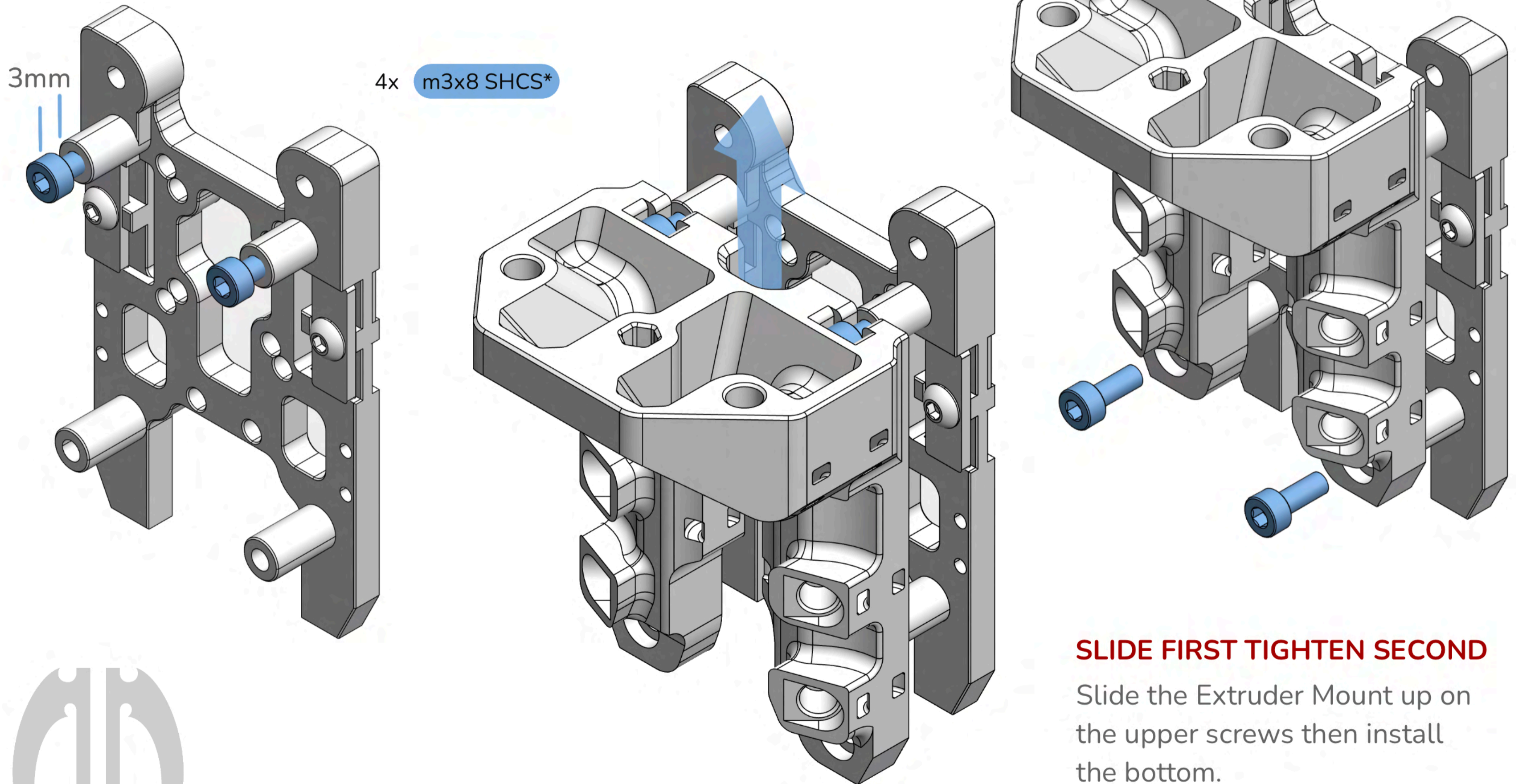


TAP CNC Extruder mounts have not been tested on every available market option. Some interference and clearancing of the printed part may be required.



## EXTRUDER MOUNT

### TAP CNC VORON CARRIAGE



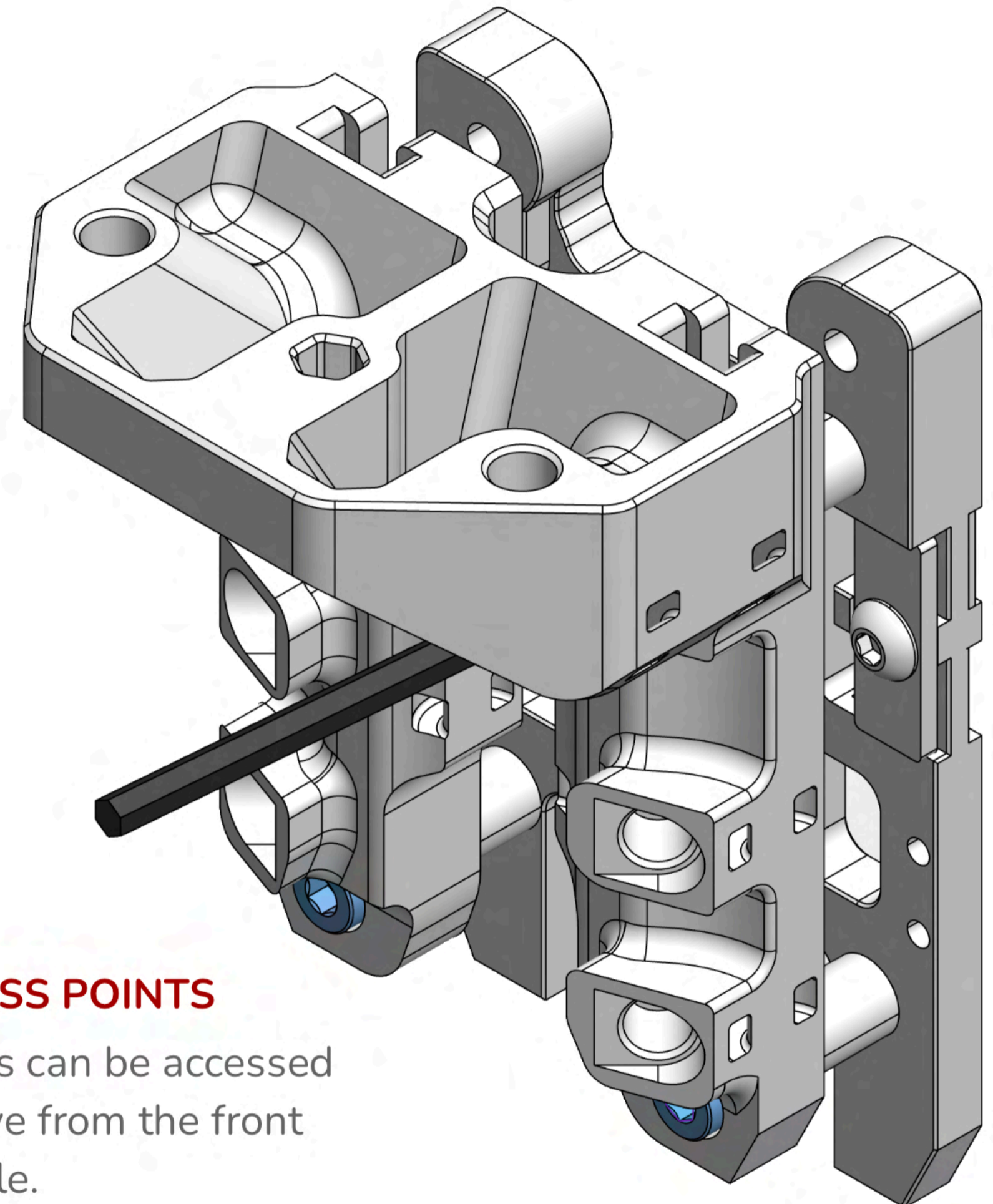
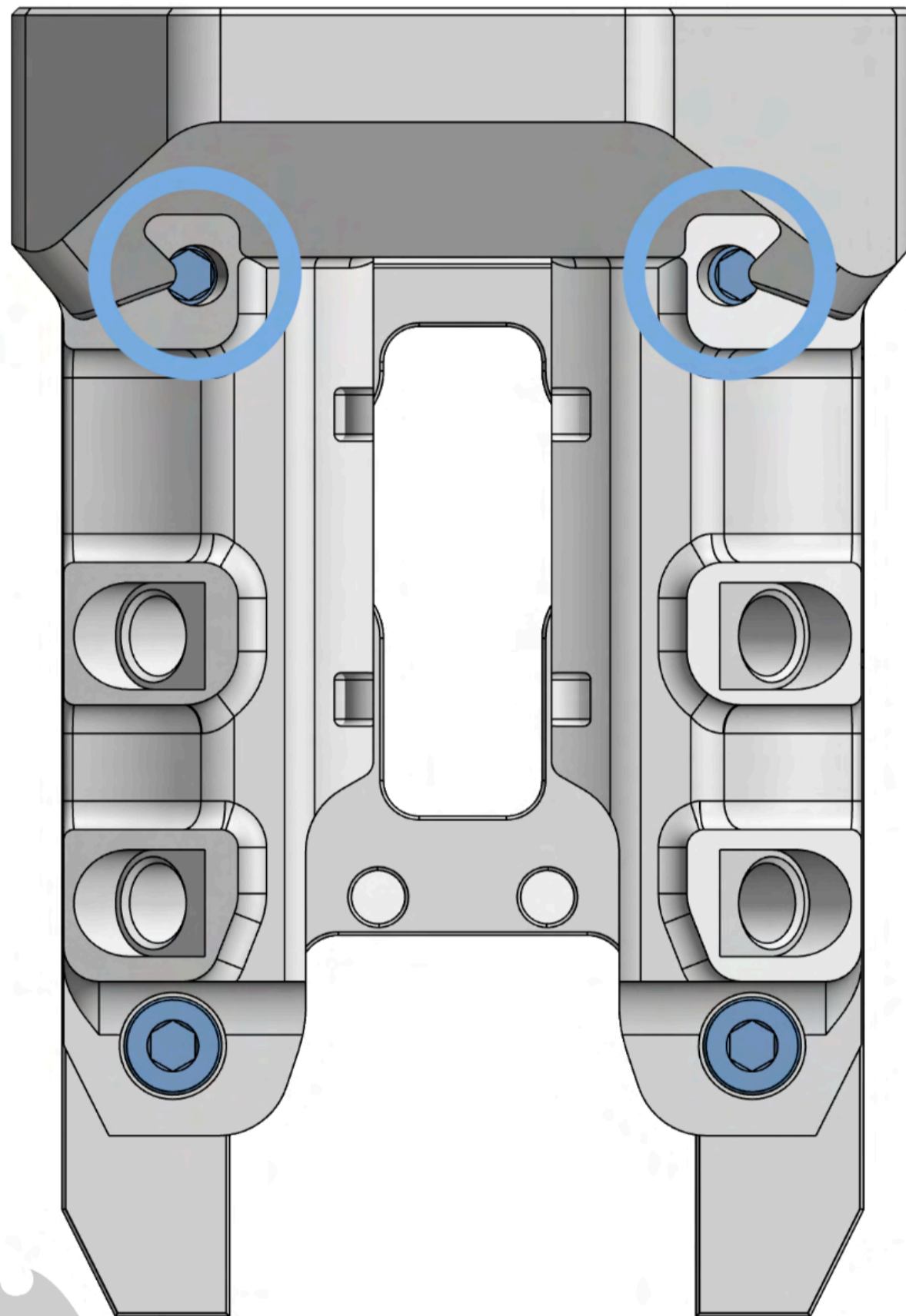
### **SLIDE FIRST TIGHTEN SECOND**

Slide the Extruder Mount up on the upper screws then install the bottom.

\*Some carriages will allow for longer screws. That's your decision.

