

# MAKER GEAR MICRO

## MECHANICAL ASSEMBLY GUIDE

SCRATCH BUILT EDITION

#MAKEYOUROWNMICRO

# HELLO!

Thank you for choosing the MakerGear MICRO as  
your next 3D printing project!

Please share your journey with us on social media (@MakerGear) & if  
you do encounter any questions or concerns OR if you just have some feedback  
about our designs, please email us at [print@makergear.com](mailto:print@makergear.com) Happy Printing.





# 3D PRINTED PARTS

## Preferred Print Settings:

- Use a nozzle diameter between .35-.5mm with a layer height between .2-.3mm
- Print parts with a minimum of 3 perimeters with at least 4 top & bottom layers
- Infill should be a minimum of 10% with an extrusion multiplier 2-3% higher than your typical settings
- Use extra dense support layers for any long or flat overhangs & have horizontal separation set higher than your nozzle diameter
- Parts will have surfaces labeled “FD” which should be oriented and printed “face down” to ensure easier printing and a better overall print quality
- Add skirts for large parts with long print times to limit lifting or warped corners
- Use slower print speeds for your perimeters

## Printed Parts List:

Base	Bed Clips (x4)	Hot End Mount	X Motor Mount	Z Knob
Top	Electronics Case	Fan Mount	X Idler Mount	Spool Holder
Bed	Electronics Case Base	X Belt Grip	Y stop	

# NON-PRINTED PARTS

Part	Description/Details	QTY
BIGTREETECH SKR Mini E3 V2.0 Control Board	32bit board with silent drivers	1
BIGTREETECH TFT28 Display	comes with necessary wires	1
MK8 Extruder Original Replacement	12 volt 40 watt fully assembled hotend with heater & thermistor	1
BL Touch	purchase with the optional extension cable if available	1
30x30x10mm Cooling Fan	12 volts	2
NEMA 14-size Hybrid Bipolar Stepping Motor	500 mA at 10 V	2
NEMA 17 Stepper Motor with 310mm T8x8 Lead Screw	lead screw gets cut to 230mm, comes with brassnut for lead screw	1
NEMA 17 Stepper Motor	1.5A	1
Aluminum Extruder Drive Feeder	drop in replacement for creality, comes with hardware and drive gear	1
Nema 17 Stepper Motor Mounting Bracket	2mm thick bent metal brackets	1
8mm x 150mm Linear Motion Rods	Diameter 8mm, tolerance -0.005mm to -0.03mm	4
8mm x 200mm Linear Motion Rods	Diameter 8mm, tolerance -0.005mm to -0.03mm	2
8mm Bore Linear Ball Bearings	15 mm outer diameter, 4 rows of steel balls	6
300mm Closed Loop Belt	2GT, 6mm wide	1
400mm Closed Loop Belt	2GT, 6mm wide	1
6mm Belt Tension Spring	5.2mm outer diameter	1
5mm bore GT2 Timing Belt Idler Pulley	20 teeth, compatable with 6mm belts	2
5mm bore GT2 Timing Belt Drive Pulley	20 teeth, compatable with 6mm belts, comes with set screws	2
Rubber Feet Bumpers	.625in H, .932in D, .178in bore	4
Momentary Micro Limit Switch	5A, 3 pins	2
Sanded Acrylic Bed (must be fabricated)	3mm acrylic cut into a 4in x 4in square (DXF file available to laser cut)	1



# HARDWARE

## NUTS & BOLTS

M3x8 Hex Socket Head Screws	x15
M3x12 Hex Socket Head Screws	x14
M3x14 Hex Socket Head Screws	x8
M3x18 Hex Socket Head Screws	x7
M3x35 Hex Socket Head Screws	x2
M3 Washers	x46
M3 Nylon Lock Nuts	x26
M4x14 Hex Socket Head Screws	x8
M4 Washers	x4
M4 Nylon Lock Nuts	x4
M2.5x12 Hex Socket Head Screw	x4
3mm Nylon Spacers (7mm OD)	x4
5mm x 14mm socket shoulder screw	x2
8mm Shaft Lock Collar	x1

## TOOLS

M1.5 Allen Key
M2 Allen Key
M2.5 Allen Key
M3 Allen Key
5.5mm Hex Wrench
Precision Hobby Knife (optional)
Plumber's Tape (optional)

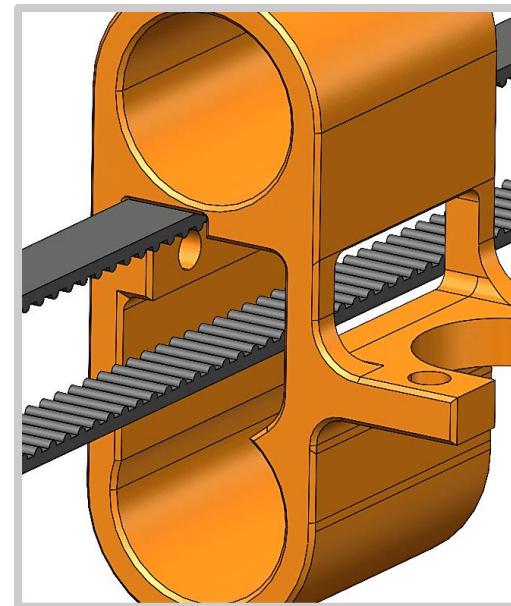
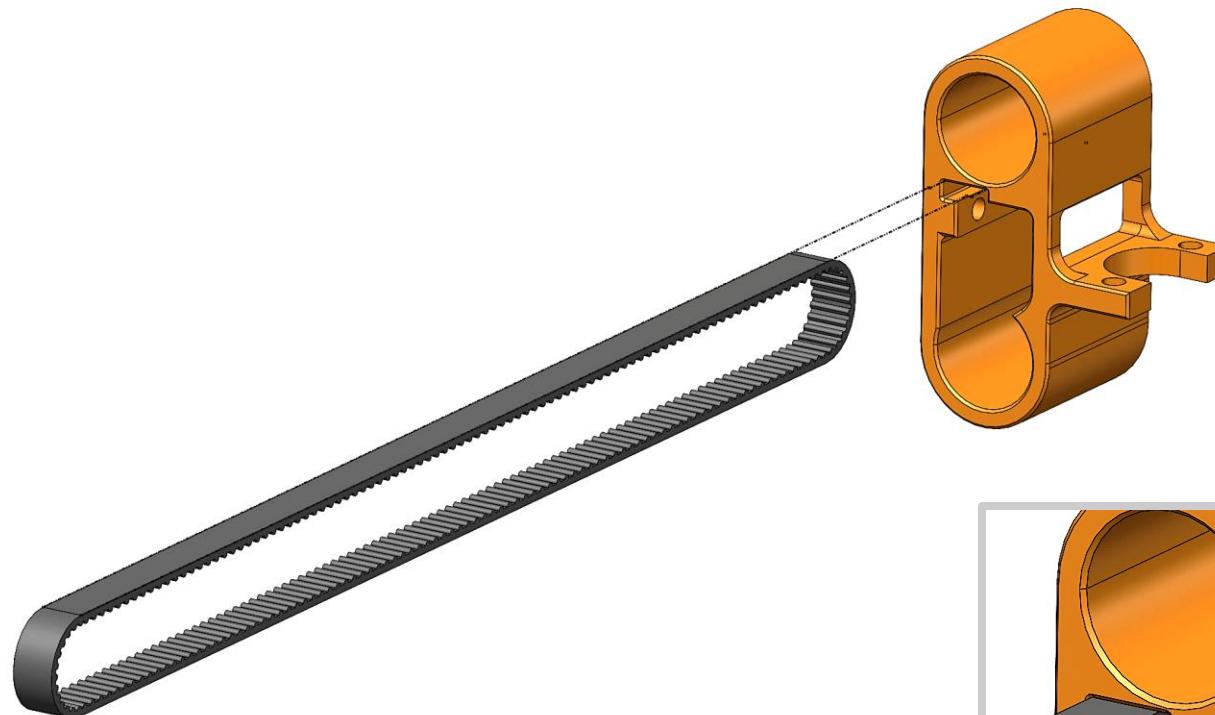
## TIPS & TRICKS

-Use a precision hobby knife to clean up any print imperfections or to clean up any holes that are too tight of a fit

-Hole tolerances can vary based on filaments & machines; small bits of plumber's tape can be used if linear bearings or linear motion rods are too loose within the assembly

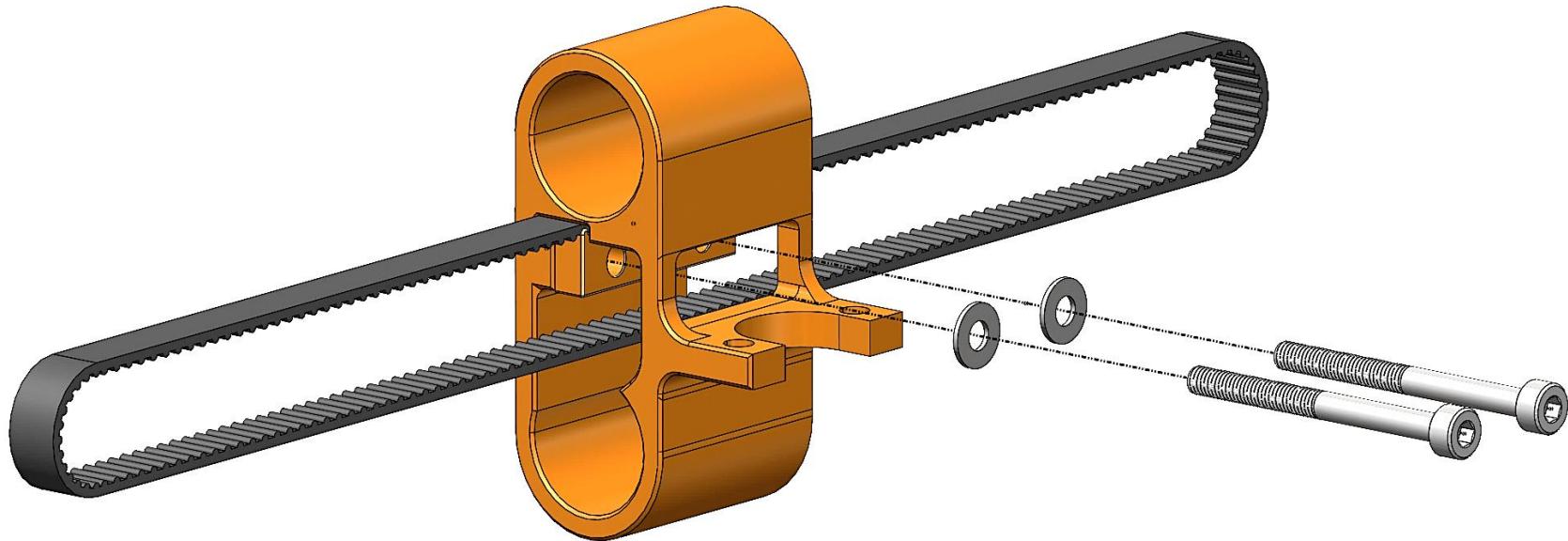
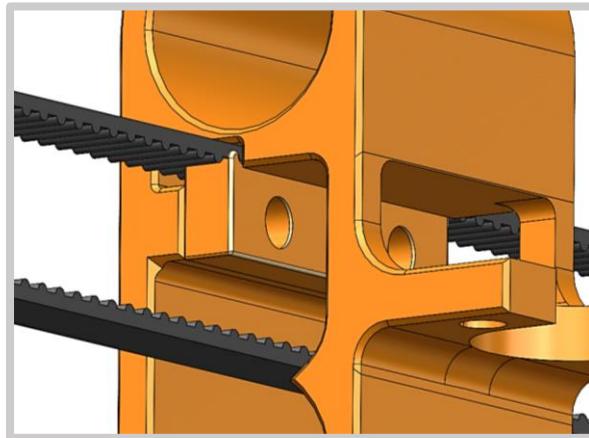
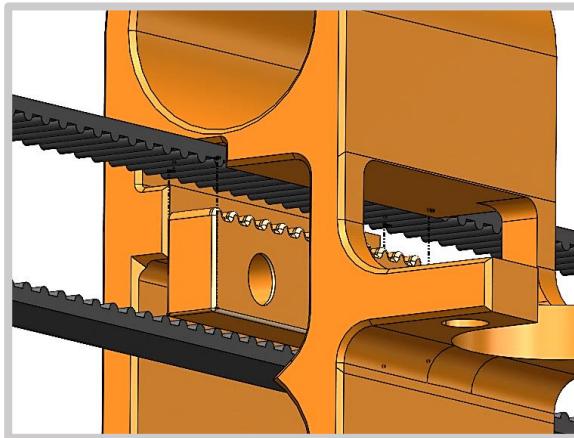
-While snug fits within the assembly are ideal, do not overtighten any bolts or use extreme force to fit parts into the prints

-Pay close attention to the orientation of the parts presented in this guide & to which direction they are when secured into place. Even the brightest engineers can accidentally mount a switch backwards.. Trust us. We're engineers.



