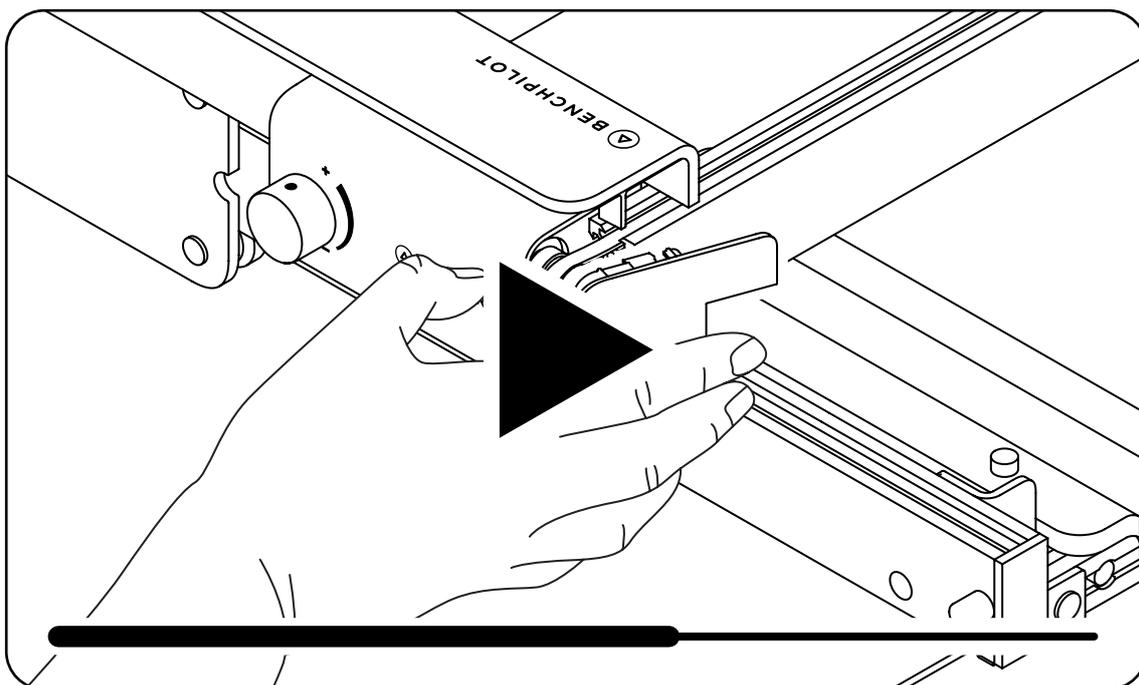


Shaper BenchPilot

Assembly & Usage Instructions

Video Walkthrough Available



Scan the QR code or visit
shapertools.com/benchpilot-video
to watch a video walkthrough of
these assembly instructions.

1 YEAR WARRANTY

Included with your BenchPilot

+1 YEAR EXTENSION

When you register your BenchPilot at
shapertools.com/register/benchpilot



*Register your BenchPilot at shapertools.com/register/benchpilot
for a two year warranty. Terms and Conditions apply.*

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P23	8. Install Workstation
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P25-33	10. Install the Crossbar
P34	11. Install the Emergency Stop Box
P35-38	12. Install the Origin Harness
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P46	16. Wiring Diagram
P47-48	17. Secure BenchPilot to your Workbench
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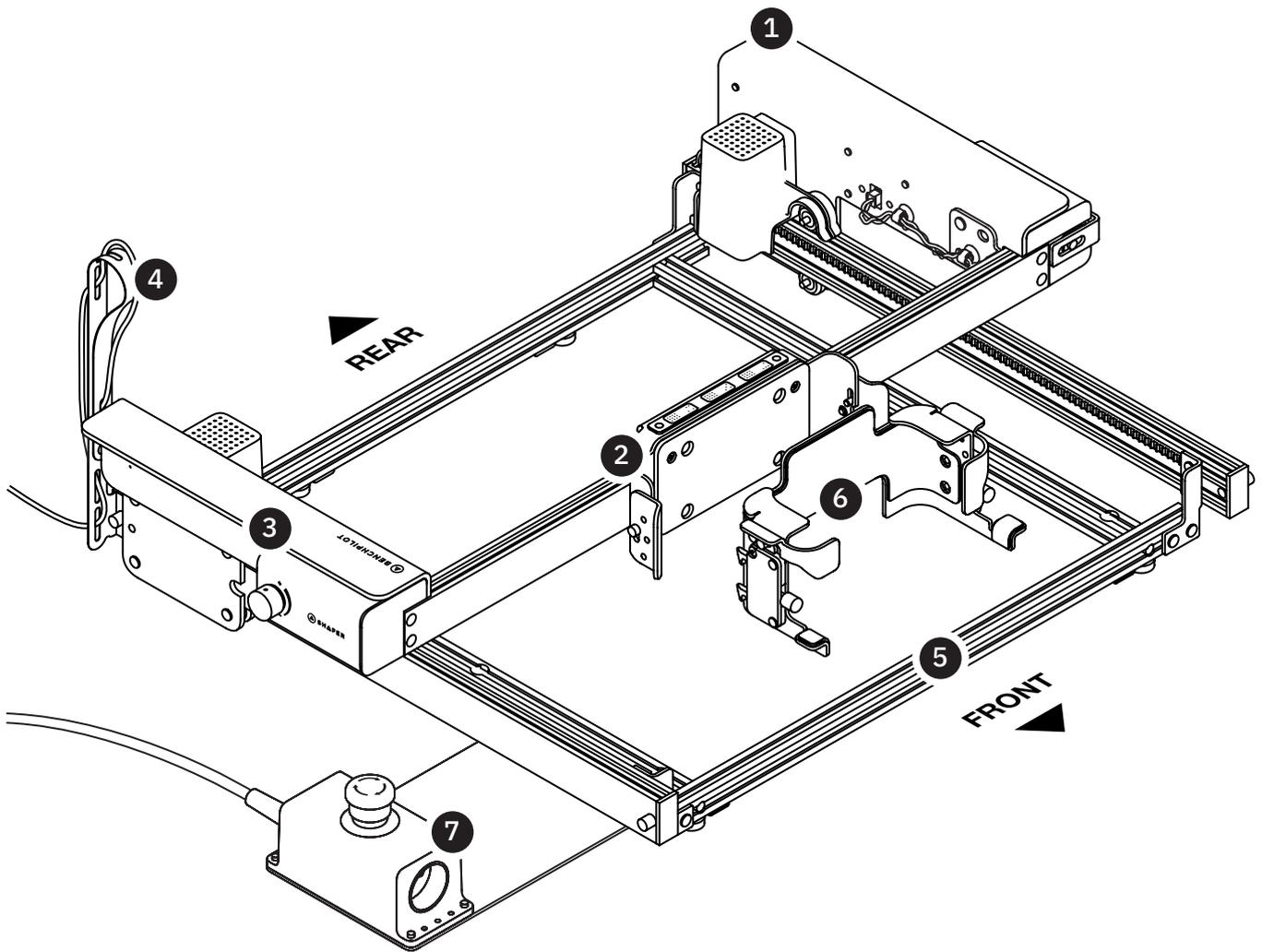


