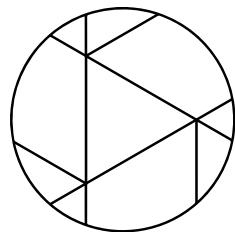


MILL ONE V3

Assembly Manual



SIENCI LABS
DESKTOP CNC MILLING

Throughout this policy the words "we", "us" and "our", or "Sienci Labs" will be used to refer to Sienci Labs Inc. herein and "Mill One" or "machine" will refer to Sienci Labs' Sienci Mill One product. Additionally, the words "you", "your", "user", and "operator" will refer to the original purchaser/customer, user, or viewer of any of the products or media provided by or through Sienci Labs.

Machine Disclaimer

The listed "Safety Warnings and Guidelines" outline the necessary precautions that should be taken any time the machine is operated. By assembling our provided kit, the product user takes on all the associated liability pertaining to the operation and maintenance of the Mill One. Sienci Labs will not be held responsible for any damages to property or injury incurred on the operator or bystanders if any alterations are made to the design or assembly of our machine. Although care is taken to ensure the accuracy of information made available on our website (www.Sienci.com) and other forms of media, Sienci Labs will not be held liable for any inaccuracies, errors, or inconsistencies in website content, the content of files linked to by our website, references made to external websites herein, and/or other information produced by Sienci Labs. The information which has been made available will not be applicable to all situations and is subject to change without notice so it should not substitute for the discretion of the user. Variability in machine accuracy and performance may occur due to improper machine assembly by the user, as such, Sienci Labs takes no responsibility for variation between claimed machine specifications and the performance of the user's machine from improper assembly.

Safety Warnings and Guidelines

1. Be sure to carefully follow provided machine assembly instructions before machine use to ensure operator safety.
2. All wires must be appropriately positioned before beginning the operation of this machine. Cutting a "live" wire may cause exposed metal parts of the routing/trimming tool to become electrified and shock the operator.
3. Ensure the machine is placed on a flat surface and in a well-ventilated space before operation.
4. Always wear eye protection during machine operation.
5. Always wear hearing protection during extended machine operation based on proximity to machine.
6. Materials may release chemicals that are toxic or unsafe to inhale when cut. Always check the Material Safety Data Sheet (MSDS) of the material in question before cutting. Always cover exposed skin and wear appropriate airway protection (e.g. dust mask/respirator) specific to the material used and its application.
7. Any workpiece must be appropriately secured before starting a cutting routine by clamps or other practical securing method. Holding the material by hand or employing any any other unstable form of securing will lead to unsafe loss of machine control.
8. Cutting bits used for the Mill One should be used at the discretion of the user. Bits are sharp and can crack and break without notice so appropriate care should be taken by the user while manipulating and installing them. Carefully check bits for cracks or damage before operating the machine and replace any cracked or unfit bits immediately.
9. Carefully inspect any consumable material before use on the machine, any unforeseen inconsistency in material hardness or material quality may cause damage to the machine.
10. Keep away from all moving parts during machine operation.
11. Before beginning a cutting job, ensure the router/trimmer runs properly. Immediately disable the tool if visible vibration or wobble occurs. This might indicate a damaged tool or an improperly installed bit.
12. Make sure the bit is not contacting the workpiece before the router/trimmer tool is turned on.
13. Do not leave the machine running unattended, the machine should only be operated with the operator present.
14. Do not touch the cutting bit immediately after use. It may be hot and could burn the operator.
15. Use bits that are appropriate to the material and cutting speed used.

LIST OF PARTS



M3-N
12x



M3-8
12x



M3-12
12x



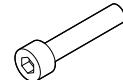
M5-N
10x



M5-NE
6x



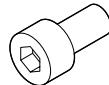
M5-W
12x



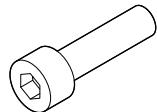
M5-25
16x



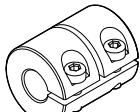
M8-N
10x



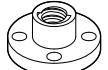
M8-15
30x



M8-25
10x



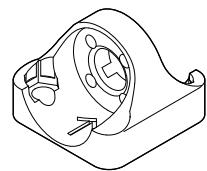
SC
3x



A-N
3x



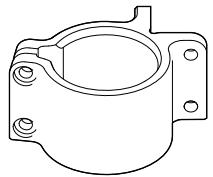
VW
12x



P-NH
3x



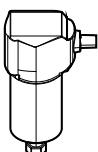
P-AM
5x



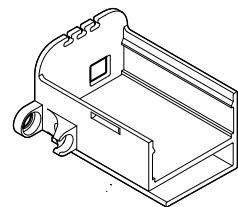
P-RM
1x



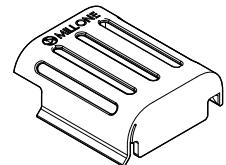
P-RB
1x



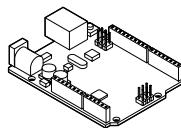
RO
1x



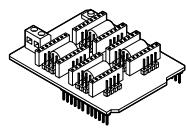
P-EH
1x



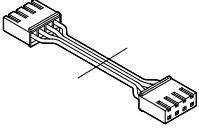
P-EC
1x



E-ARD
1x



E-CNC
1x



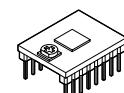
E-C
3x



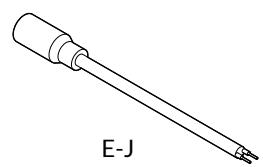
E-HJ
6x



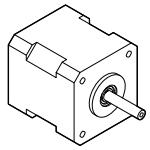
E-SDH
3x



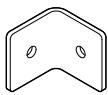
E-SDC
3x



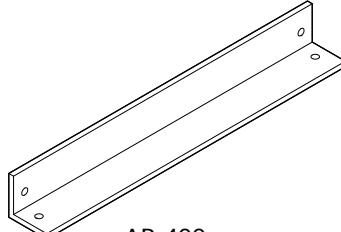
E-J
1x



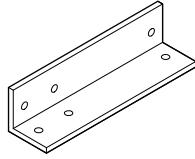
SM
3x



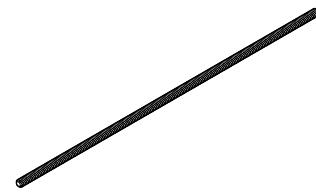
M-FB
8x



AR-400
2x



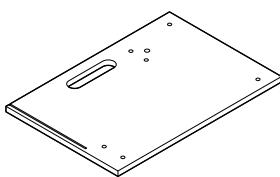
AR-200
1x



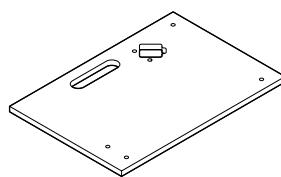
LS-400
2x



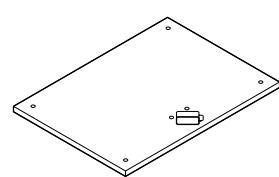
LS-150
1x



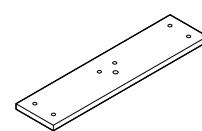
F-L
1x



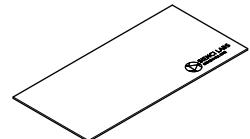
F-R
1x



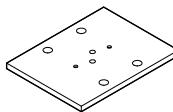
F-B
1x



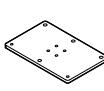
F-F
1x



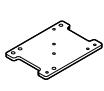
F-AC
1x



WB
1x



G-Y
1x



G-XZ
1x

Tools:

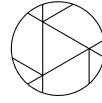
●	●	●	●
2	2.5	4	6
Allen Keys			



Phillips



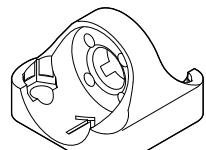
8mm / 5/16"
Wrench



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STEP 1

Lead Screw
Nut Holding
Assembly



P-NH
3x



A-N
3x



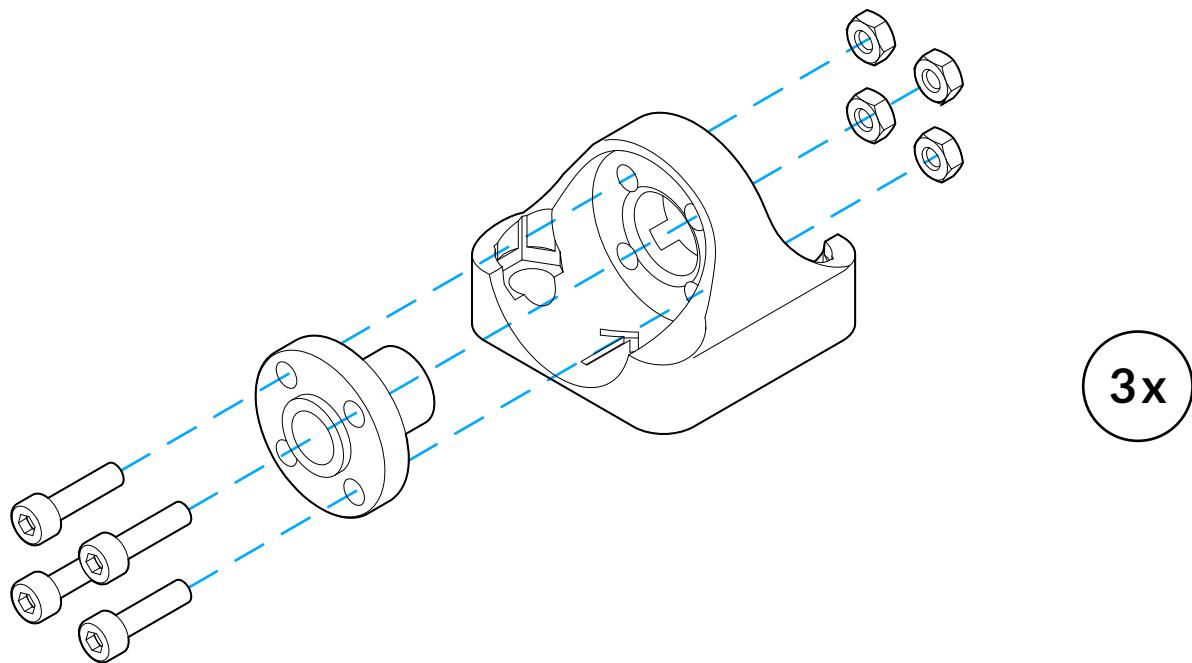
M3-12
12x



M3-N
12x



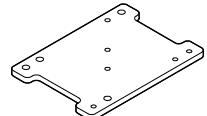
2.5
Allen



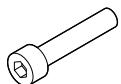
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DESKTOP CNC MILLING

STEP 2

XZ Gantry
Assembly



G-XZ
1x



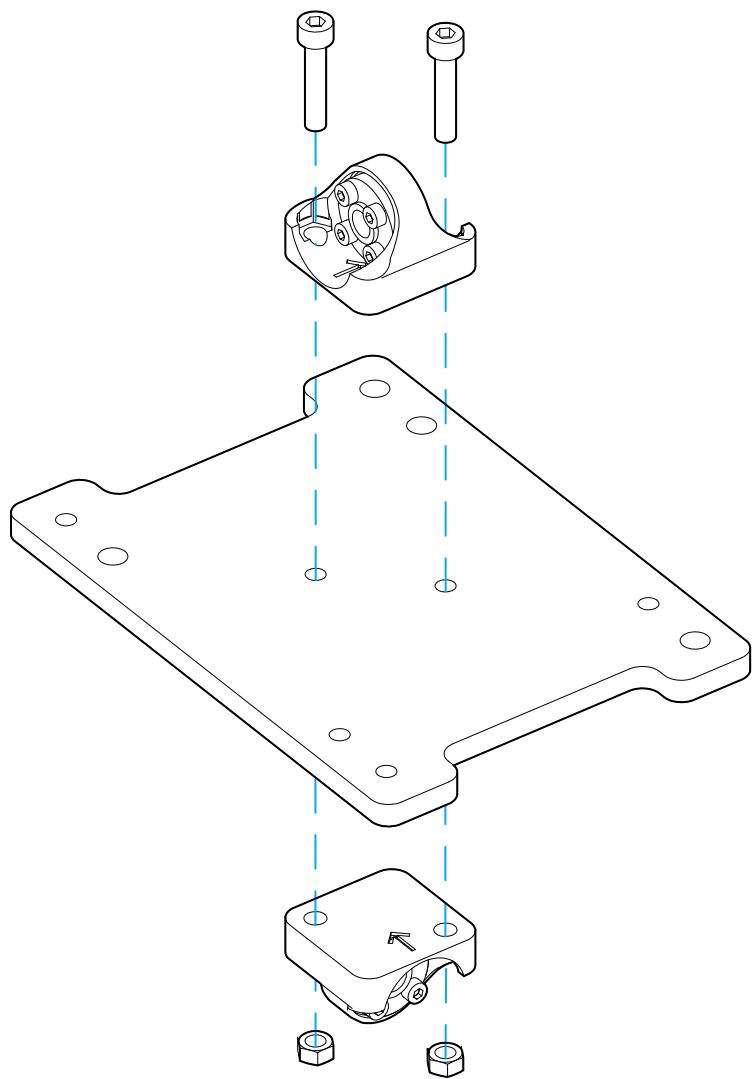
M5-25
2x



M5-N
2x



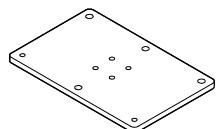
4
Allen



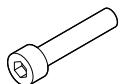
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STEP 3

Y Gantry
Assembly



G-Y
1x



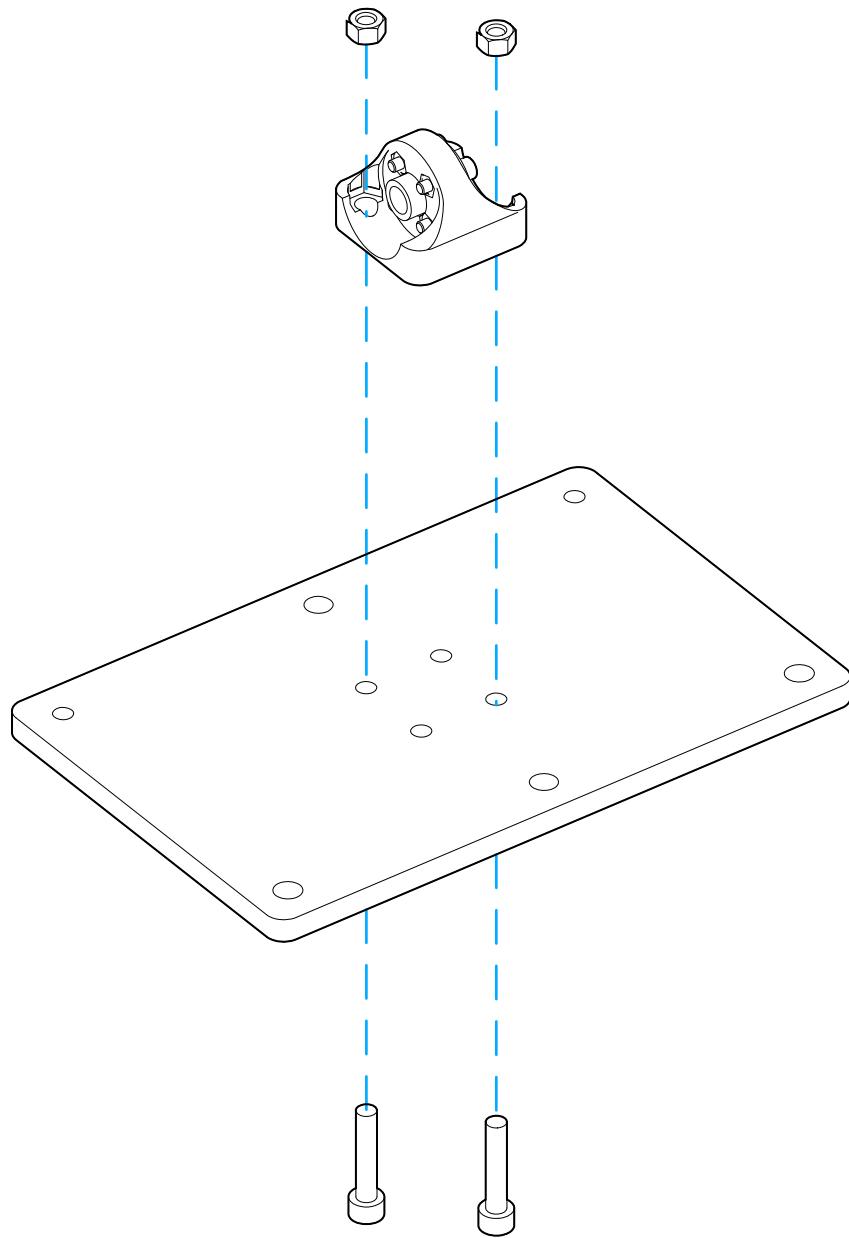
M5-25
2x



M5-N
2x



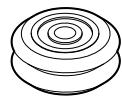
4
Allen



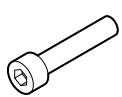
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STEP 4