**Hot End Mount**  
x1

400mm Belt  
x1



X Belt Grip

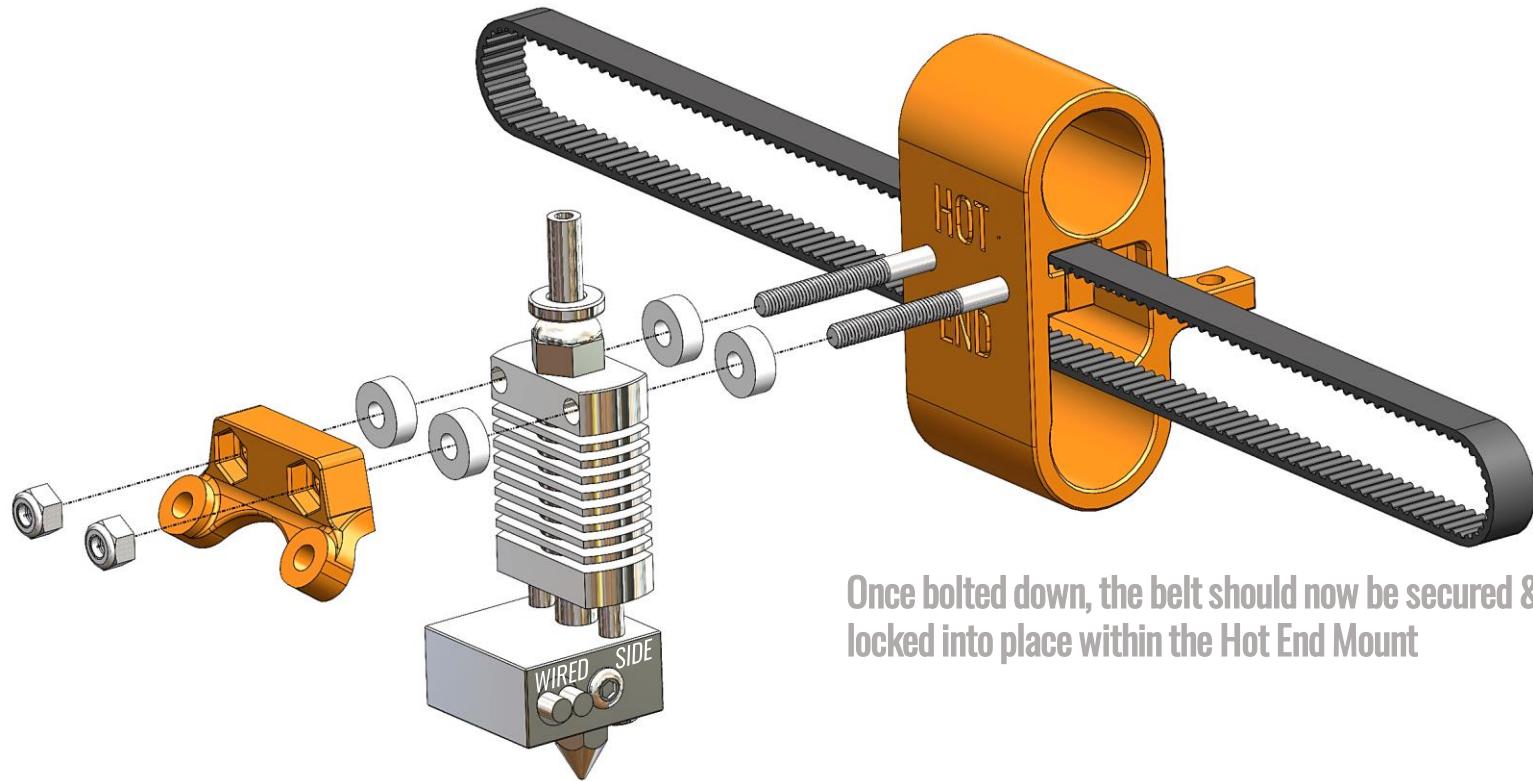
M3x35

M3 washers

x1

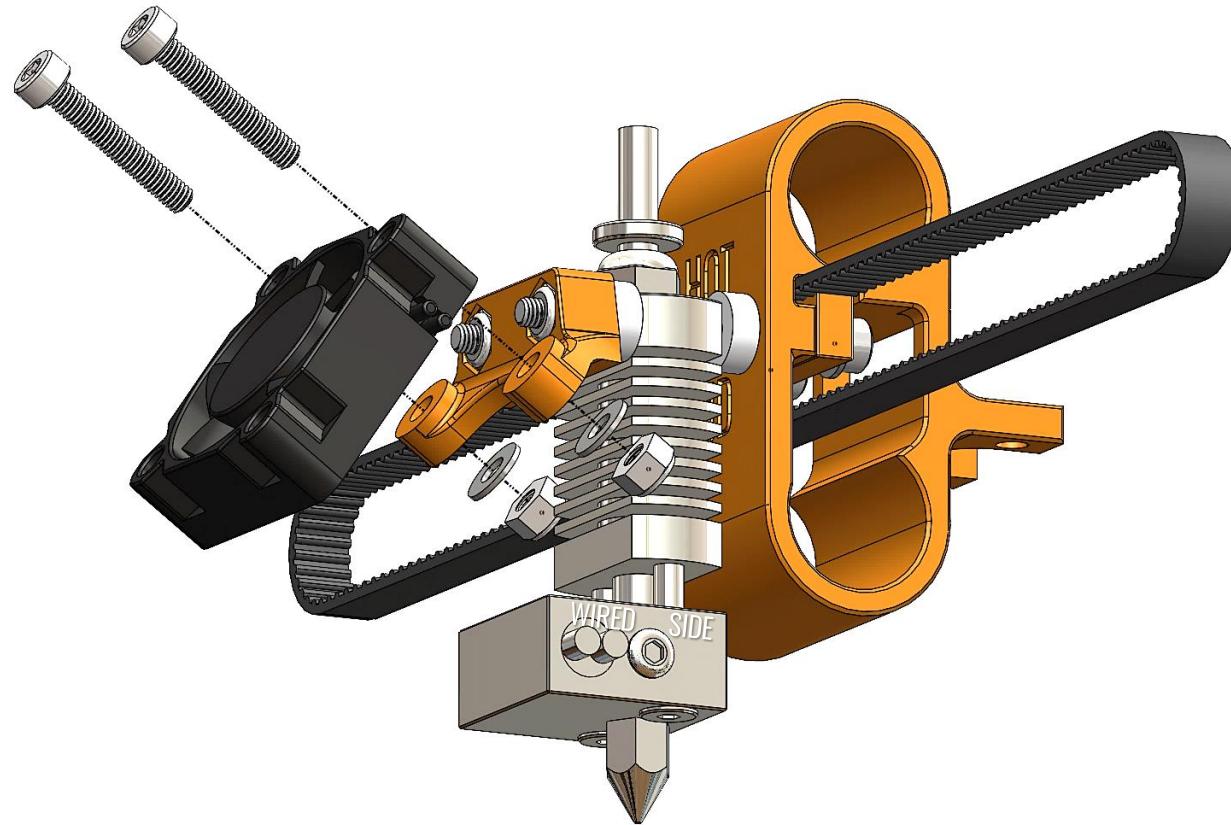
x2

x2



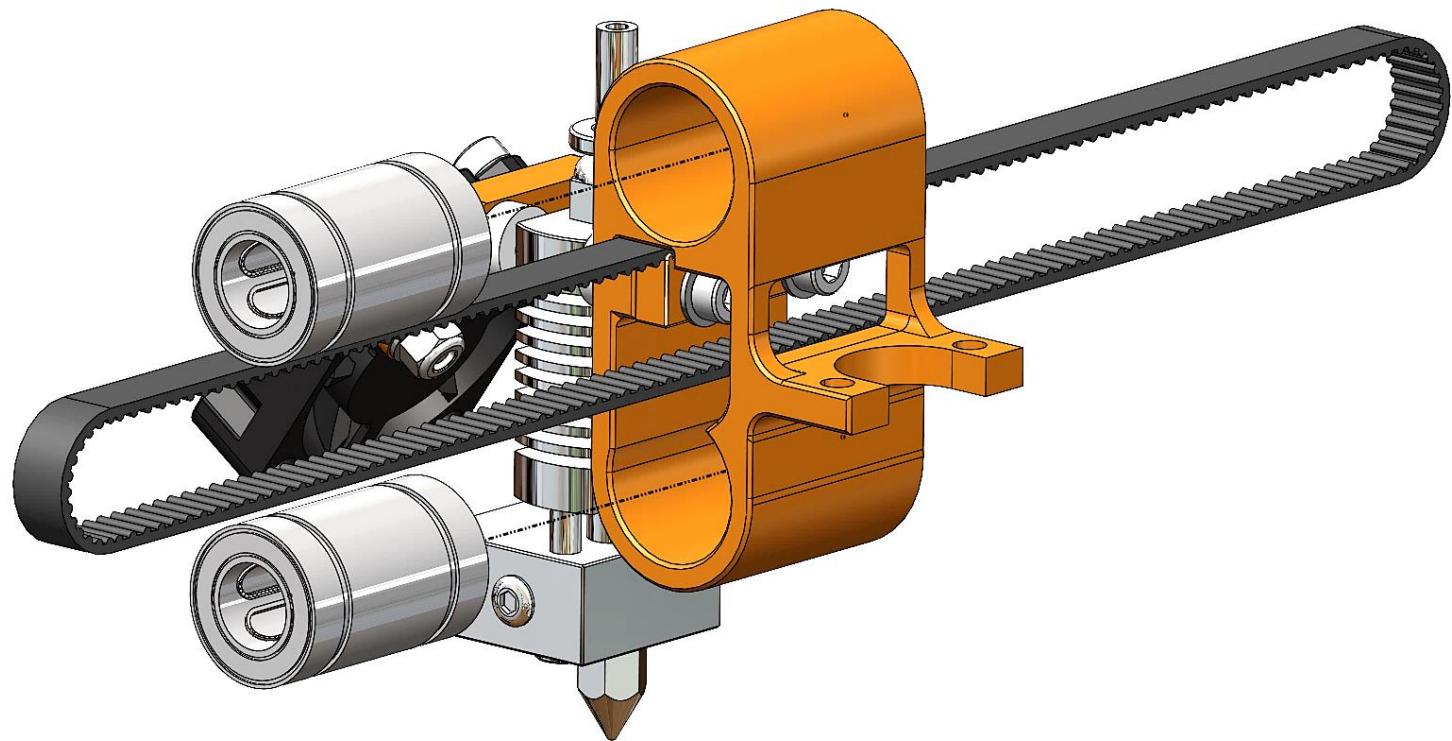
Once bolted down, the belt should now be secured & locked into place within the Hot End Mount

Fan Mount	x1
Hot End Assembly	x1
Nylon Spacers	x4
M3 nuts	x2

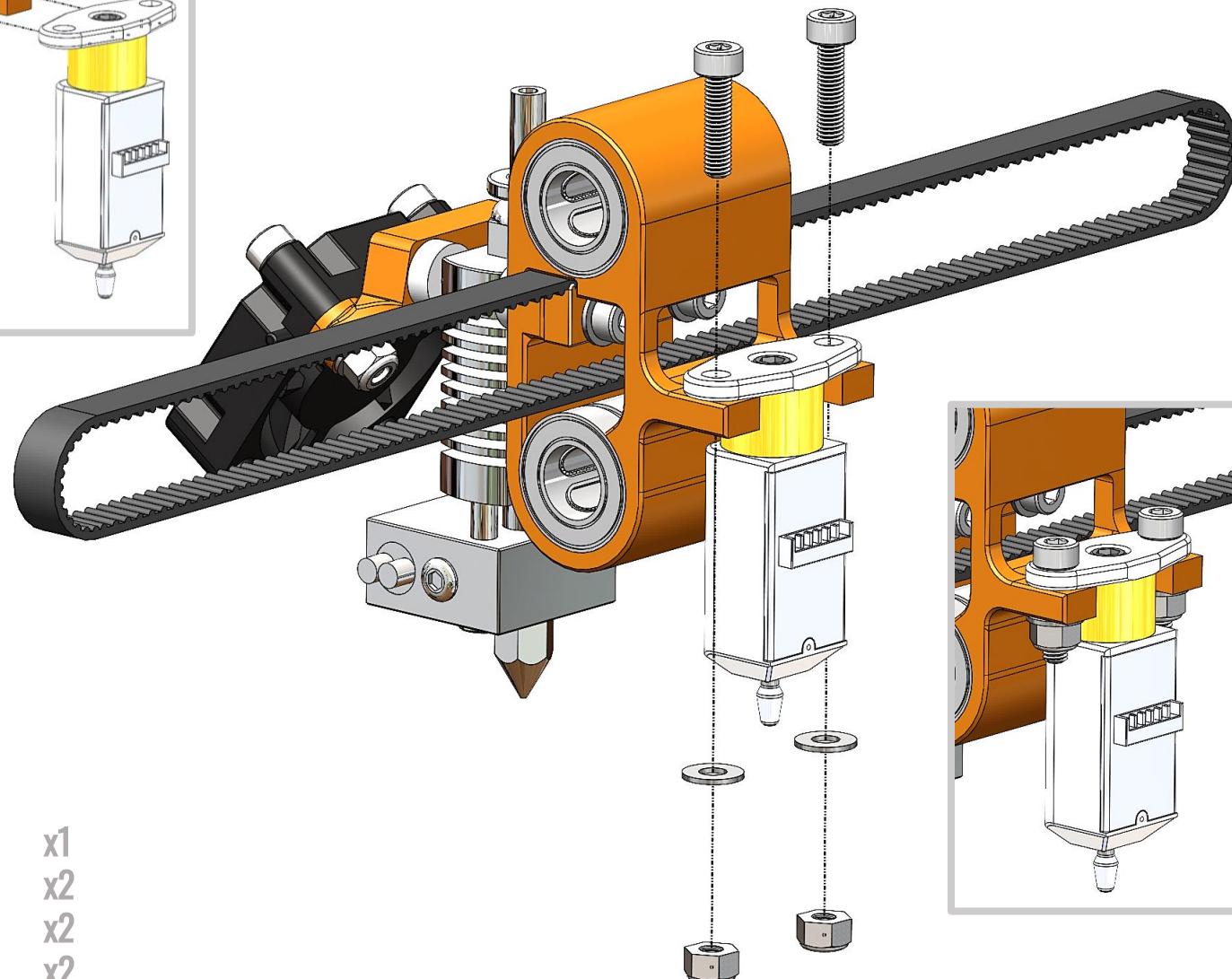
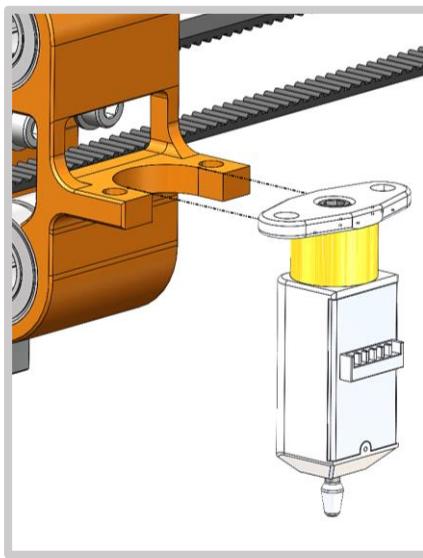


Cooling Fan  
M3x18  
M3 washers  
M3 nuts

x1  
x2  
x2  
x2

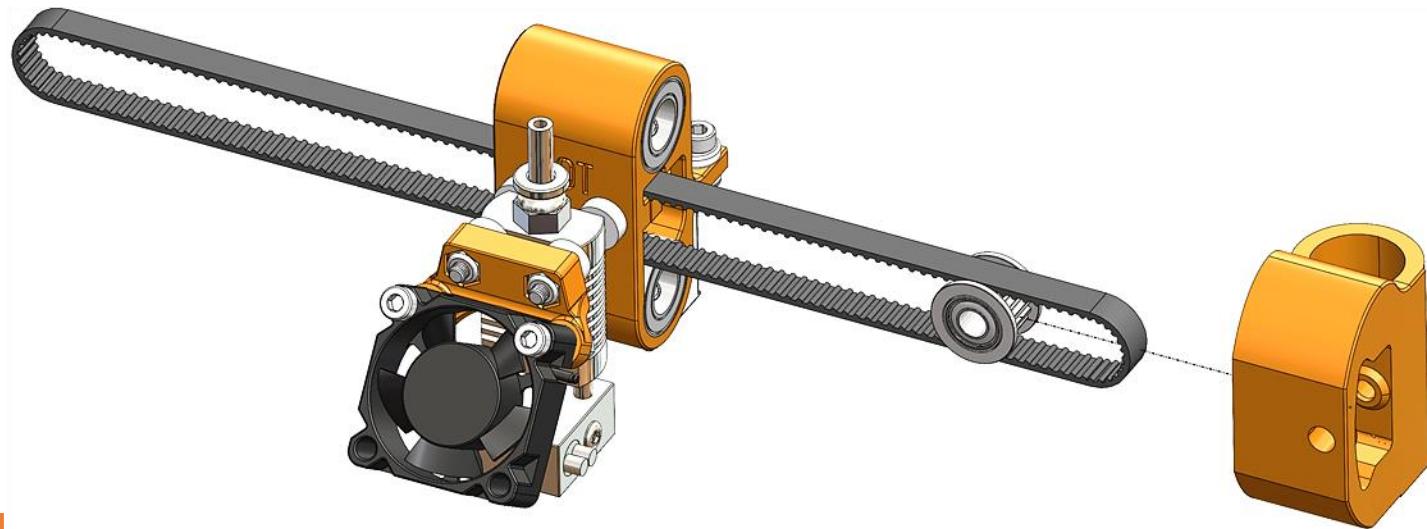
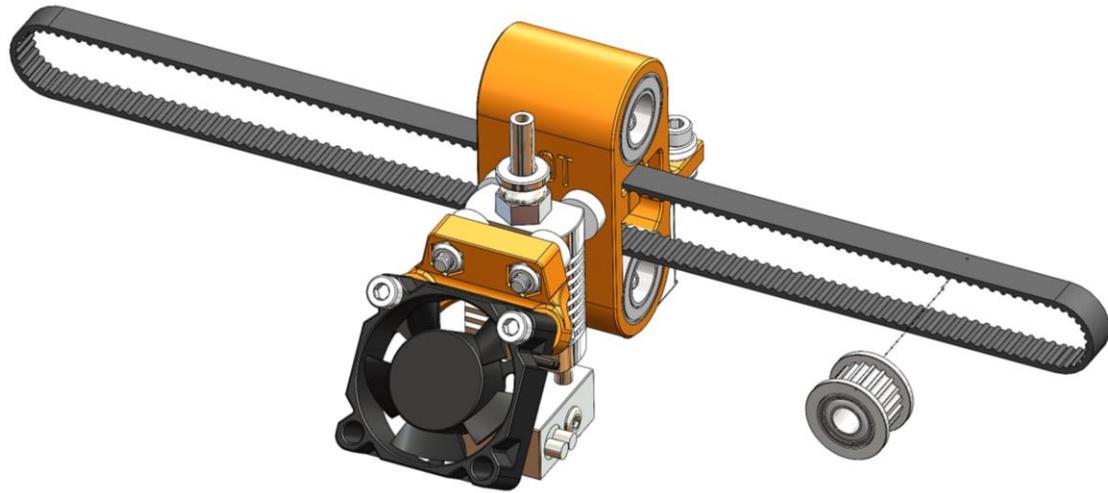