## EXTRUDER MOUNT

### TAP CNC VORON CARRIAGE



#### **SCREW ACCESS POINTS**

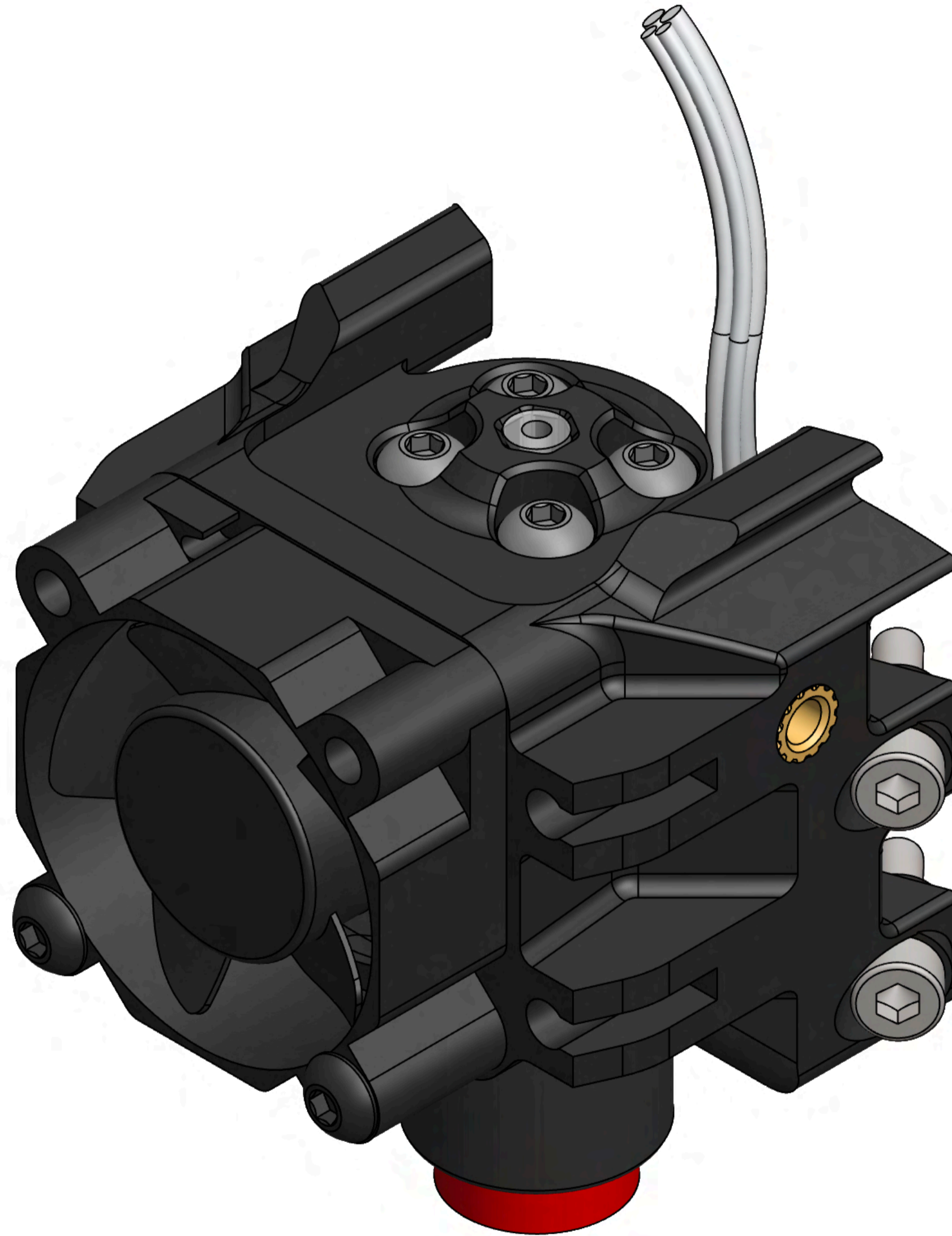
The top screws can be accessed with a hex drive from the front at a slight angle.

Ball end driver is not specifically required.