XZ Gantry Assembly



VB
4x



M5-25
4x



M5-W
4x



M5-N
2x



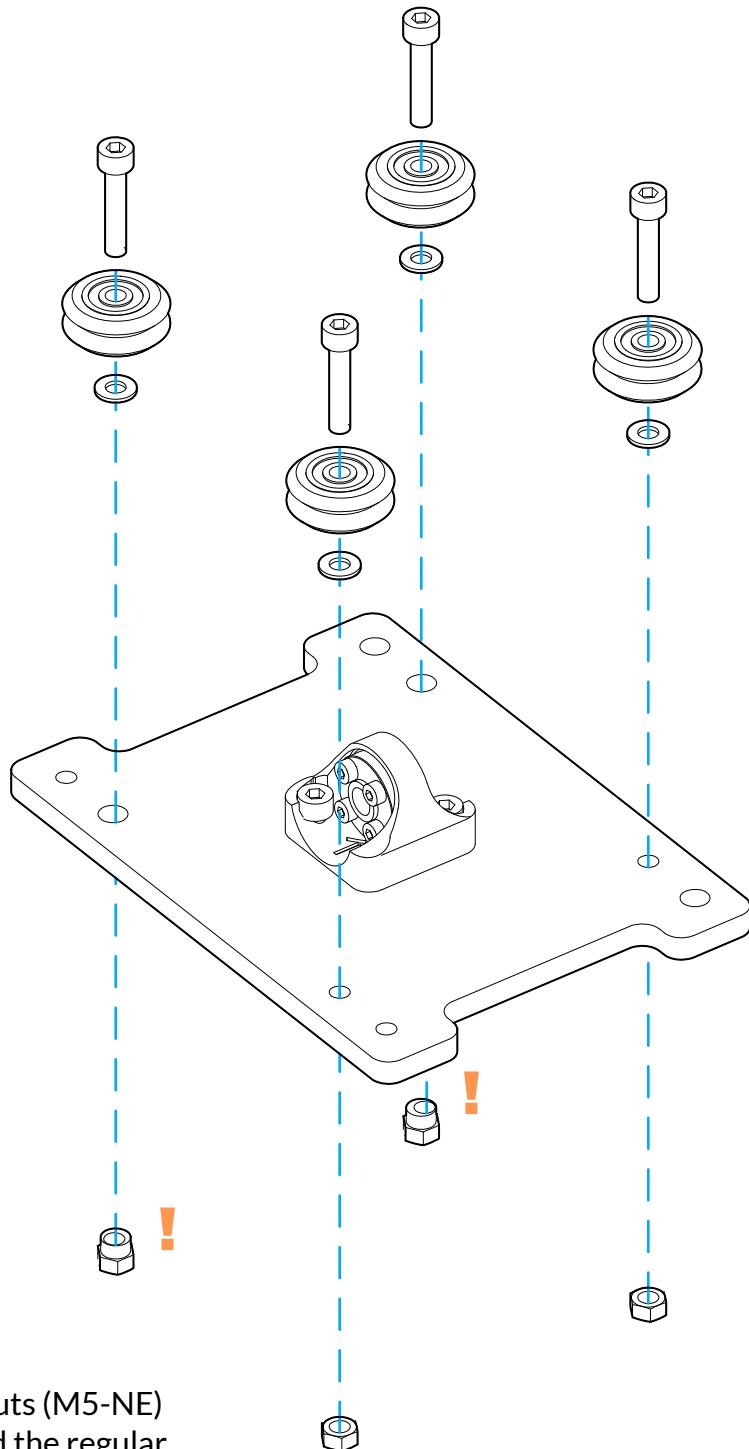
M5-NE
2x



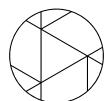
4
Allen



8mm / 5/16"
Wrench



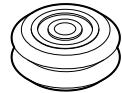
! Match the eccentric nuts (M5-NE) to the larger holes, and the regular nuts (M5-N) to the smaller holes



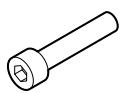
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DESKTOP CNC MILLING

STEP 5

XZ Gantry Assembly



VB
4x



M5-25
4x



M5-W
4x



M5-N
2x



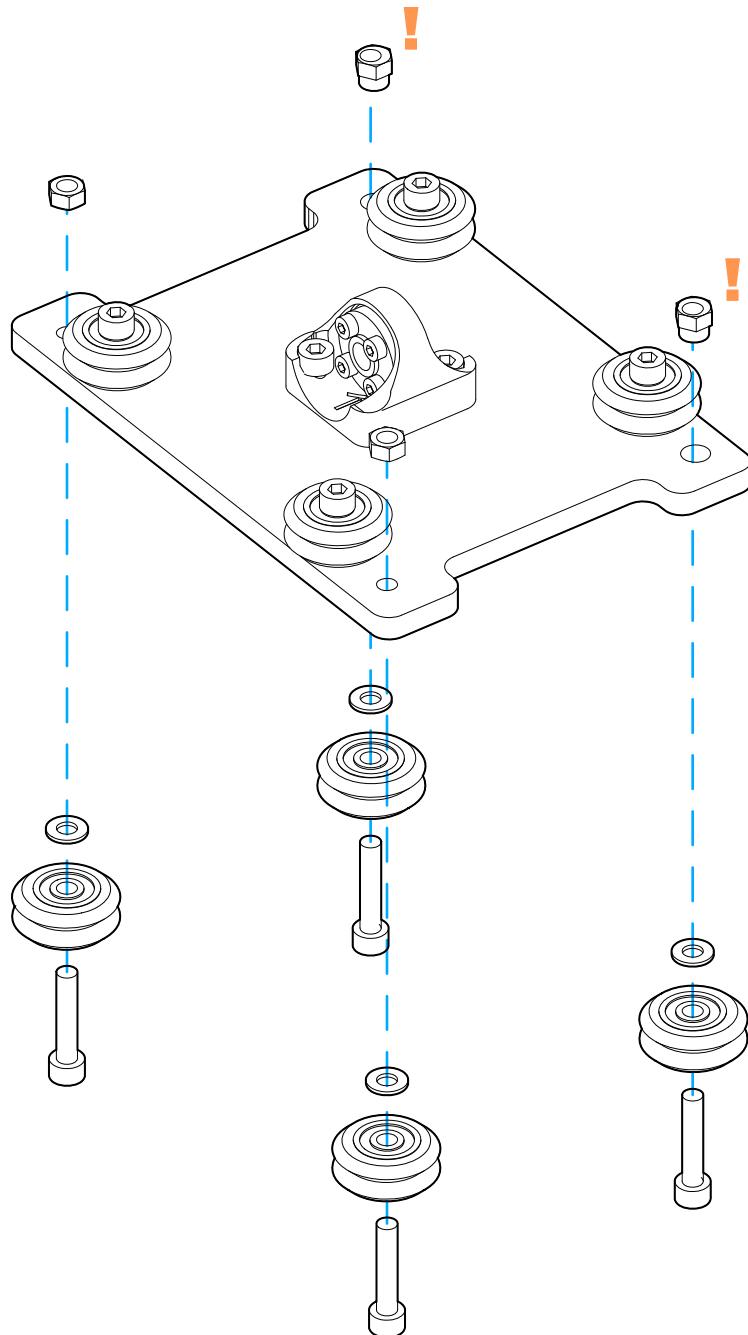
M5-NE
2x



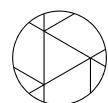
4
Allen



8mm / 5/16"
Wrench



- ! Match the eccentric nuts (M5-NE) to the larger holes, and the regular nuts (M5-N) to the smaller holes



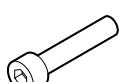
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STEP 6

Y Gantry
Assembly



VB
4x



M5-25
4x



M5-W
4x



M5-N
2x



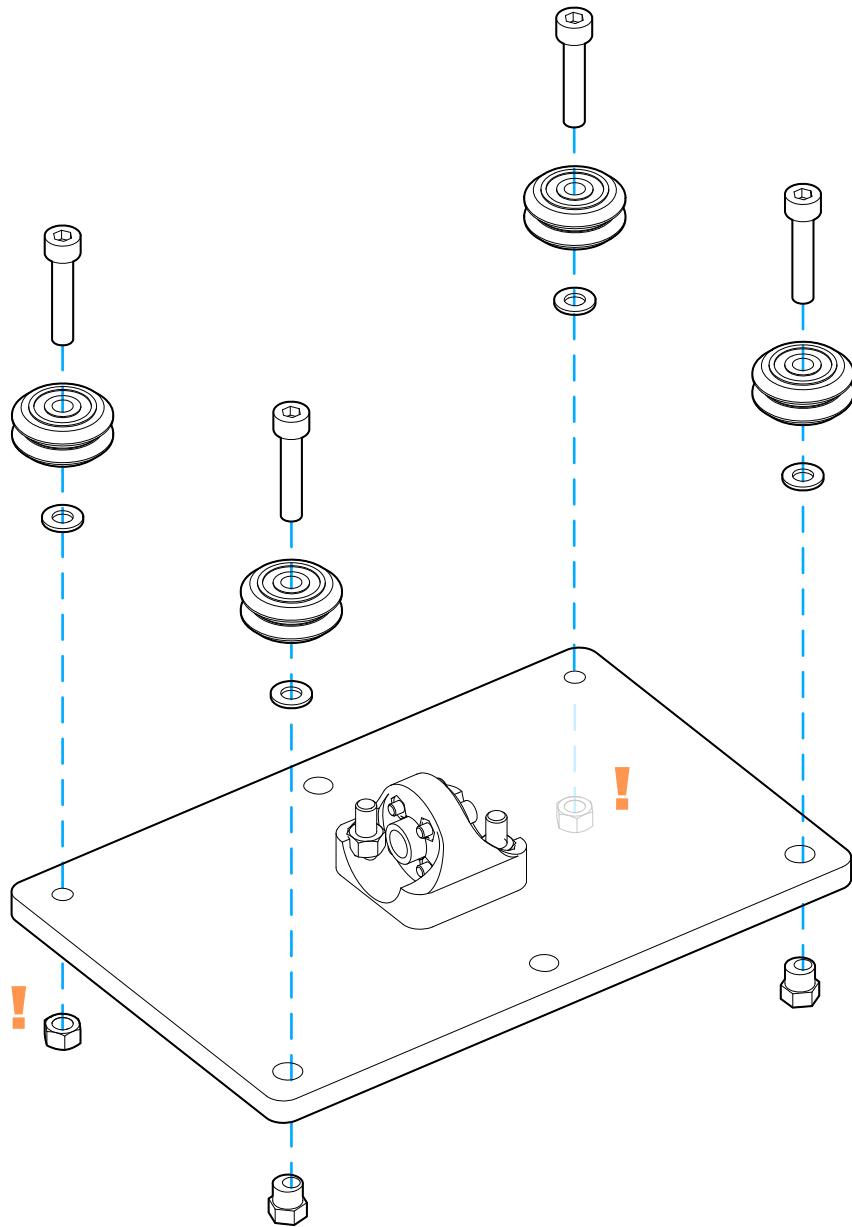
M5-NE
2x



4
Allen



8mm / 5/16"
Wrench



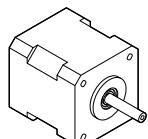
- ! Match the eccentric nuts (M5-NE) to the larger holes, and the regular nuts (M5-N) to the smaller holes



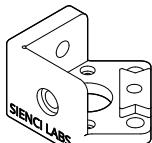
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STEP 7

Mounting the Motors to the Rails



SM
3x



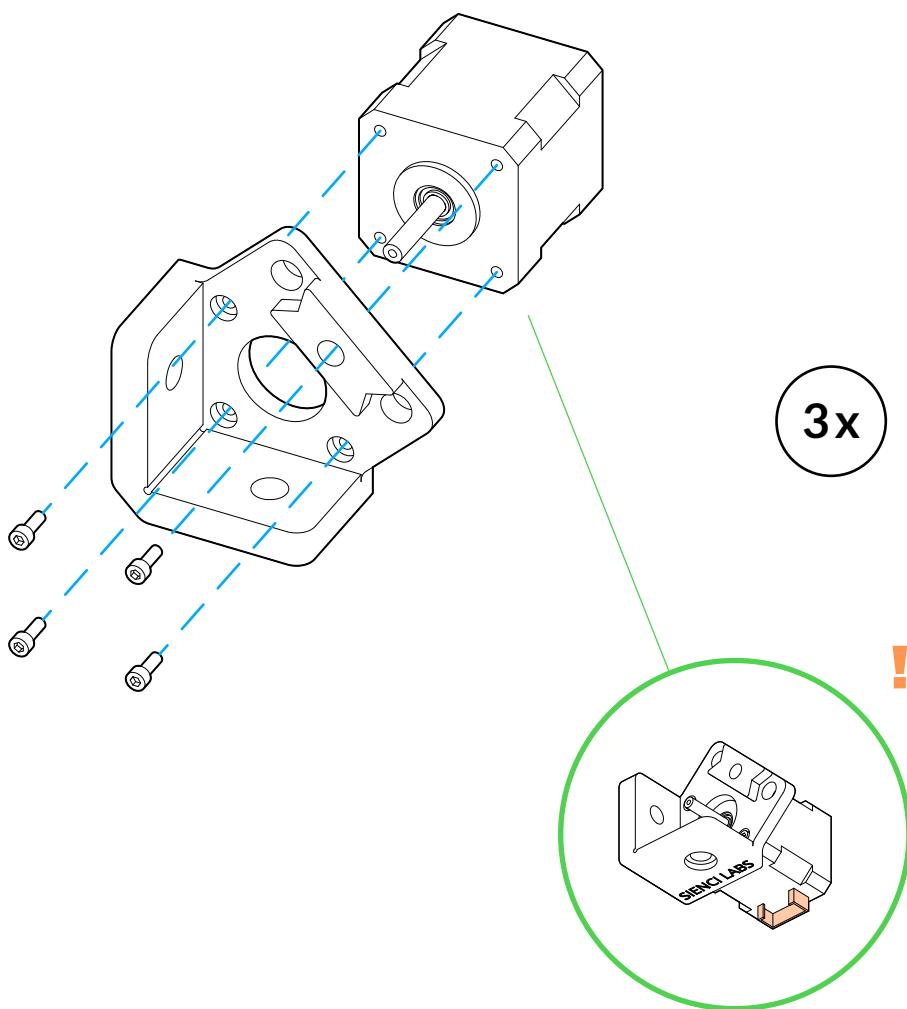
P-AM
3x



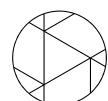
M3-8
12x



2.5
Allen



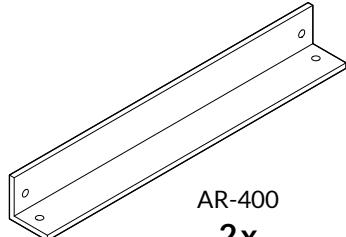
! Make sure that the motor connector is facing downwards



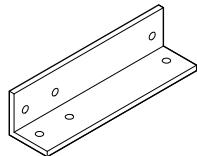
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STEP 8