Linear Bearings    x2

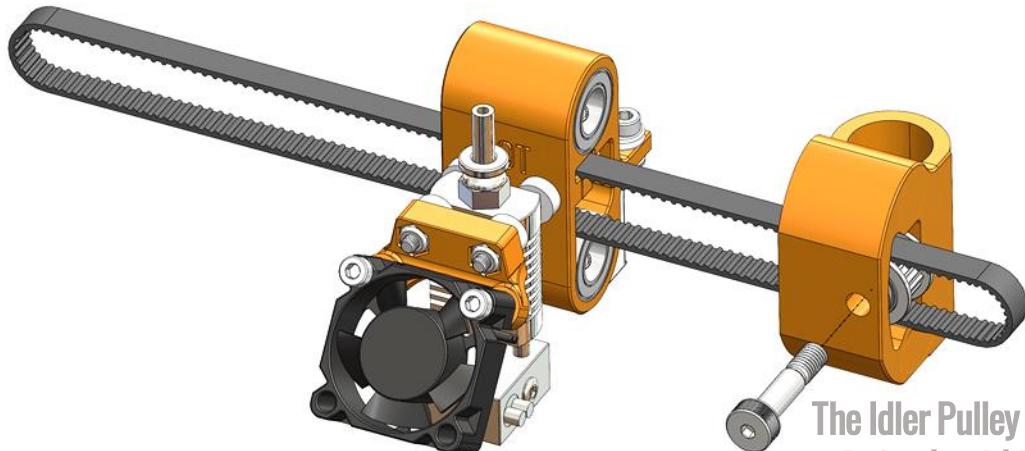


BL Touch  
M3x12  
M3 washers  
M3 nuts

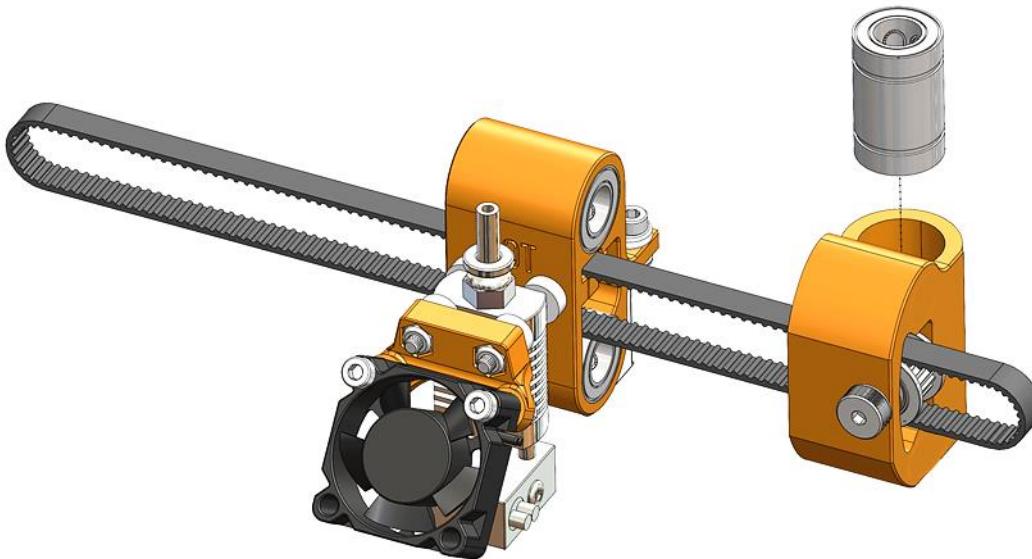
x1  
x2  
x2  
x2



X Idler Mount x1  
Idler Pulley x1



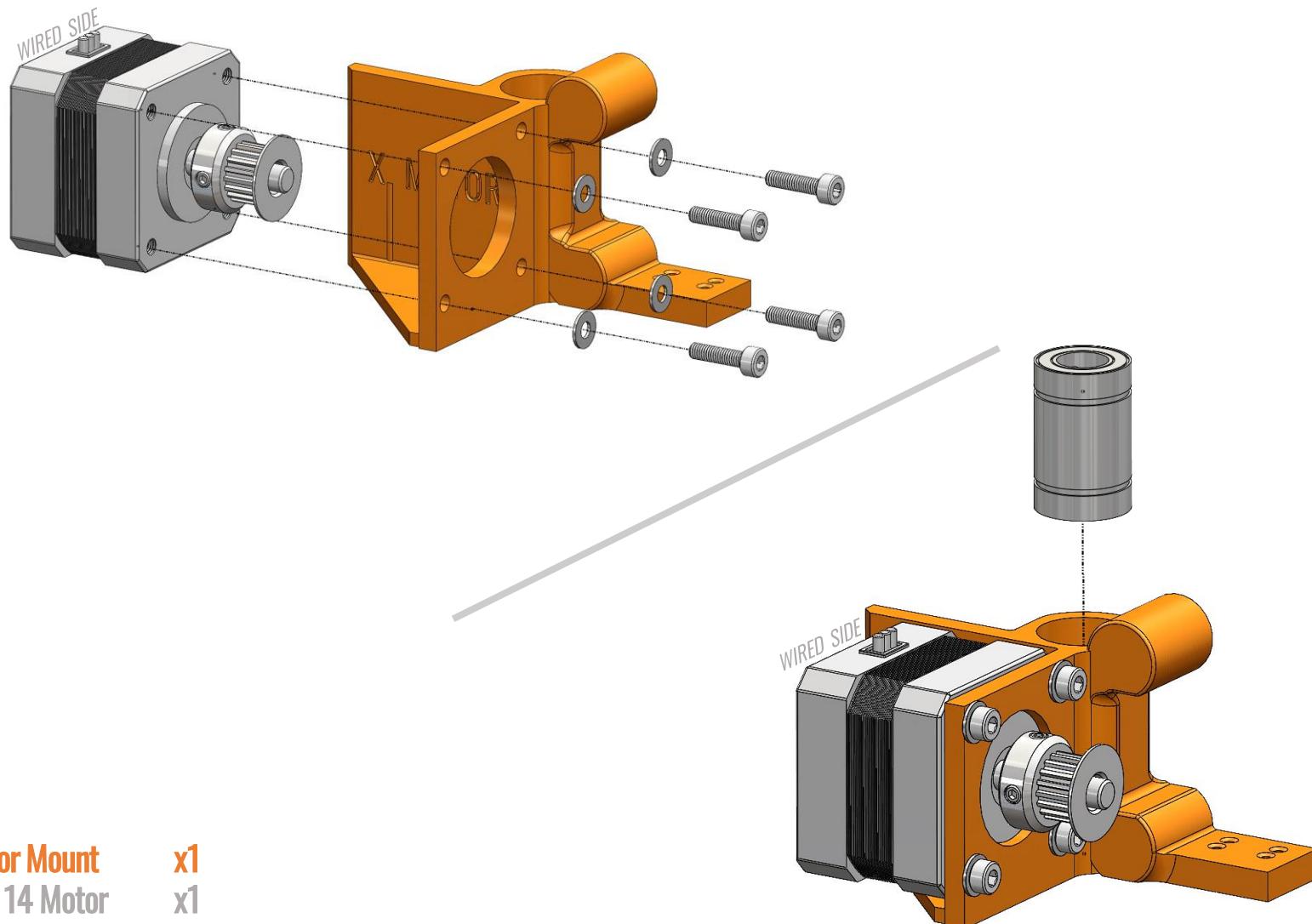
The Idler Pulley should be able to spin freely within the X Idler Mount



Shoulder Bolt  
Linear Bearing

x1

x1

**X Motor Mount**

NEMA 14 Motor

x1

x1

M3x8

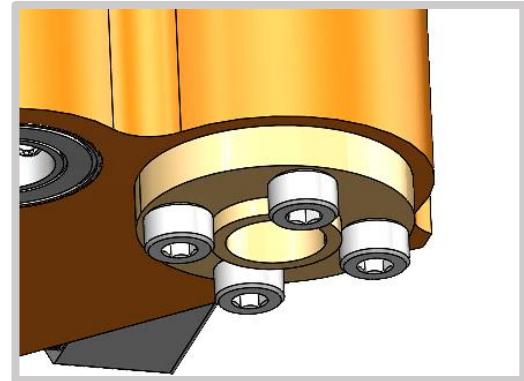
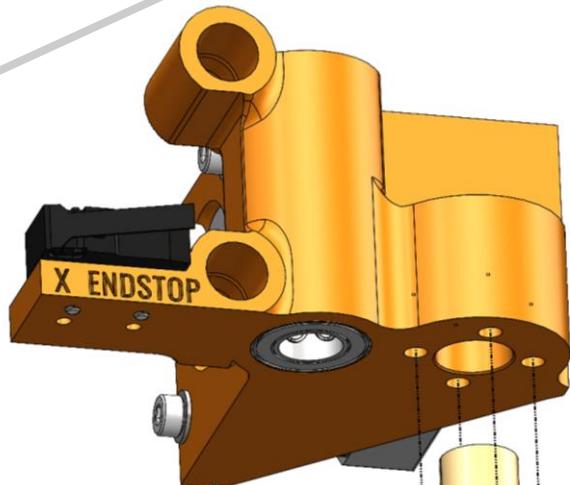
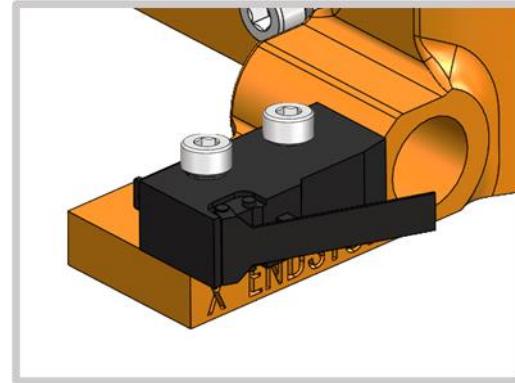
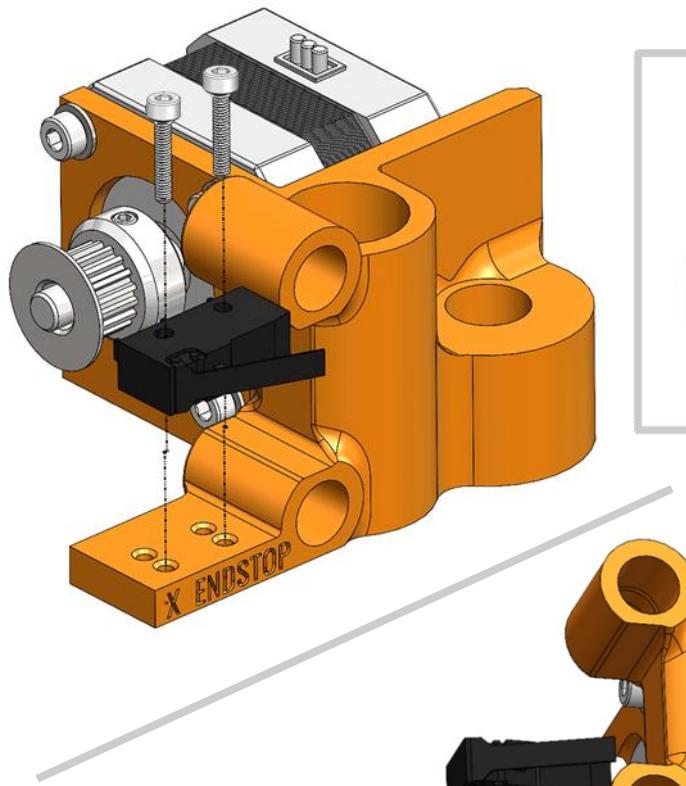
x4

M3 washers

x4

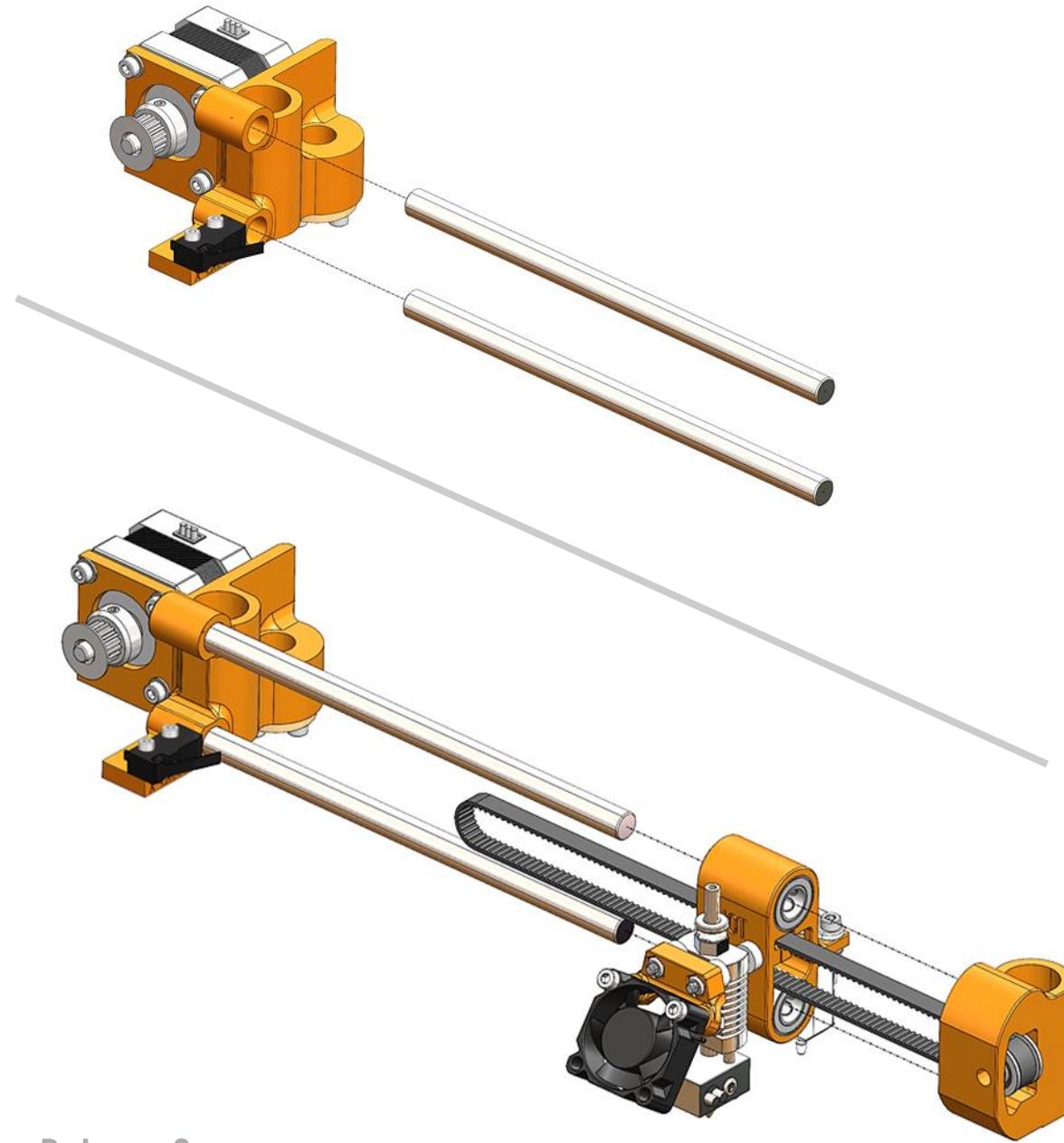
Linear Bearing

x1

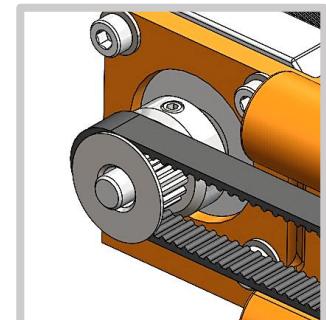


Limit Switch	x1
M2.5x12	x2
Z Rod Brass Nut	x1
M3x12	x4

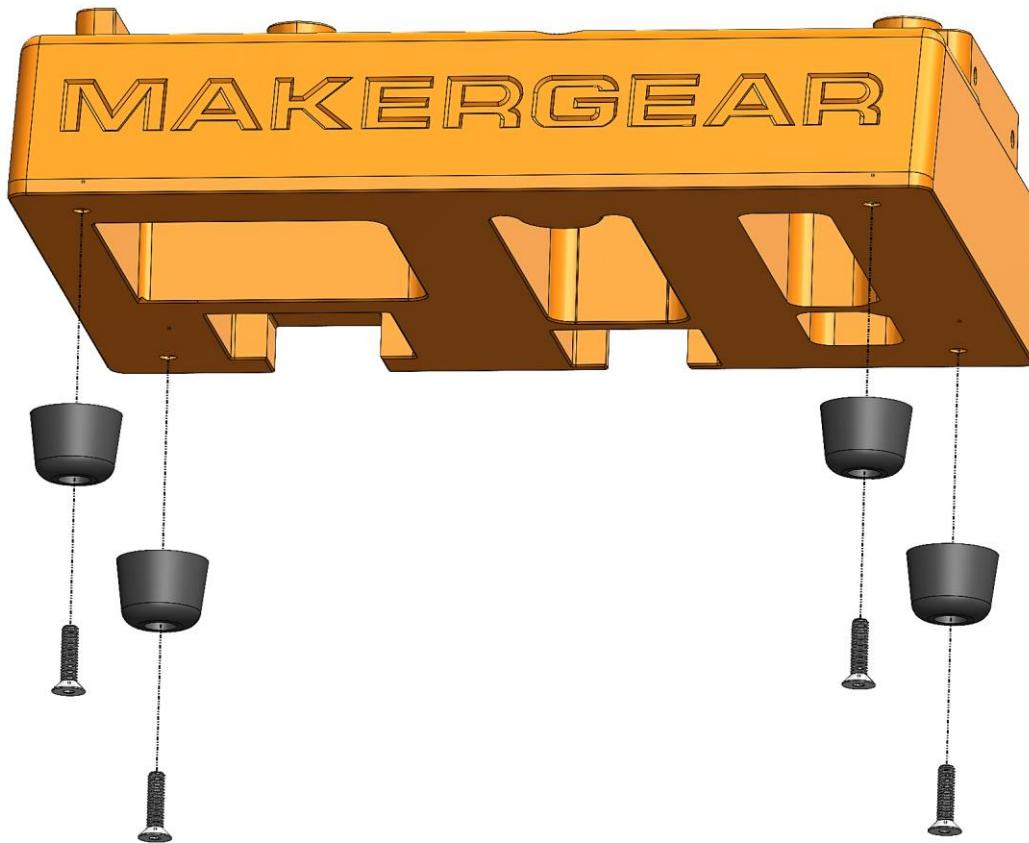




150mm Linear Rods x2

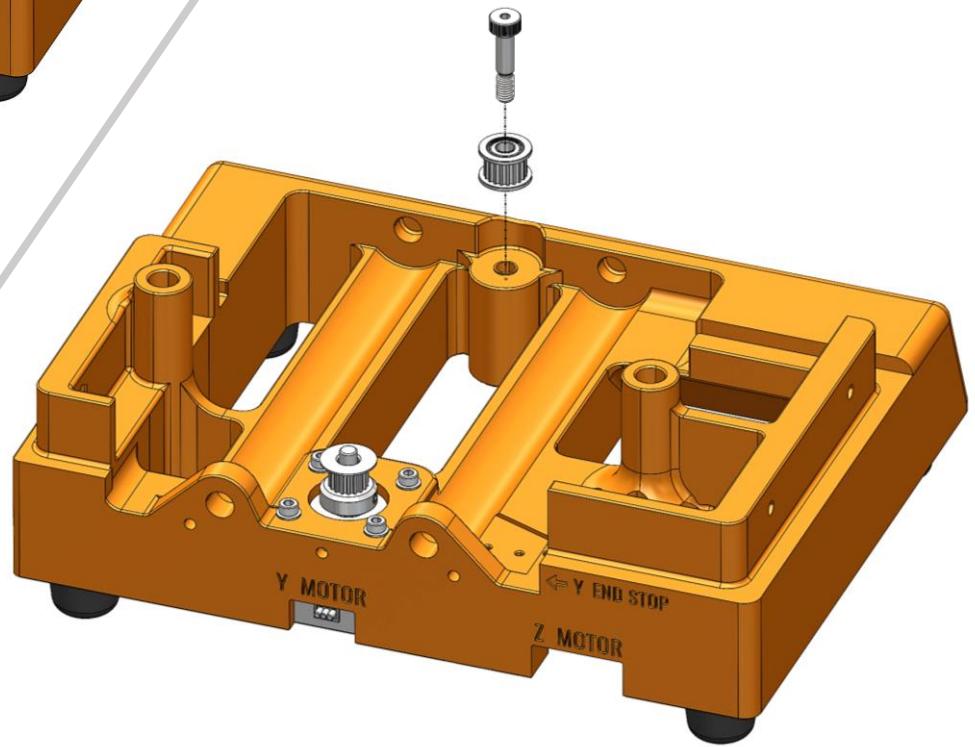
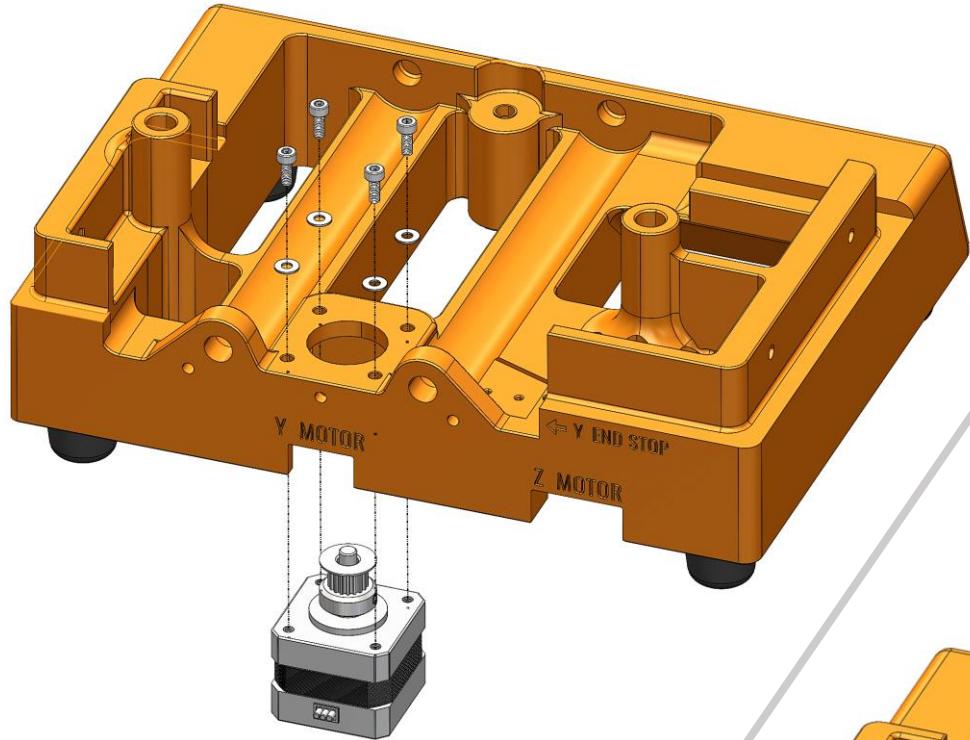