ESTIMATED ASSEMBLY TIME: 1 HOUR

Shaper BenchPilot is designed only to be driven by Shaper Origin, and used with compatible Shaper accessories. Do not use it in configurations that it has not been designed for.



Warning! Read all safety warnings, instructions, illustrations and specifications provided with this power tool. Failure to follow all instructions listed in the provided safety guide may result in electric shock, fire, and/or serious injury. **Save all warnings and instructions for future reference.**



1
Right Arm

2
Crossbar
*Includes Docking Carriage
for Origin*

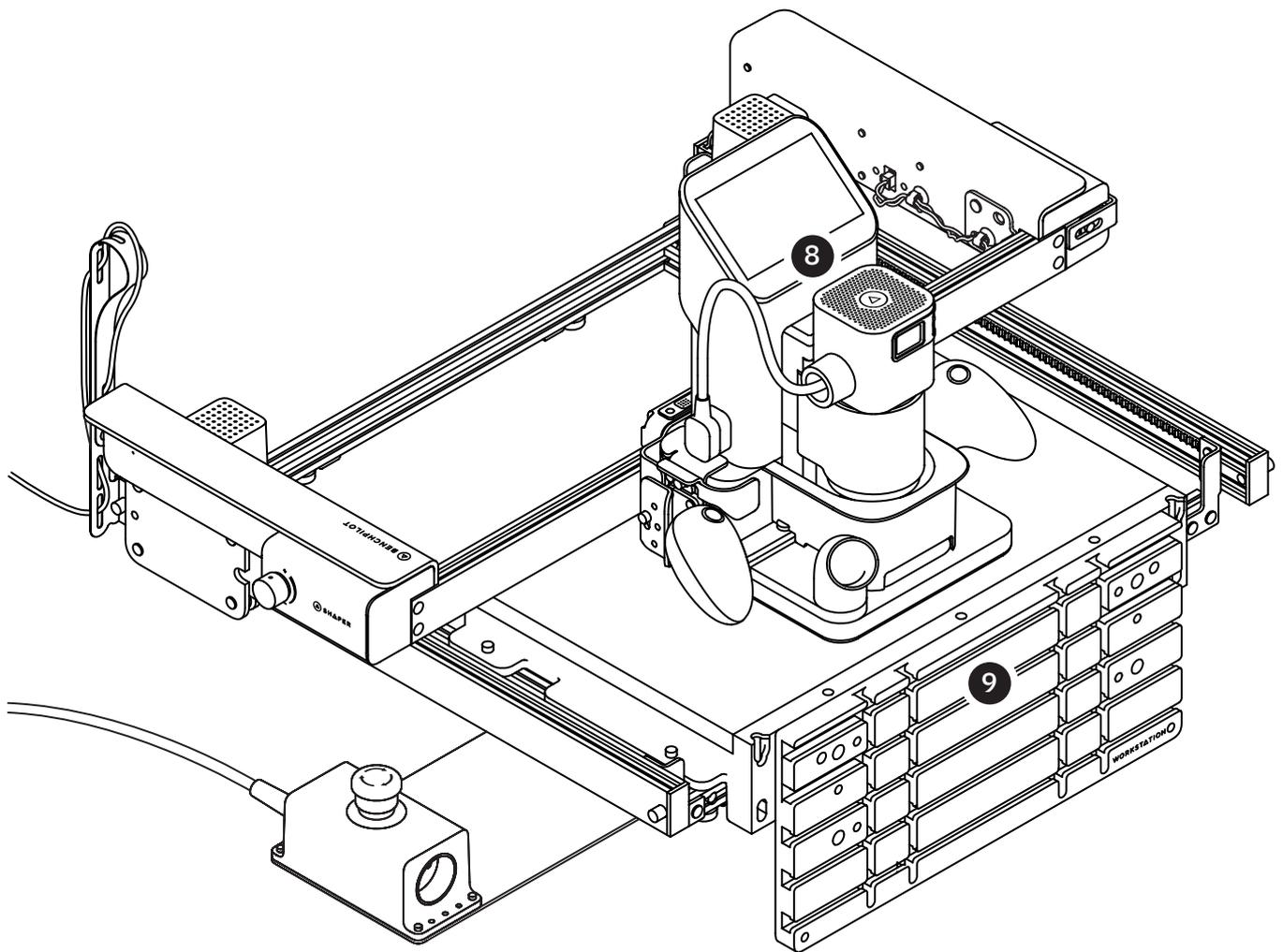
3
Left Arm
*Includes Auto Speed
Adjustment Dial*

4
DC Cable
*Threaded Through DC
Cable Strain Relief*

5
Base Frame Assembly
*Includes X-Bars (2x)
and Y-Bars (2x)*

6
Origin Harness
*Left and Right Shoulder
Brackets Attached*

7
Emergency Stop Box
*Attached to Emergency
Stop Box Bracket*



8

Shaper Origin

*Mounted within Origin Harness,
Docked onto BenchPilot*

NOTE:

*Power Supply not shown. Refer to
Step 16 for Wiring Diagram.*

9

Shaper Workstation

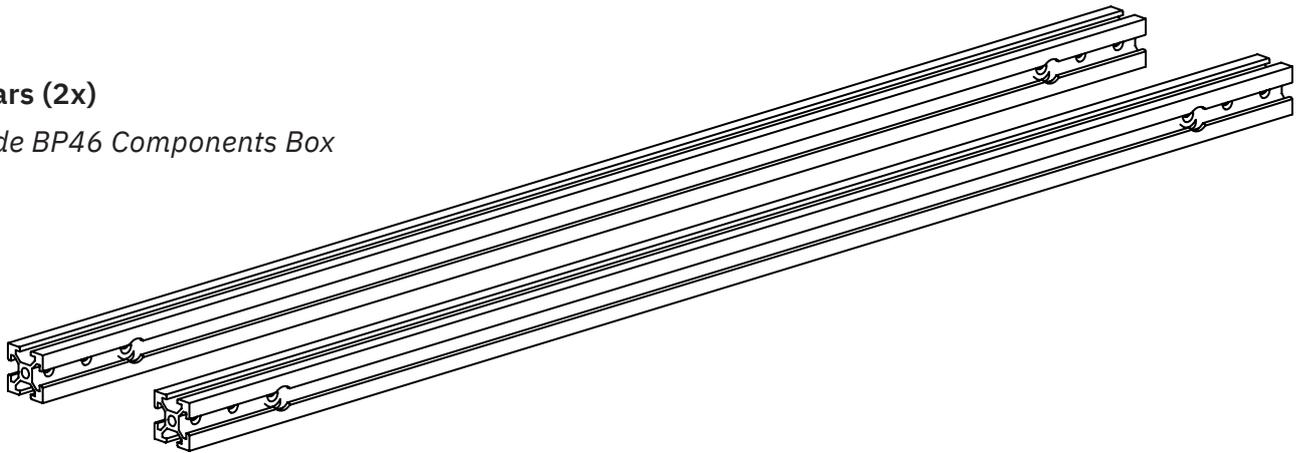
*Mounted to BenchPilot's
Base Frame Assembly*

NOTE:

*Shaper Origin and Shaper
Workstation are sold separately.*

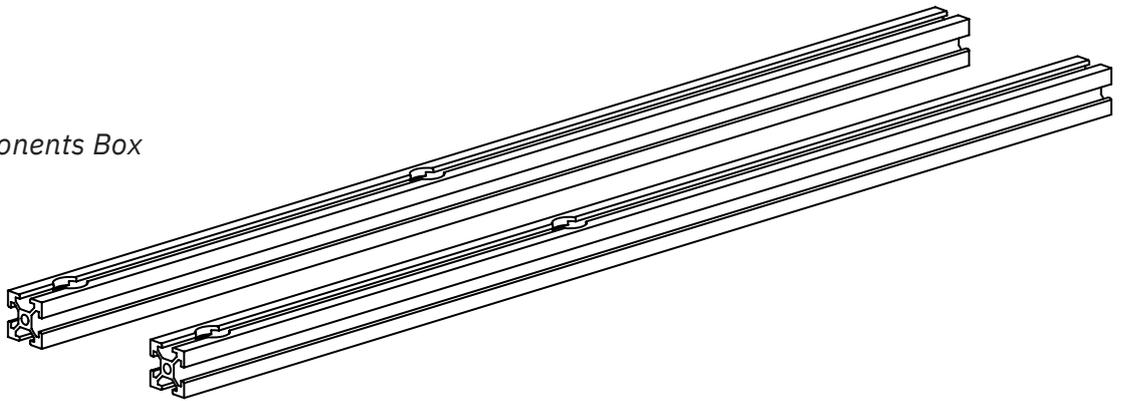
X-Bars (2x)

Inside BP46 Components Box



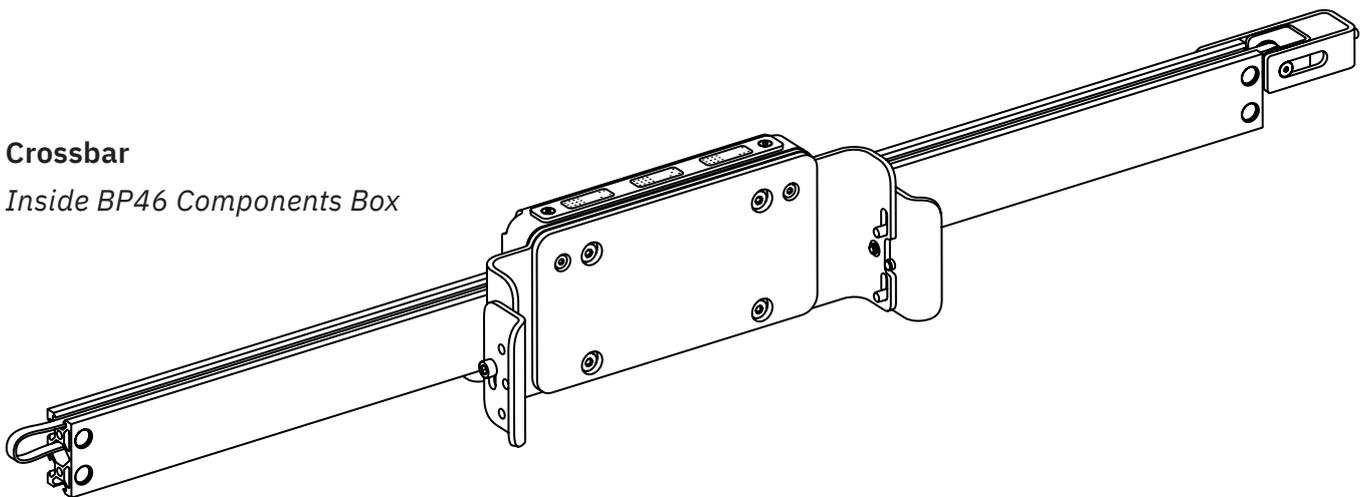
Y-Bars (2x)