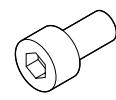
Mounting the Motors to the Rails



AR-400
2x



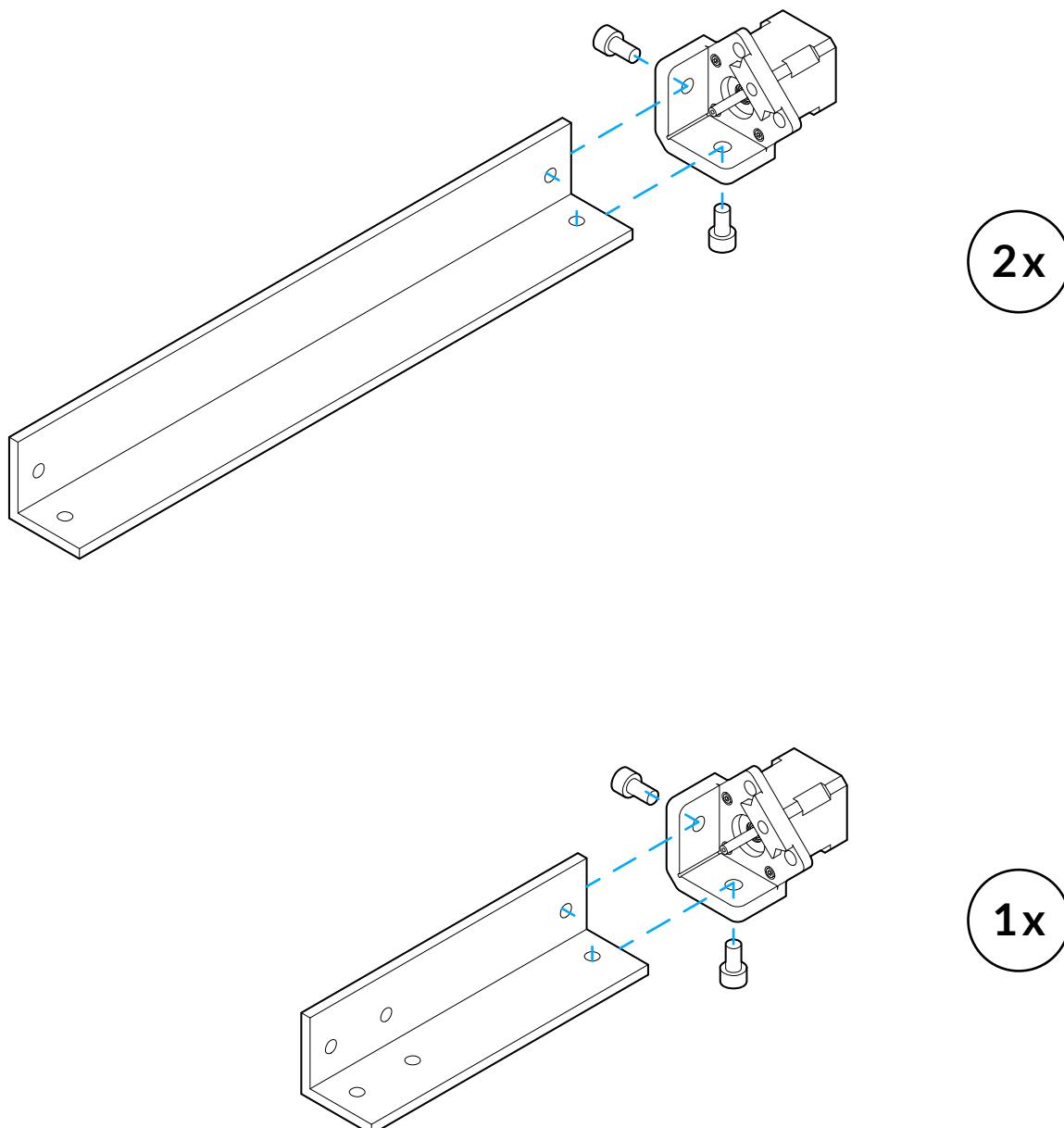
AR-200
1x



M8-15
6x



6
Allen

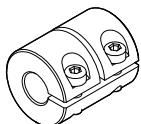


STEP 9

Attaching
Z-Lead Screw
to XZ Gantry

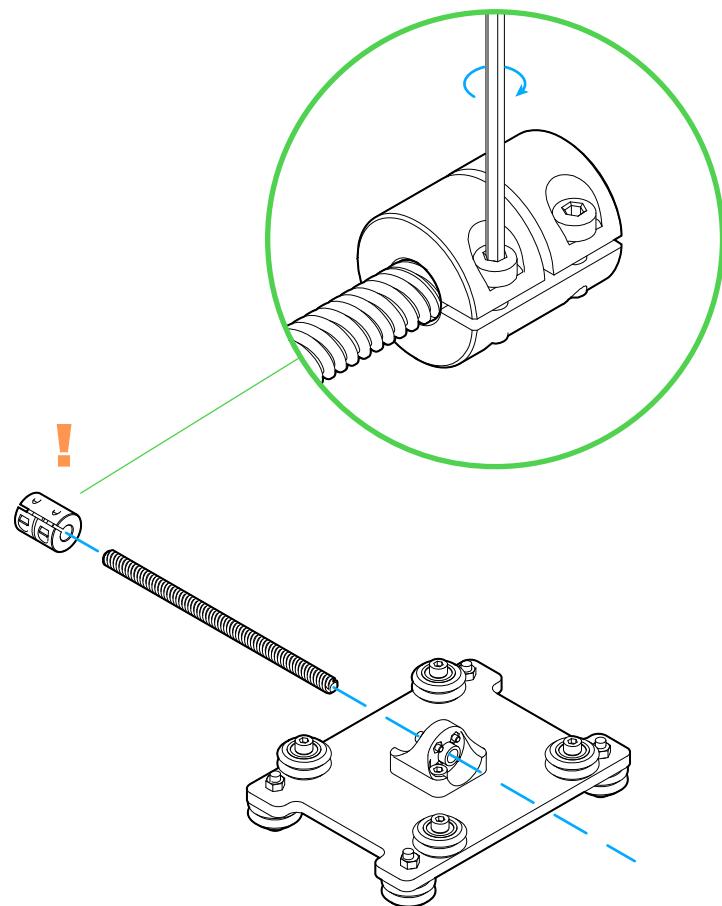


LS-150
1x

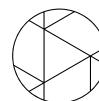


SC
1x

2
Allen



! Make sure to push coupler all the way onto lead screw before tightening

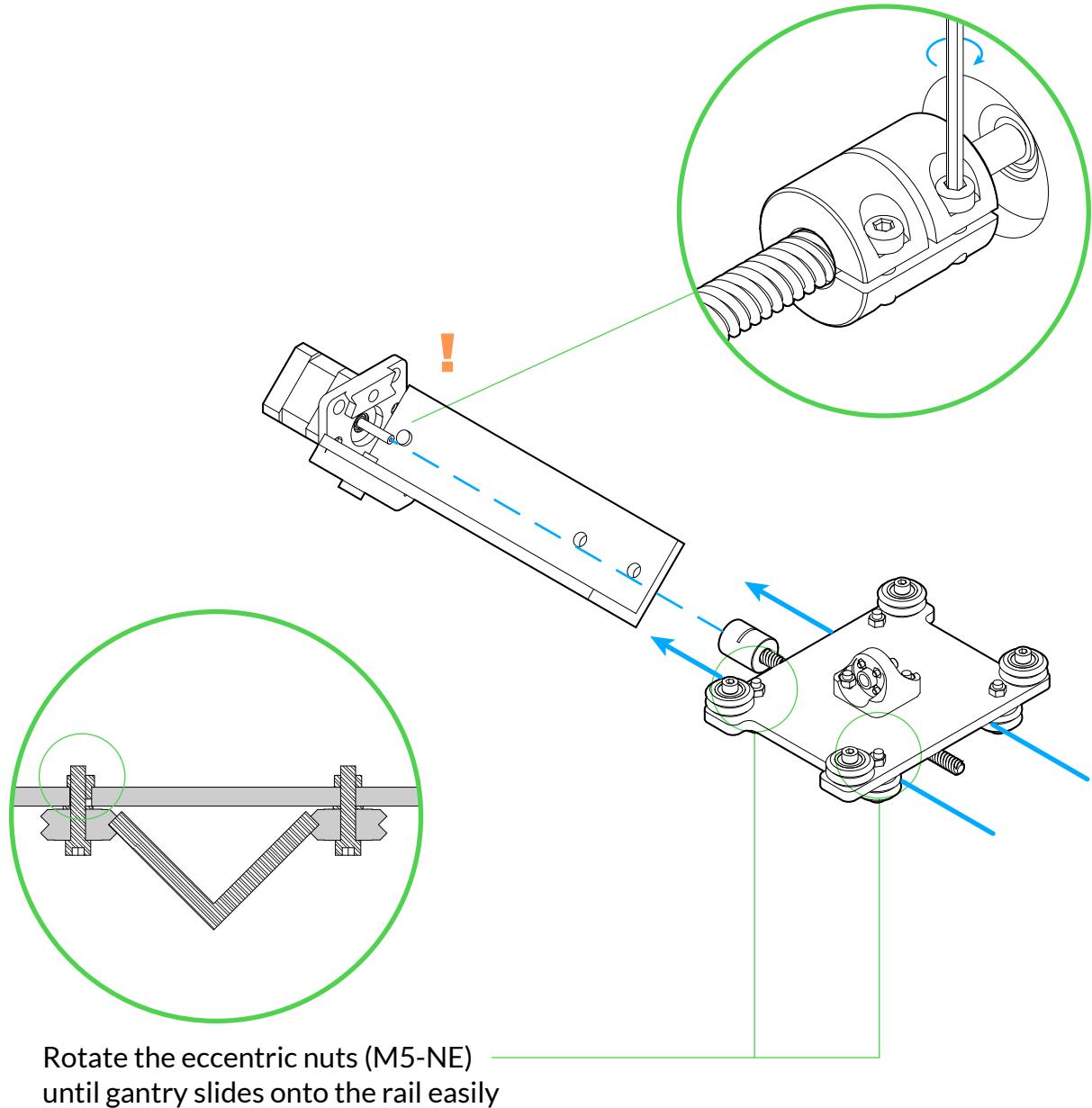


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STEP 10

Attaching the
Z-Rail to the XZ
Gantry

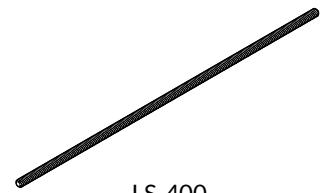
• 
2 Allen
8mm / 5/16"
Wrench



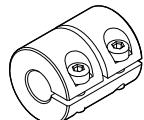
! Make sure to push coupler all the way onto motor shaft before tightening

STEP 11

Attaching the X-Lead screw to the XZ Gantry and Calibration



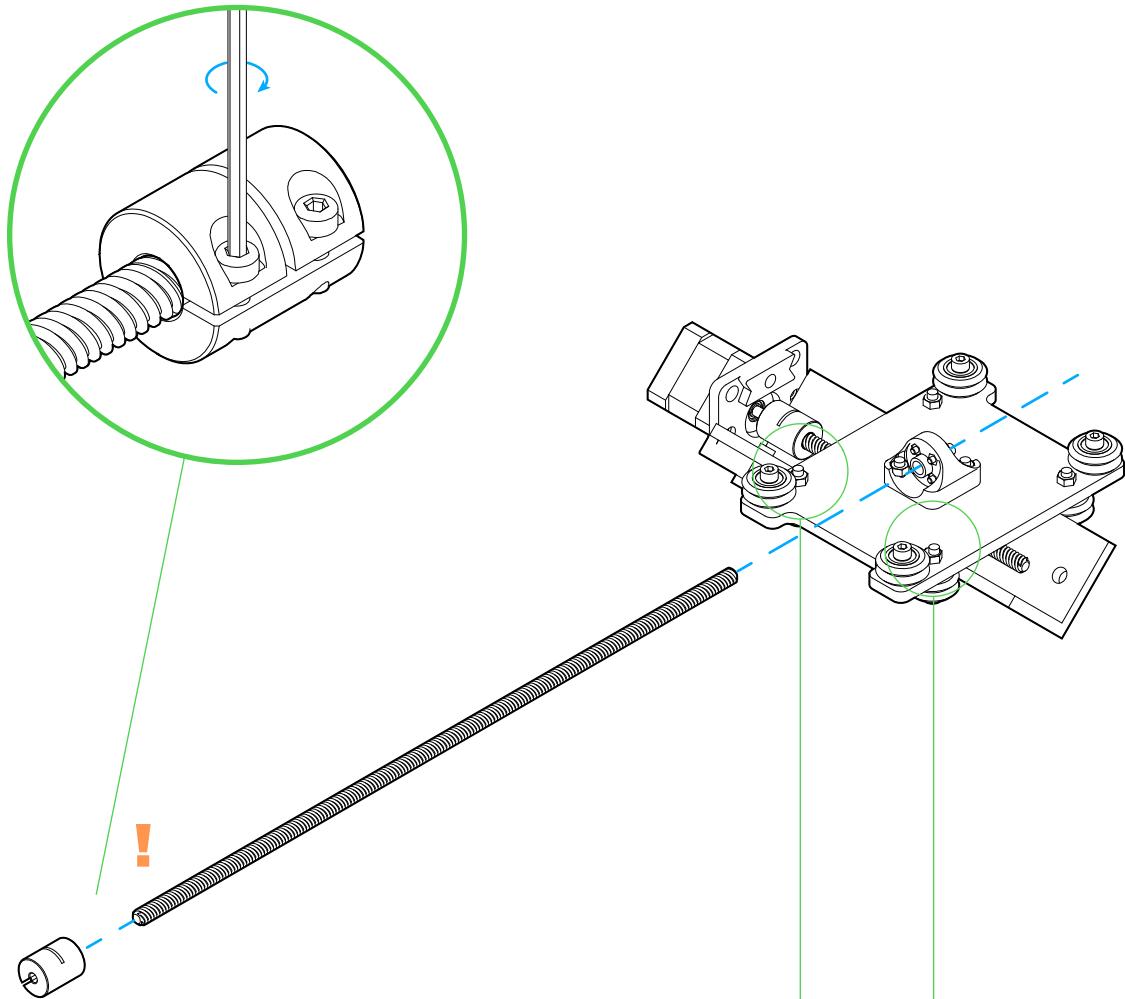
LS-400
1x



SC
1x



2
Allen
8mm / 5/16"
Wrench



Rotate the eccentric nuts (M5-NE) to tighten the grip of the wheels on the rail. Tighten until you can no longer rotate the V Groove bearings (VB) with your fingers.

! Make sure to push coupler all the way onto lead screw before tightening

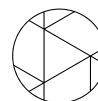
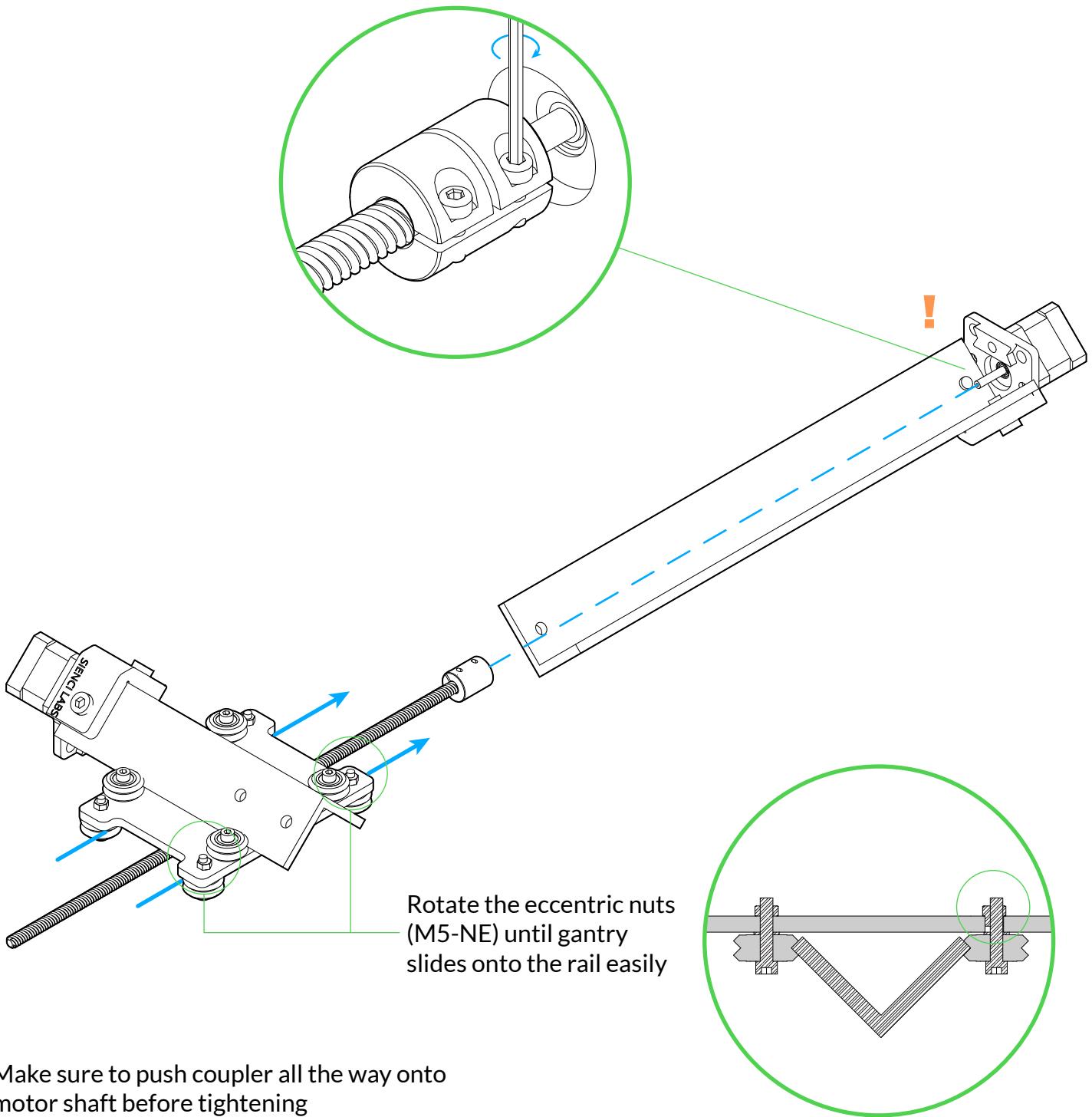