Slip belt over drive  
pulley once linear rods  
are slid into place



M4x14  
Rubber Feet

x4  
x4



**Base**

NEMA 14 Motor

x1

M3x8

x1

M3 washers

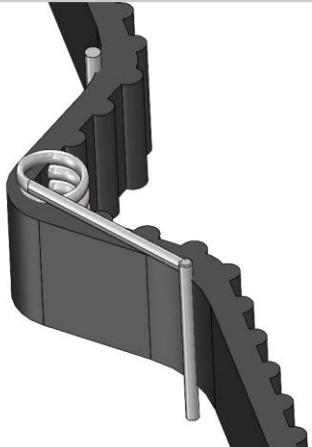
x4

Shoulder Bolt

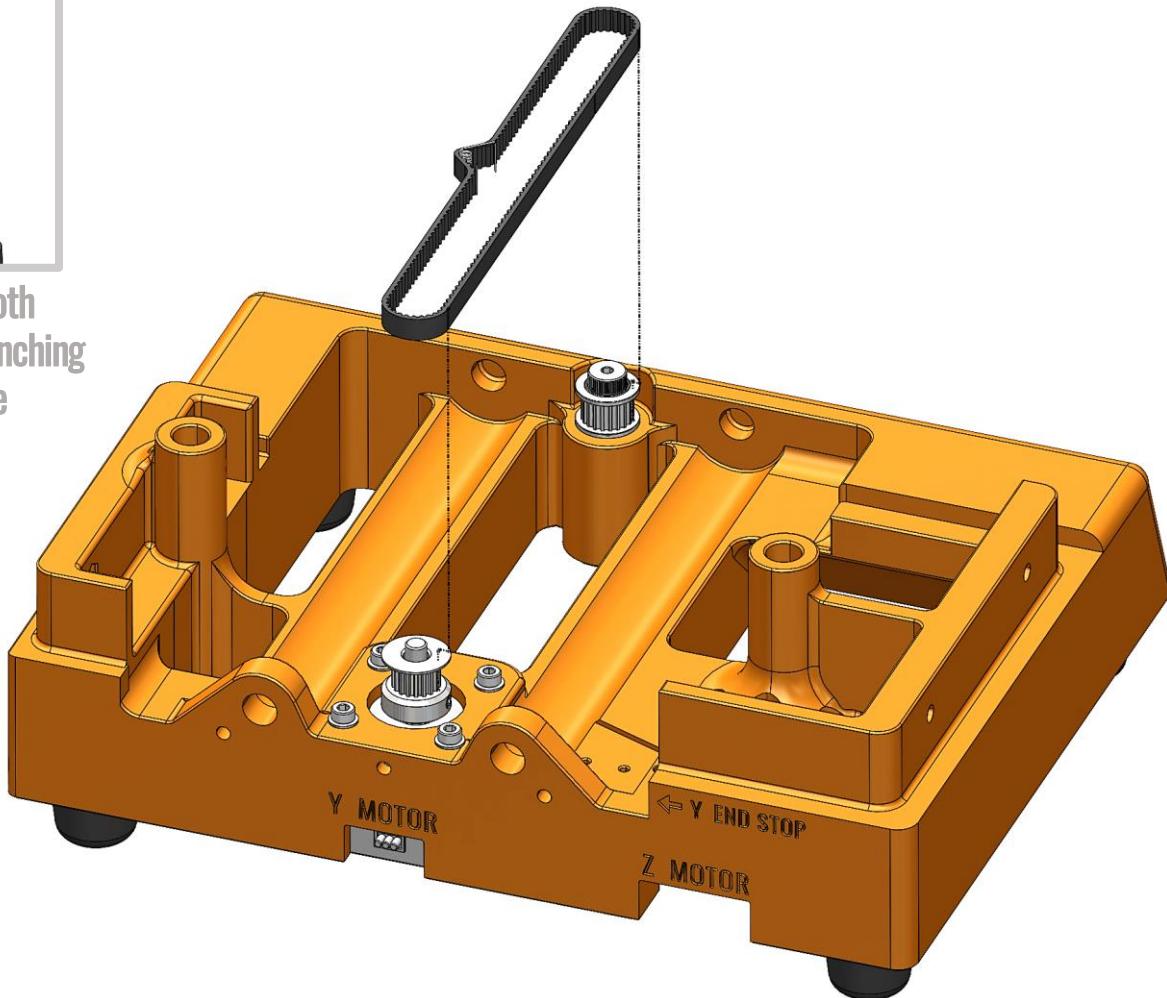
x1

Idler Pulley

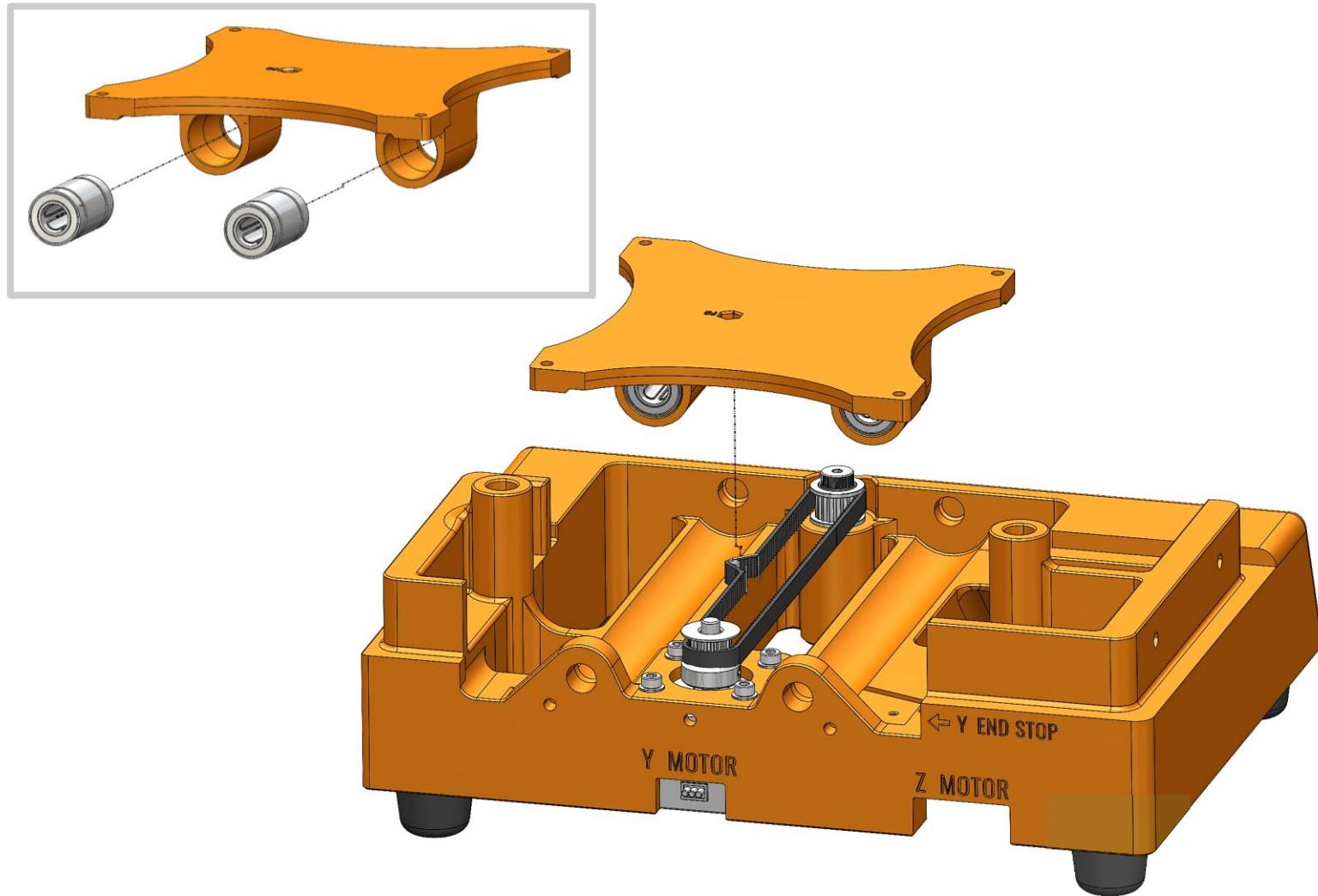
x2



Slip spring tensioner into the tooth side of the belt with the arms pinching from the outside smooth surface

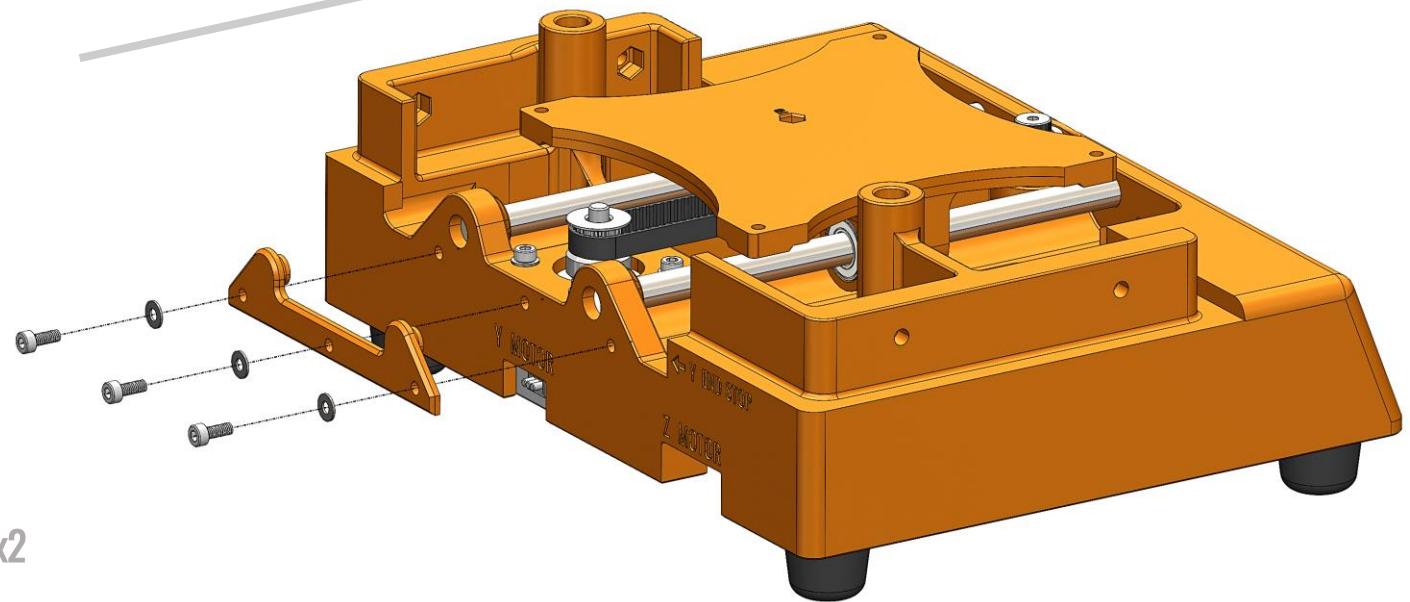
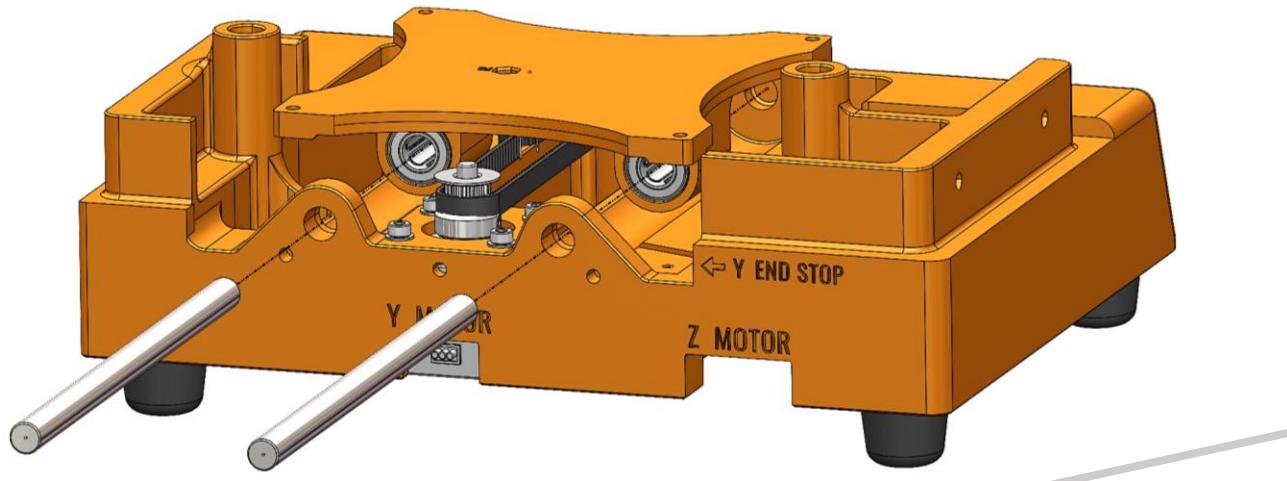


300mm Belt with Spring Tensioner x1



**Bed**  
Linear Bearings

x1  
x2

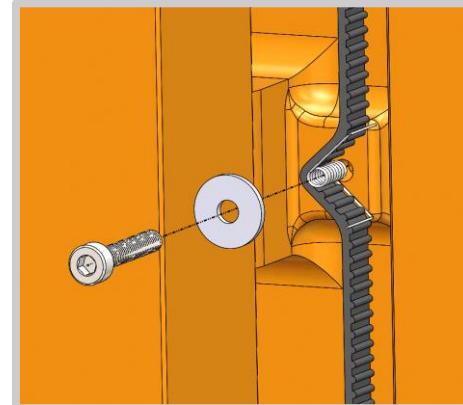
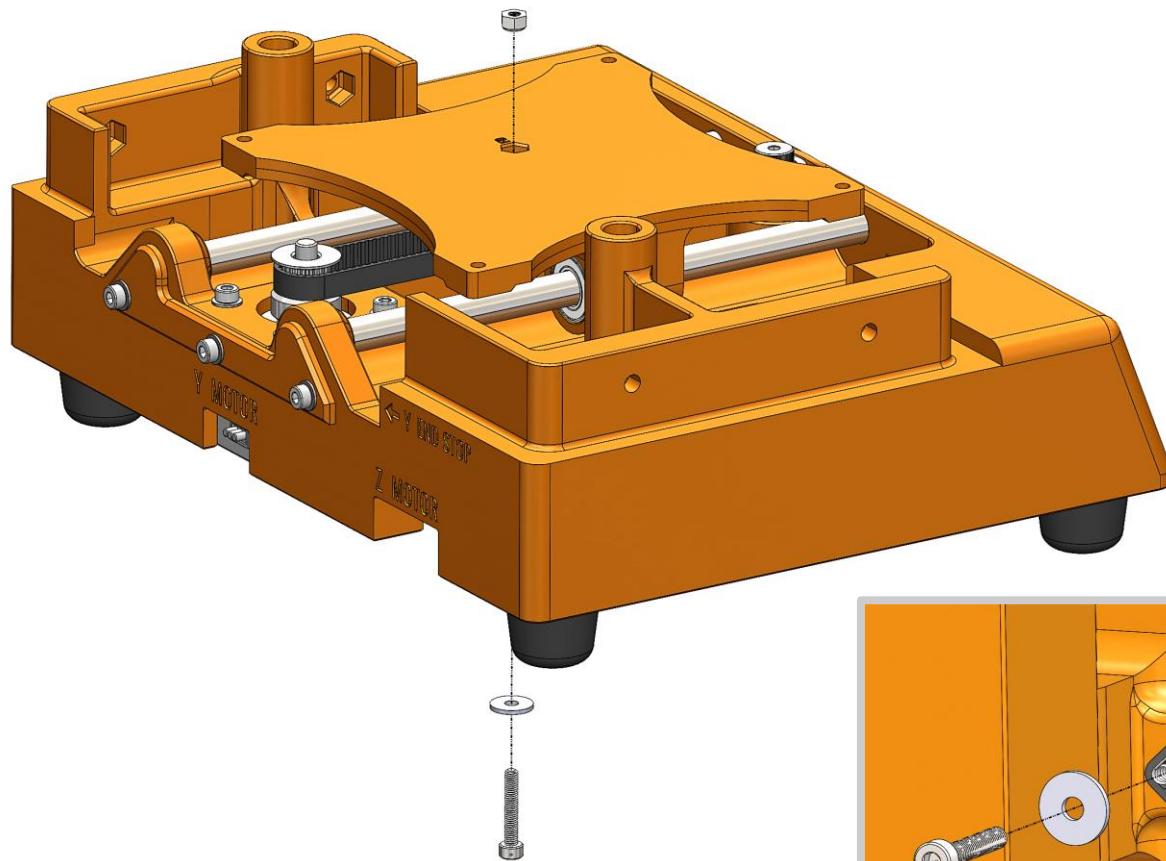