Inside Core Components Box



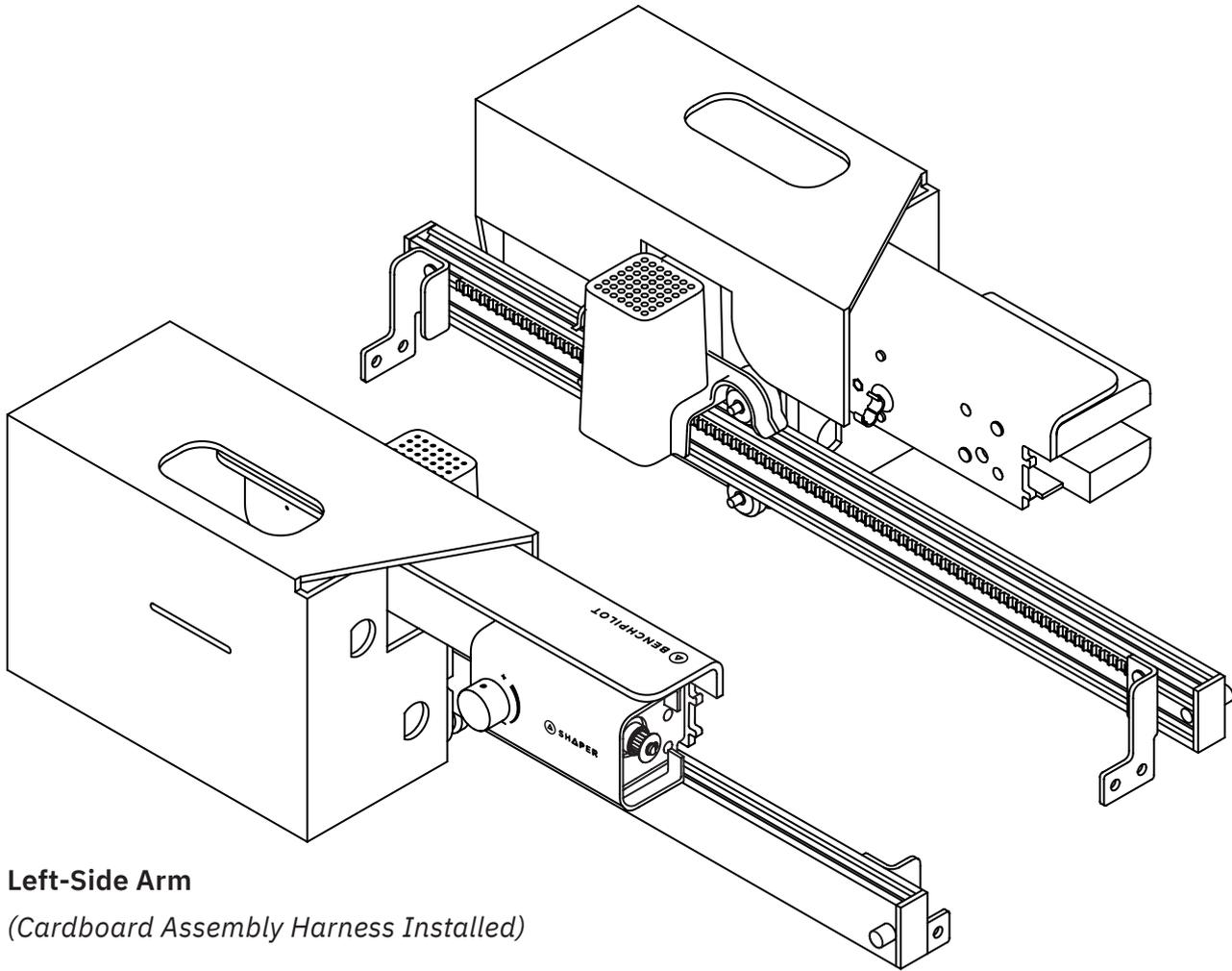
Crossbar

Inside BP46 Components Box



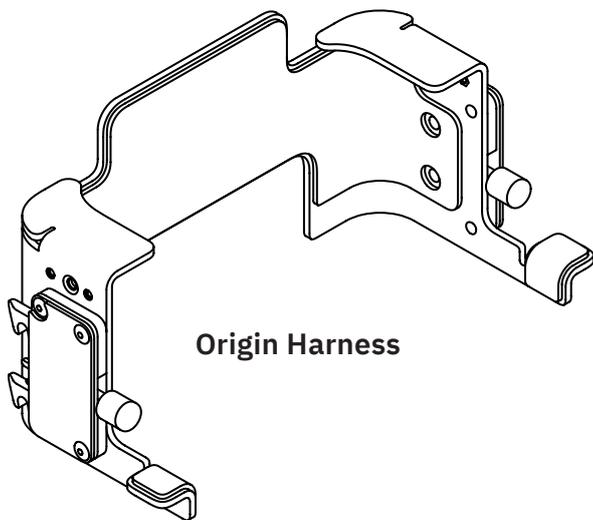
Right-Side Arm

(Cardboard Assembly Harness Installed)



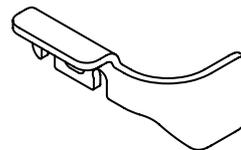
Left-Side Arm

(Cardboard Assembly Harness Installed)