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DESKTOP CNC MILLING

STEP 12

Attaching the X-Rail to the XZ Gantry

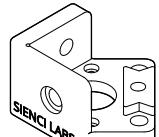
2 Allen
8mm / 5/16" Wrench



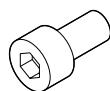
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DESKTOP CNC MILLING

STEP 13

Attaching the Z-Rail to the XZ Gantry and Calibration



P-AM
1x



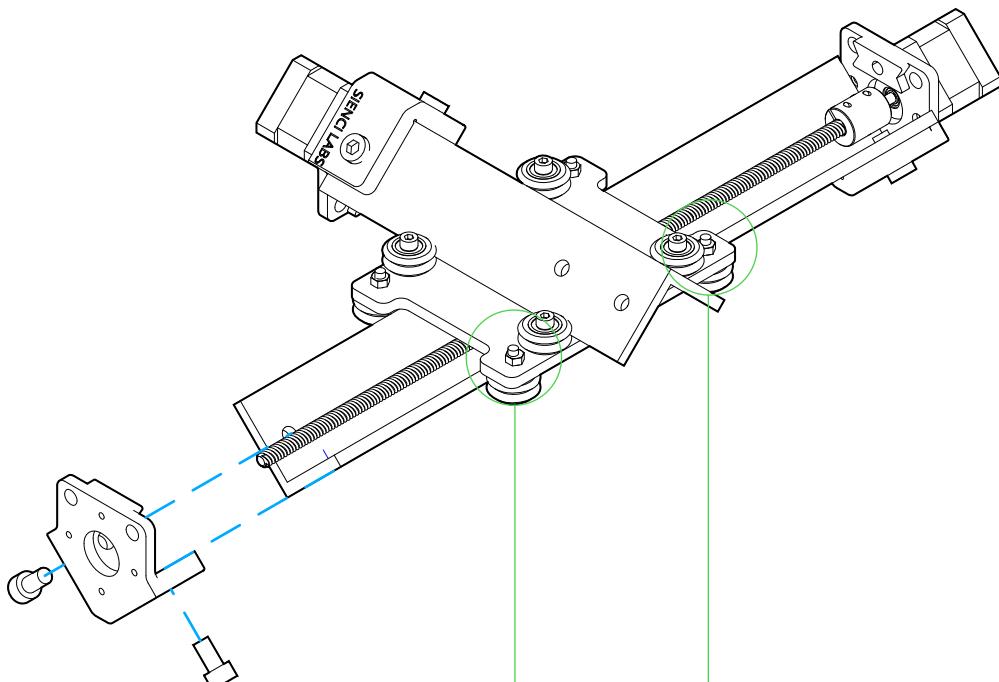
M8-15
2x



6
Allen



8mm / 5/16"
Wrench



Rotate the eccentric nuts (M5-NE) to tighten the grip of the wheels on the rail. Tighten until you can no longer rotate the V Groove bearings (VB) with your fingers.



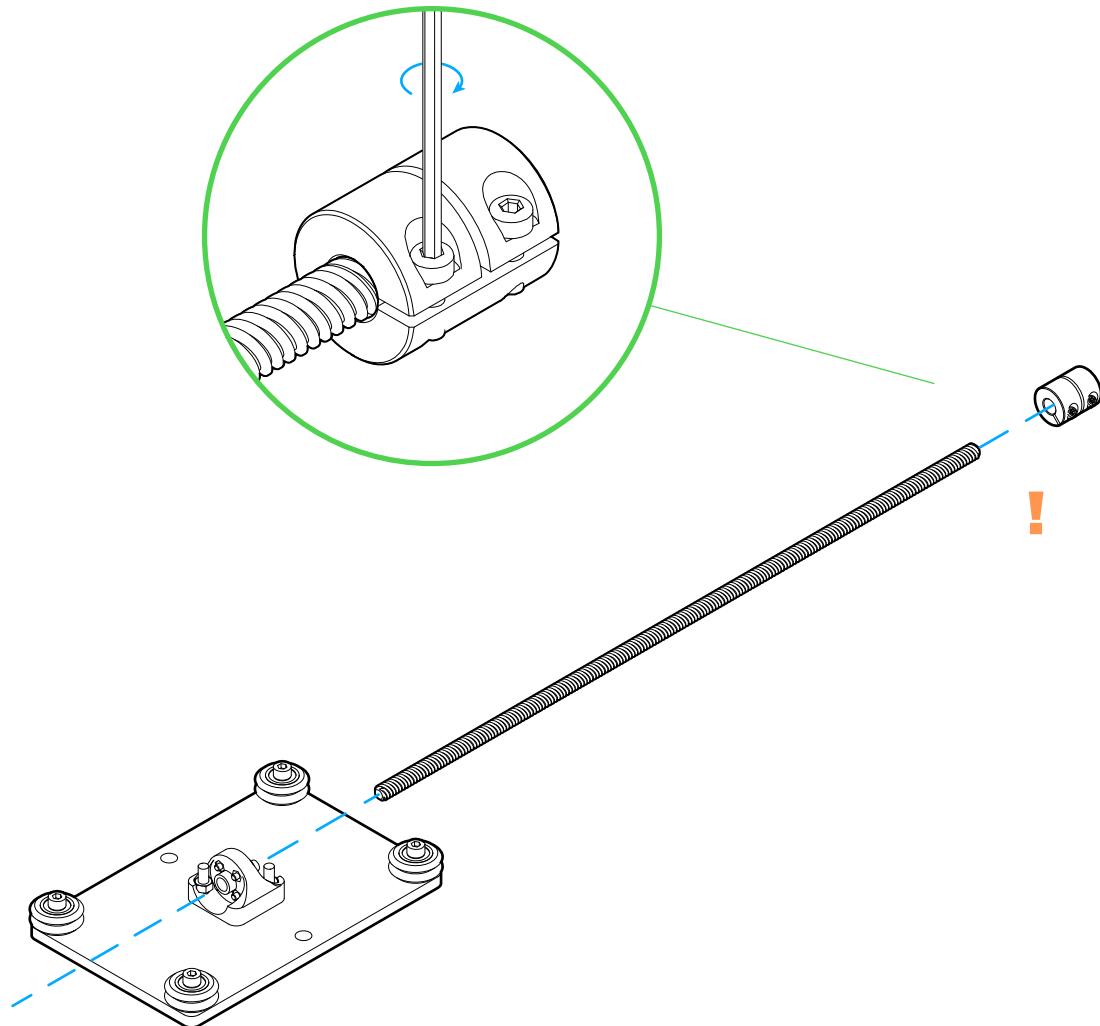
SIENCI LABS
DESKTOP CNC MILLING

STEP 14

Attaching Lead
Screw to Y
Gantry



2
Allen



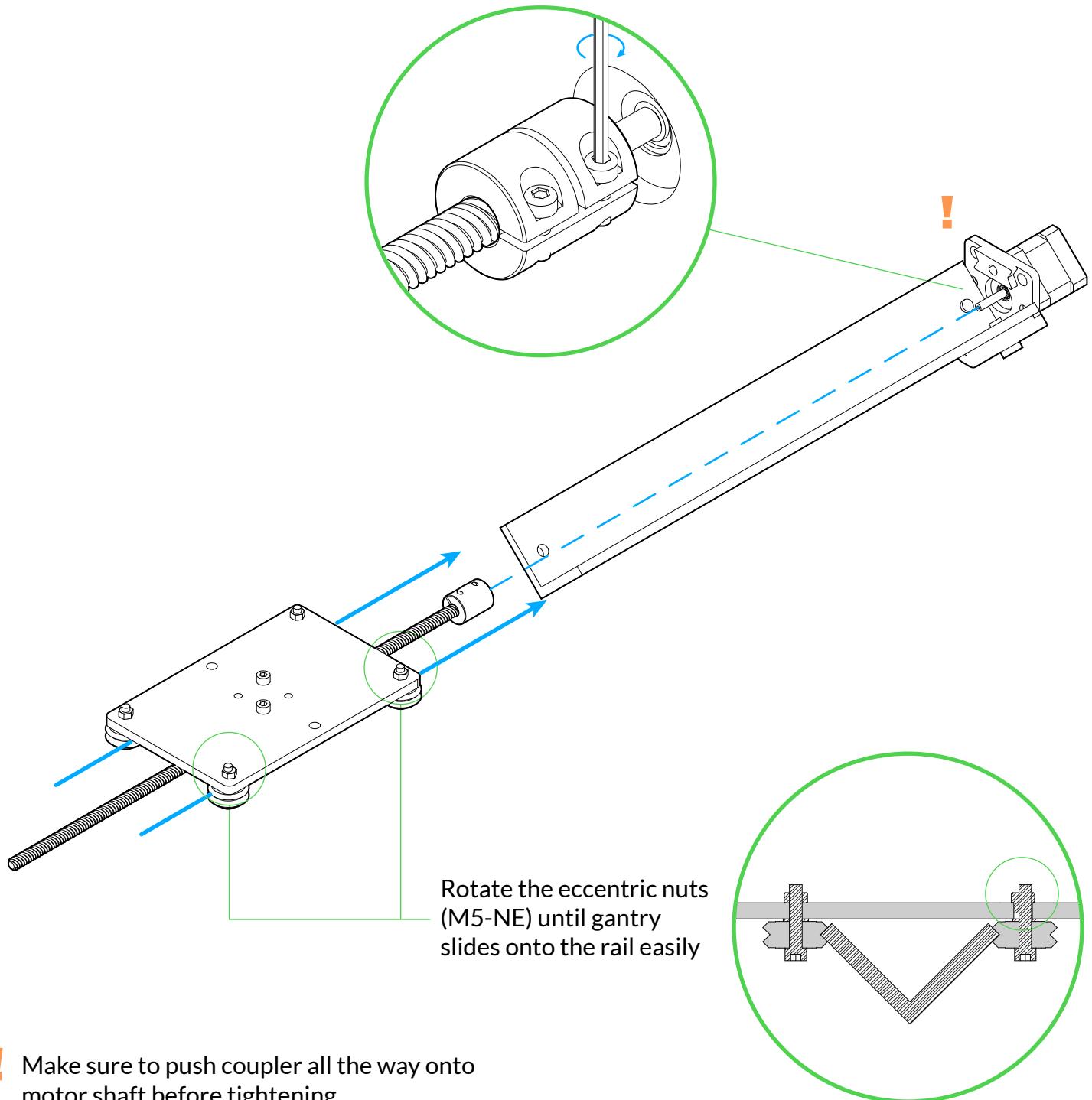
! Make sure to push coupler all the way onto lead screw before tightening

STEP 15

Attaching the Y-Rail to the Y Gantry



2
Allen
8mm / 5/16"
Wrench



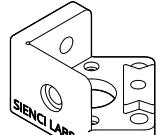
! Make sure to push coupler all the way onto
motor shaft before tightening



SIENCI LABS
DESKTOP CNC MILLING

STEP 16

Attaching the Y-Rail to the Y Gantry



P-AM
1x



M8-15
2x

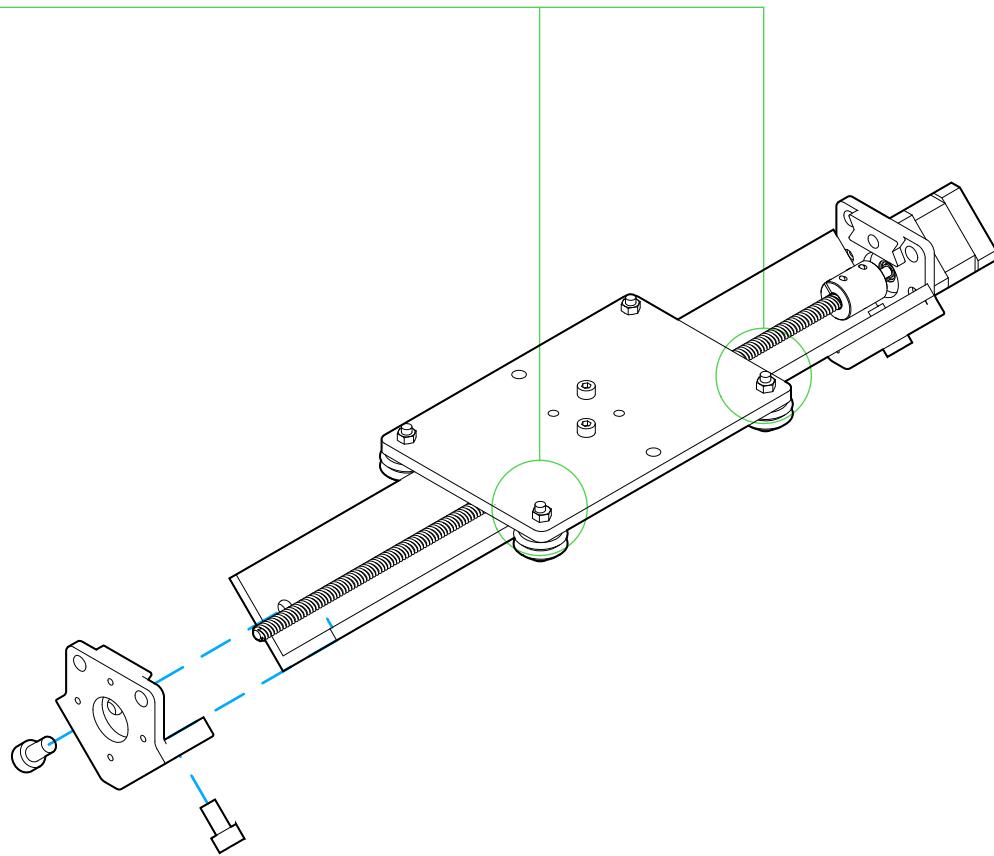


6
Allen



8mm / 5/16"
Wrench

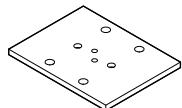
Rotate the eccentric nuts (M5-NE) to tighten the grip of the wheels on the rail. Tighten until you can no longer rotate the V Groove bearings (VB) with your fingers.