HOTEND MOUNT

<https://apdm.tech/>

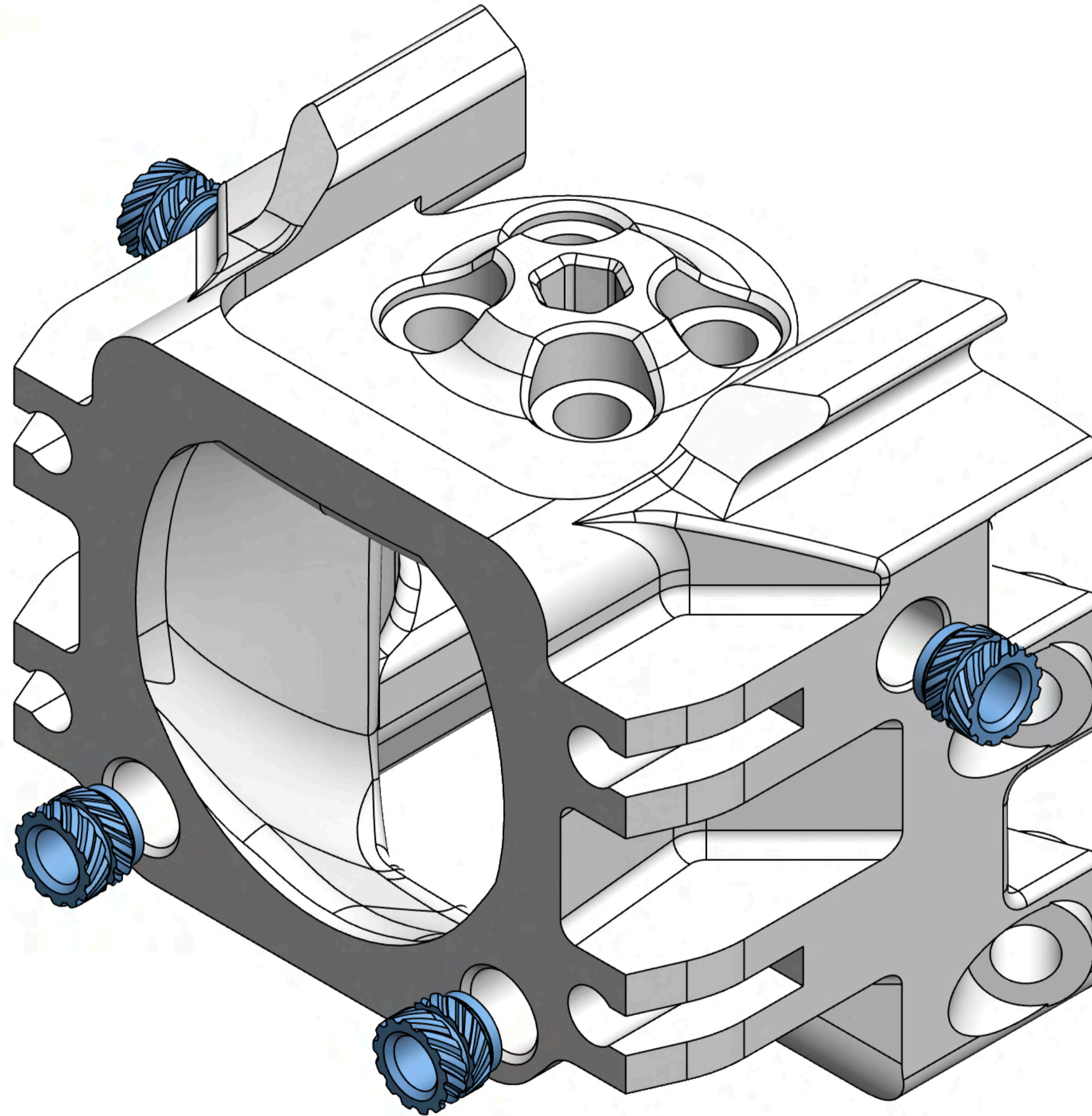




# HOTEND MOUNT

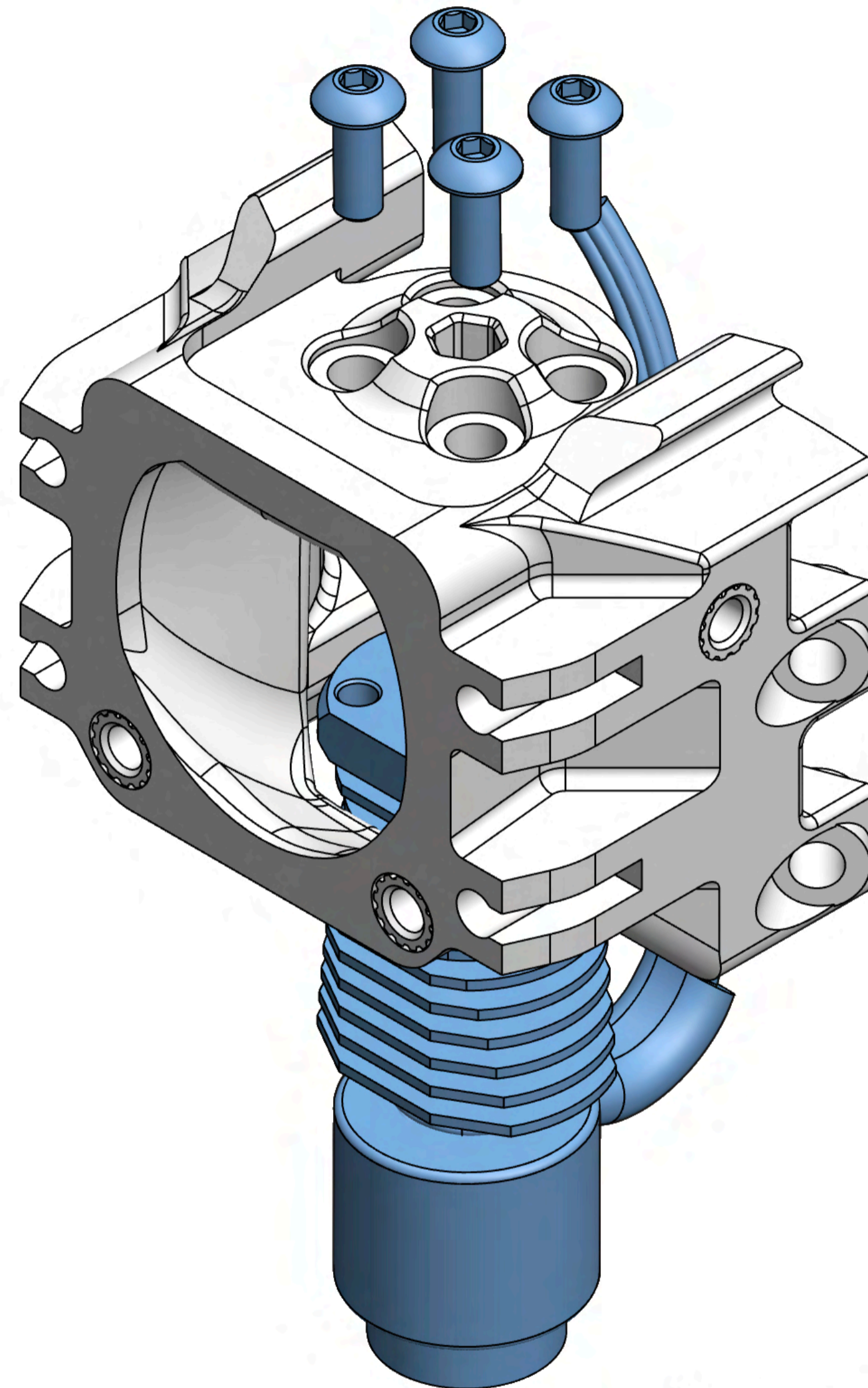
<https://apdm.tech/>

4X HEAT SET INSERTS



## HOTEND MOUNT

### MOUNTING SCREWS



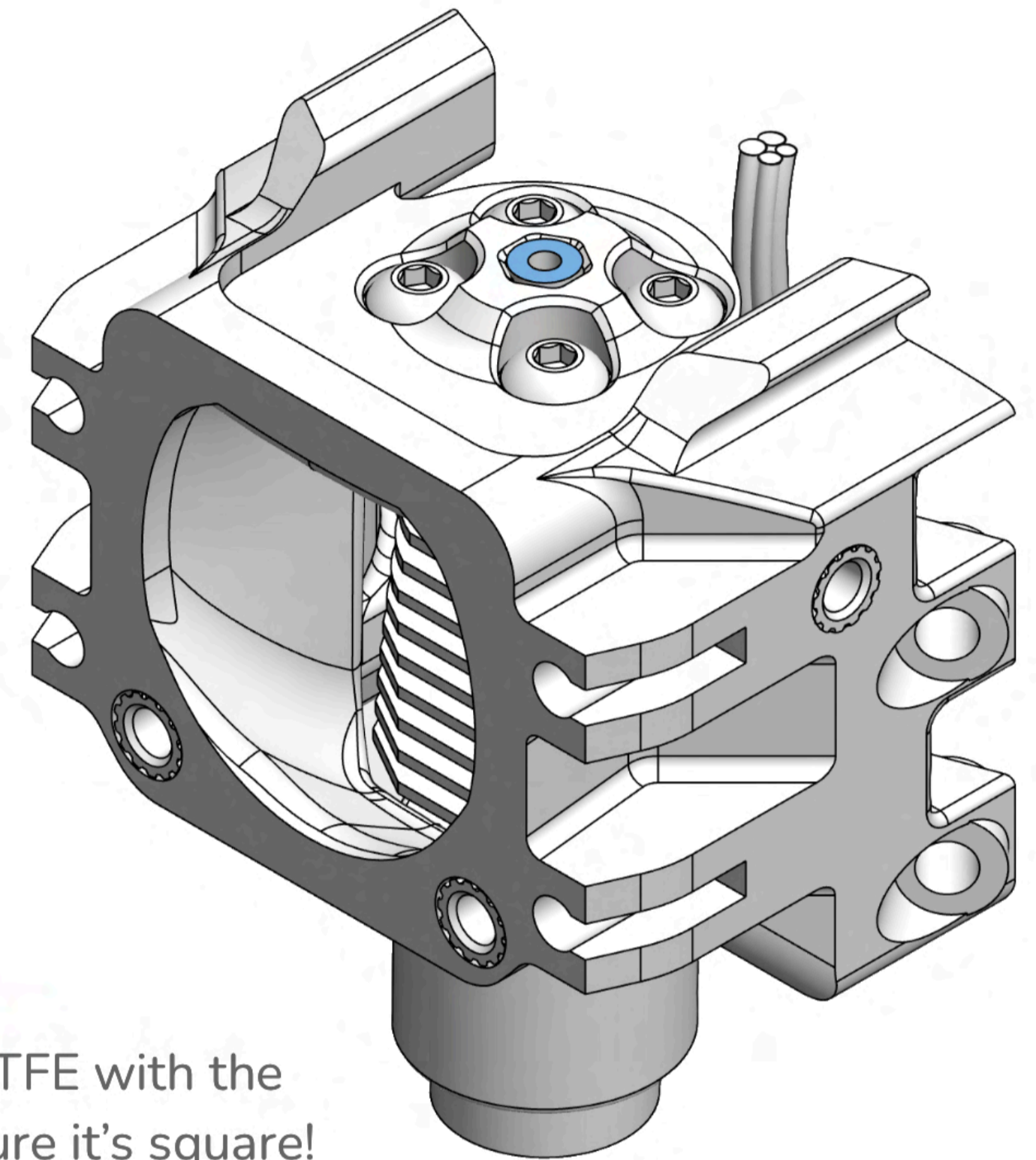
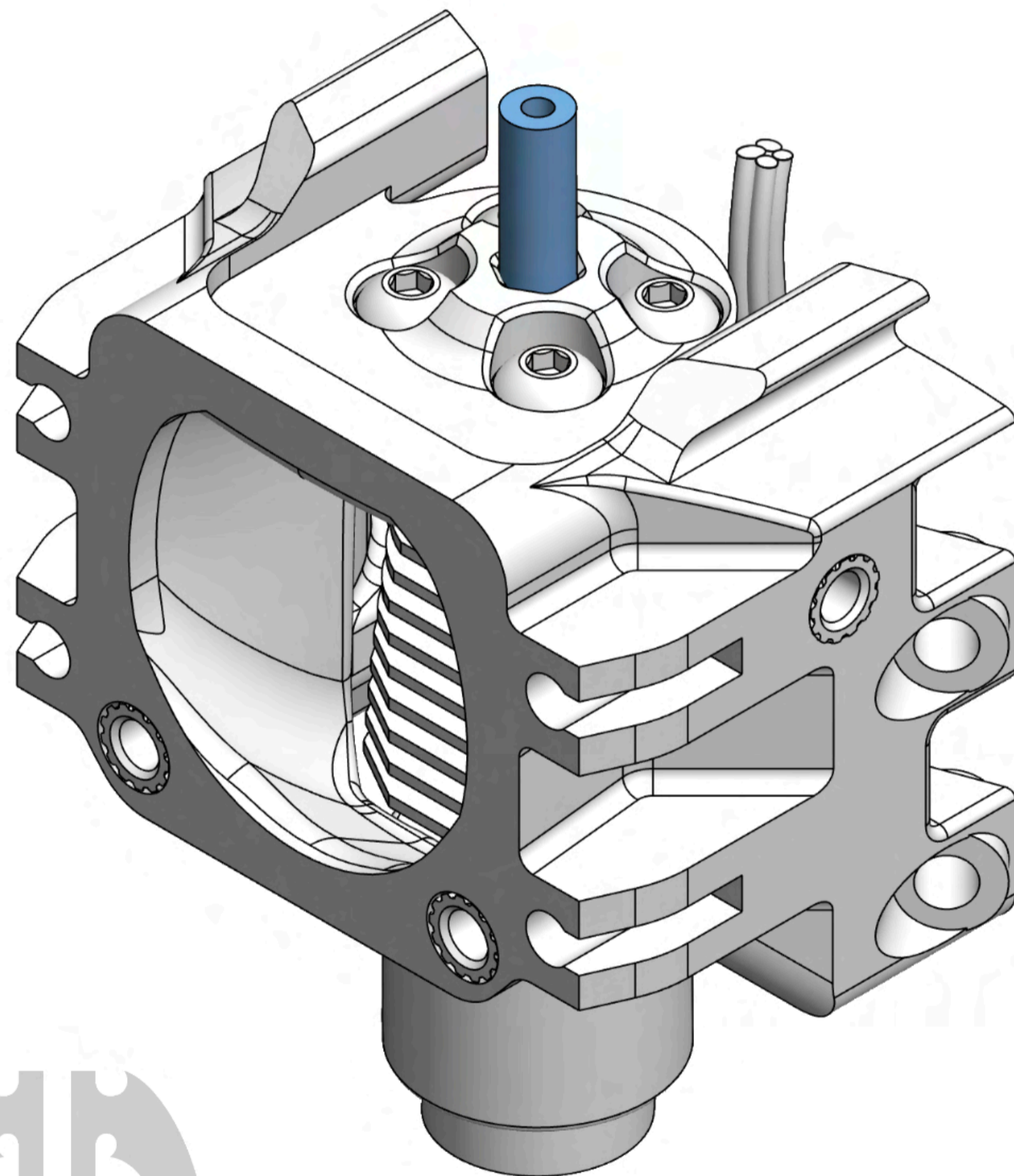
Use spec screw sizes for your specific Hotend.  
Number and length TBD.  
Lengths usually range from 6-8mm.



## HOTEND MOUNT

<https://apdm.tech/>

### INSTALL PTFE



### **FLUSH IT UP!**

Flush cut the PTFE with the Mount. Make sure it's square!

Flare the inside if necessary for a smooth filament path.

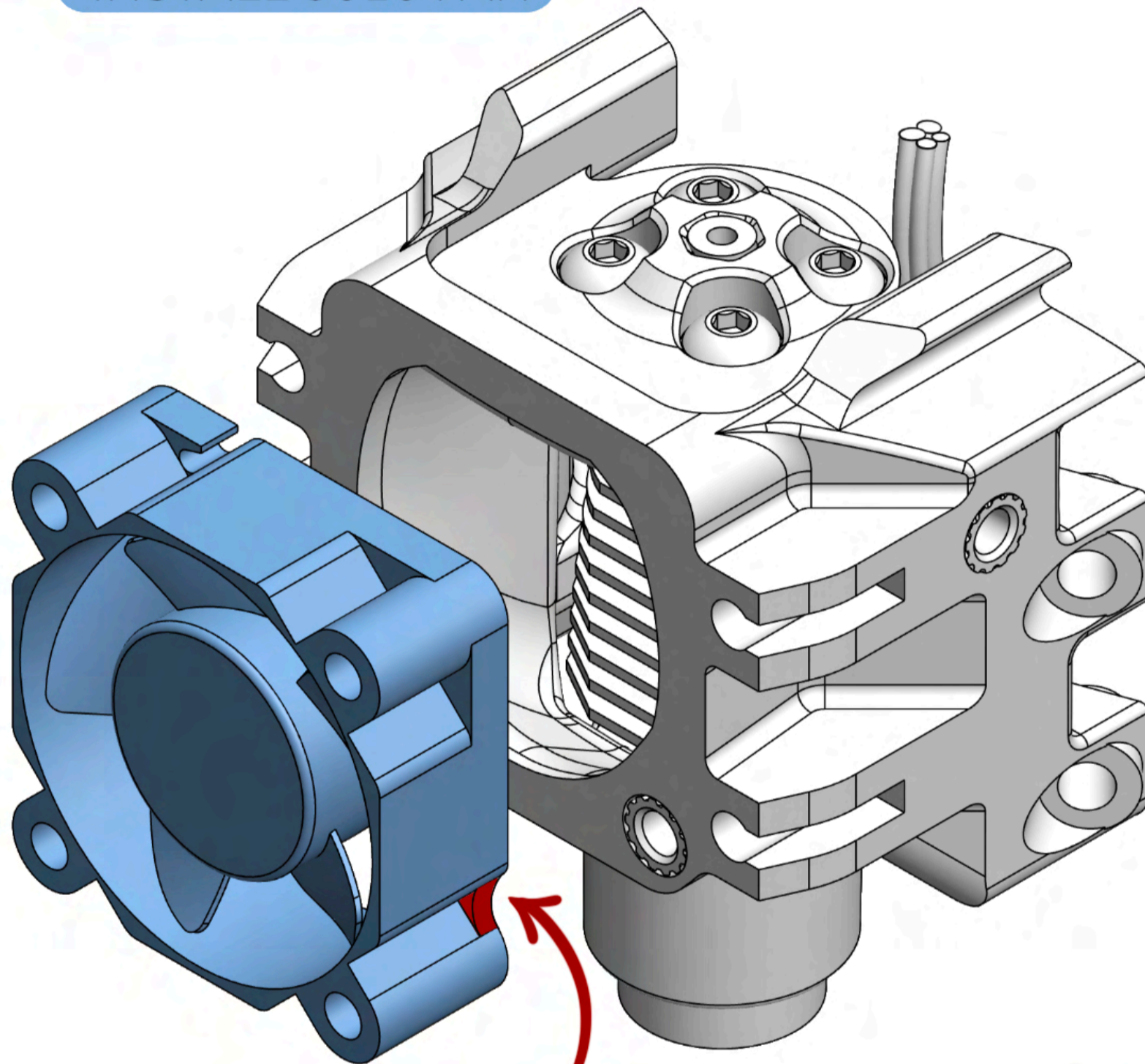


The PTFE is meant to be a tight fit so it won't fall out during maintenance. If necessary chase with a 2mm drill bit.



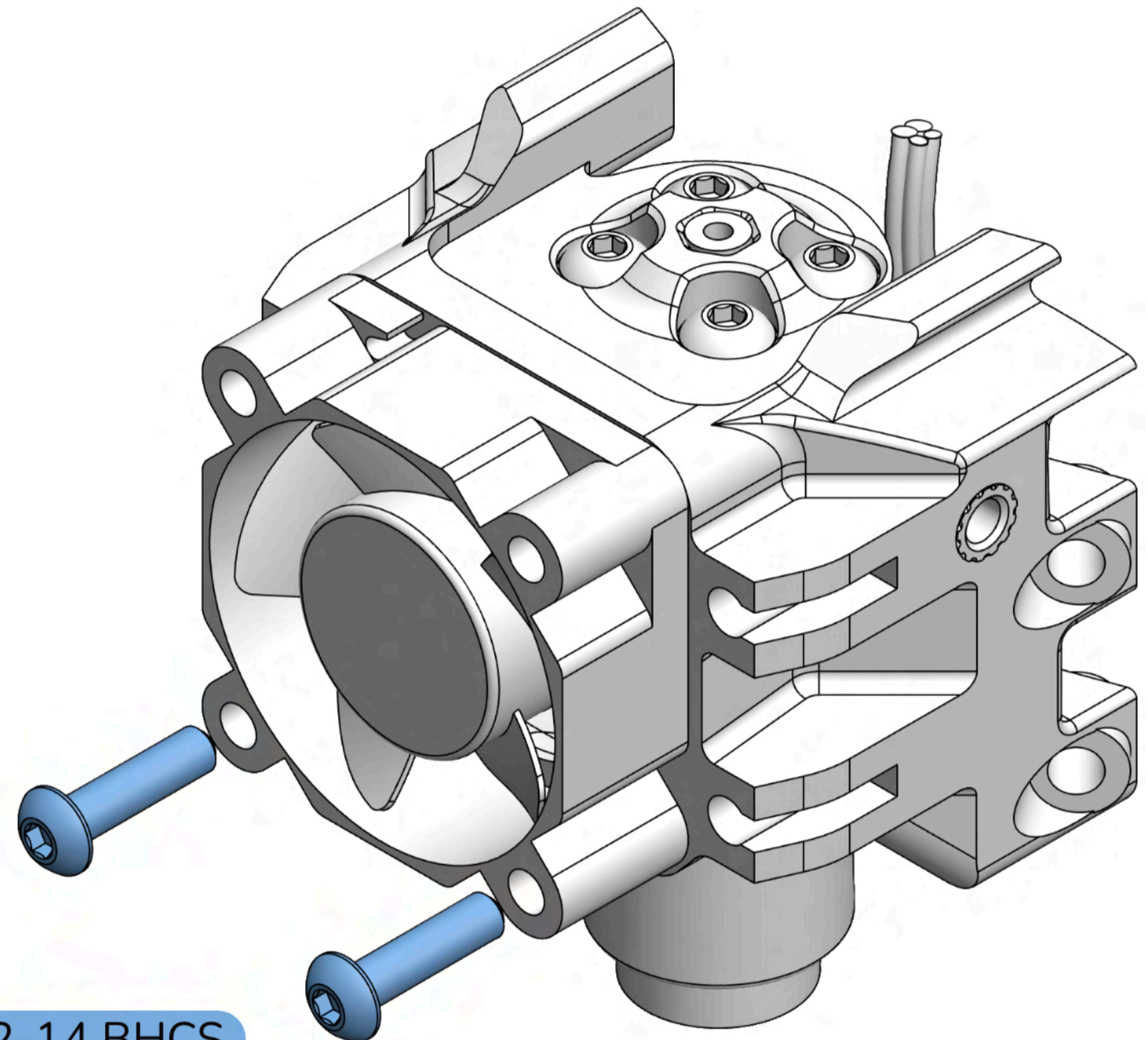
# HOTEND MOUNT

## INSTALL 3010 FAN



**NOTCH IT!**

File a notch into both sides of the fan if it has a rib. (Visible on upper half)