Origin Harness

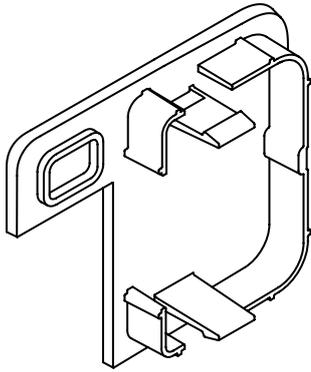
Left Shoulder Bracket



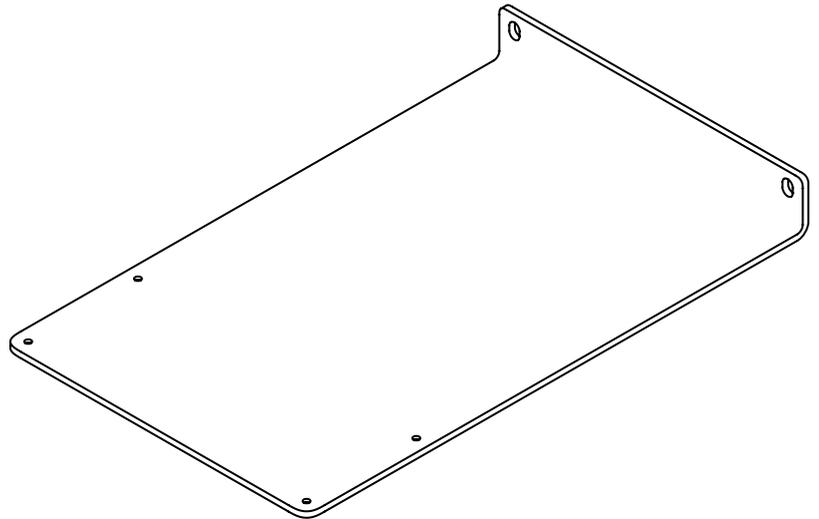
Right Shoulder Bracket



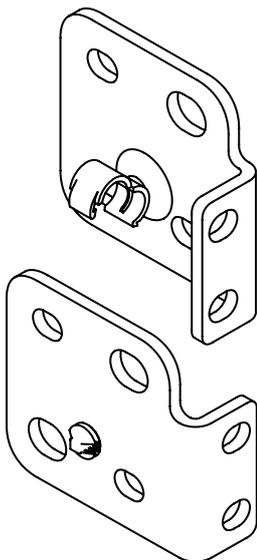
All parts listed above can be found in the Core Components Box.



Left Arm Cover

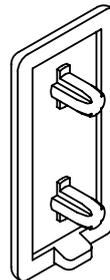


**Emergency Stop
Box Bracket**

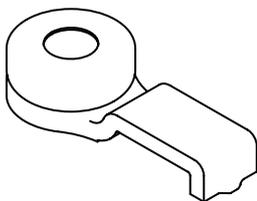


Right Crossbar Bracket

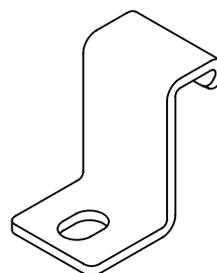
Left Crossbar Bracket



End Cap (1x)
(3x others pre-attached)

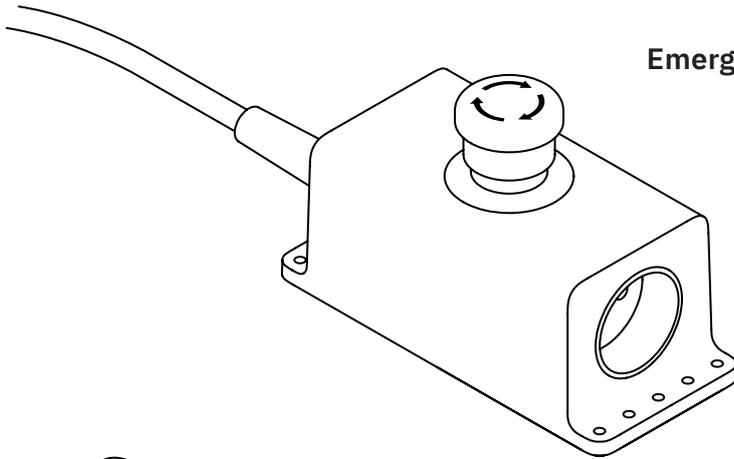


Feet (6x)



Hold Down Bracket (4x)

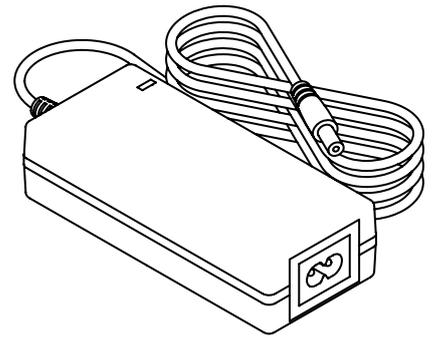
*All parts listed above can be found
in the Core Components Box.*