150mm Linear Rods x2

Y Block x1

M3x8 x3

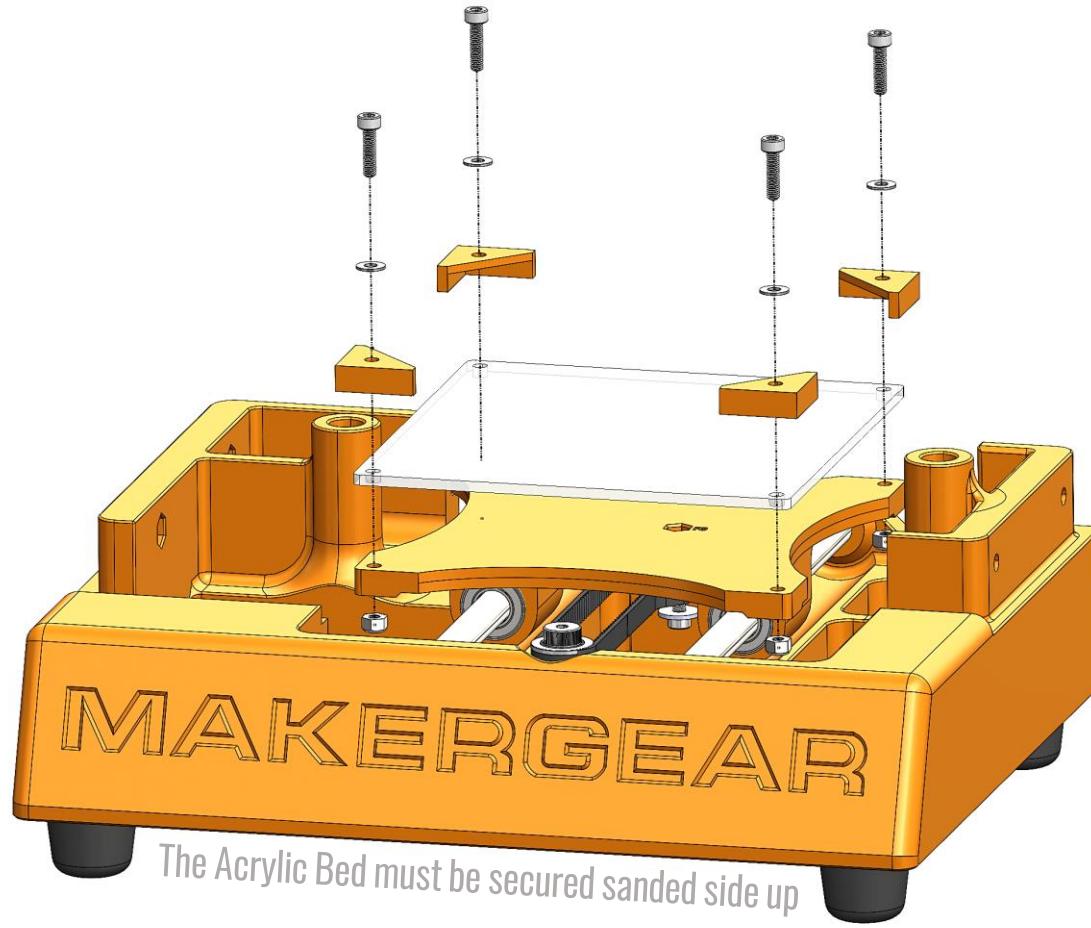
M3 washers x3



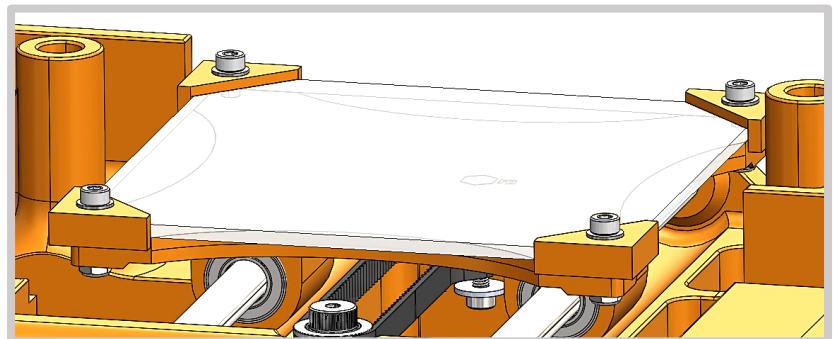
The belt and spring tensioner  
should now be fastened securely  
to the bed.

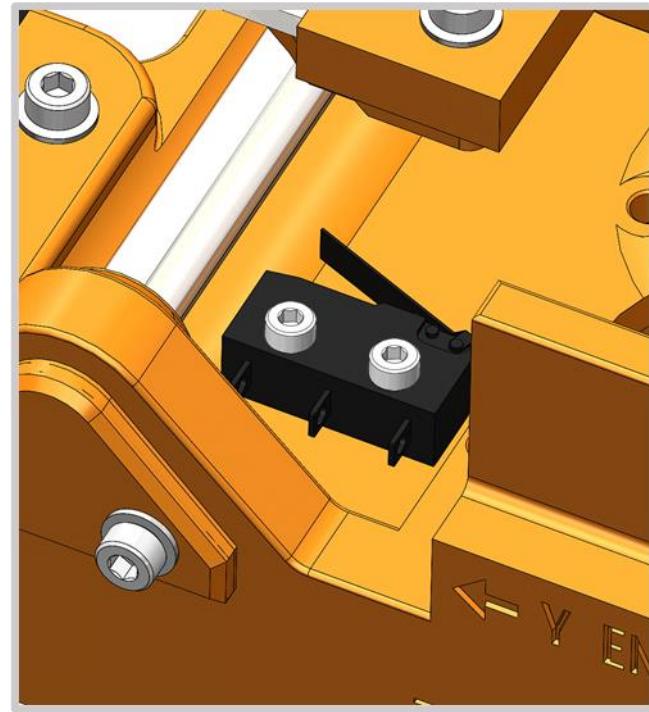
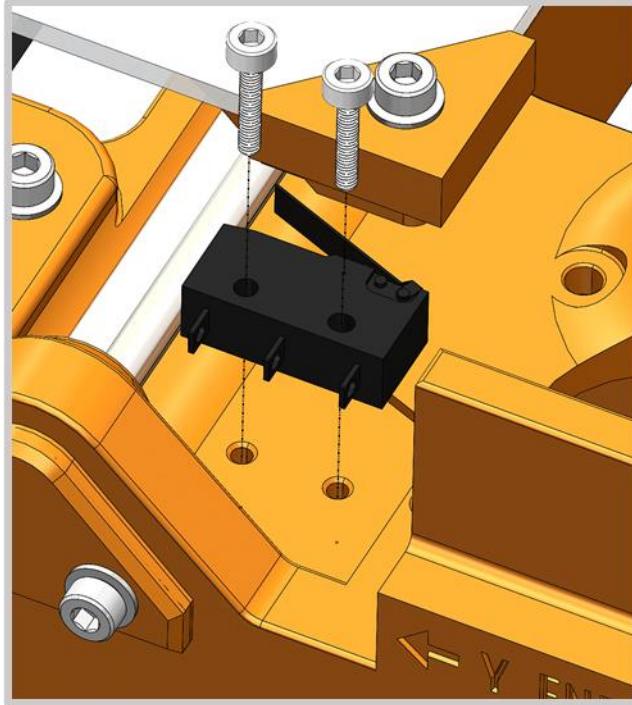
M3 nut  
M3 washer  
M3x18

x1  
x1  
x1



Sanded Acrylic Bed	x1
<b>Bed Clips</b>	<b>x4</b>
M3x12	x4
M3 washers	x4
M3 Nuts	x4

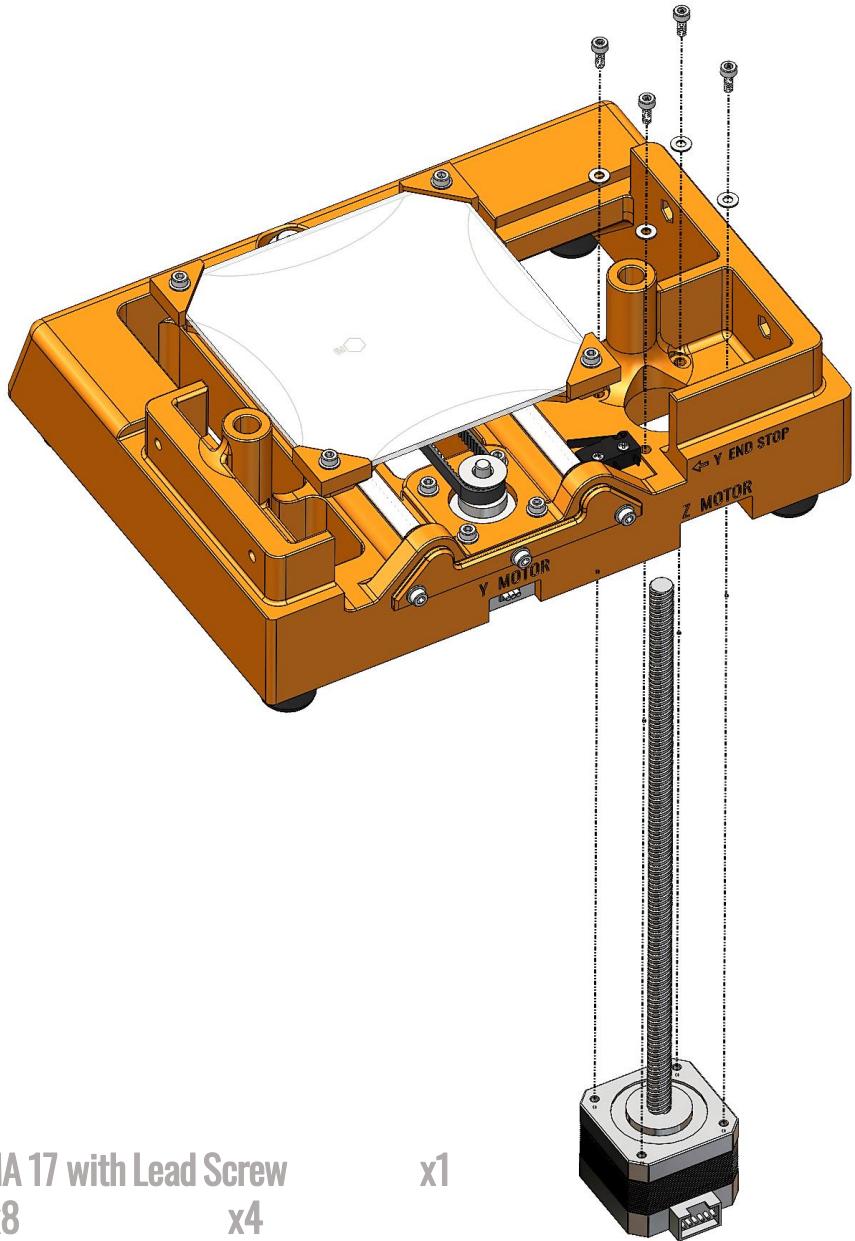




Slide the bed back and forth a few times to confirm it triggers the limit switch.