2x **m3x12-14 BHCS**

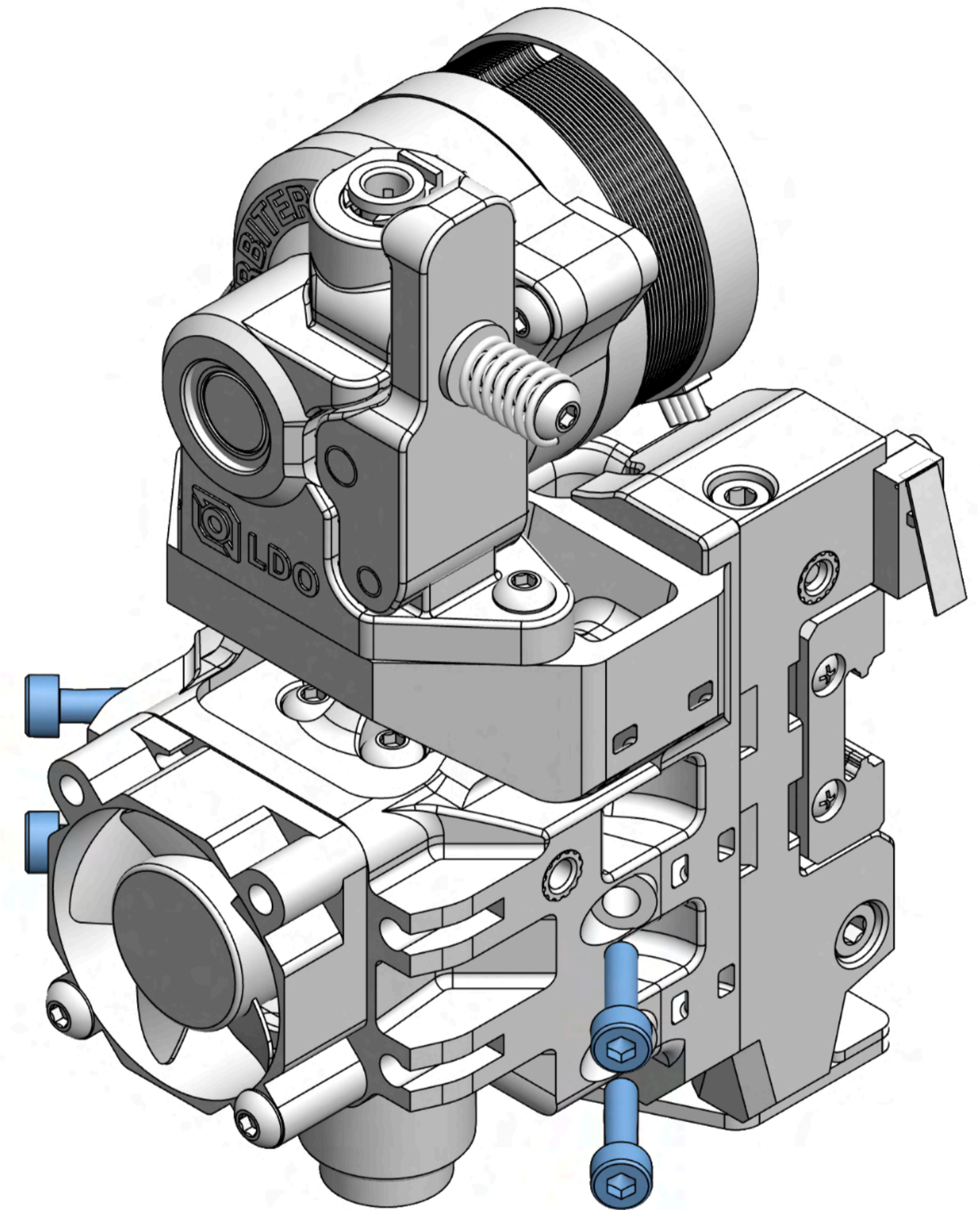
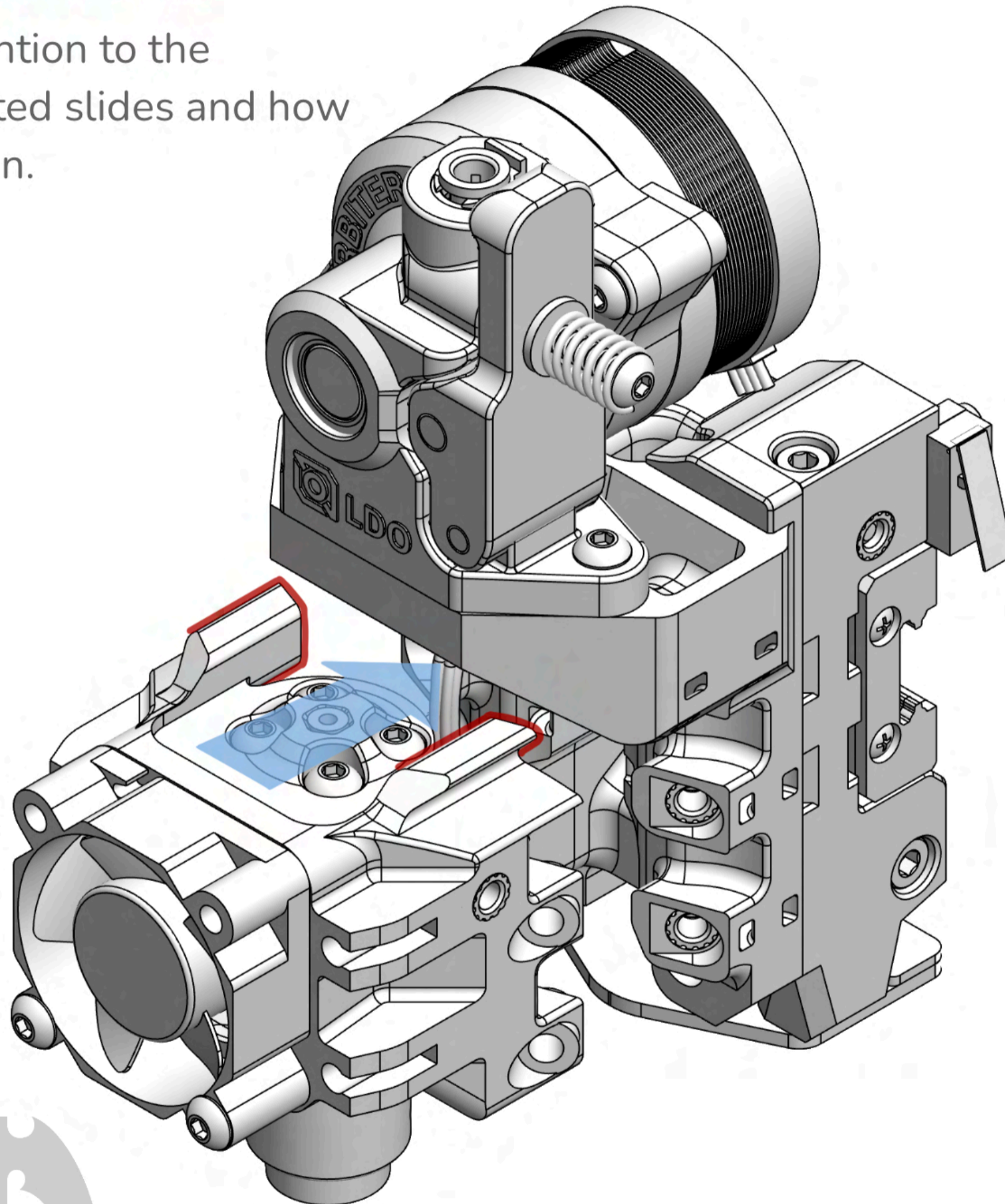


**MUST USE BHCS! SHCS WILL INTERFERE LATER ON!**  
There may be a slight gap at the top when installed, this will not affect airflow at all.

## HOTEND MOUNT

### SLIDE ER IN PLACE

Pay attention to the highlighted slides and how they align.



4x m3x12 SHCS

DO NOT FORCE IT IN!

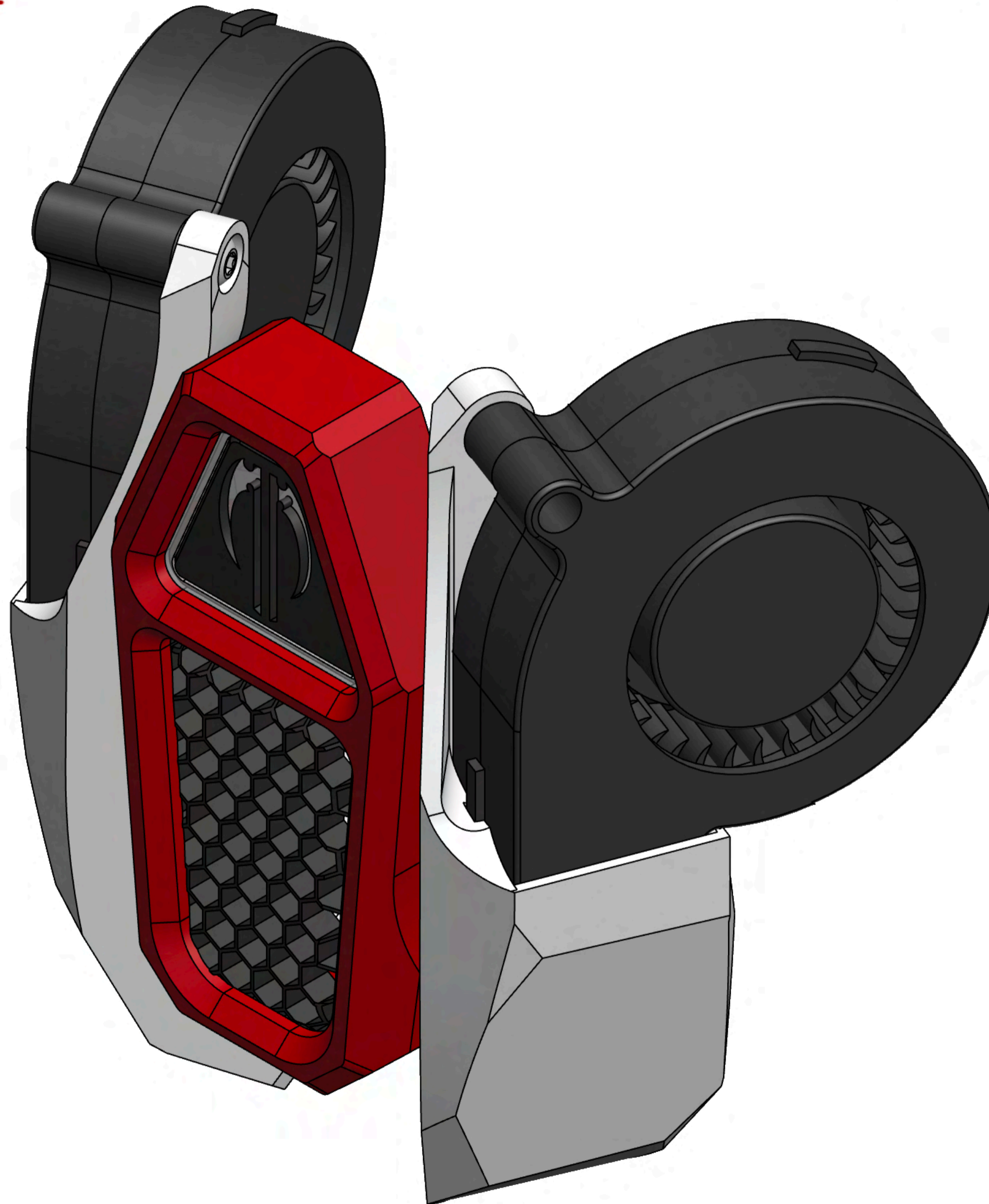
It should slide in smoothly and lock itself in place.

IF necessary a few passes of a file will help.