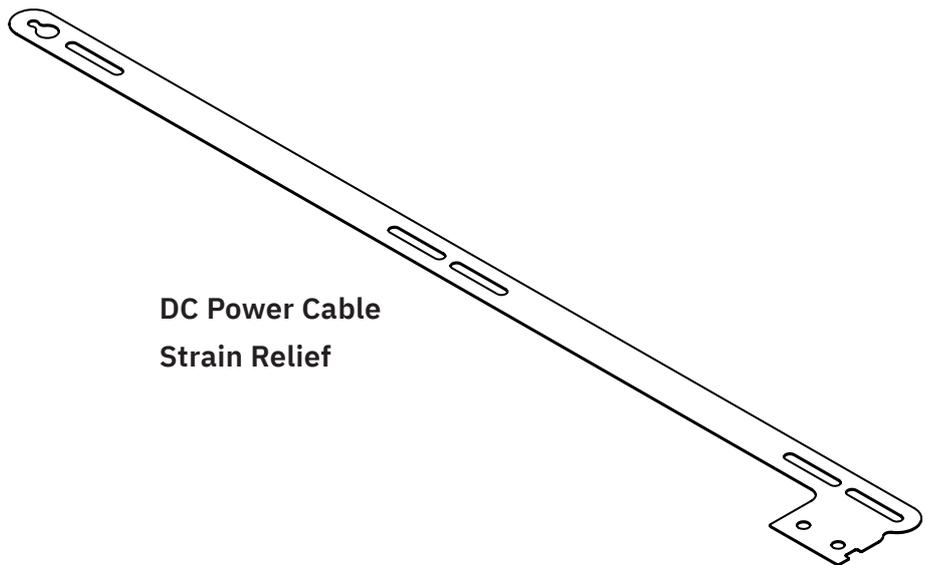
Emergency Stop Box



Power Supply AC Cable

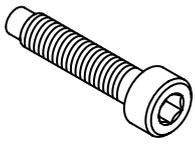


BenchPilot Power Supply



**DC Power Cable
Strain Relief**

*All parts listed above can be found
in the Core Components Box.*



Screw A (12x + 1x Spare)
4mm Hex Key



Screw B (16x + 1x Spare)
4mm Hex Key



Screw C (6x + 2x Spare)
4mm Hex Key



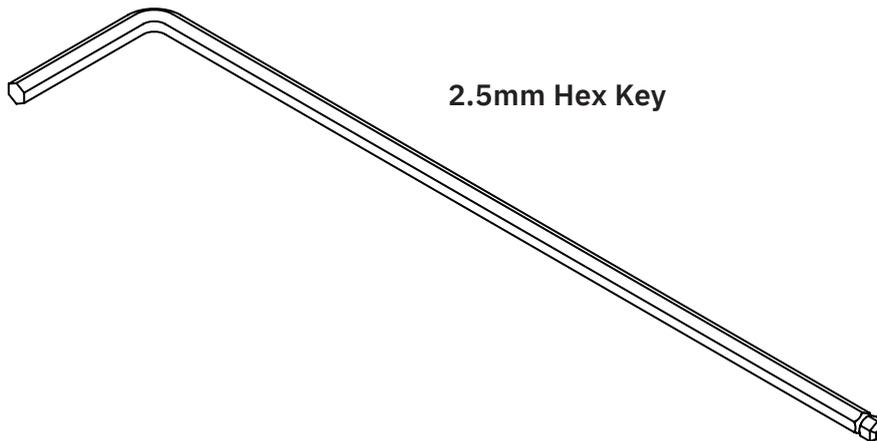
Screw D (4x + 1x Spare)
2.5mm Hex Key



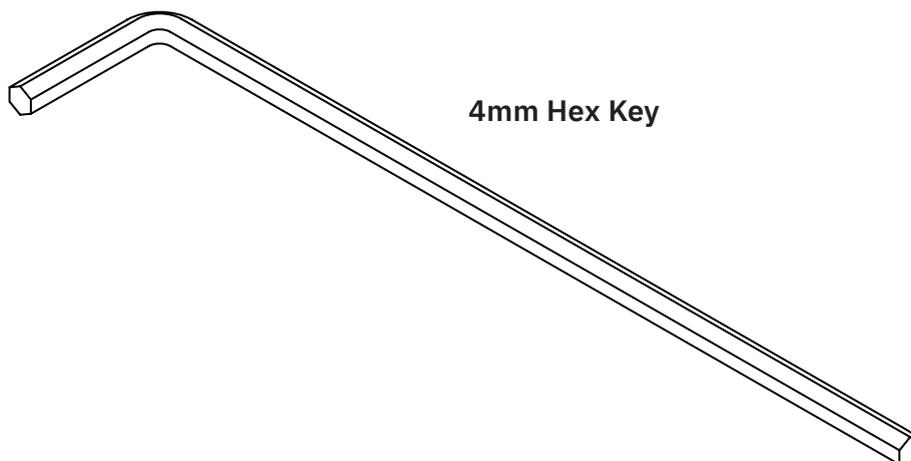
Screw E (2x + 1x Spare)
2.5mm Hex Key



M5 T-Nuts (2x + 1x Spare)
Accepts Screw C



2.5mm Hex Key



4mm Hex Key

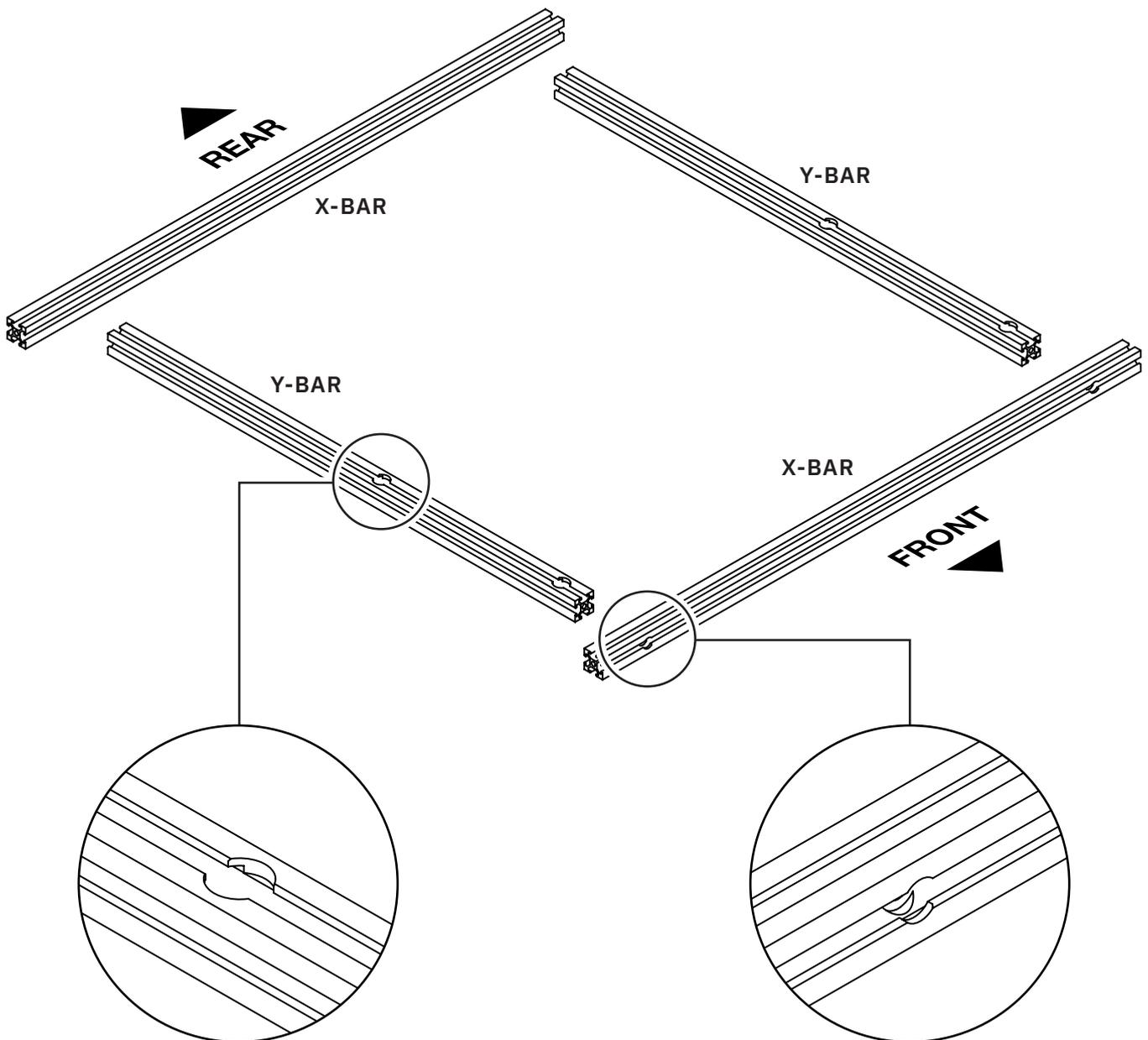
All hardware and assembly tools can be found inside the Core Components Box.