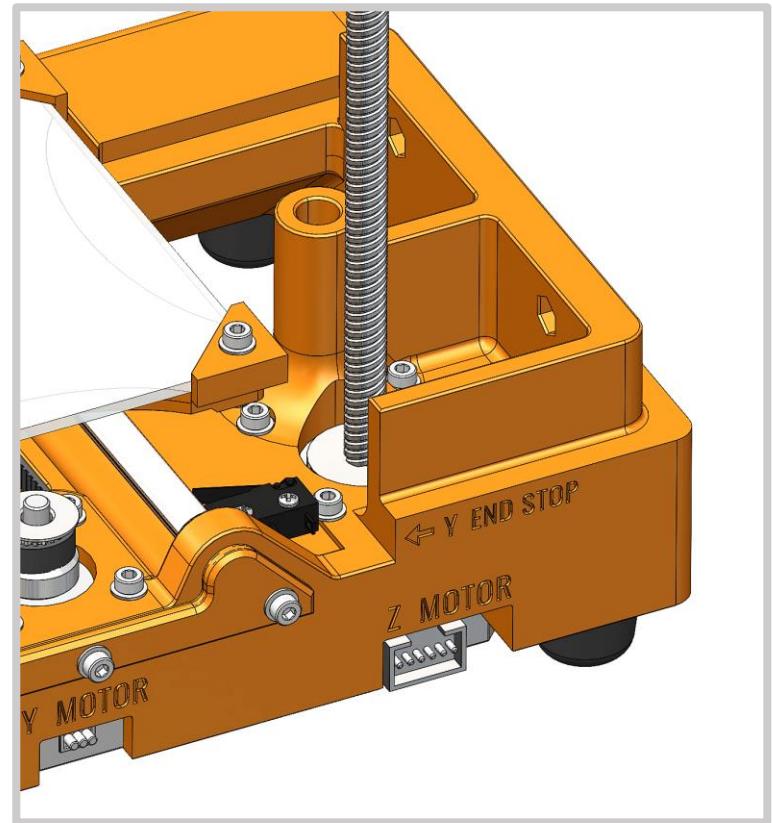
Limit Switch  
M2.5x12

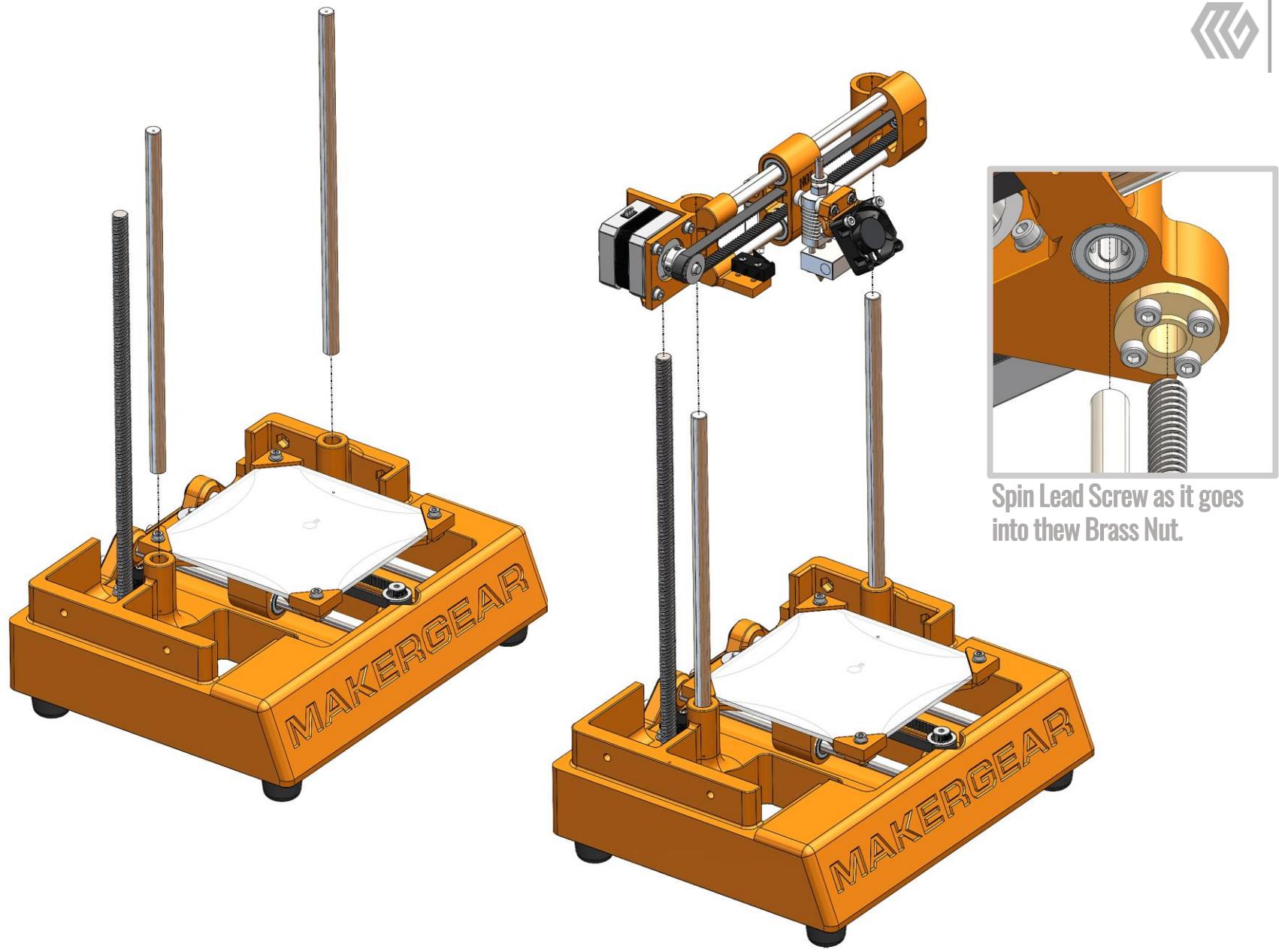
x1  
x2



NEMA 17 with Lead Screw  
M3x8 x4  
M3 washers x4

x1





200mm Linear Rod x2

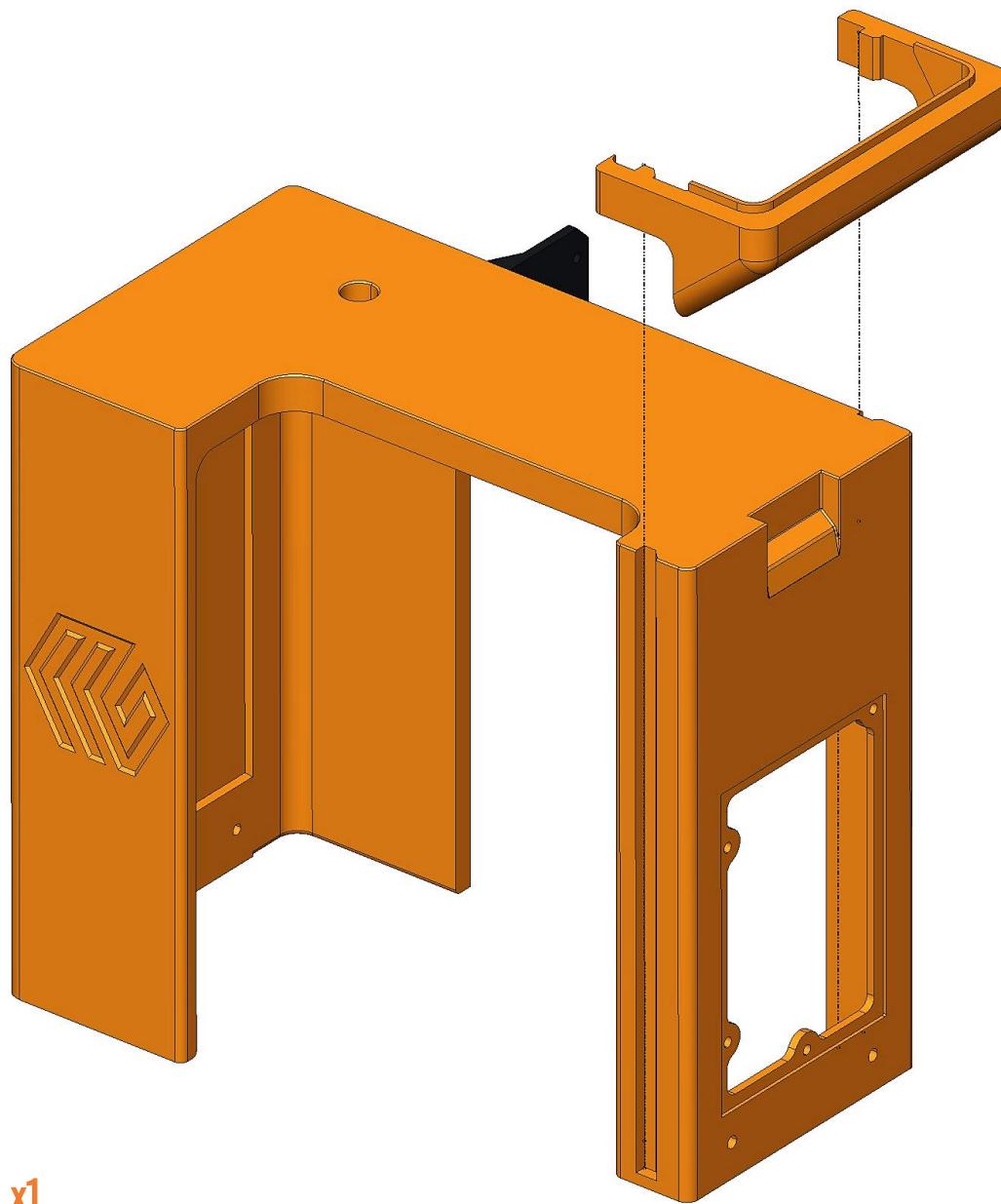
Spin Lead Screw as it goes into the Brass Nut.



**Top**  
Extruder Bracket  
M3x14  
M3 washers  
M3 nuts

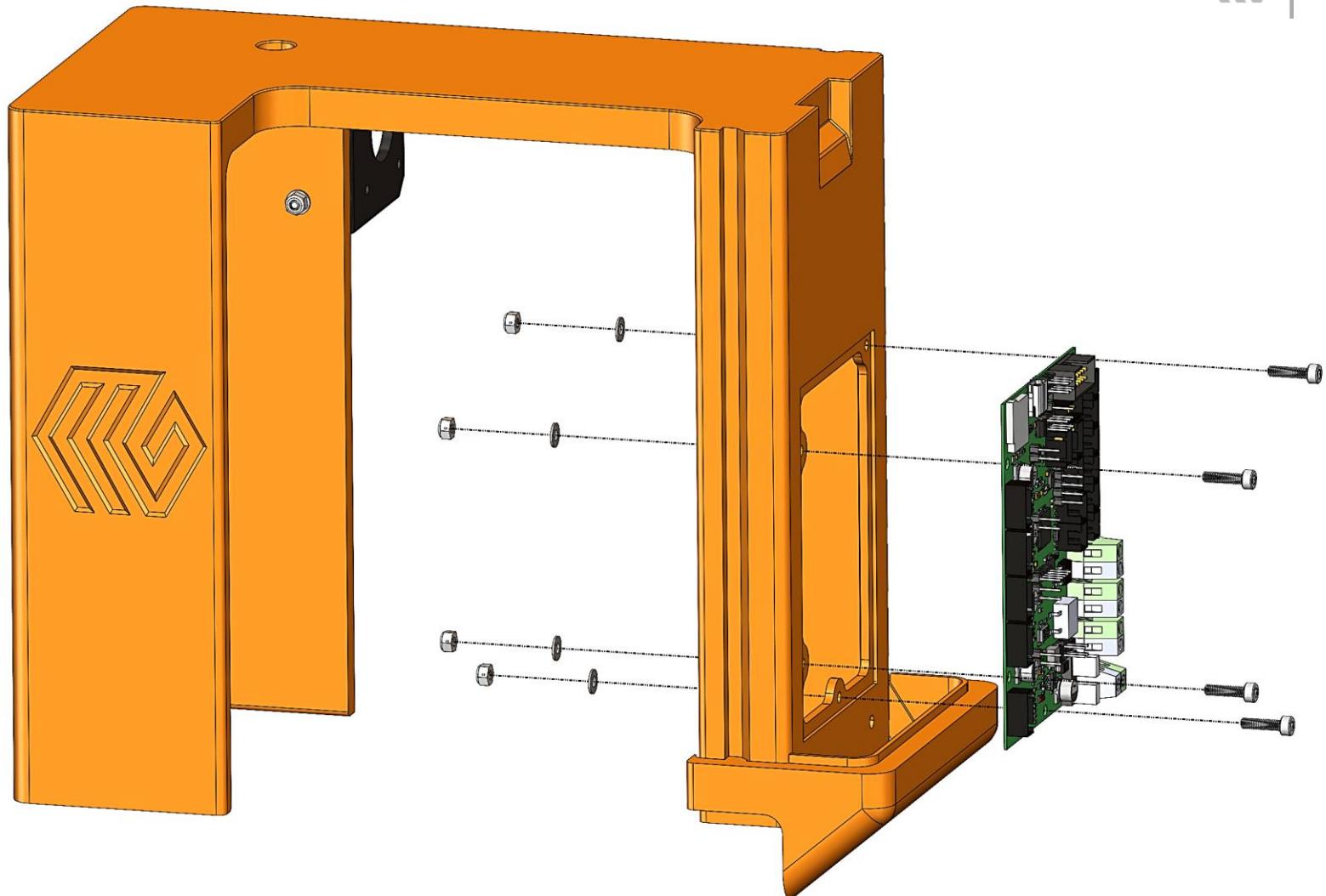
x1  
x1  
x4  
x8  
x4



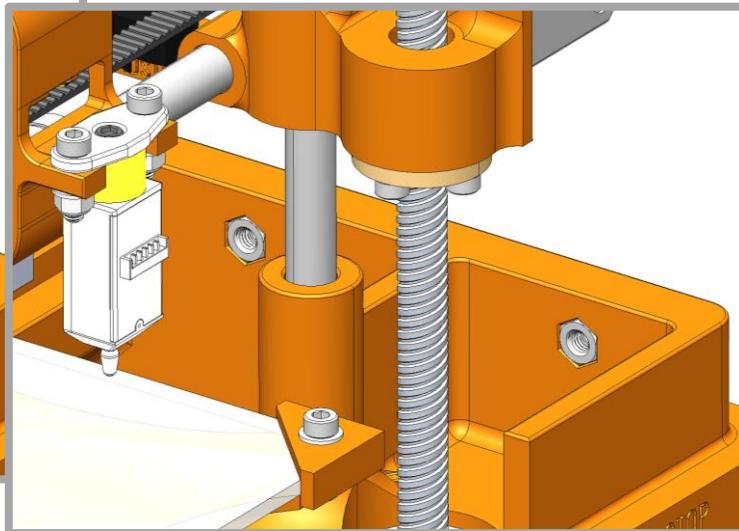
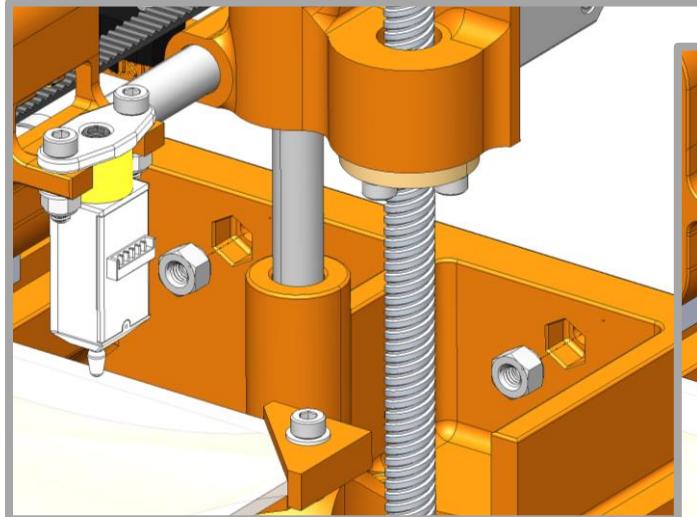


Electronic Case Base

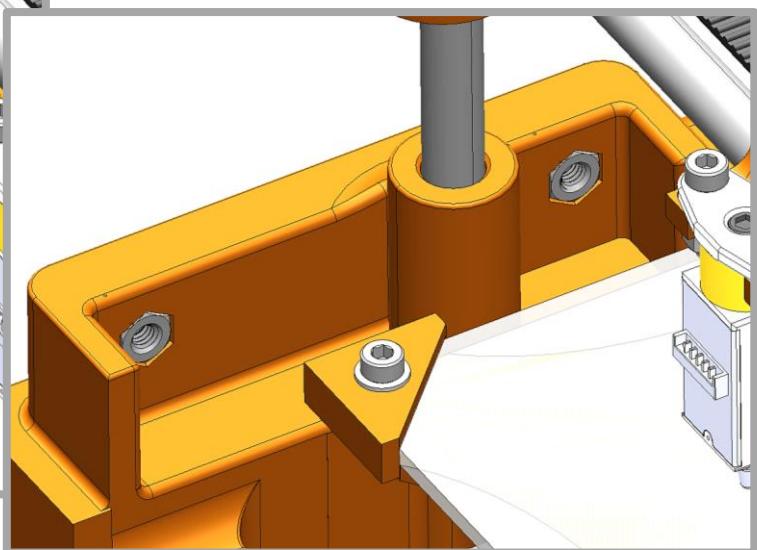
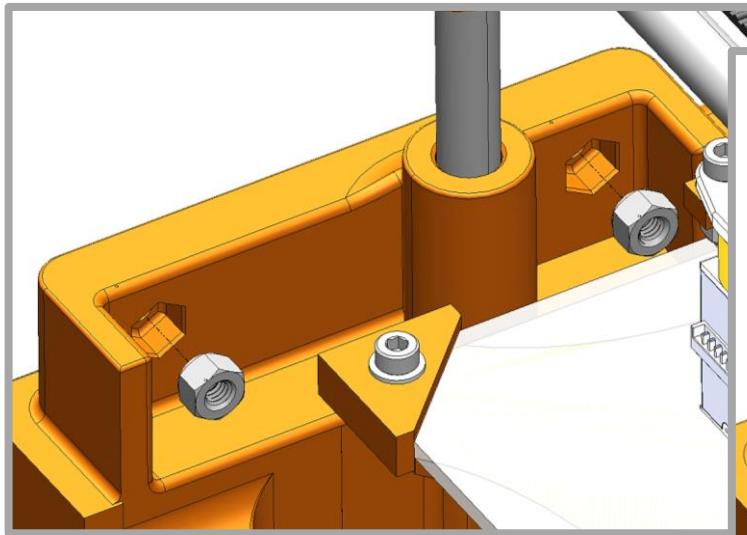
x1



SKR Mini Control Board	x1
M3x12	x4
M3 washers	x4
M3 nuts	x4

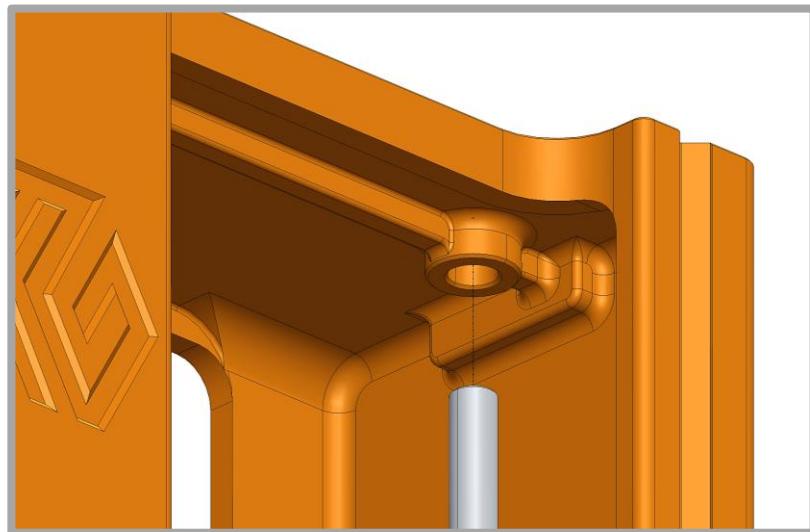
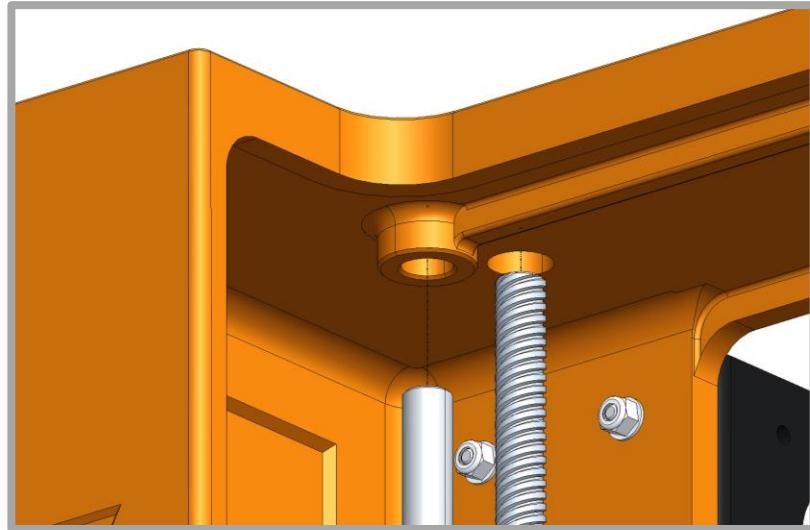
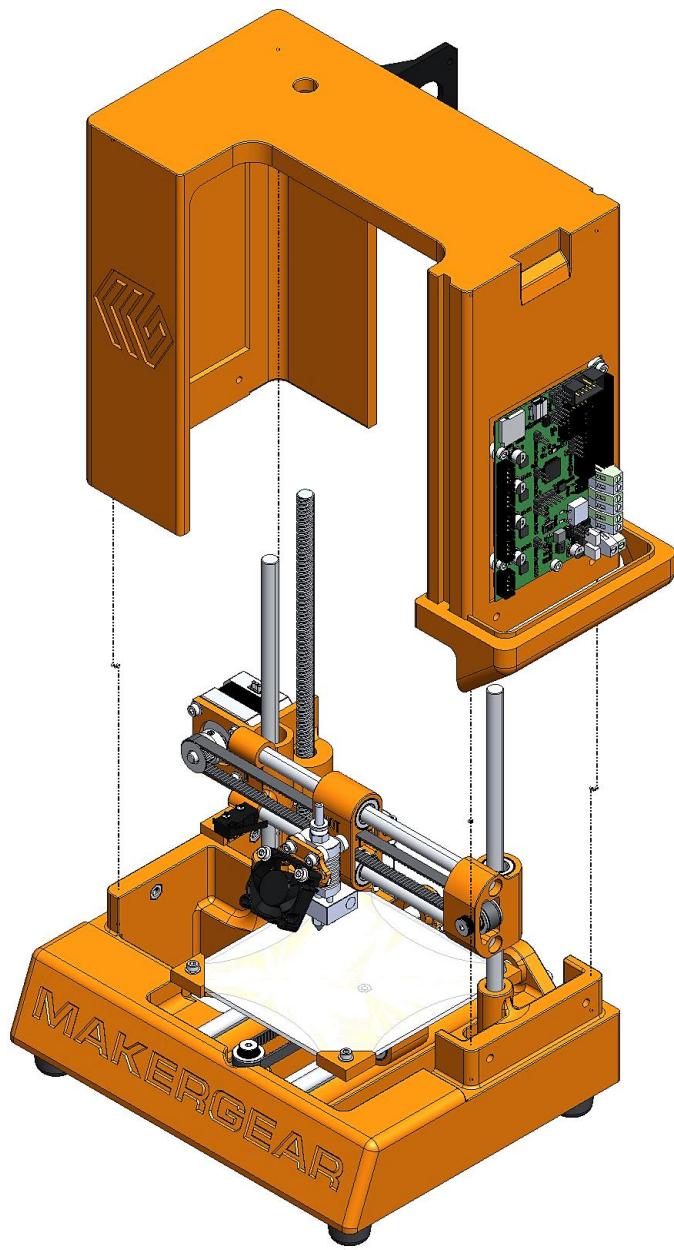