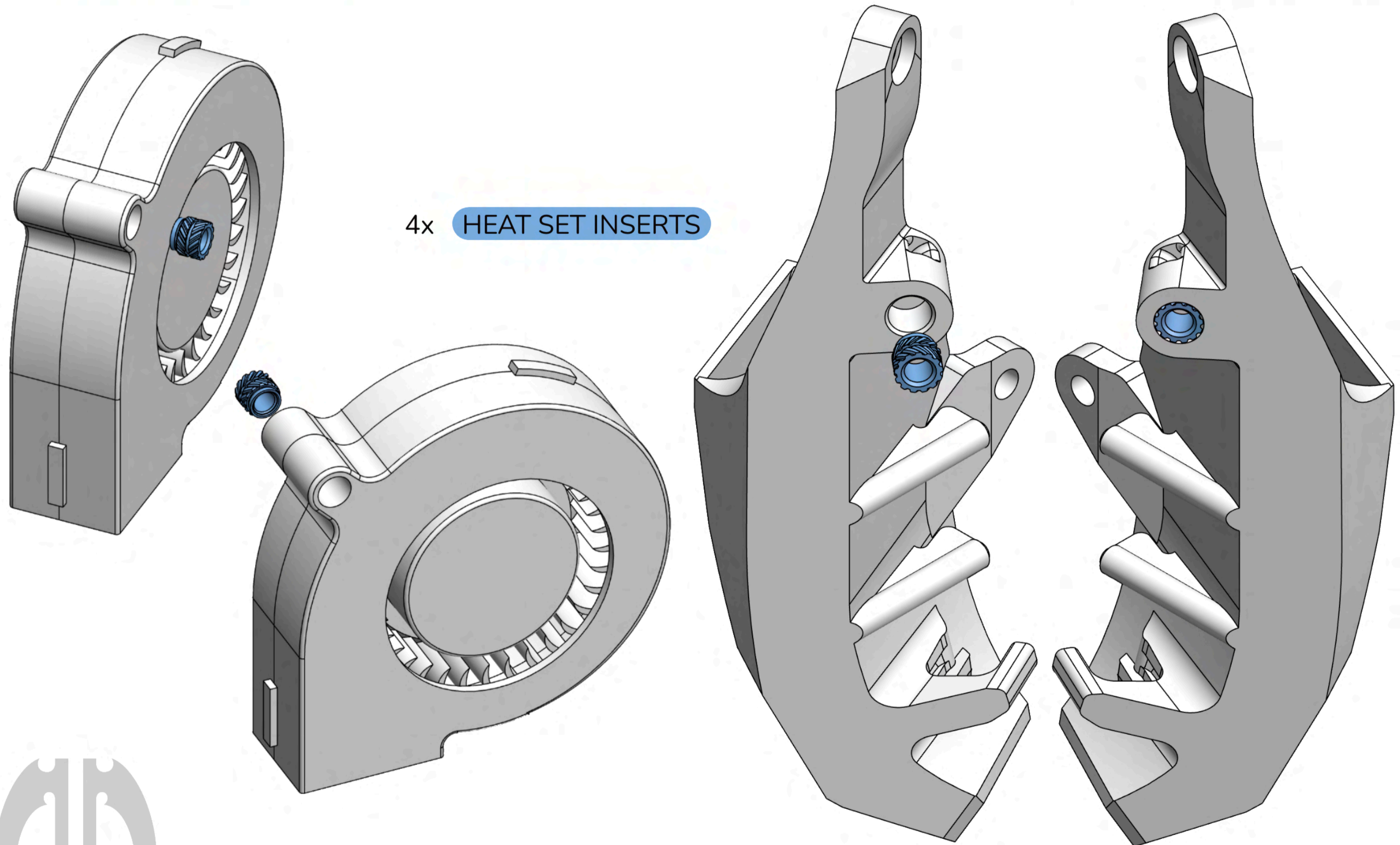
## GRILL AND DUCTS

<https://apdm.tech/>



## GRILL AND DUCTS

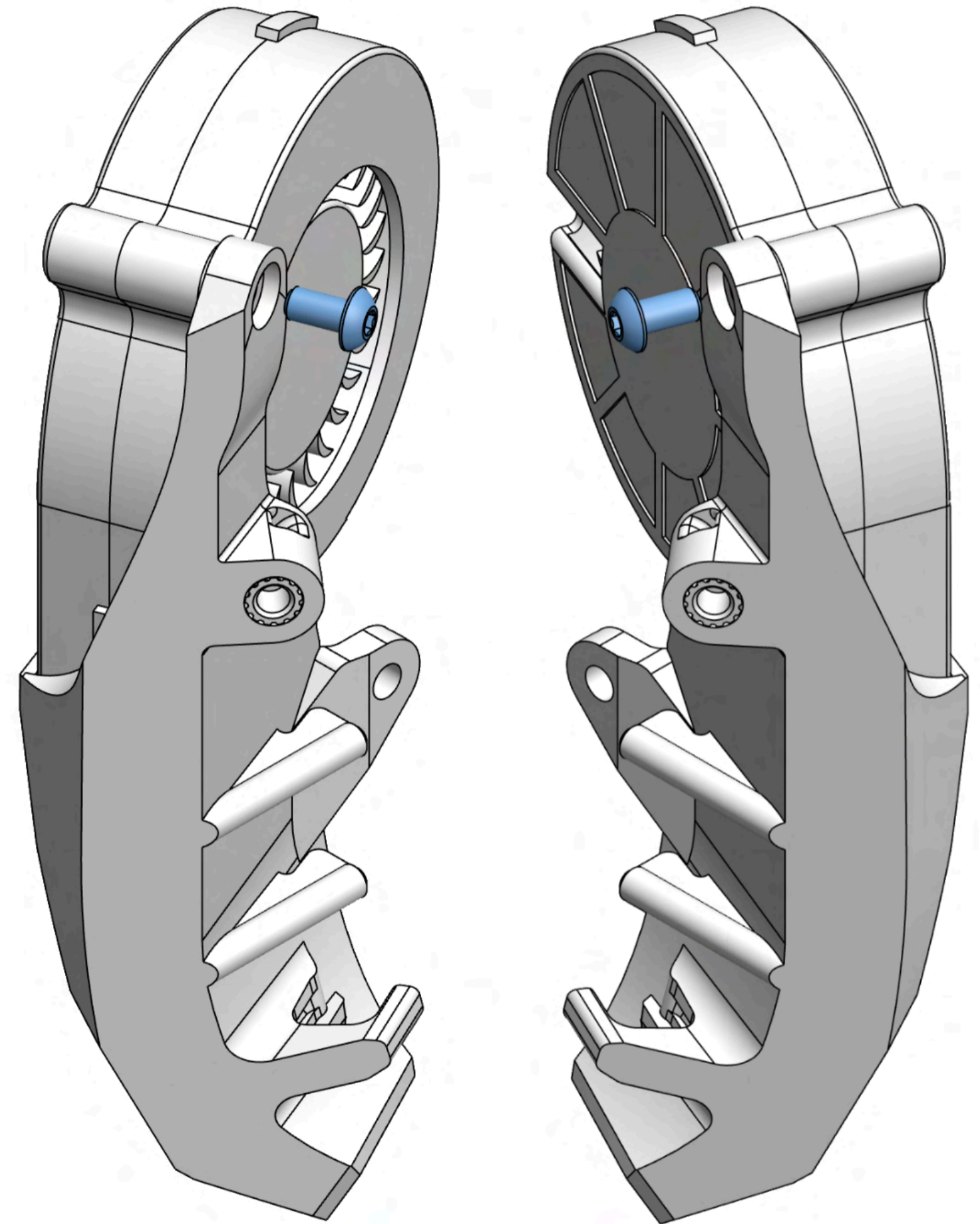
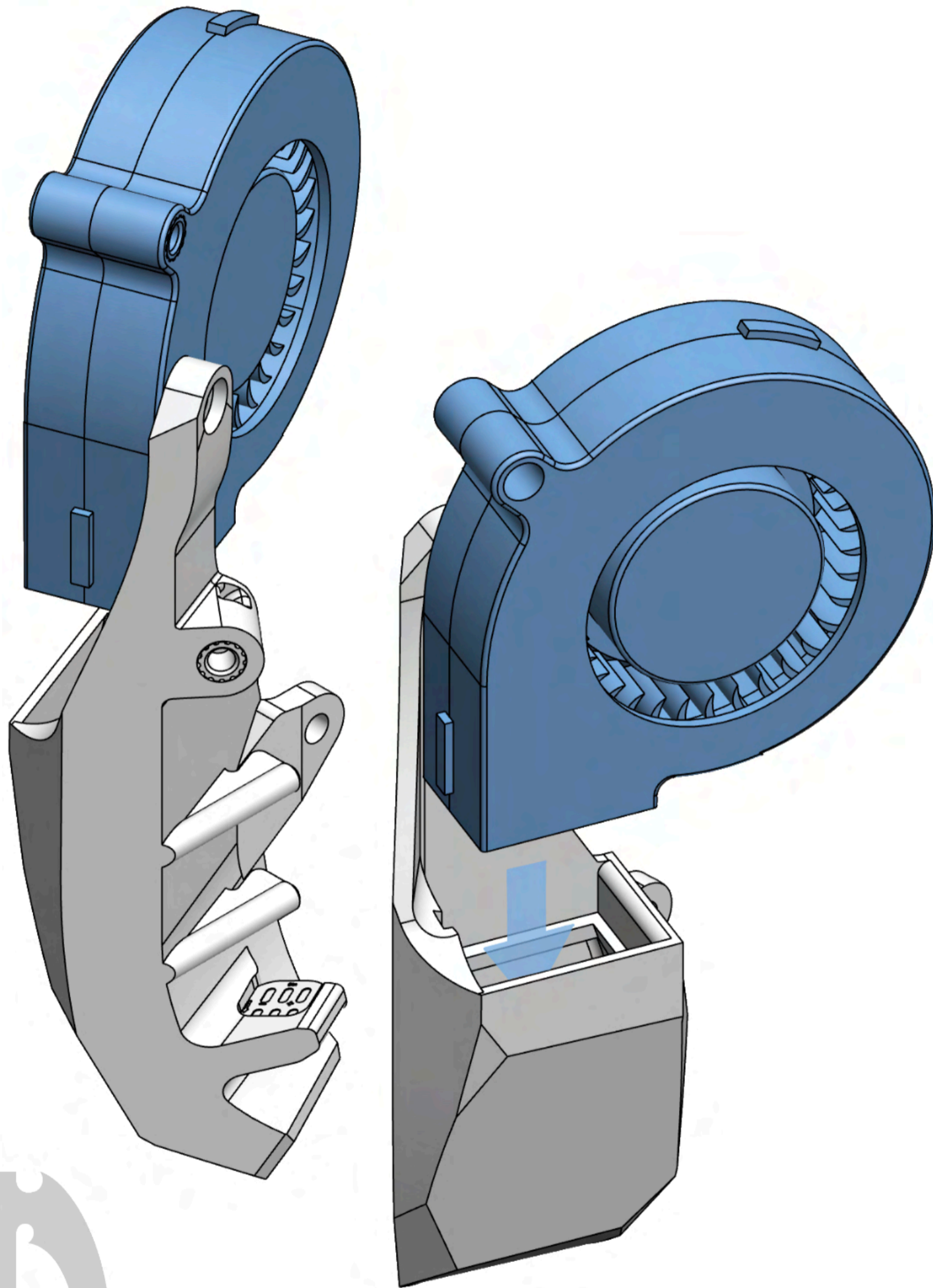
<https://apdm.tech/>



There is an option to use long screws and locknuts if you do not want to permanently alter your fans.