1 Lay Out the Base Frame Parts

EN

Parts Required:

- X-Bars (2x) Inside BP46 Components Box
- Y-Bars (2x) Inside Core Components Box



Ensure that the two holes on each Y-Bar are facing towards the FRONT of the Base Frame Assembly. Also ensure that the recessed openings on each hole are facing UP on both Y-Bars.

Ensure that the recessed openings in the X-Bars are facing OUTWARDS.

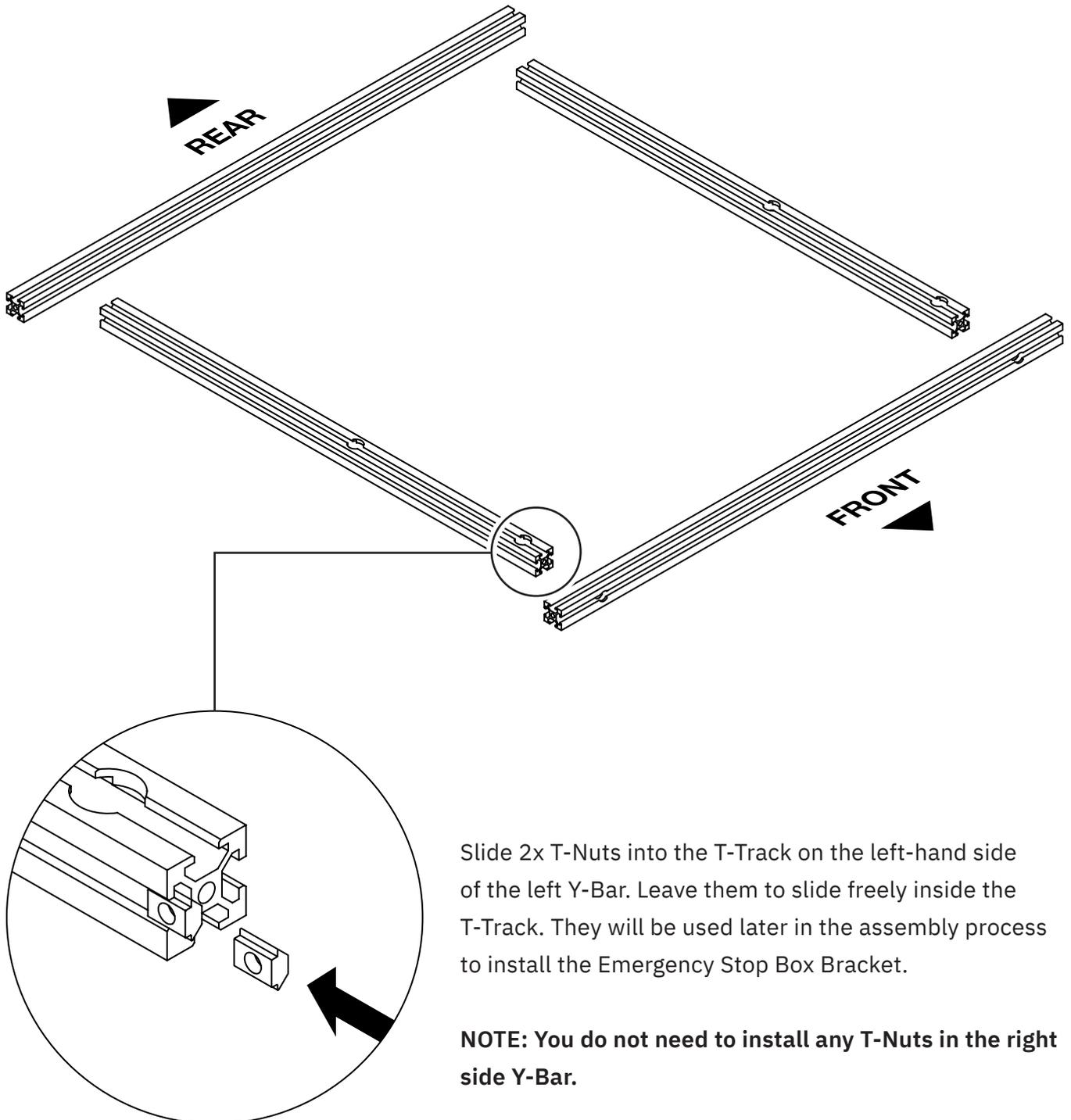
2 Insert the T-Nuts

EN

Fixings Required:



T-Nuts (2x)



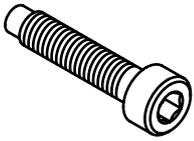
Slide 2x T-Nuts into the T-Track on the left-hand side of the left Y-Bar. Leave them to slide freely inside the T-Track. They will be used later in the assembly process to install the Emergency Stop Box Bracket.