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STEP 17

Attaching the
Wasteboard to
the Y Gantry



WB
1x



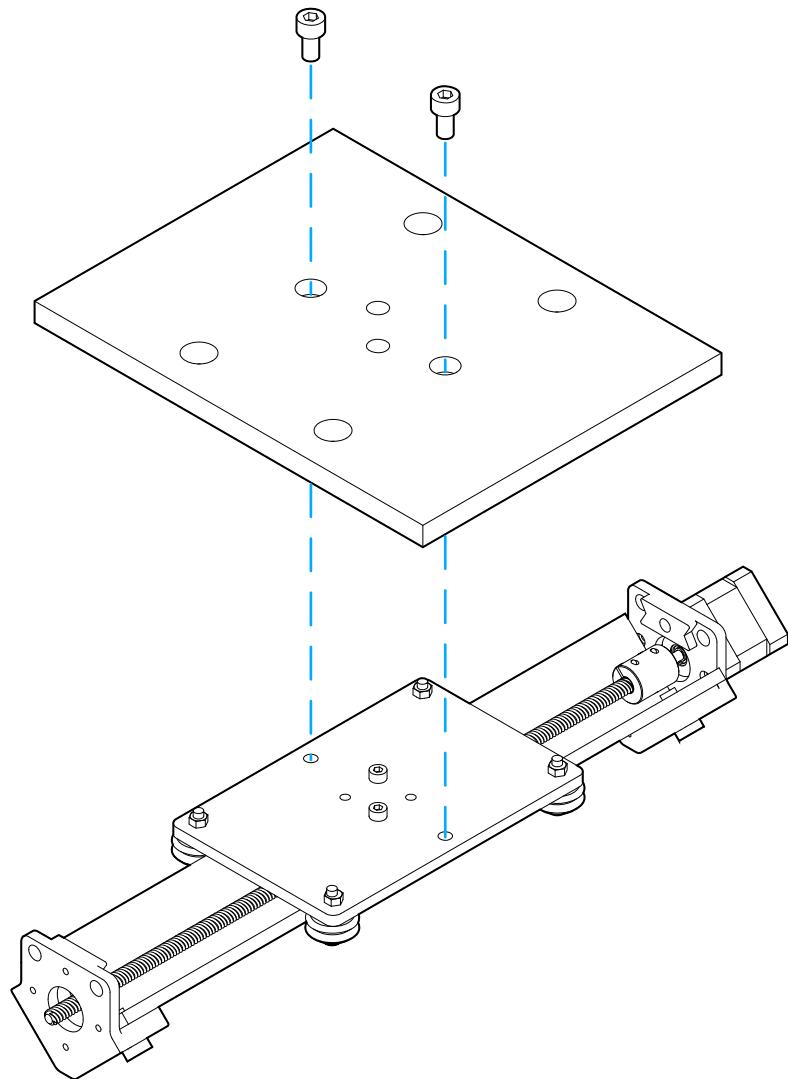
M8-15
2x



6
Allen



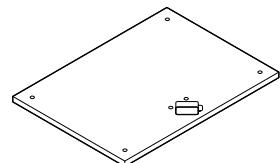
8mm / 5/16"
Wrench



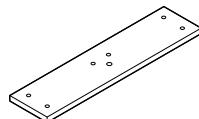
SCIENCI LABS
DESKTOP CNC MILLING

STEP 18

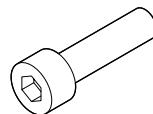
Attaching Y
Assembly to
Frame



F-B
1x



F-F
1x



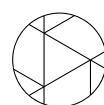
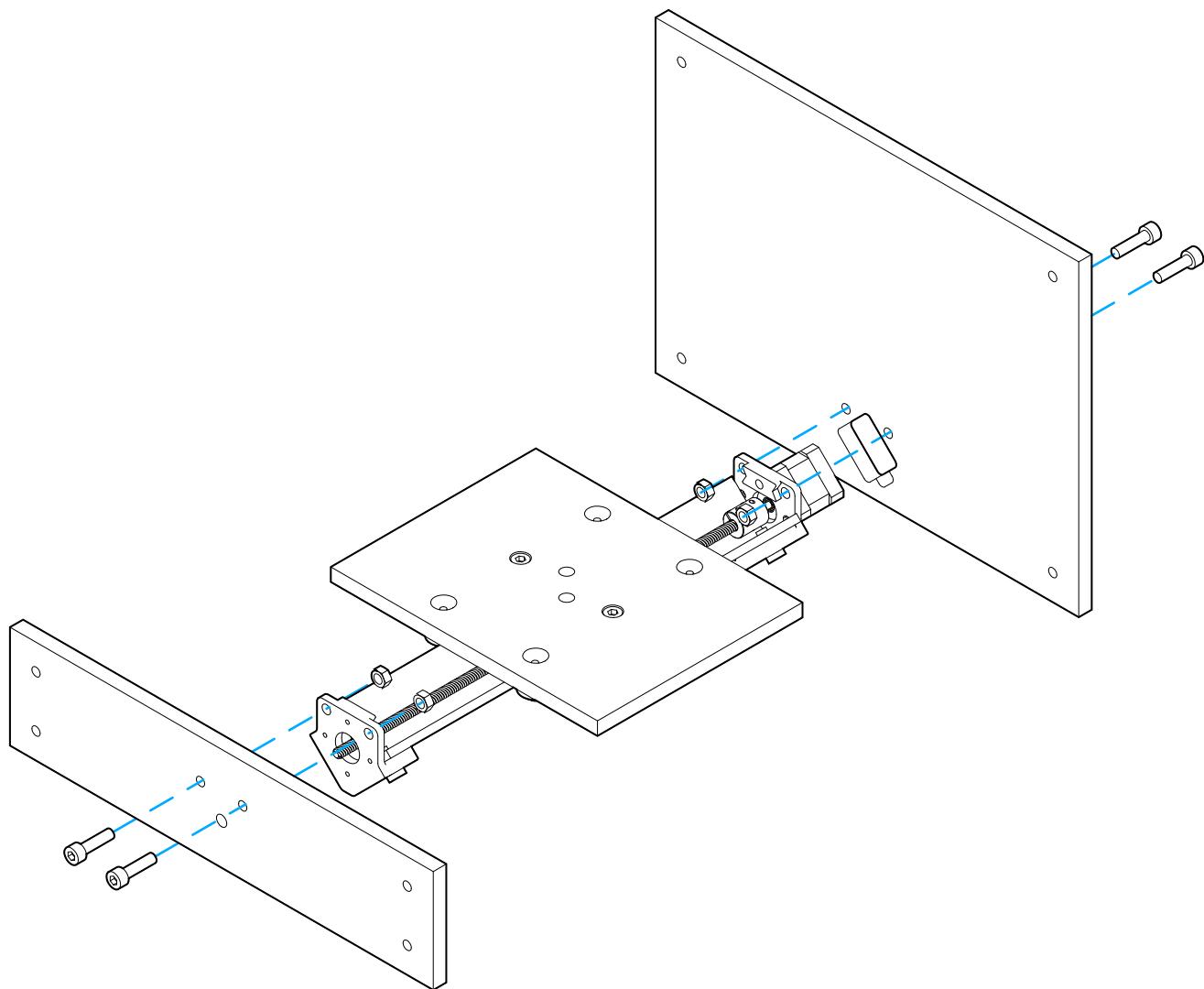
M8-25
4x



M8-N
4x



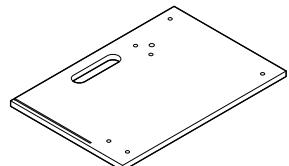
6
Allen



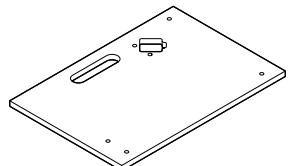
SCIENCI LABS
DESKTOP CNC MILLING

STEP 19

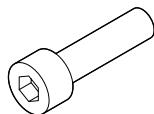
Attaching XZ
Assembly to
Frame



F-L
1x



F-R
1x



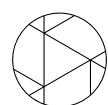
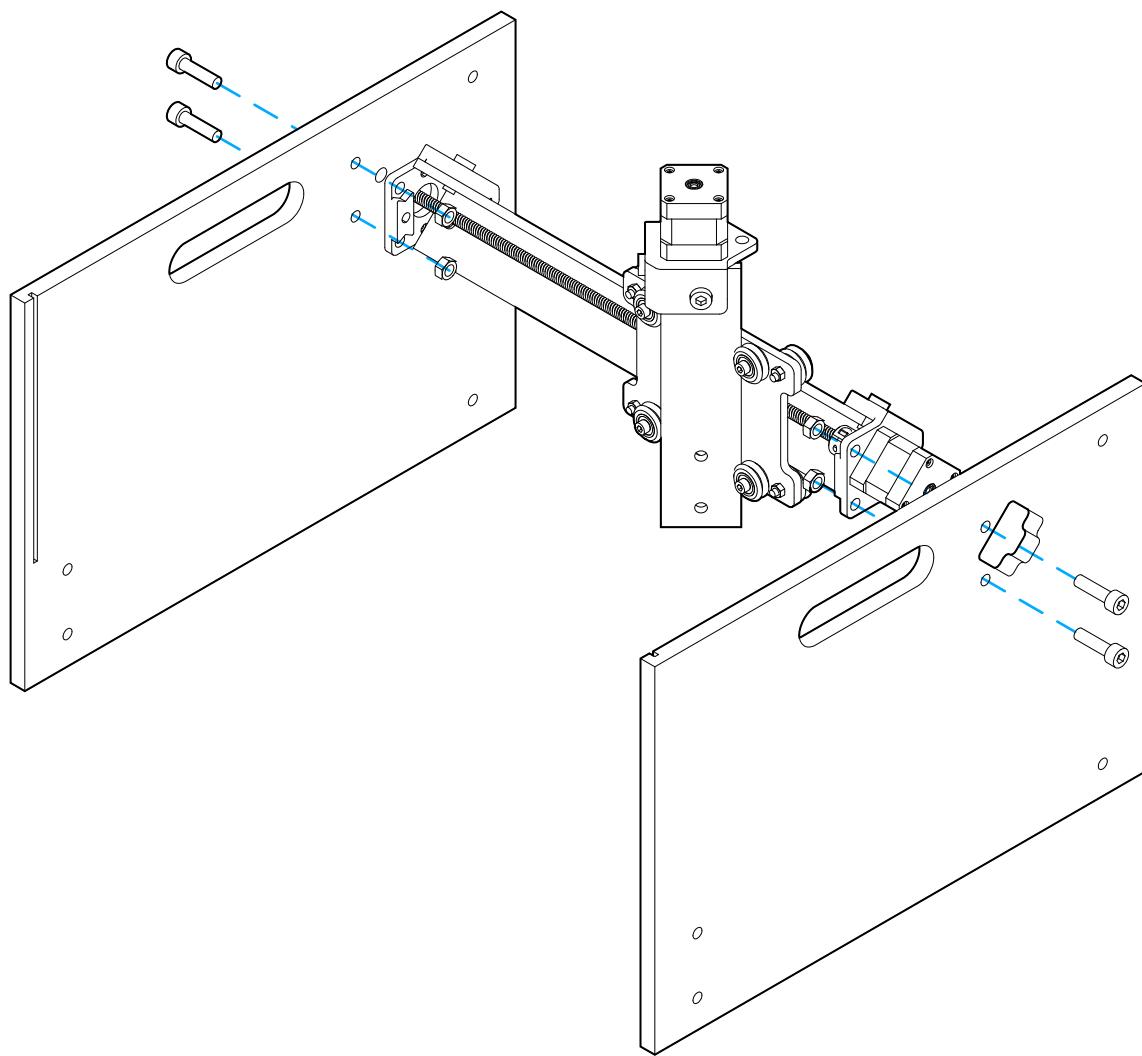
M8-25
4x



M8-N
4x



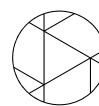
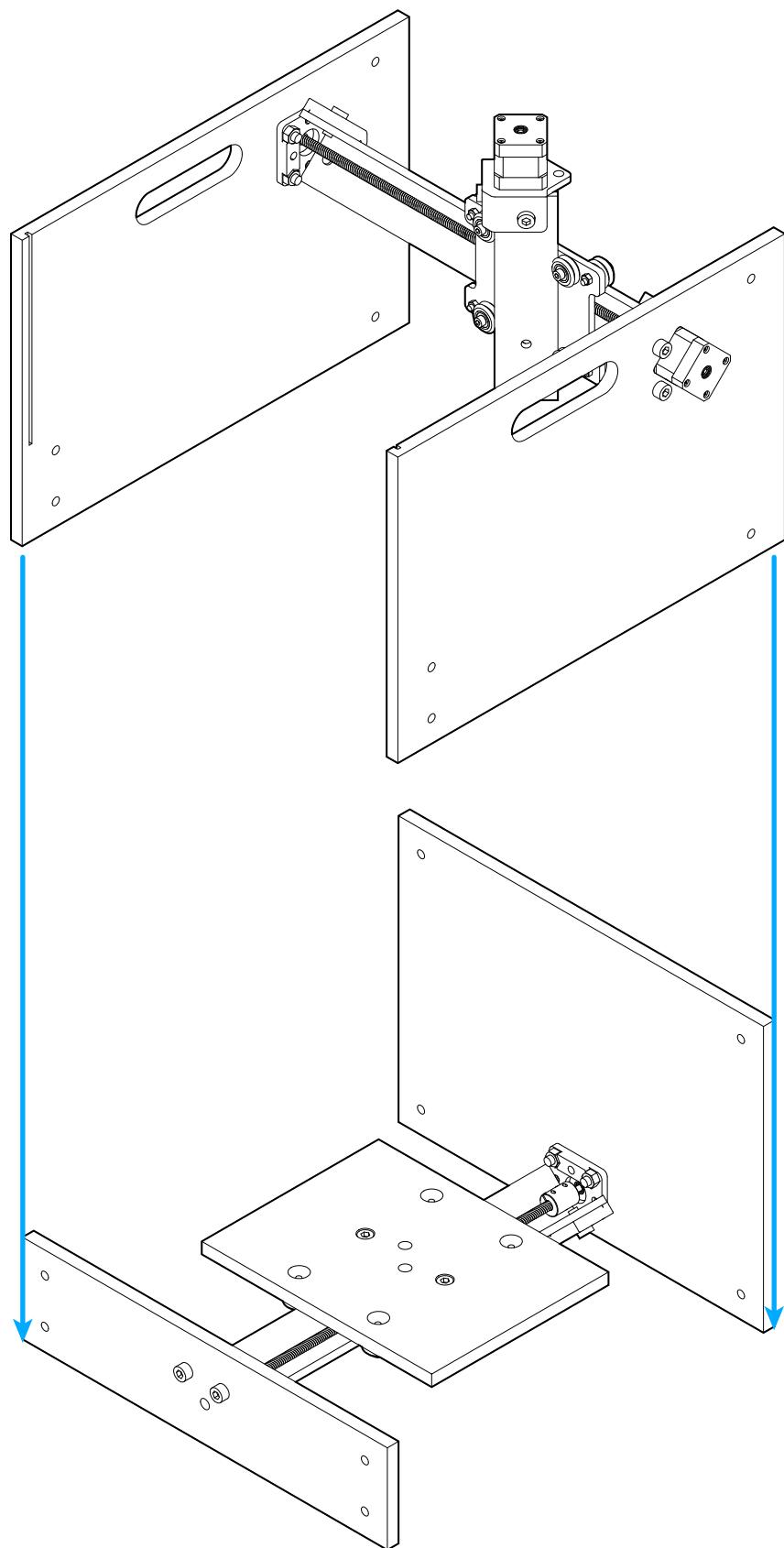
6
Allen



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STEP 20

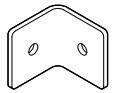
Aligning the Assemblies



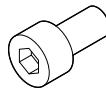
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STEP 21

Attaching
Frame Brackets



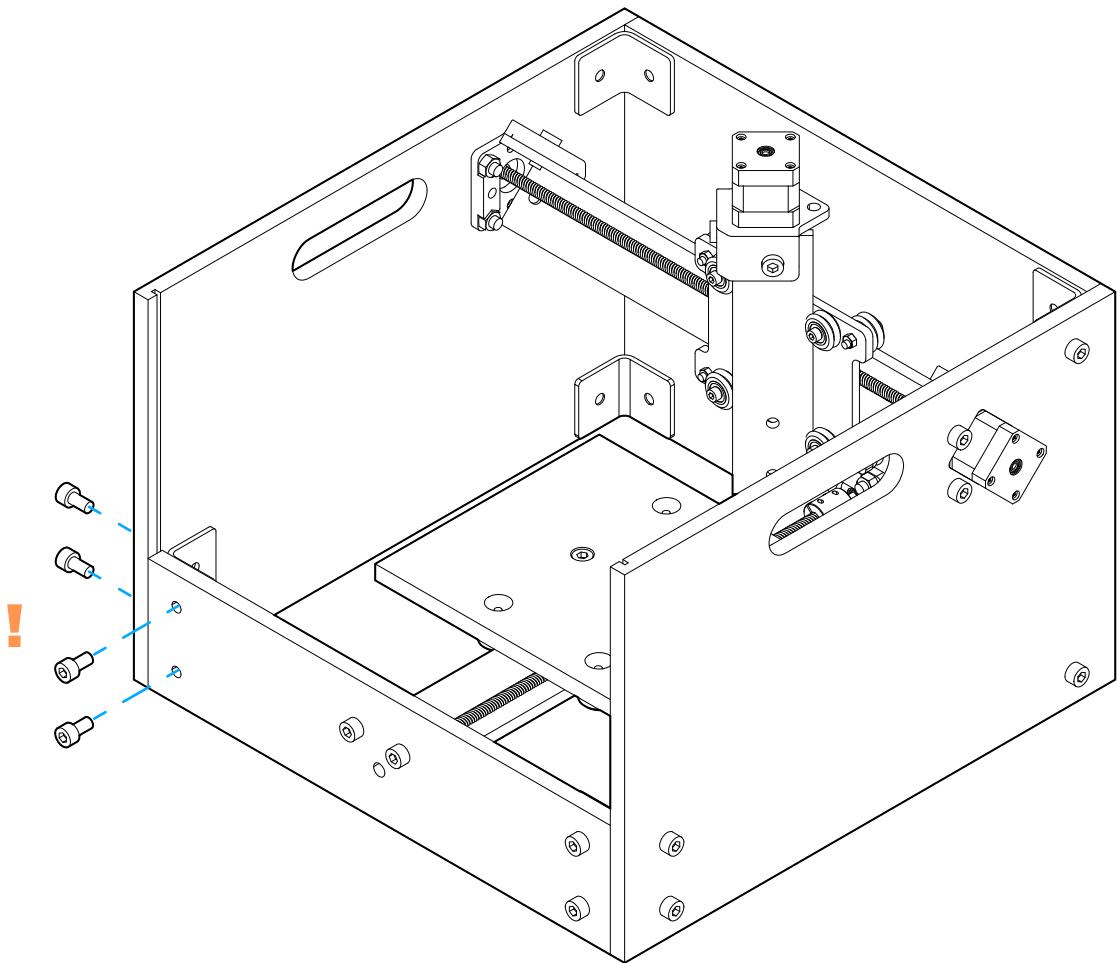
M-FB
8x



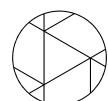
M8-15
16x



6
Allen



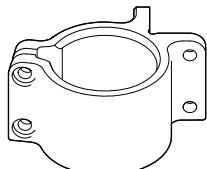
! Twist on bolts on all corners loosely,
then tighten on a flat surface