# GRILL AND DUCTS

<https://apdm.tech/>



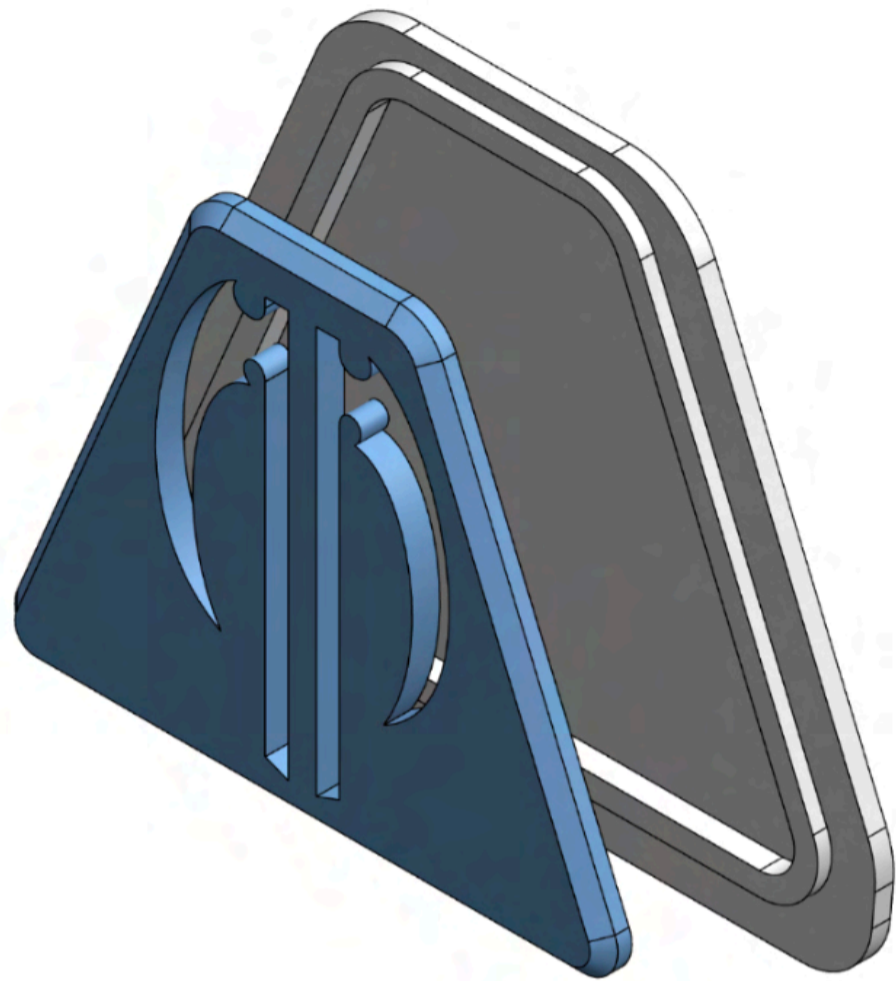
2x m3x6 BHCS



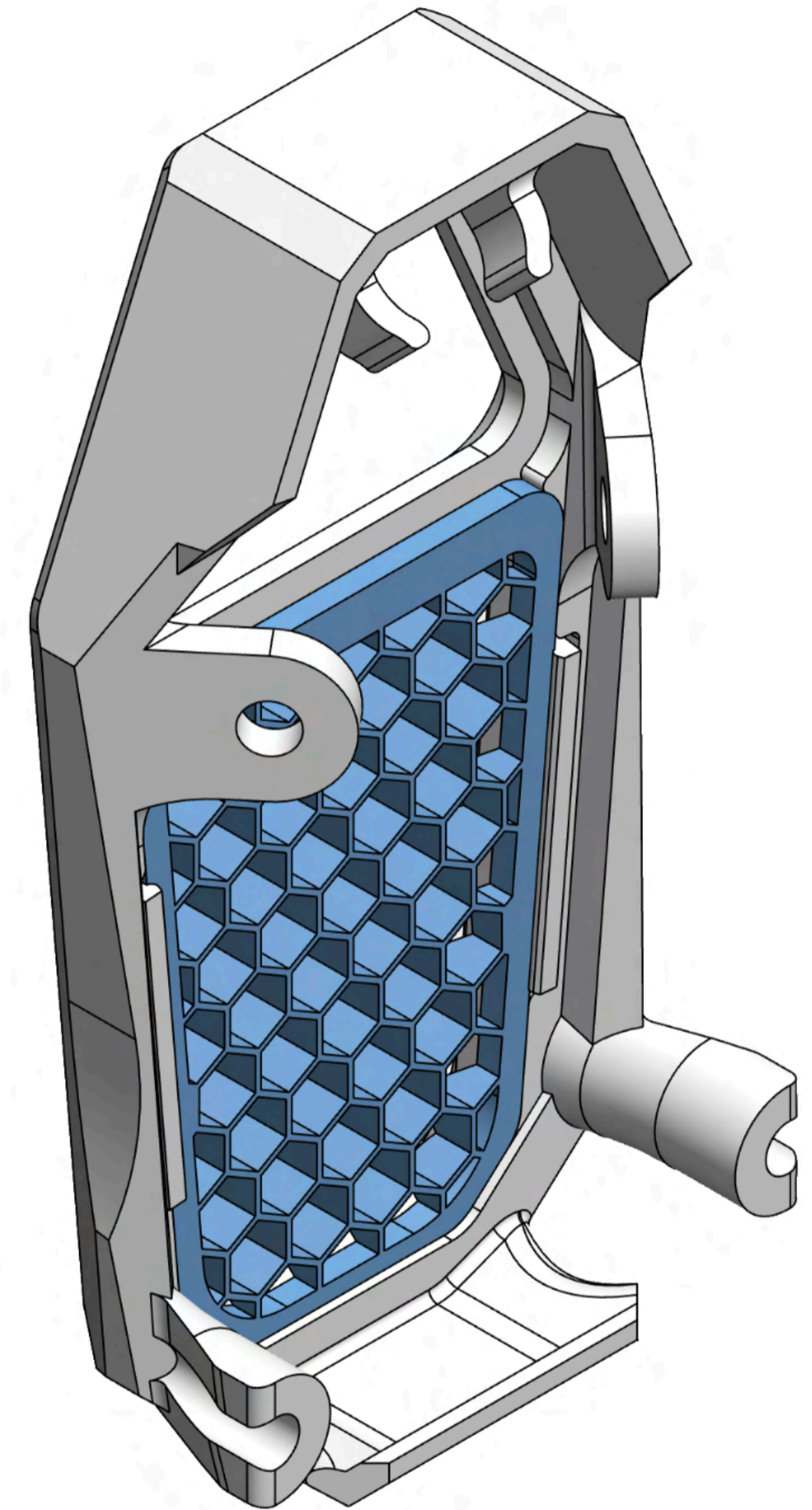
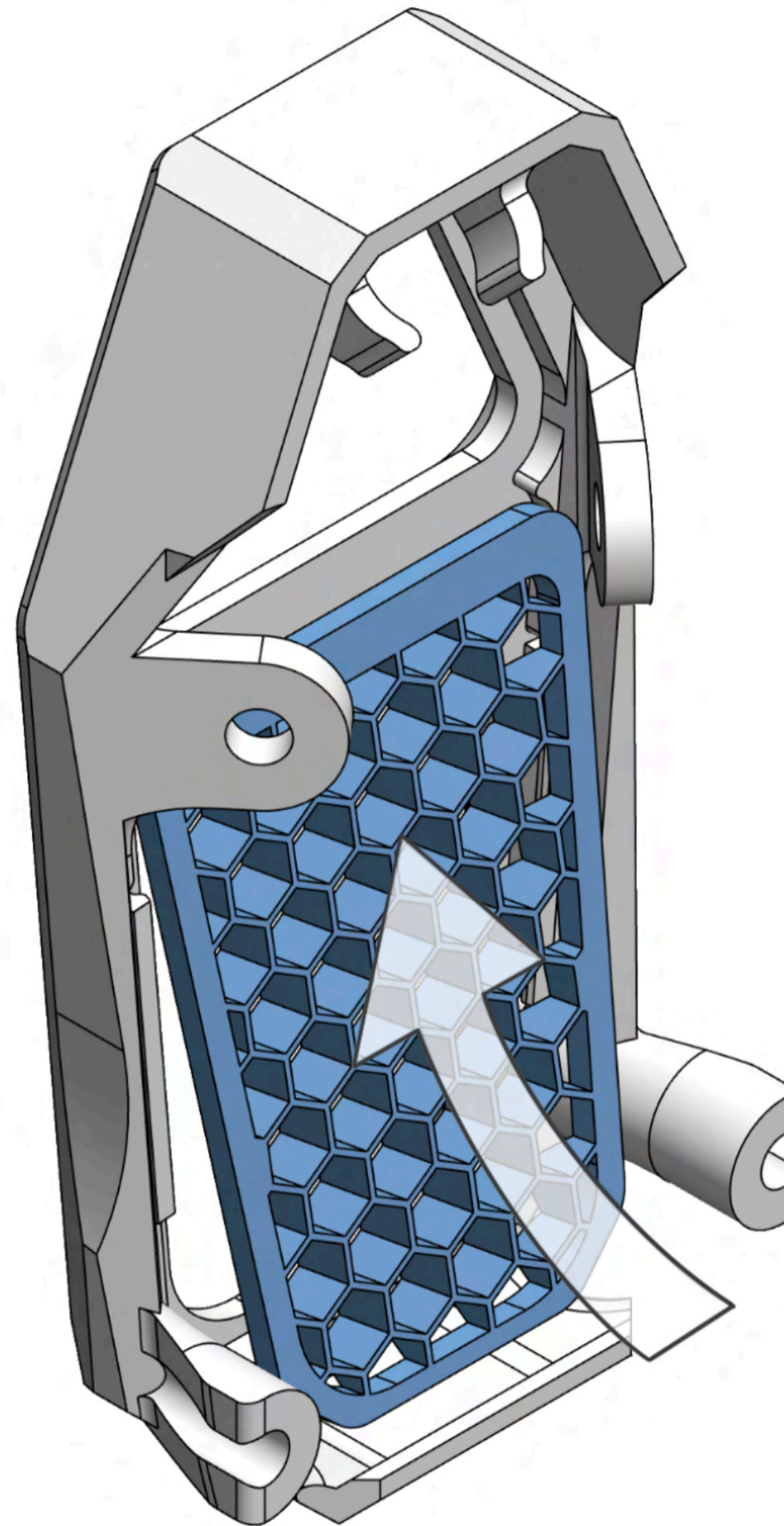
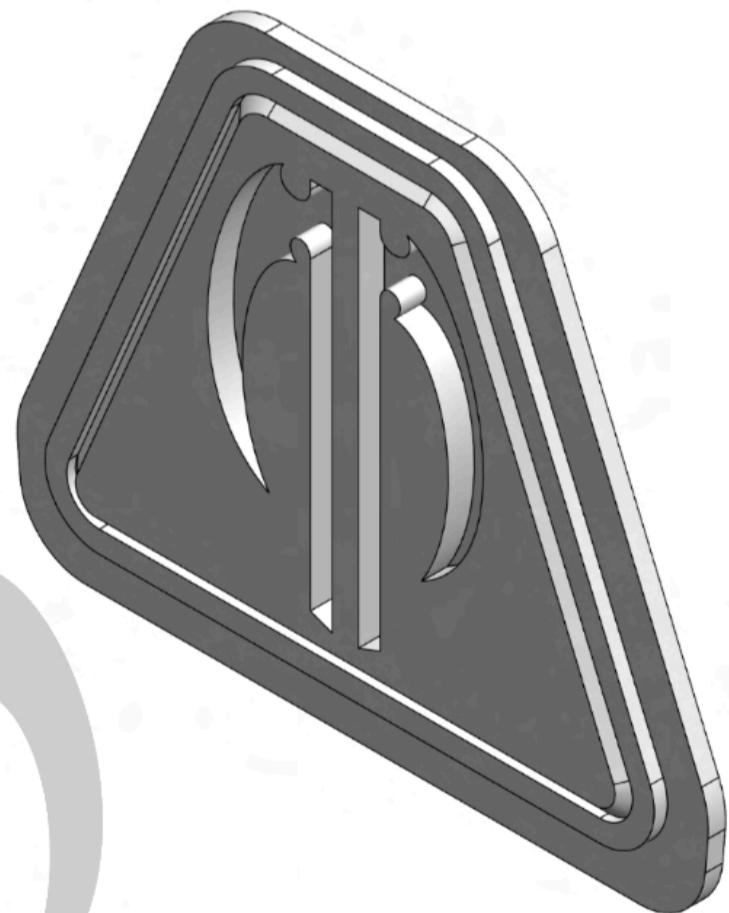