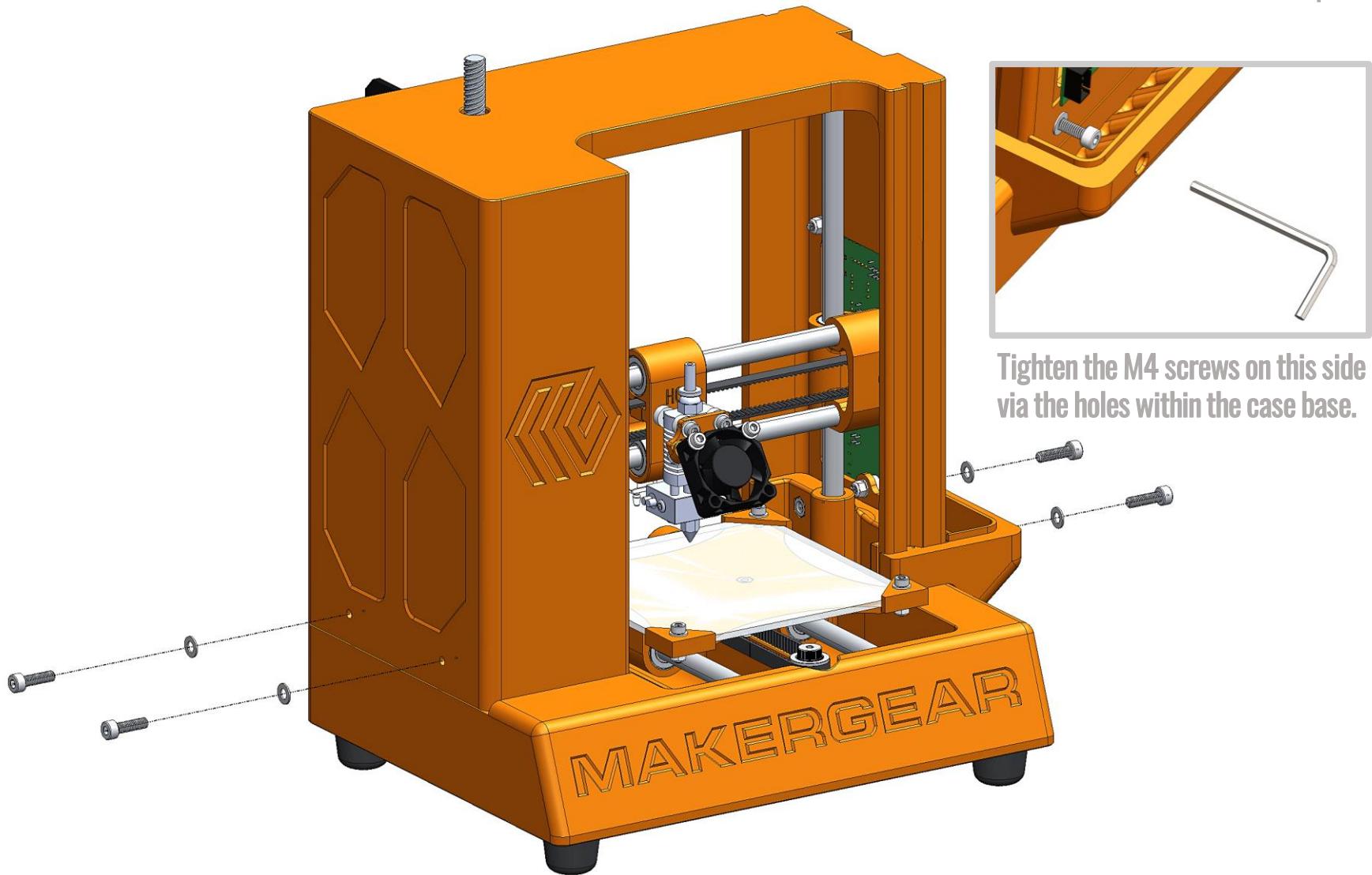
Insert M4 nuts into the Base Assembly.



M4 nuts

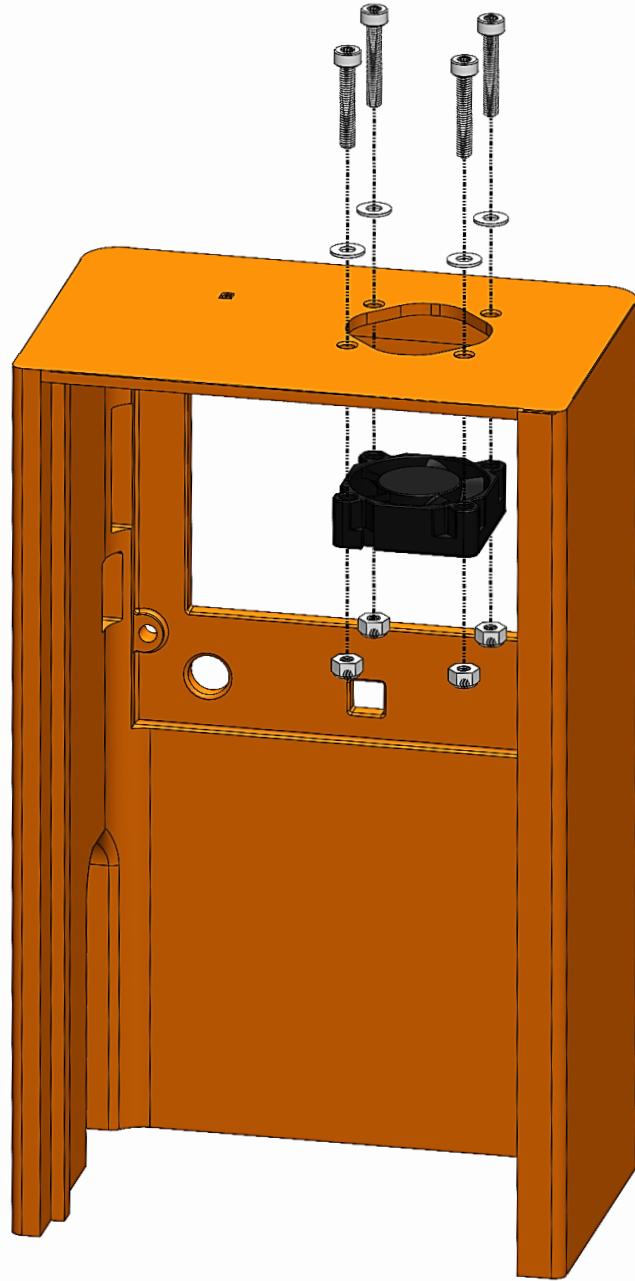
x4





Tighten the M4 screws on this side via the holes within the case base.

M4x14 x4  
M4 washers x4



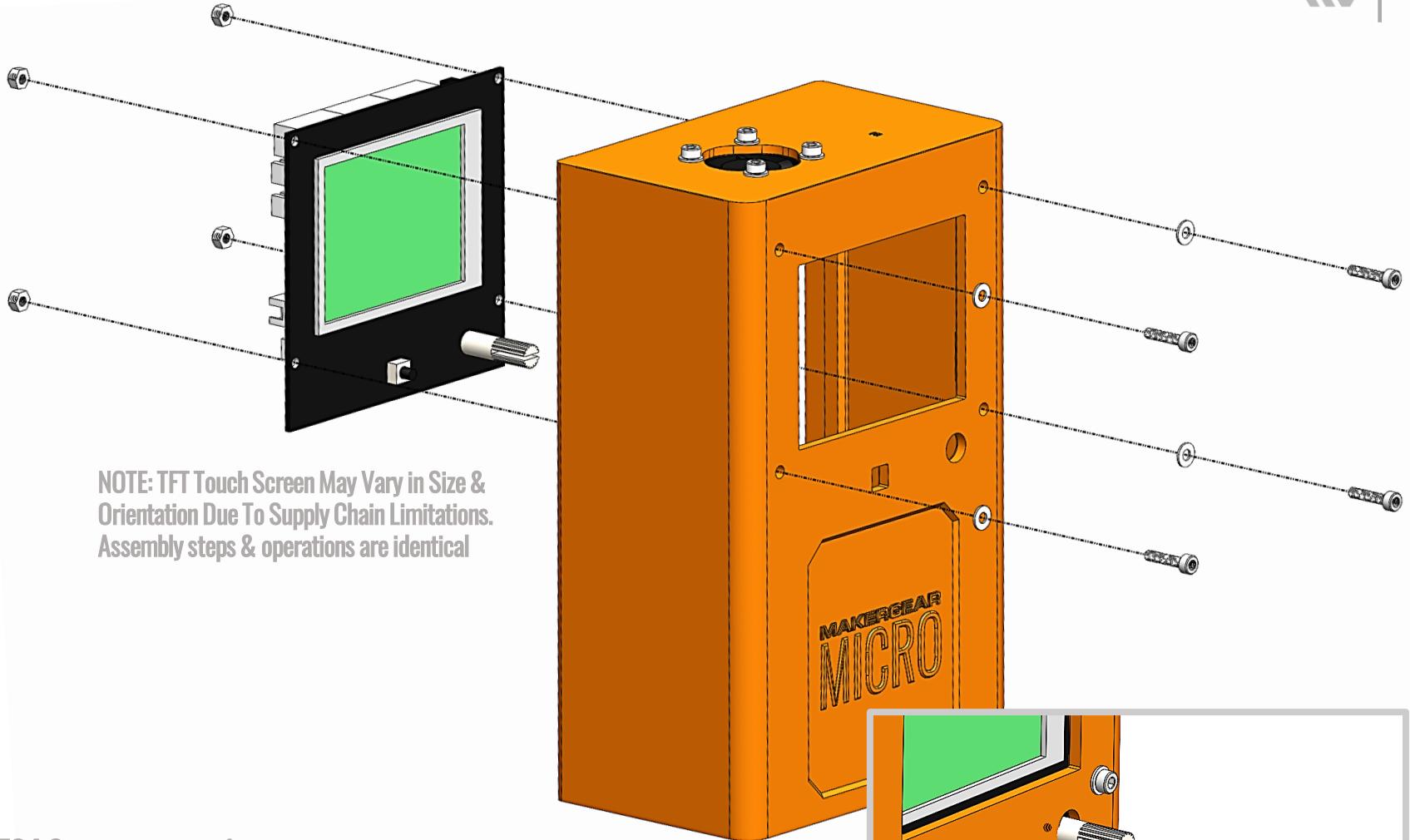
Electronics Case      x1

Cooling Fan      x1

M3x18      x4

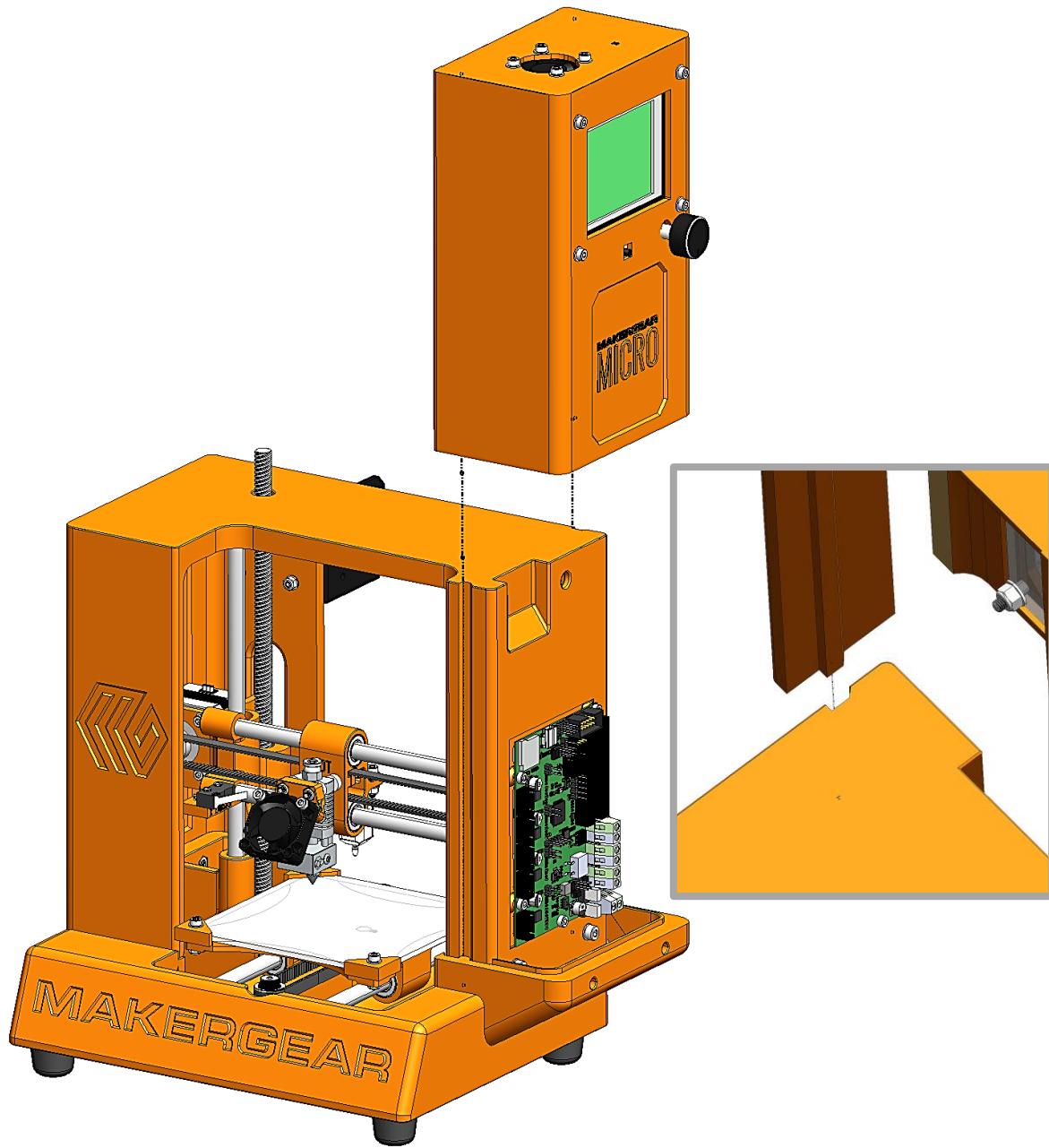
M3 washers      x4

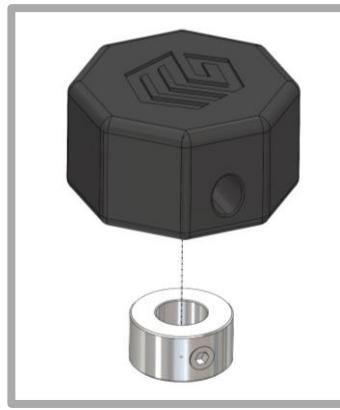
M3 nuts      x4



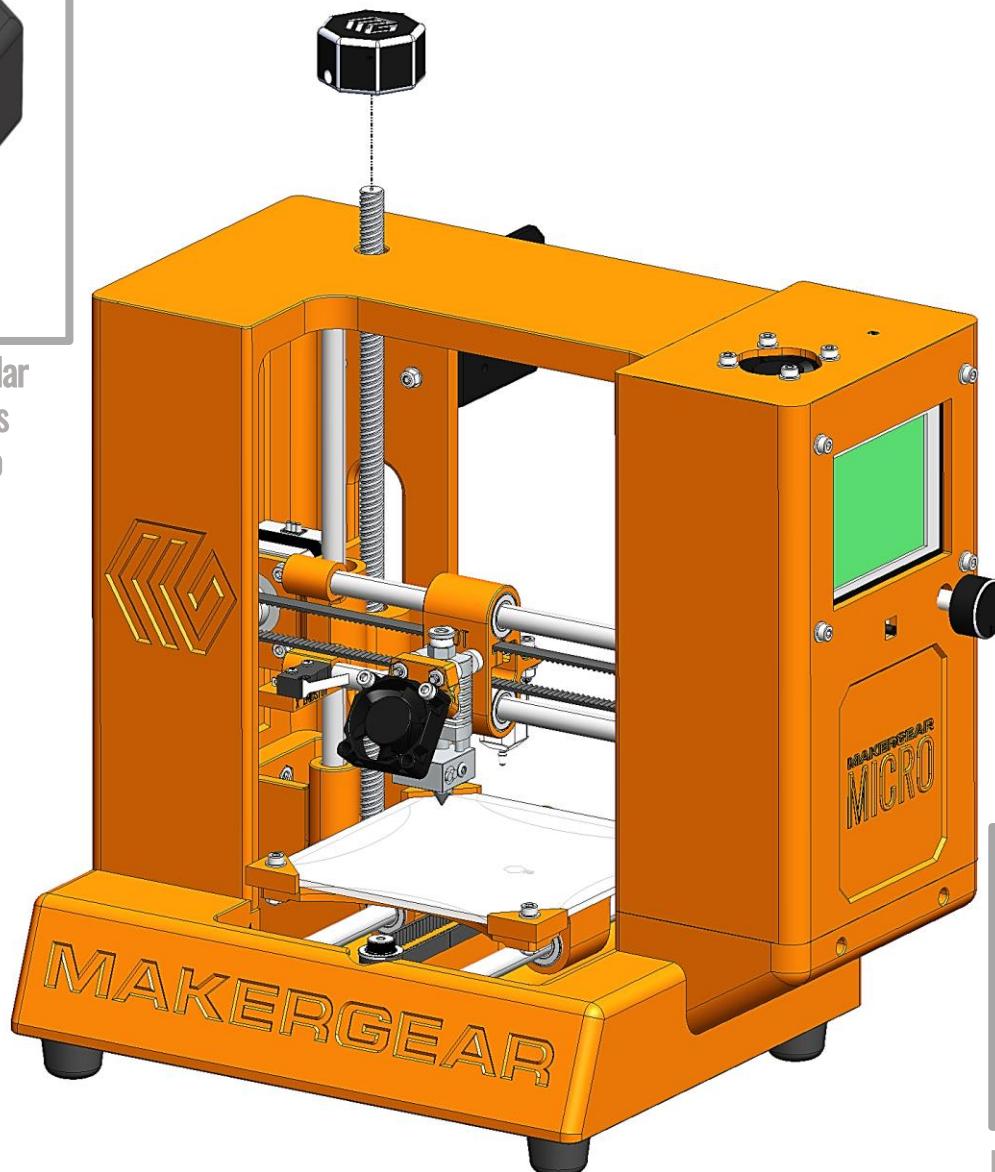
NOTE: TFT Touch Screen May Vary in Size & Orientation Due To Supply Chain Limitations.  
Assembly steps & operations are identical

TFT24 Screen	x1
Screen Knob	x1
M3x14	x4
M3 washers	x4
M3 nuts	x3





Insert Shaft Lock Collar into Z Knob with holes aligned. This needs to be a tight fit.