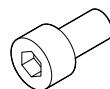
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STEP 22

Attaching
Router Mount



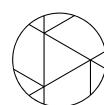
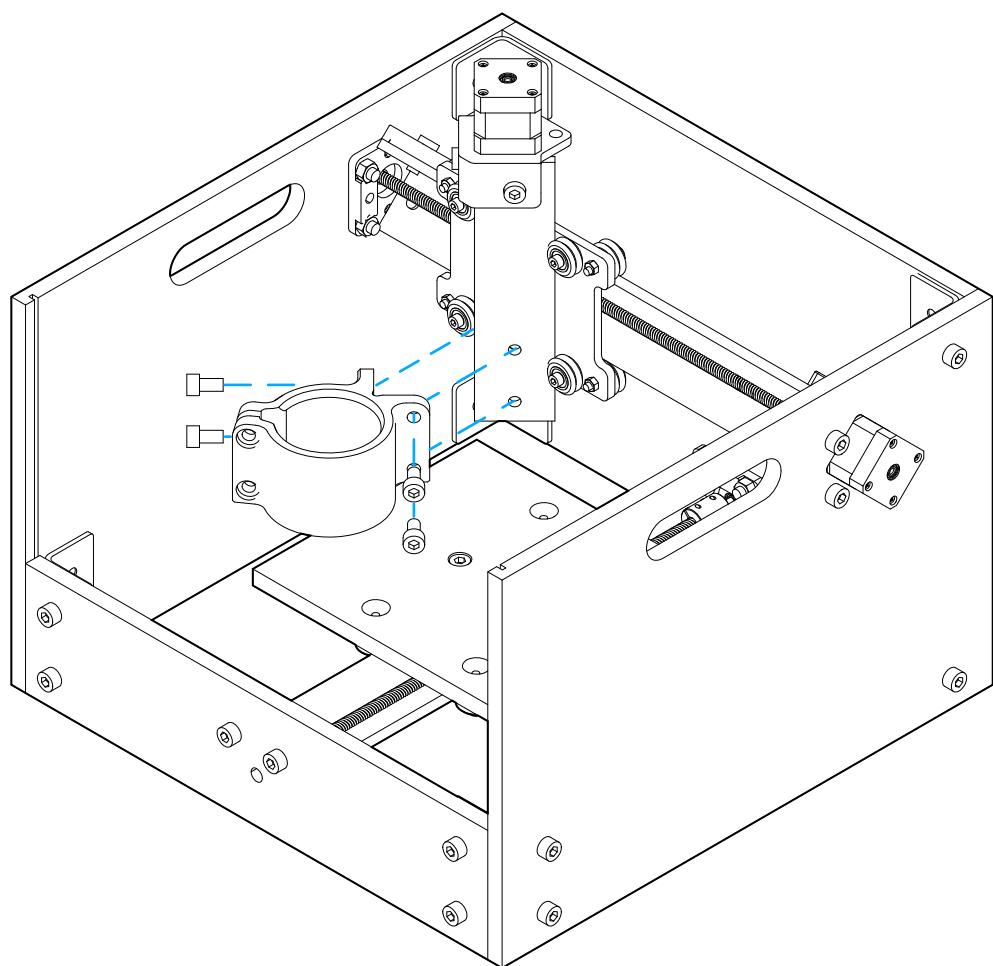
P-RM
1x



M8-15
4x



6
Allen



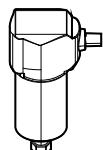
SCIENCI LABS
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STEP 23

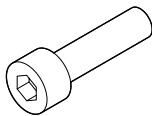
Attaching Router



P-RB
1x



RO
1x



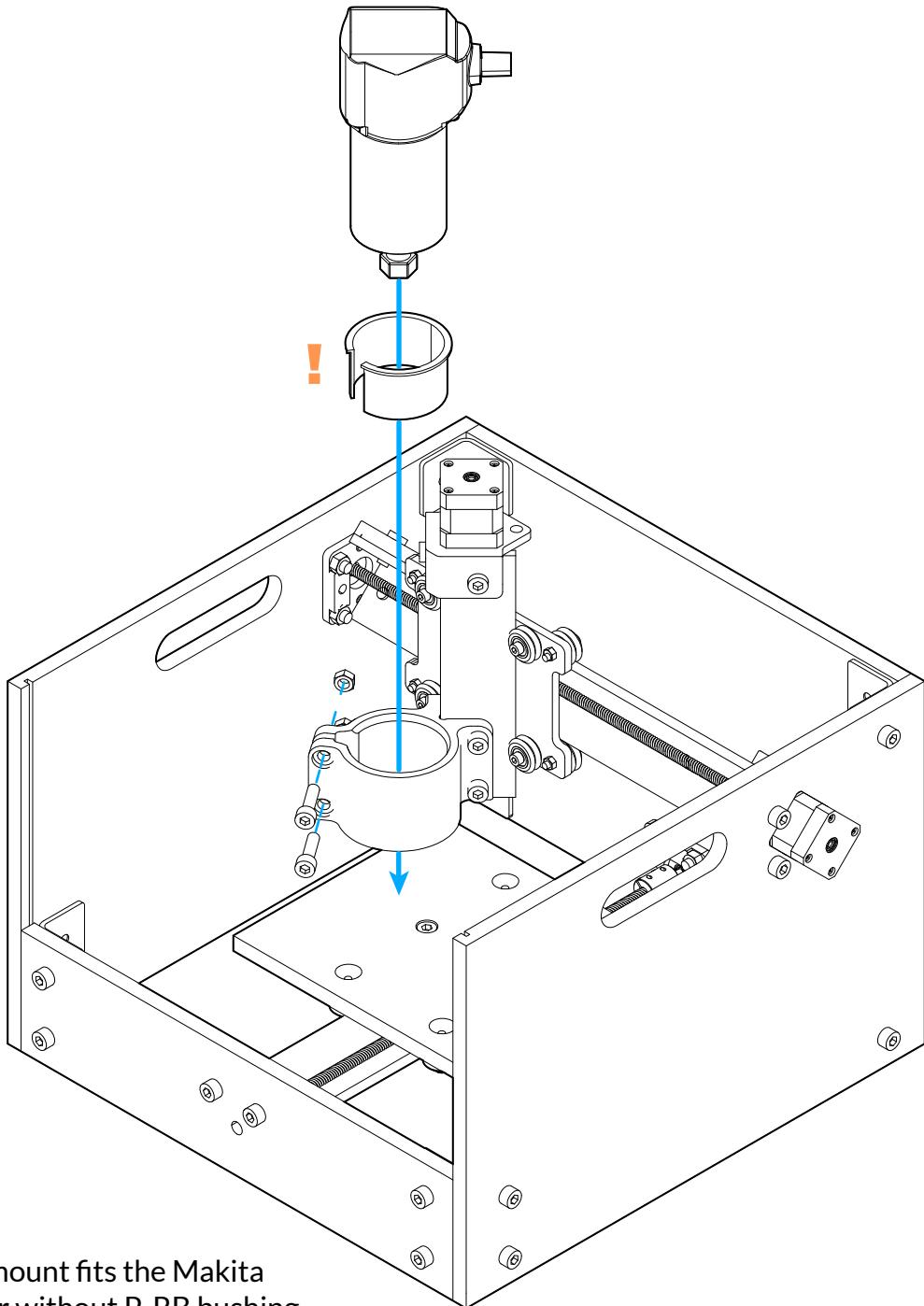
M8-25
2x



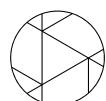
M8-N
2x



6
Allen



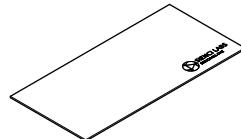
! P-RM router mount fits the Makita RT0701 router without P-RB bushing, bushing only required to mount Ridgid R24012 router



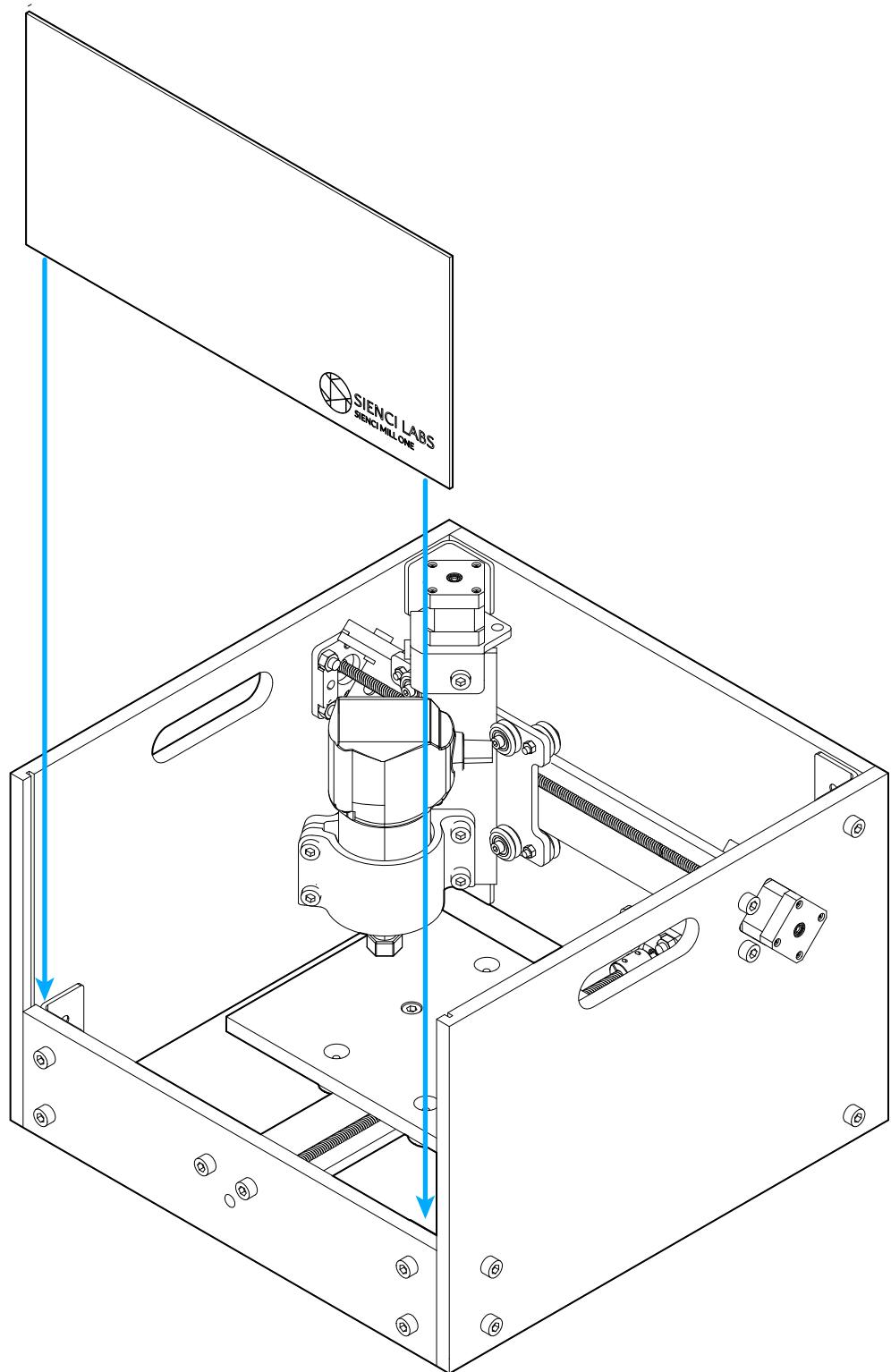
SCIENCI LABS
DESKTOP CNC MILLING

STEP 24

Sliding in
Acrylic Shield

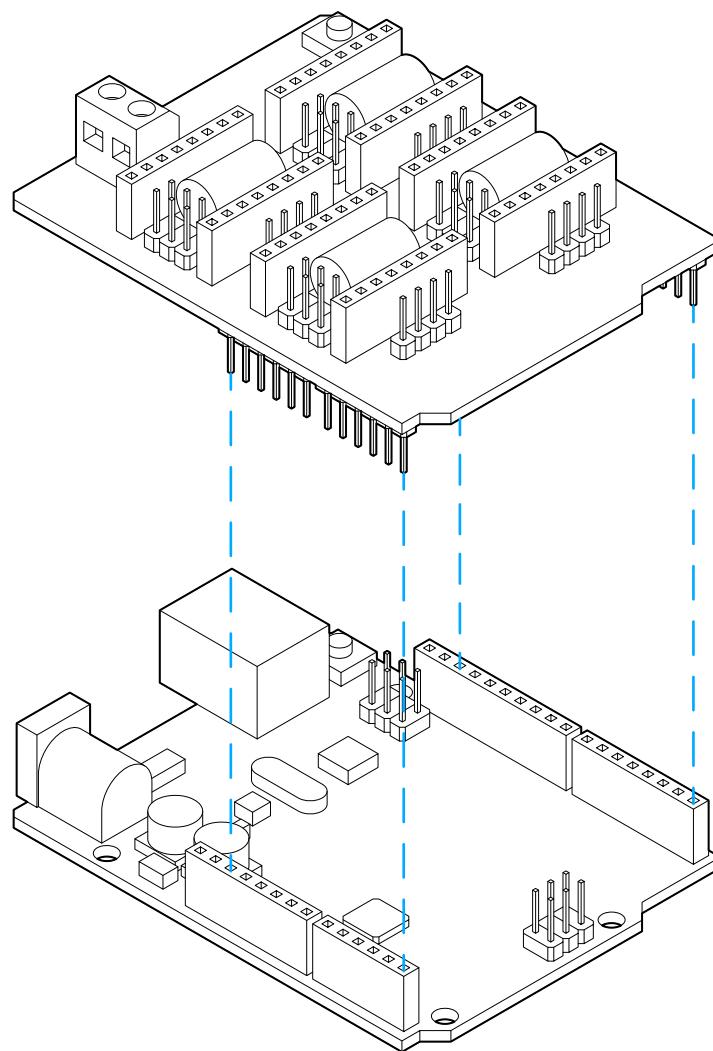
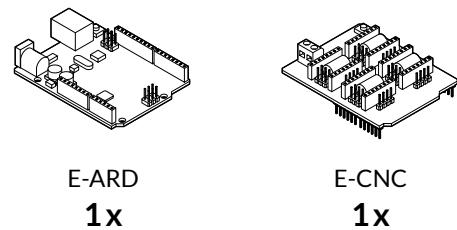