## GRILL AND DUCTS

<https://apdm.tech/>



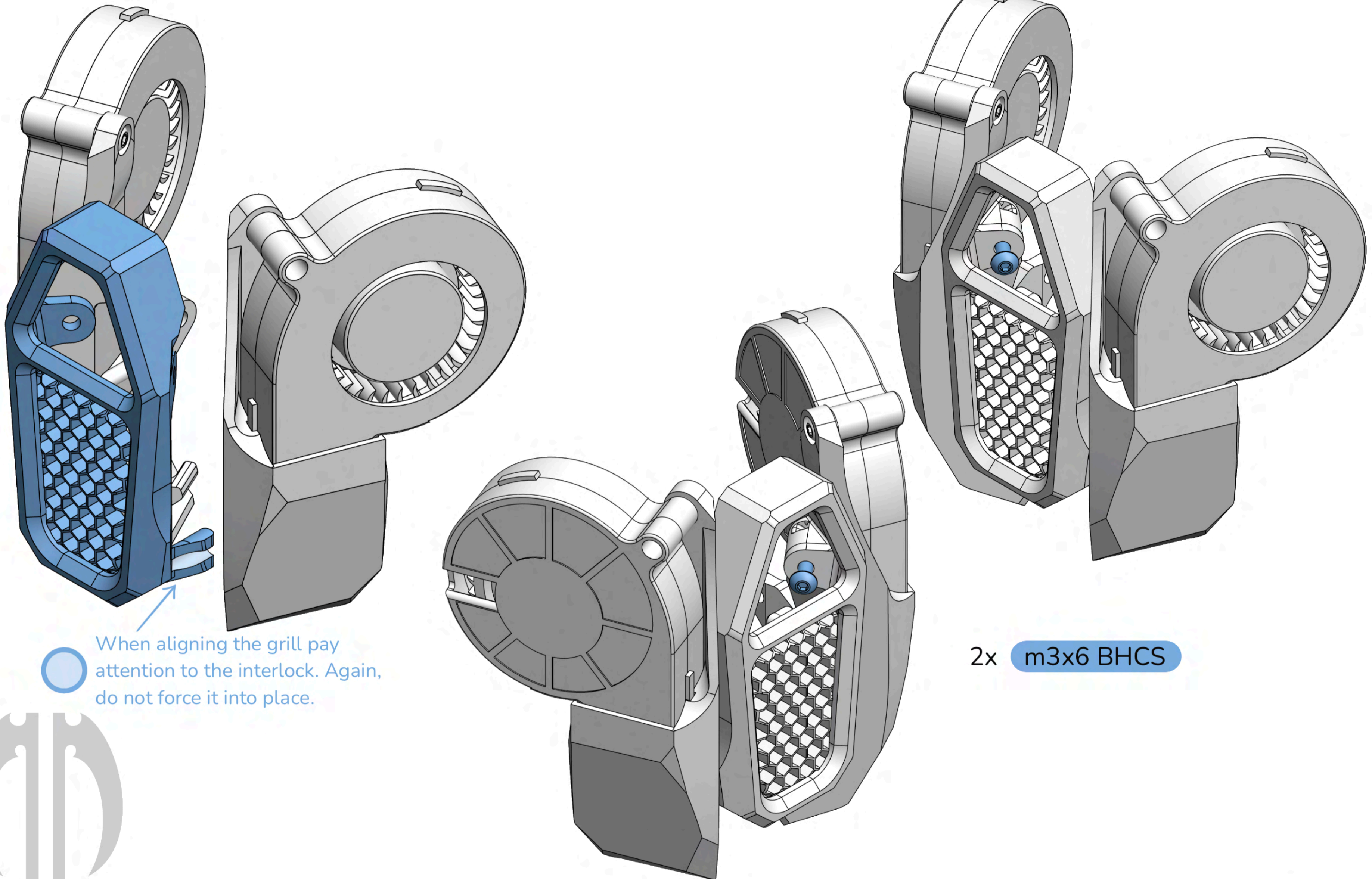
Use a few drops of CA glue to hold the Logo to the Logo Holder



Slide the the Grill Insert into place then GENTLY press until it snaps in.



# GRILL AND DUCTS



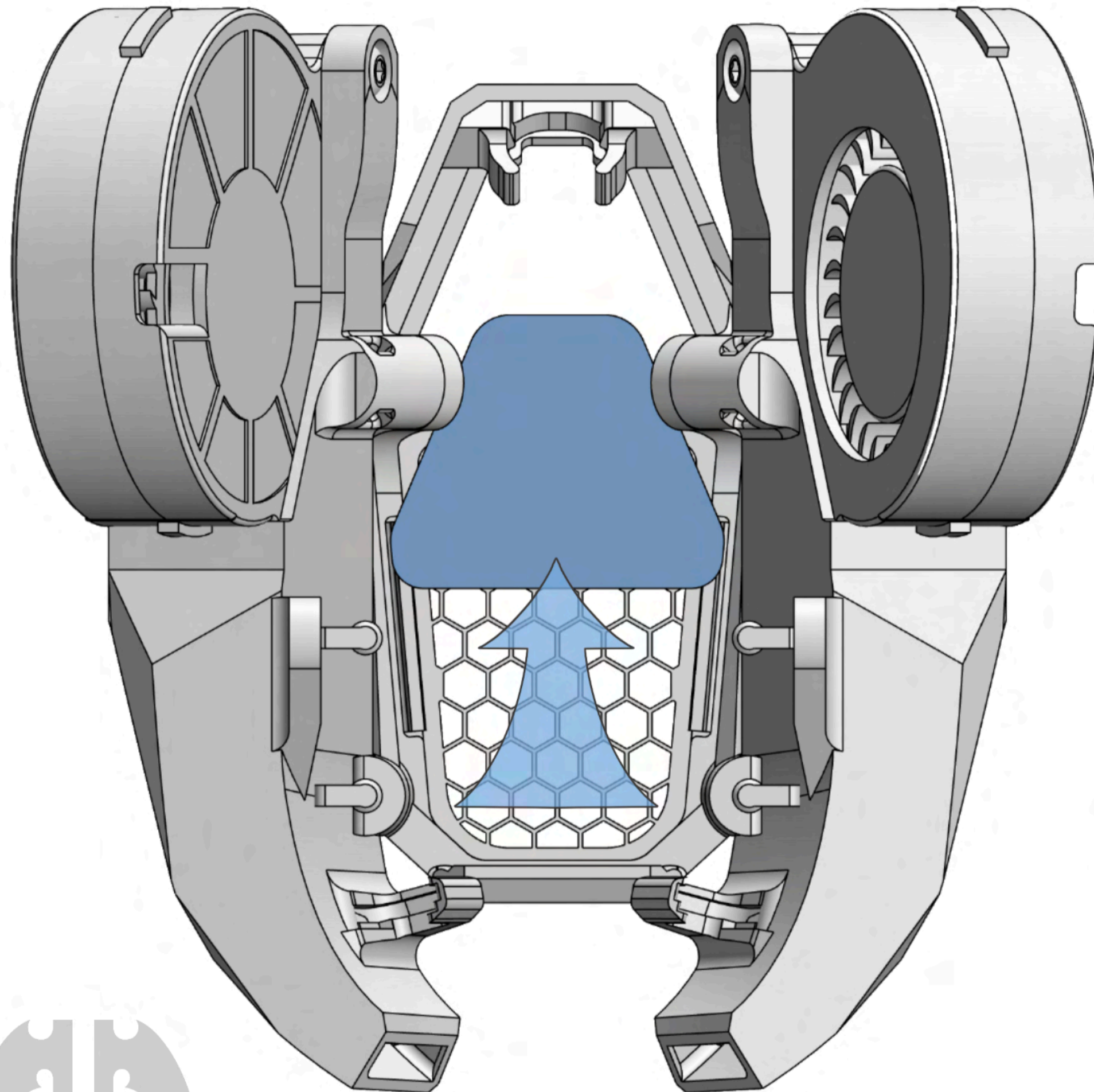
When aligning the grill pay attention to the interlock. Again, do not force it into place.

2x m3x6 BHCS

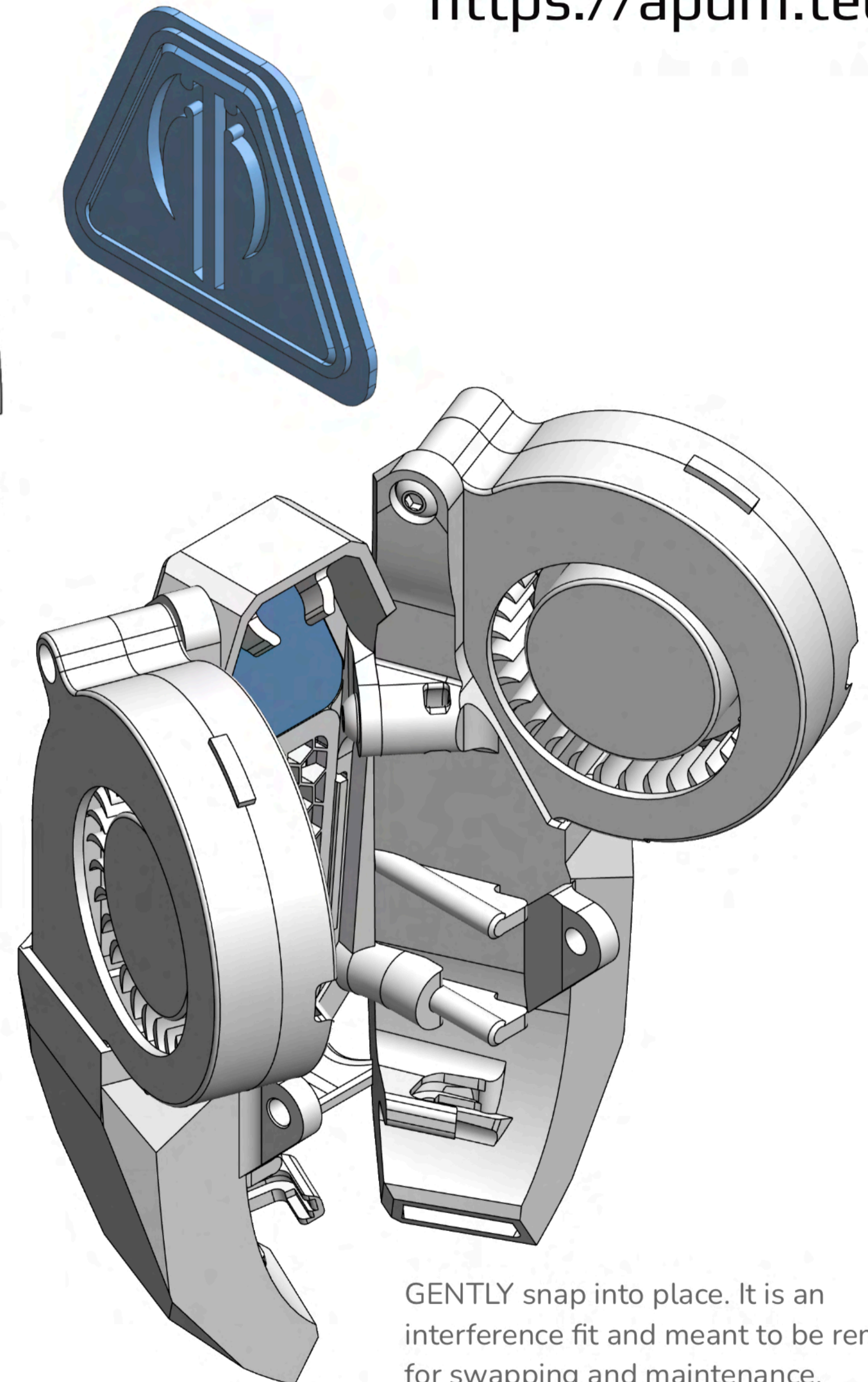


## GRILL AND DUCTS

<https://apdm.tech/>



Slide the assembled Logo Plate up and into position.



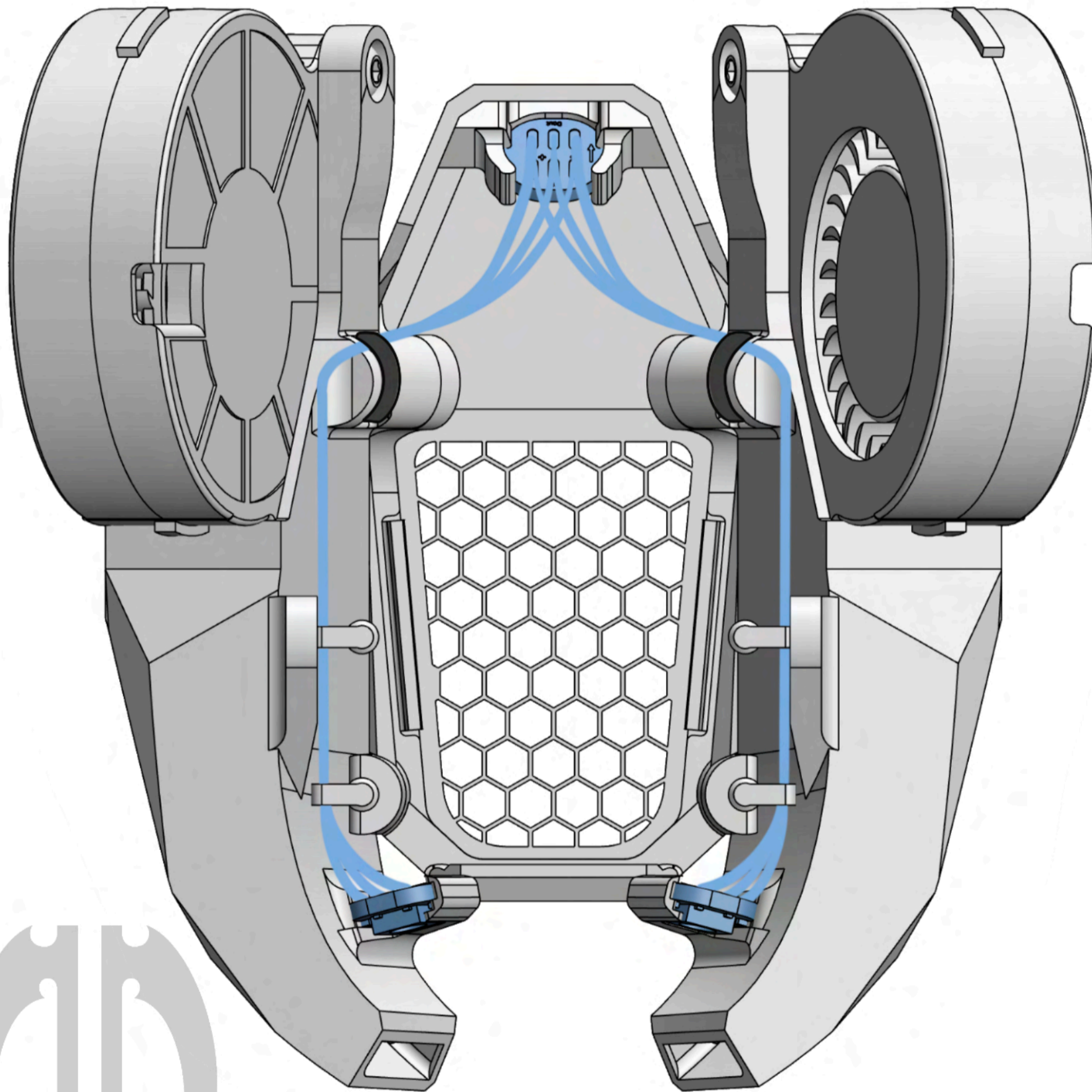
GENTLY snap into place. It is an interference fit and meant to be removable for swapping and maintenance.