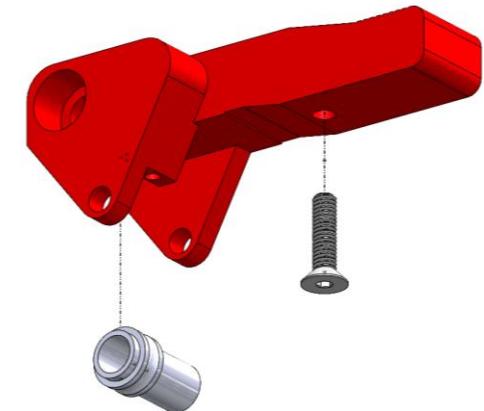
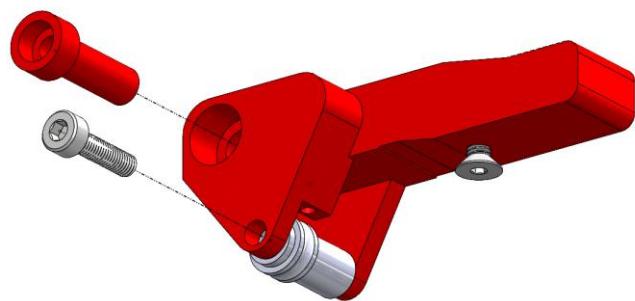
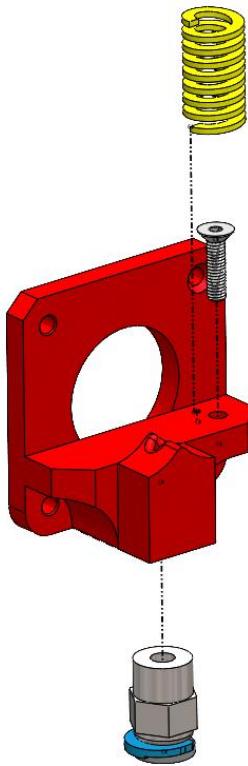


Z Knob  
8mm Shaft Lock Collar

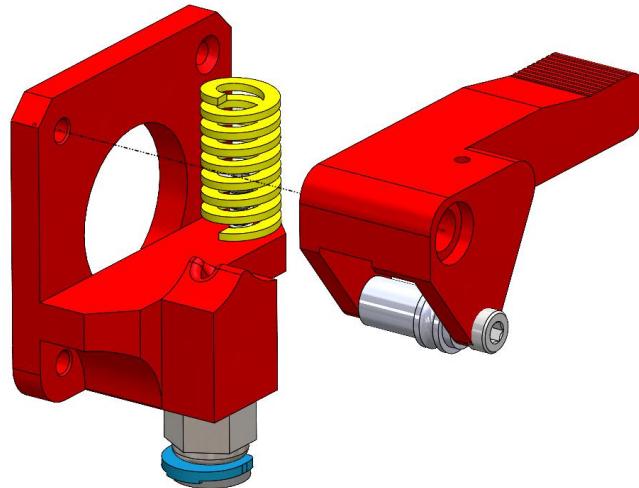
x1  
x1



Use Allen Wrench to Tighten Set Screw.

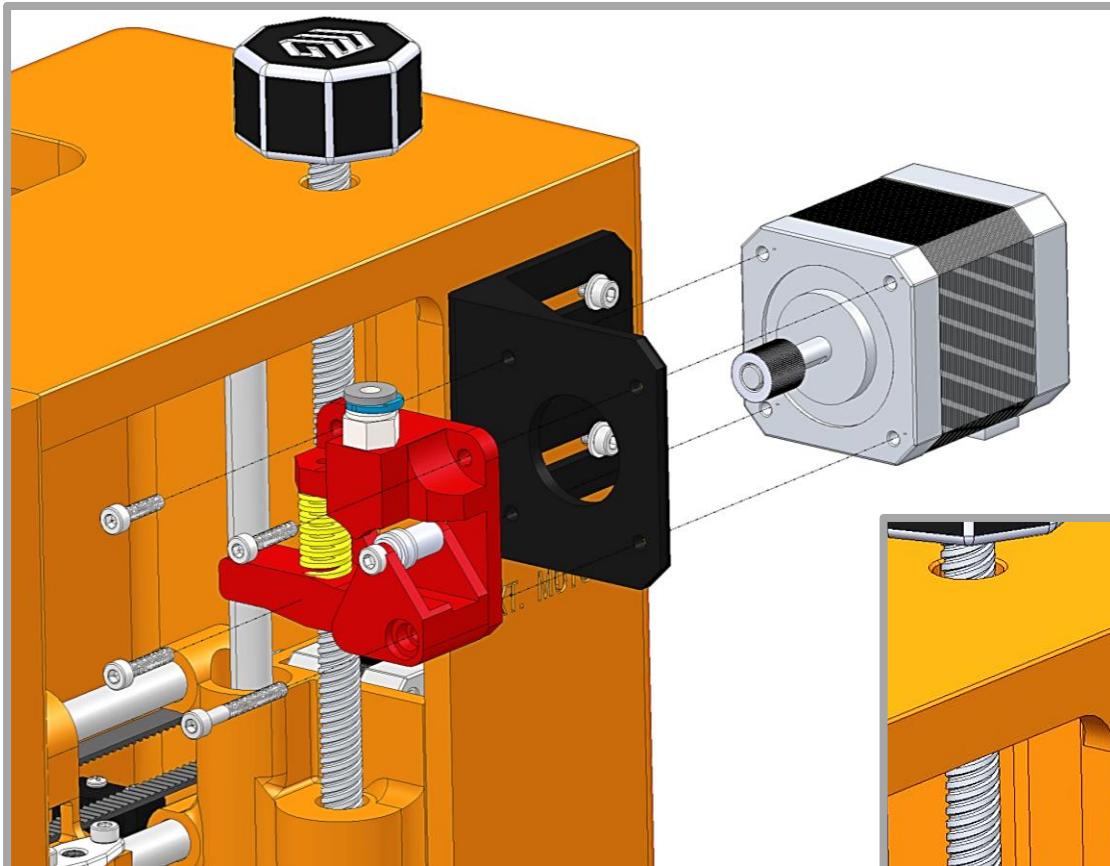


Use M3 screws provided with the Filament Drive for these steps

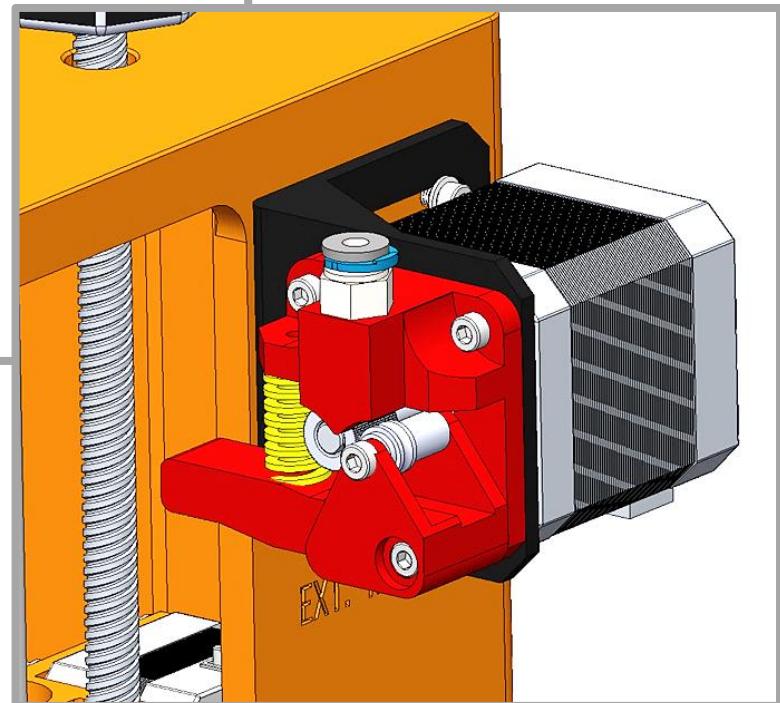


Filament Drive

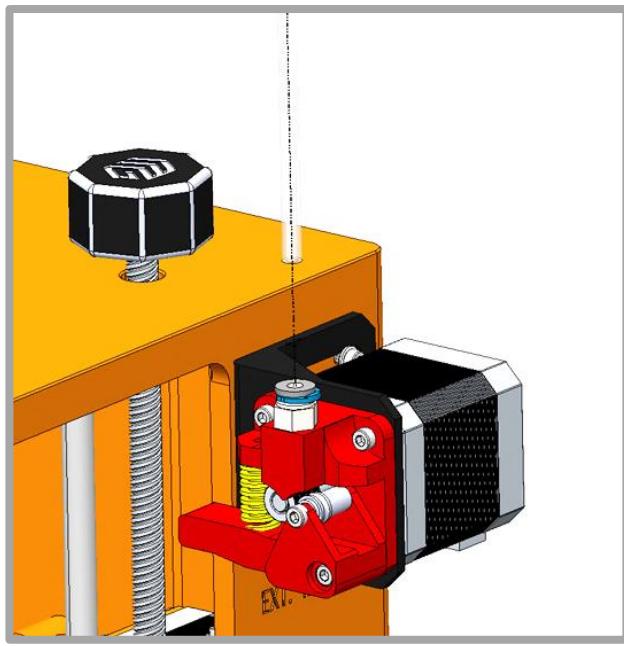
x1



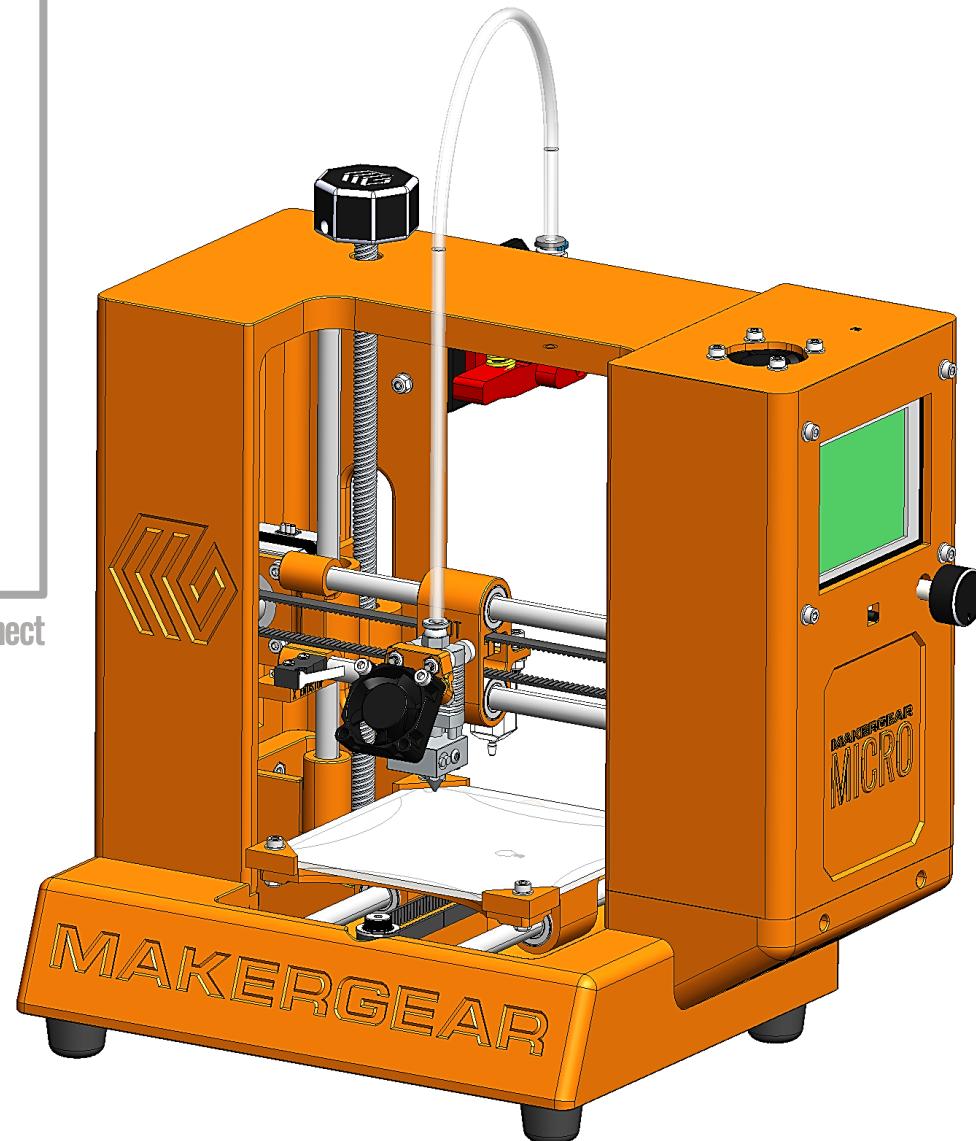
Use M3 screws & Drive Gear provided with the Filament Drive. The Drive Gear is the ONE component that requires the M1.5 Allen Key. Make sure the Drive Gear is fit securely onto the NEMA 17.

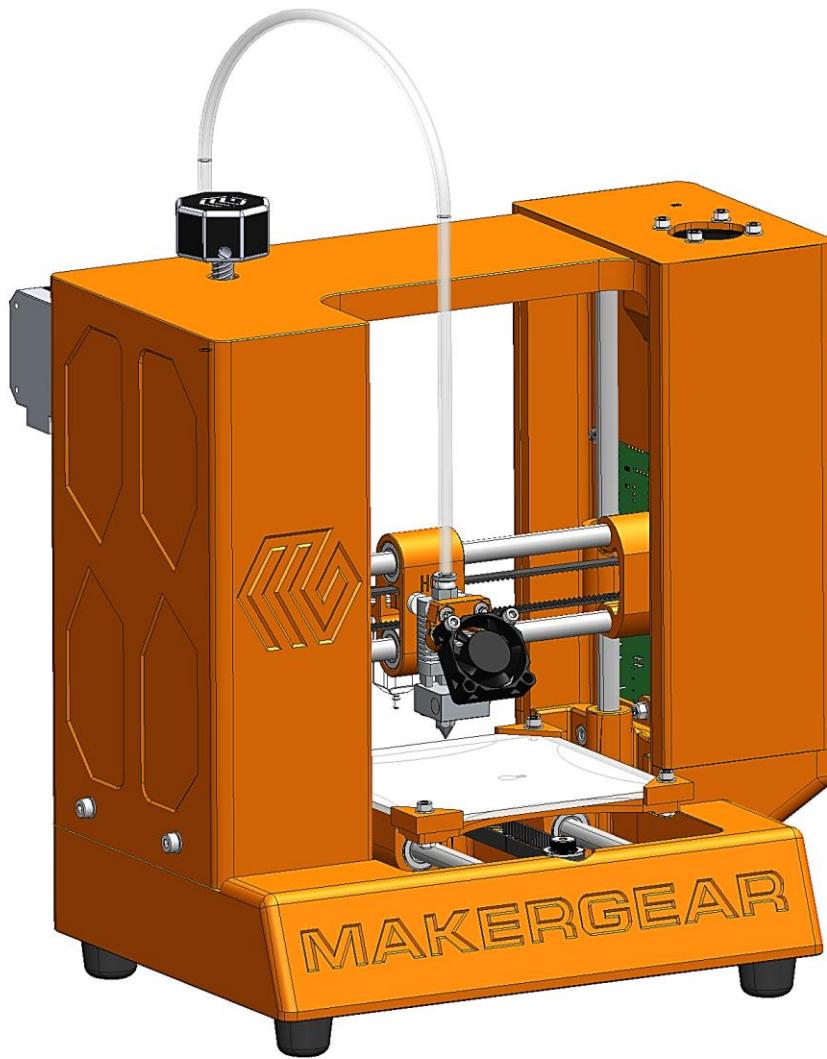


NEMA 17	x1
Filament Drive	x1
M3x18	x1
M3x10	x3



Insert Filament Guide Tube into the Quick Connect of the Filament Drive.





Continue your project with the “MICRO Wiring Guide” & “MICRO Getting Started Guide”