F-AC
1x



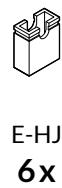
STEP 25

Combining the
Arduino and
CNC Shield

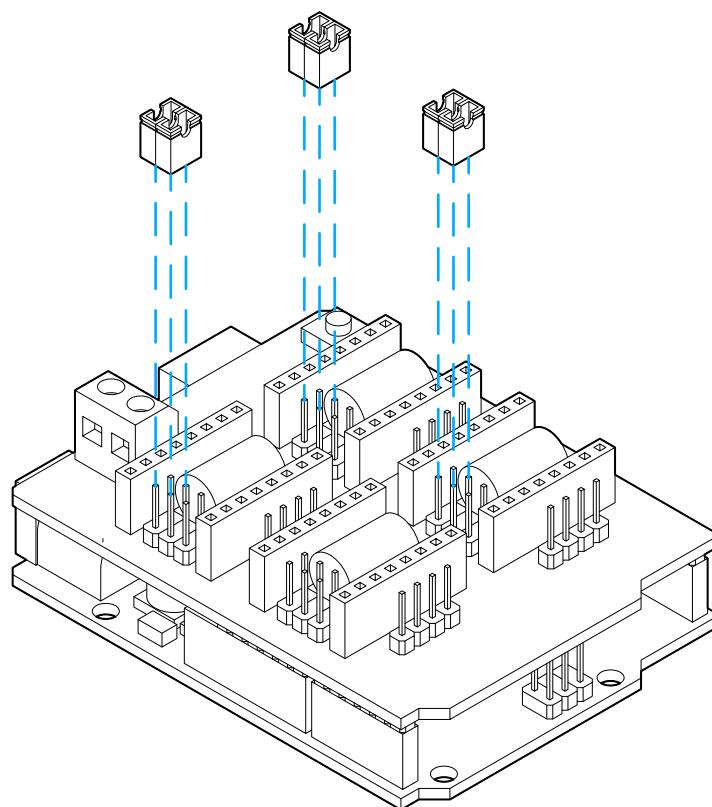


STEP 26

Attaching the
Header
Jumpers



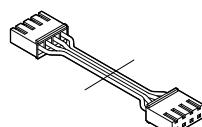
E-HJ
6x



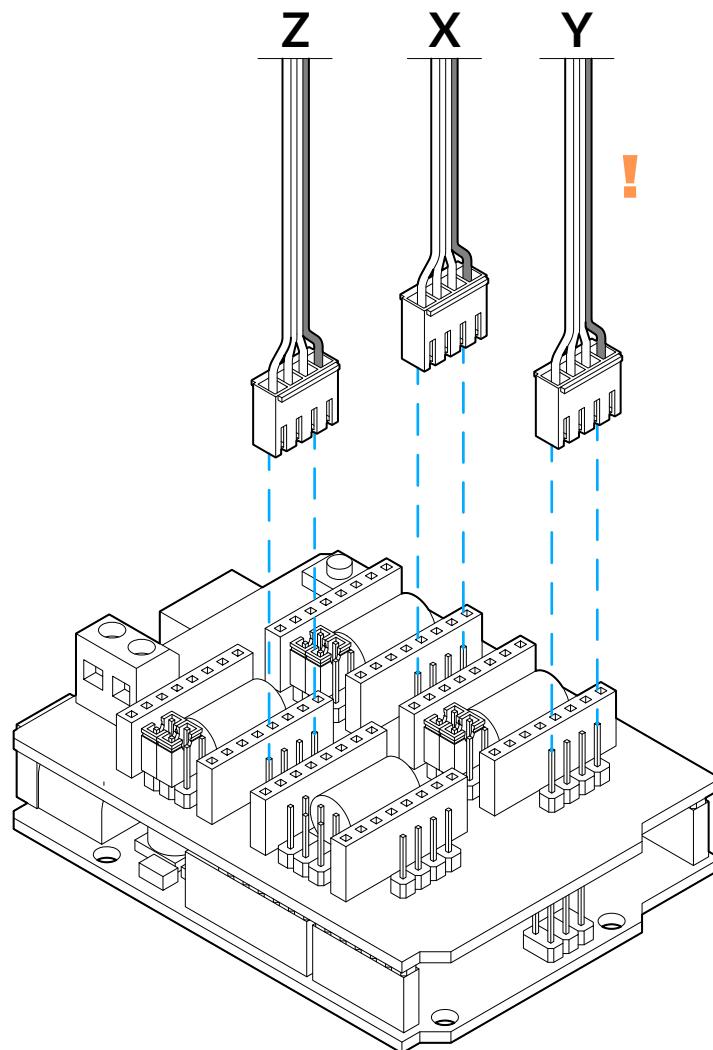
SCIENCI LABS
DESKTOP CNC MILLING

STEP 27

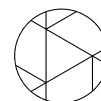
Attaching
Motor Cables



E-C
3x



! Make sure the black wire is oriented as depicted



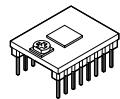
SIENCI LABS
DESKTOP CNC MILLING

STEP 28

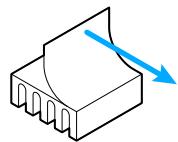
Attaching
Stepper Driver
Chips



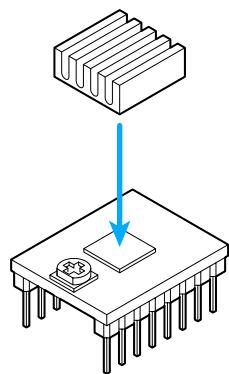
E-SDH
3x



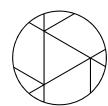
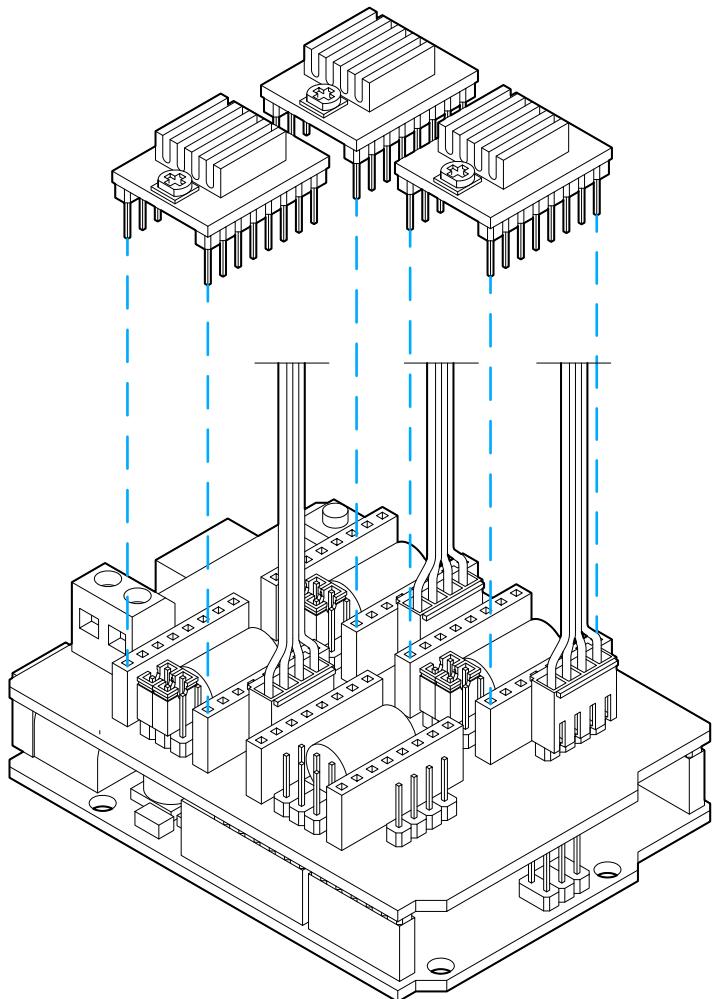
E-SDC
3x



3x



3x



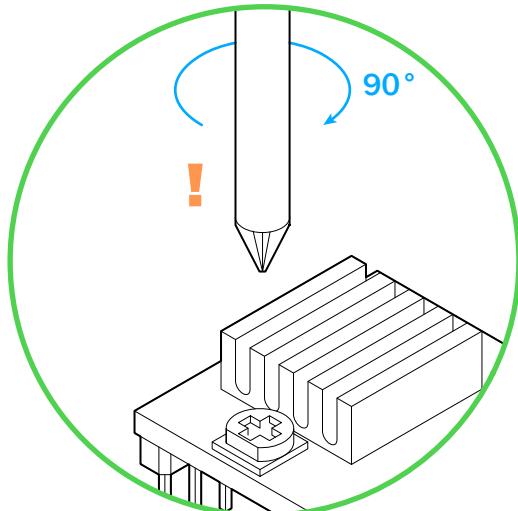
SIENCI LABS
DESKTOP CNC MILLING

STEP 29

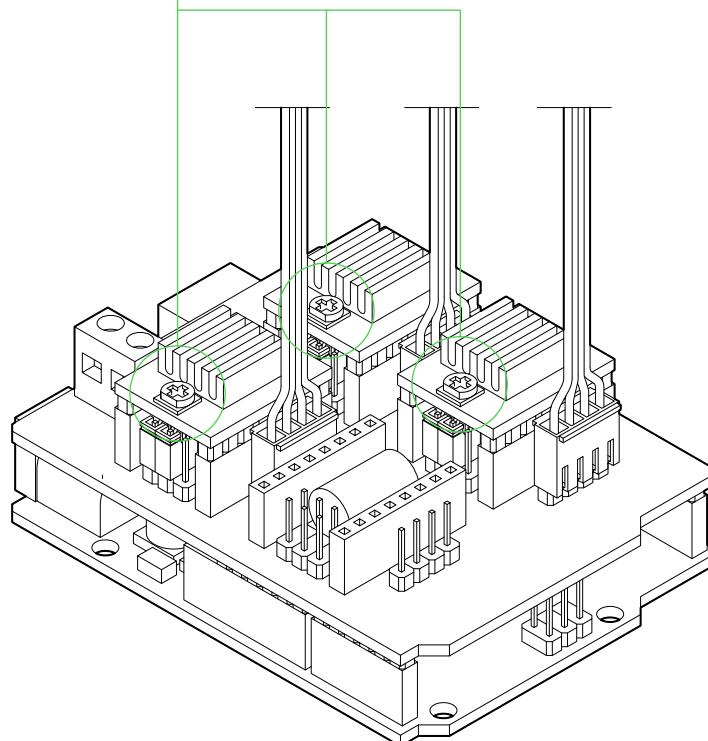
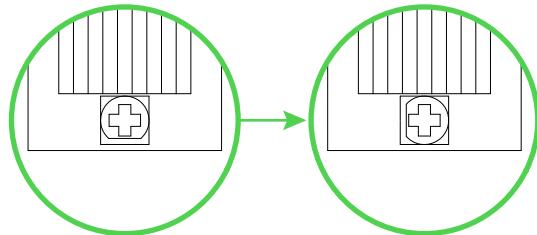
Tuning the
Stepper Motor
Drivers



Phillips



The stepper drivers should be tuned using the potentiometer on the front so that the flat edge on the dial faces to the left; this gives the stepper motors on the Mill One the right amount of power to run effectively. If further tuning is required, turning the flat either counterclockwise or clockwise will increase or decrease the motor power respectively.



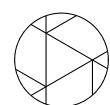
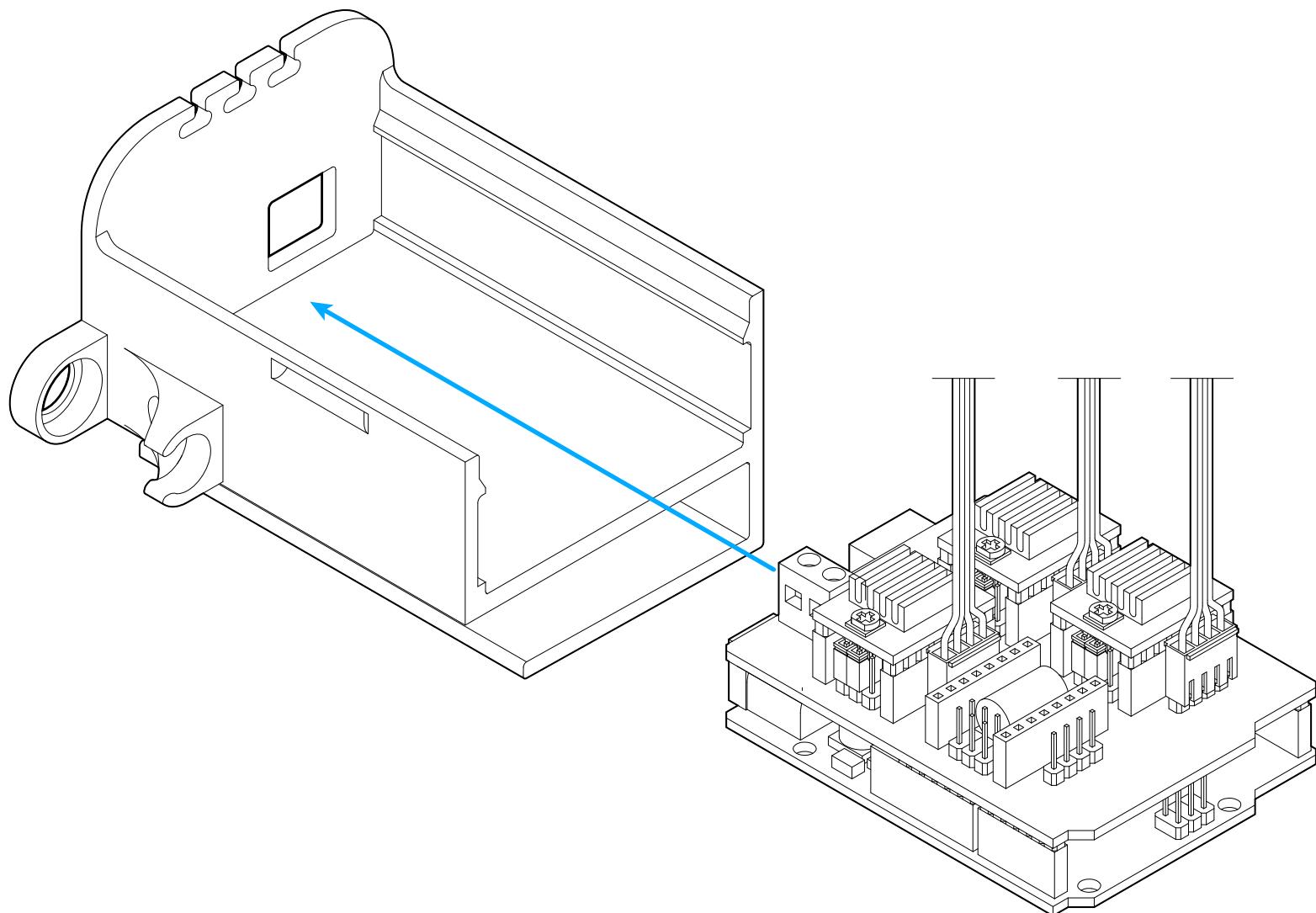
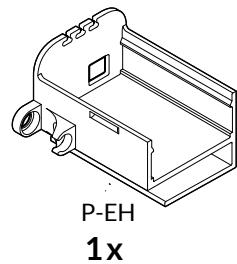
! Stepper driver potentiometers should never be turned while the board is powered up



SIENCI LABS
DESKTOP CNC MILLING

STEP 30

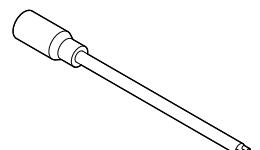
Placing Boards
into Electronics
Holder



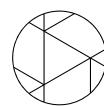
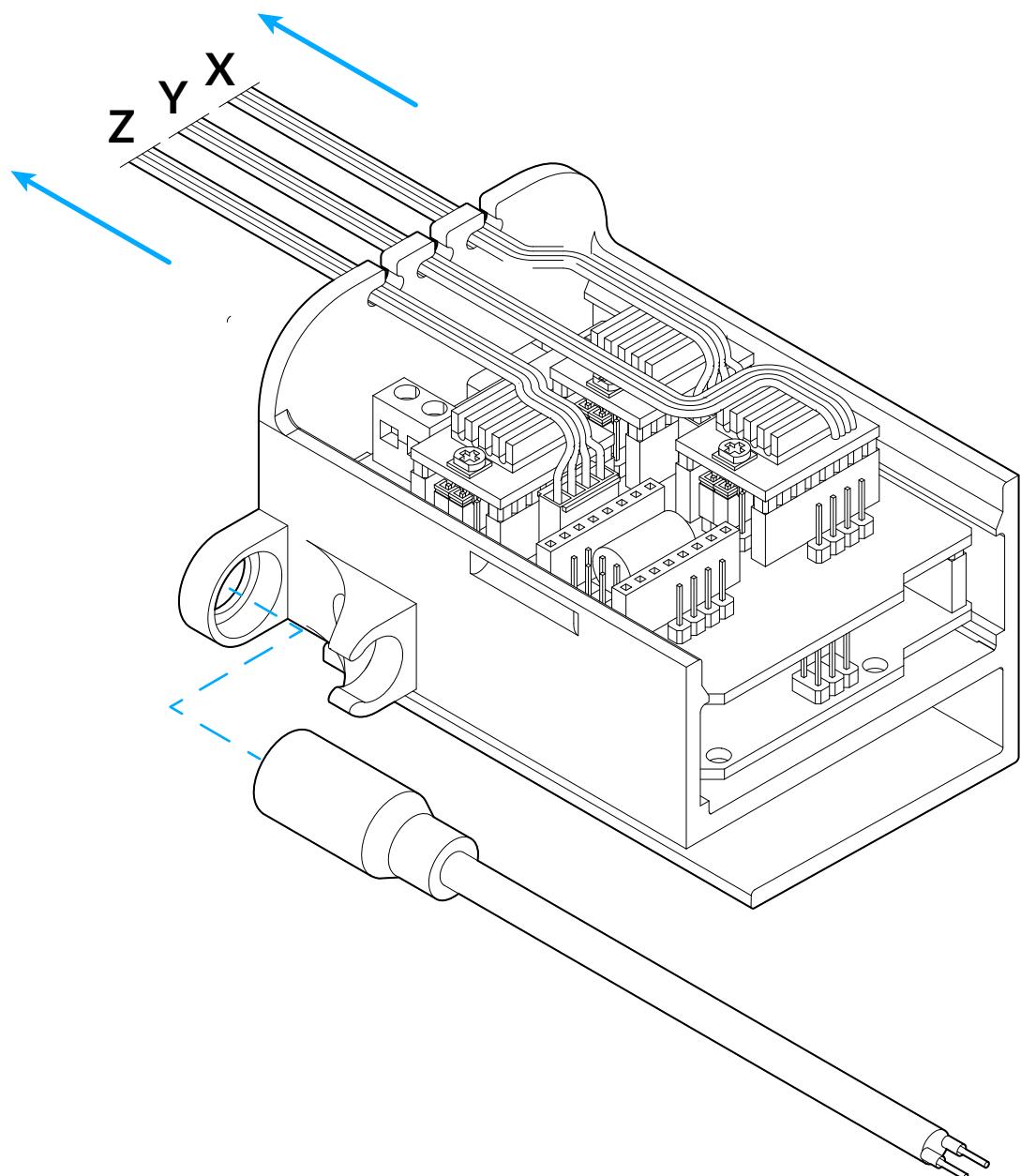
SIENCI LABS
DESKTOP CNC MILLING