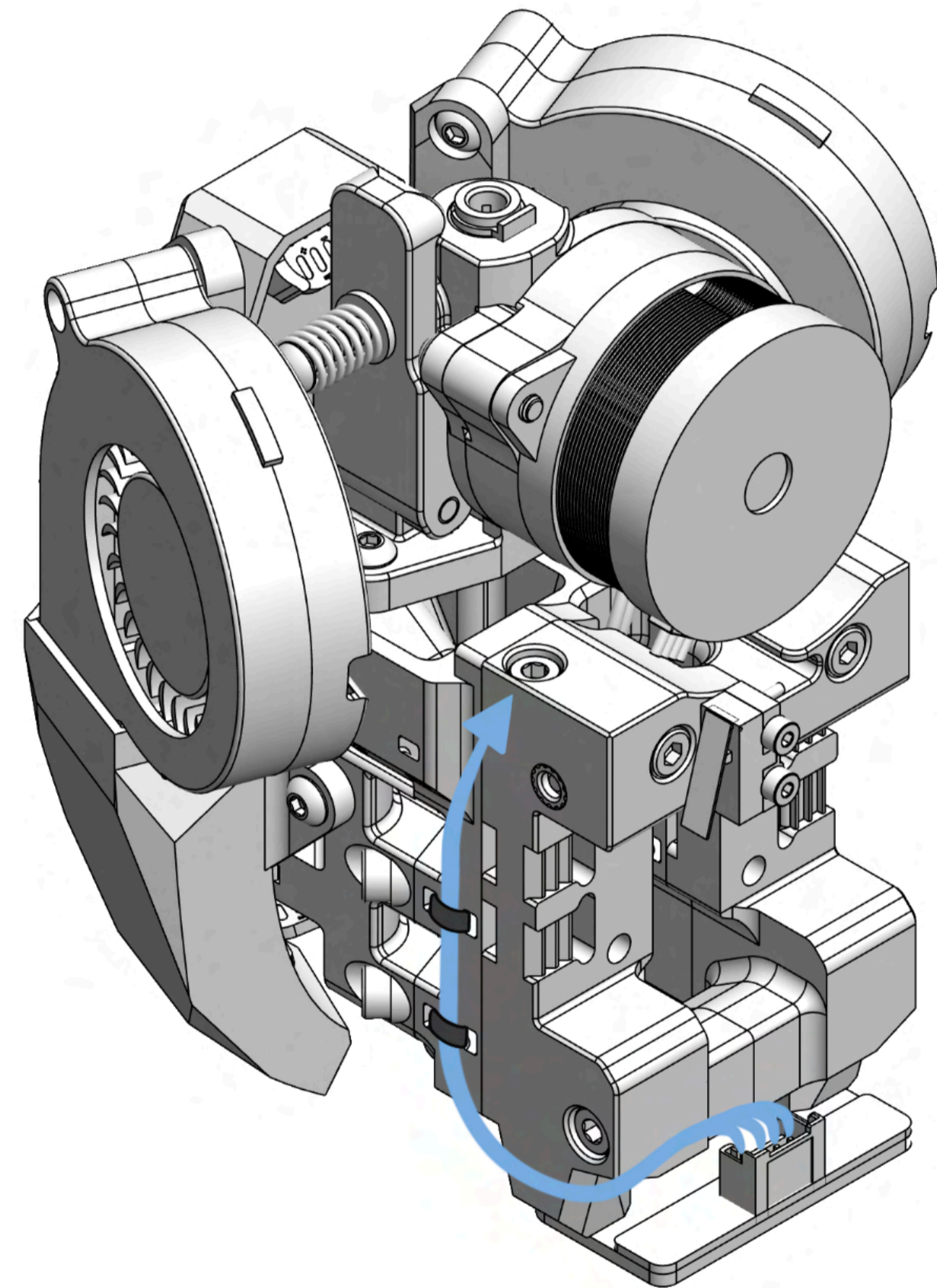
## WIRING ROUTES

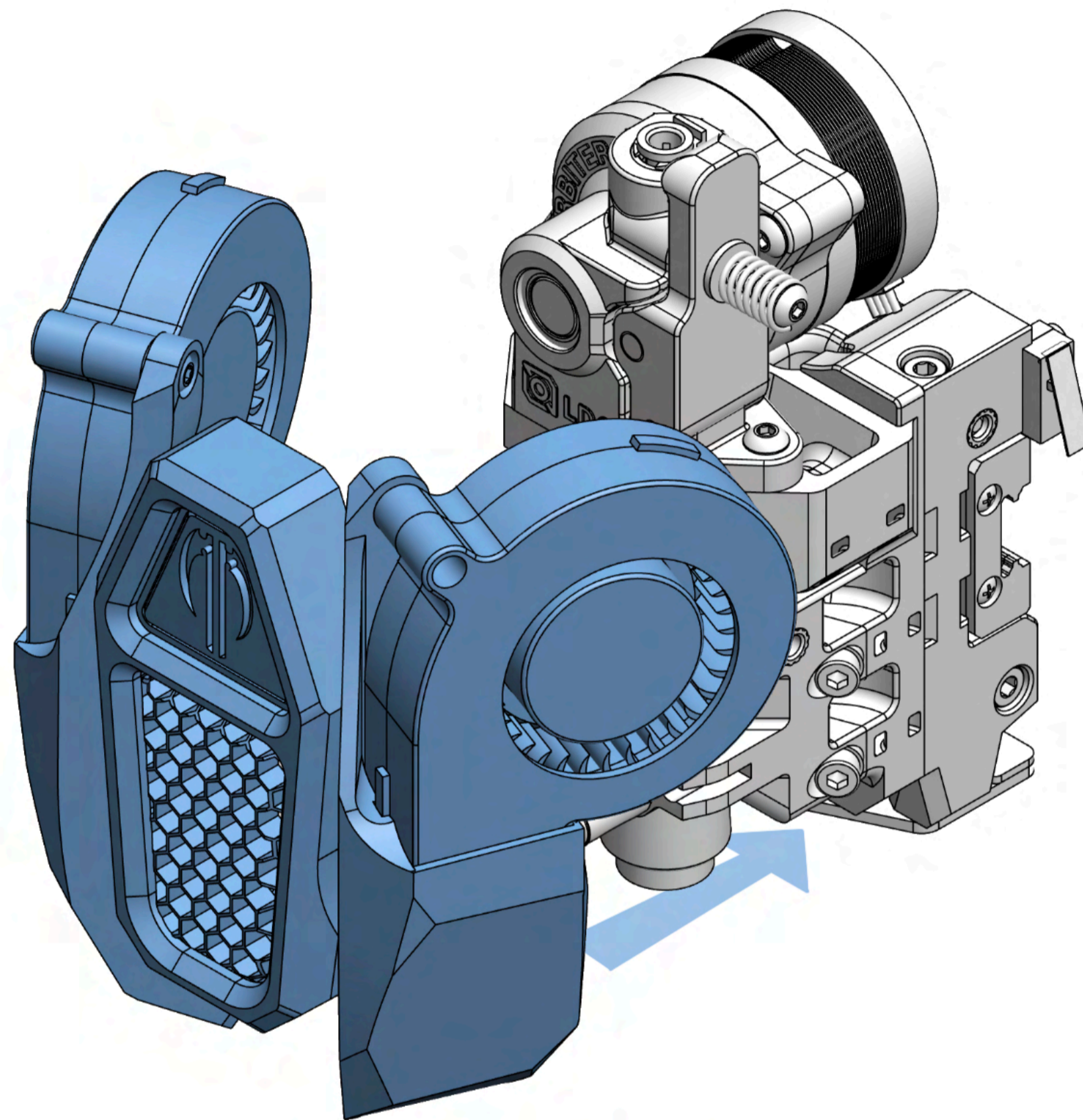
### LED WIRING PATH

Installation videos for LEDs are on the website.



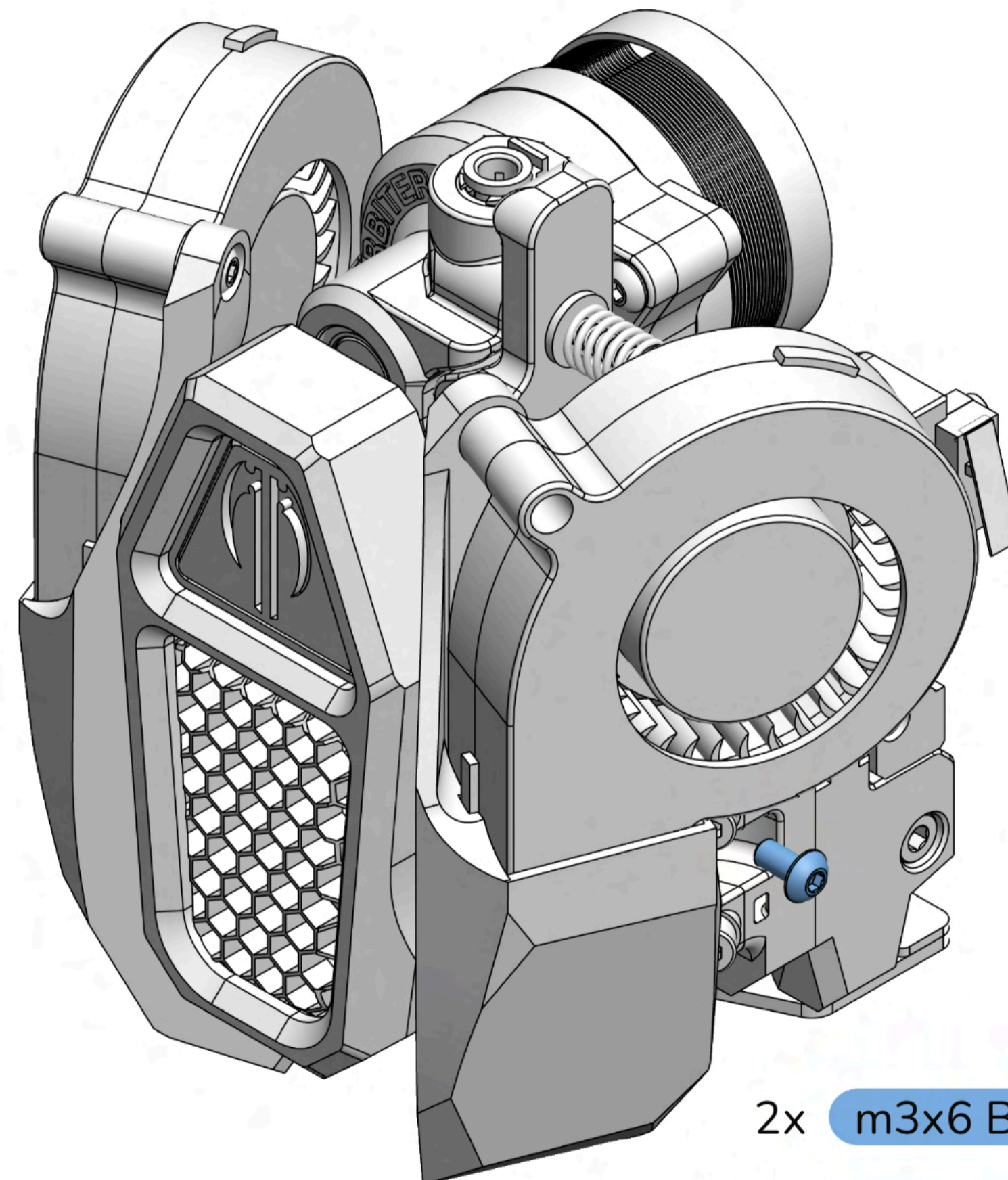
### PROBE WIRING PATH





### SLIDE ER IN PLACE

The 4 “Keys” on the ducts will line up to the keyholes on the Hotend Mount.



2x **m3x6 BHCS**

Install on each side to lock everything in place.





THANK YOU FROM THE APDM TEAM