STEP 31

Attaching
DC Jack



E-J
1x



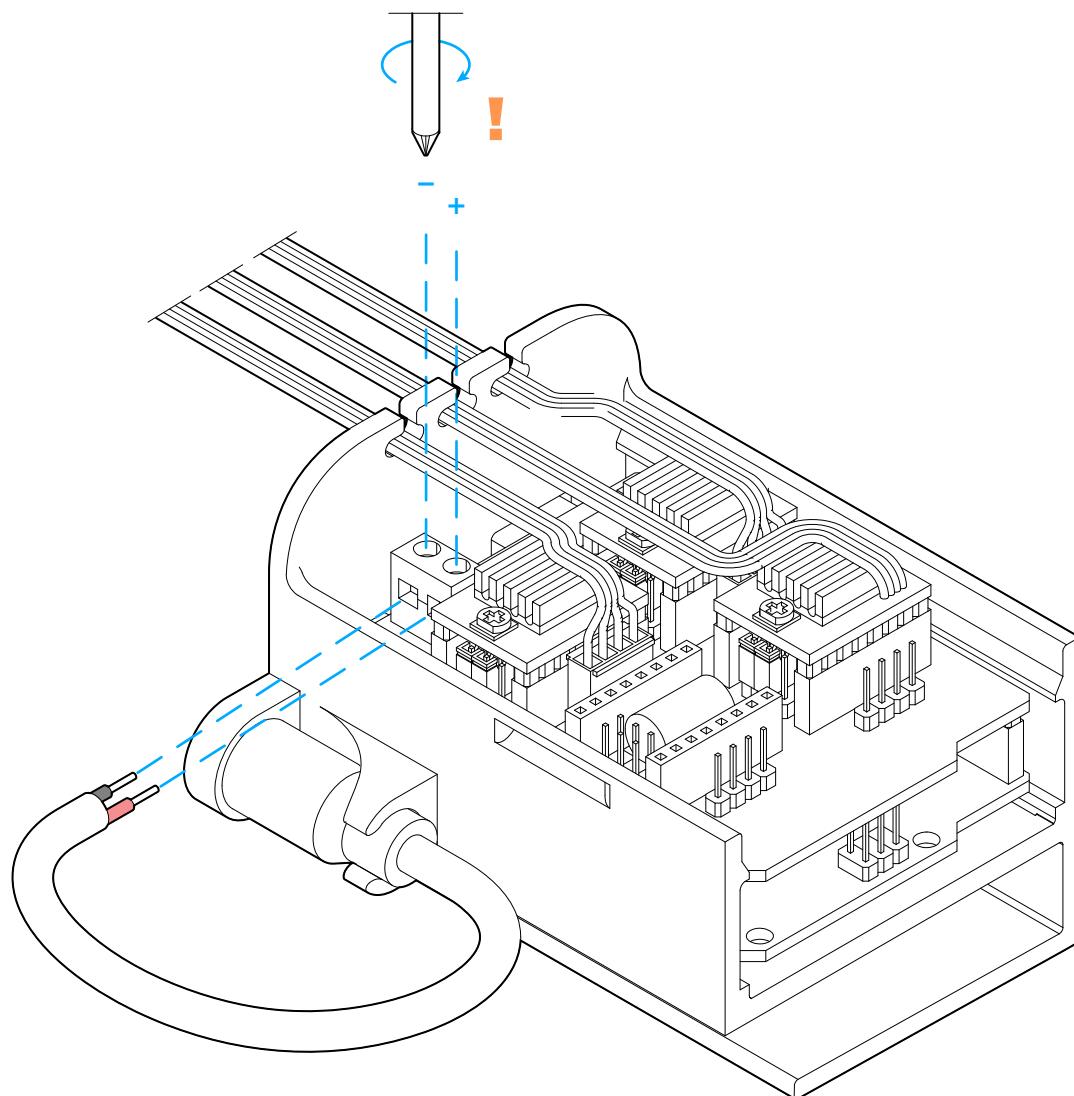
SCIENCI LABS
DESKTOP CNC MILLING

STEP 32

Attaching
DC Jack



Phillips



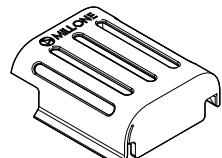
! Ensure polarity is correct to avoid damage to electronics



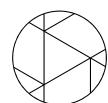
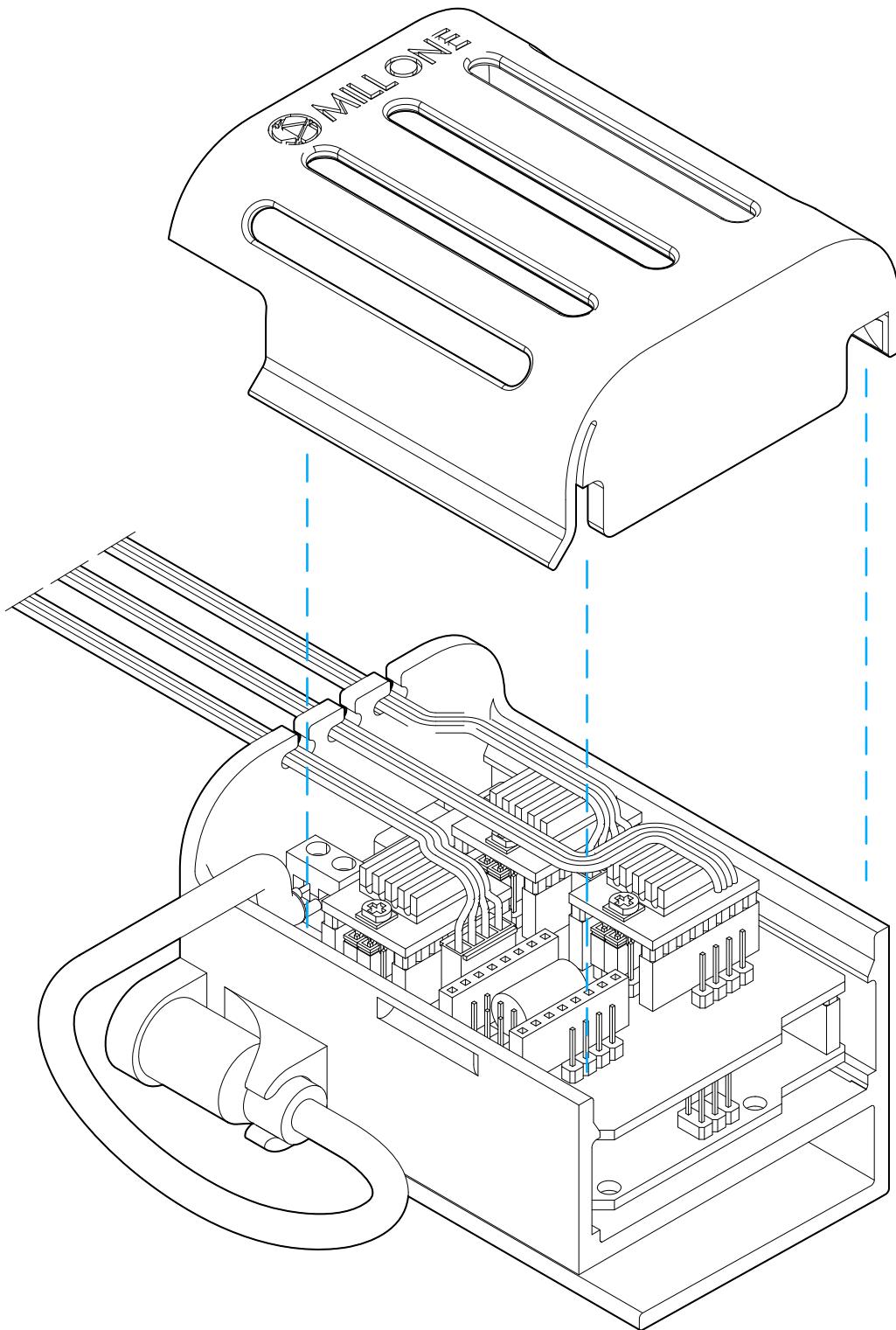
SCIENCI LABS
DESKTOP CNC MILLING

STEP 33

Covering the
Enclosure



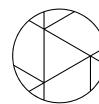
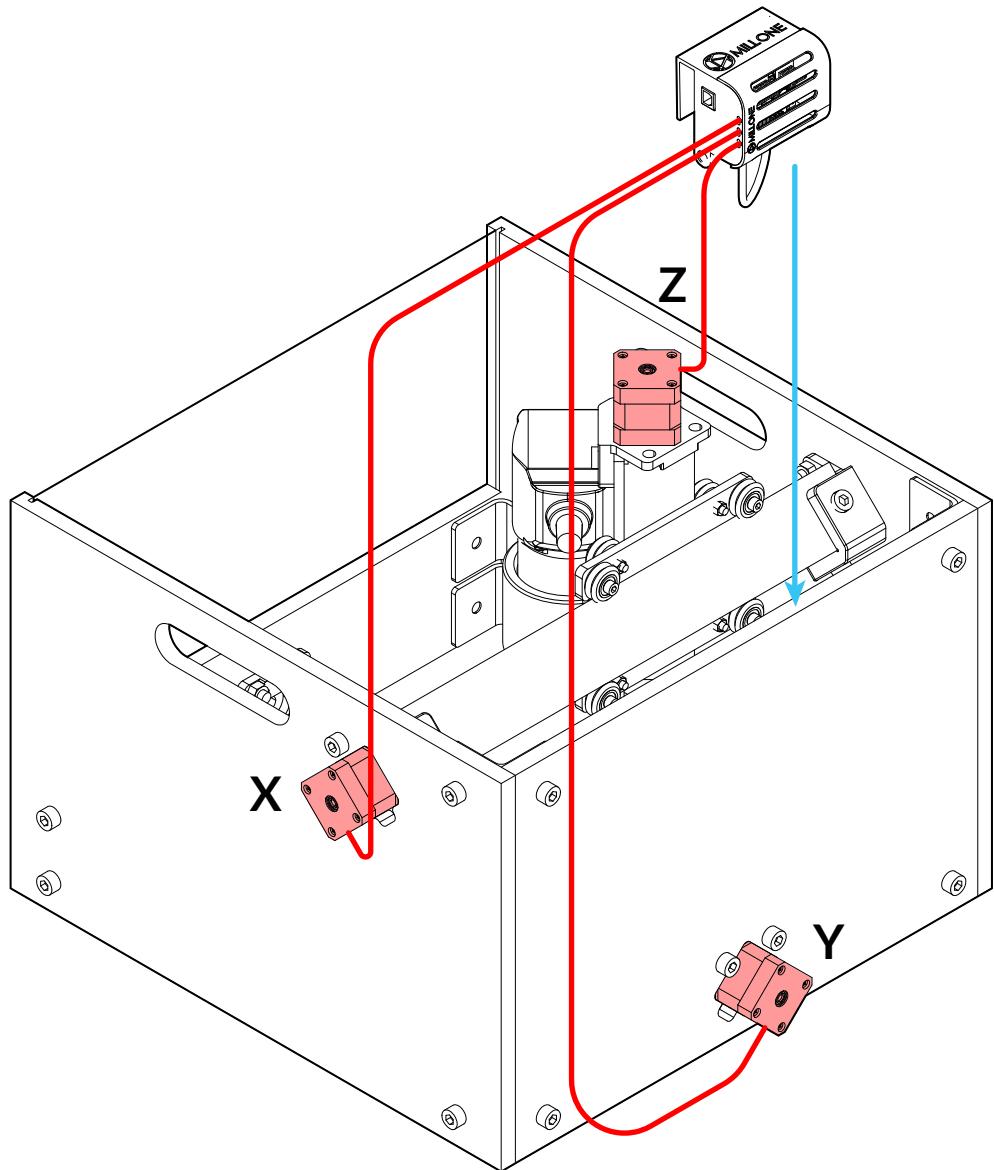
P-EC
1x



SIENCI LABS
DESKTOP CNC MILLING

STEP 34

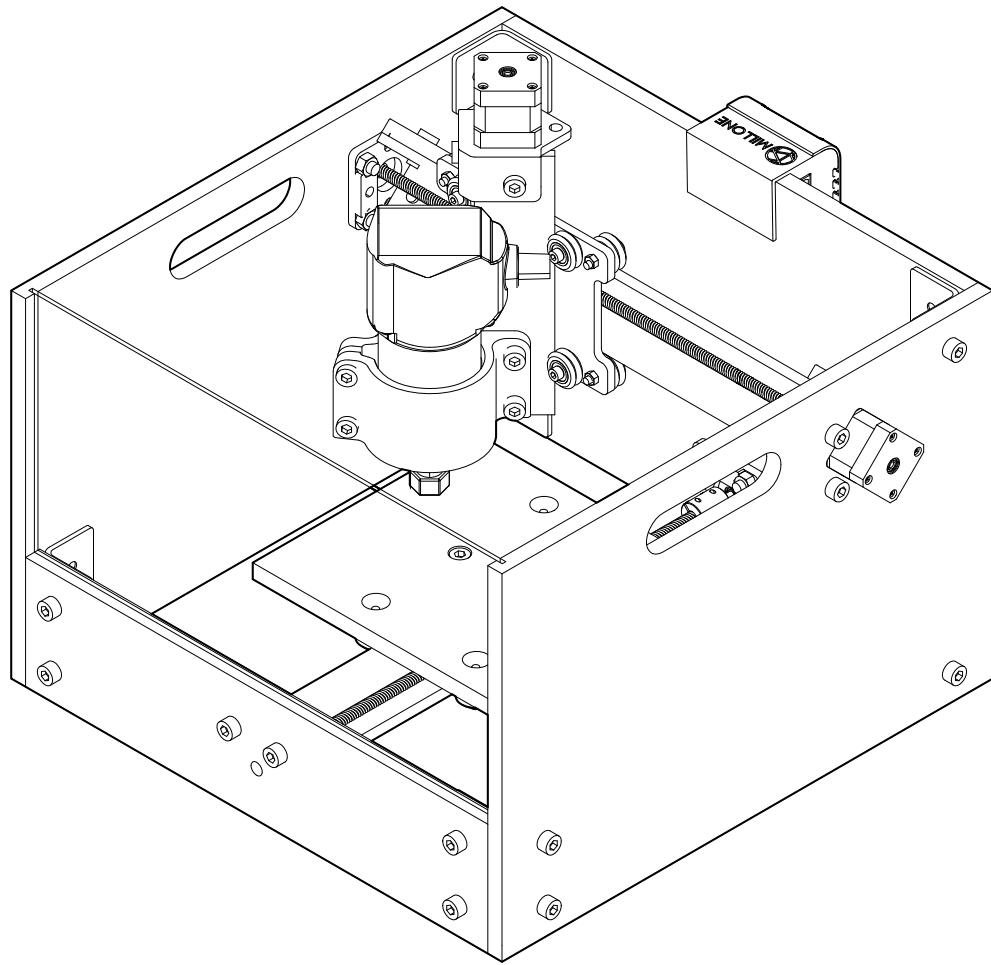
Attaching
Electronics to
Motors



SCIENCI LABS
DESKTOP CNC MILLING

STEP 35

Assembled
Mill One



Your Mill One is now fully assembled. Don't plug in your power brick yet, simply connect the USB cable to your computer and continue onto the next steps.