NOTE: You do not need to install any T-Nuts in the right side Y-Bar.

3 Assemble and Fasten the Base Frame

EN

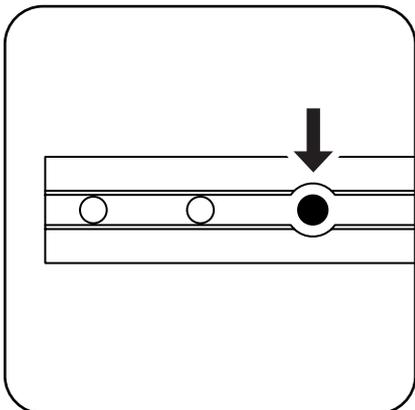
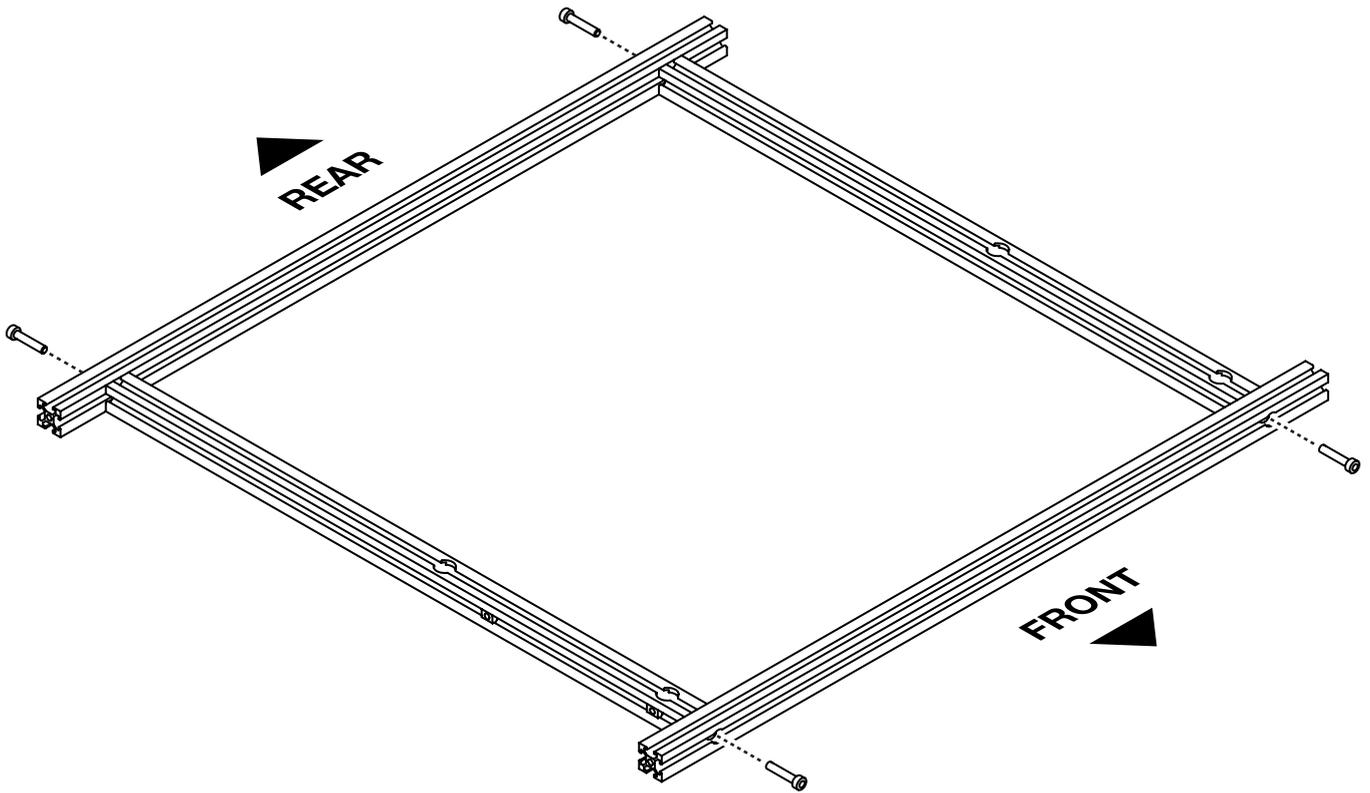
Fixings Required:



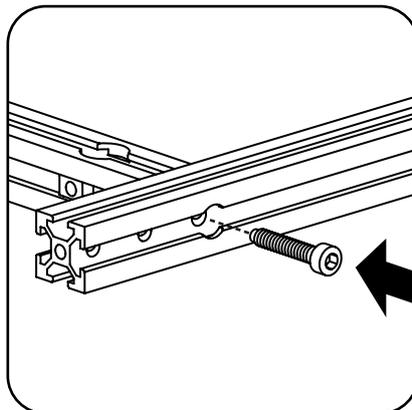
Screw A (4x)
4mm Hex Key



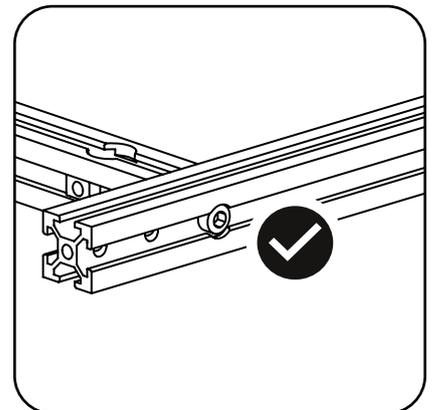
Take care to avoid cross threading screws. Start all screws using your hands to install finger-tight. Once all screws are inserted, use the hex key to fully tighten.



Identify the 3rd hole inboard of each end of the X-Bars.



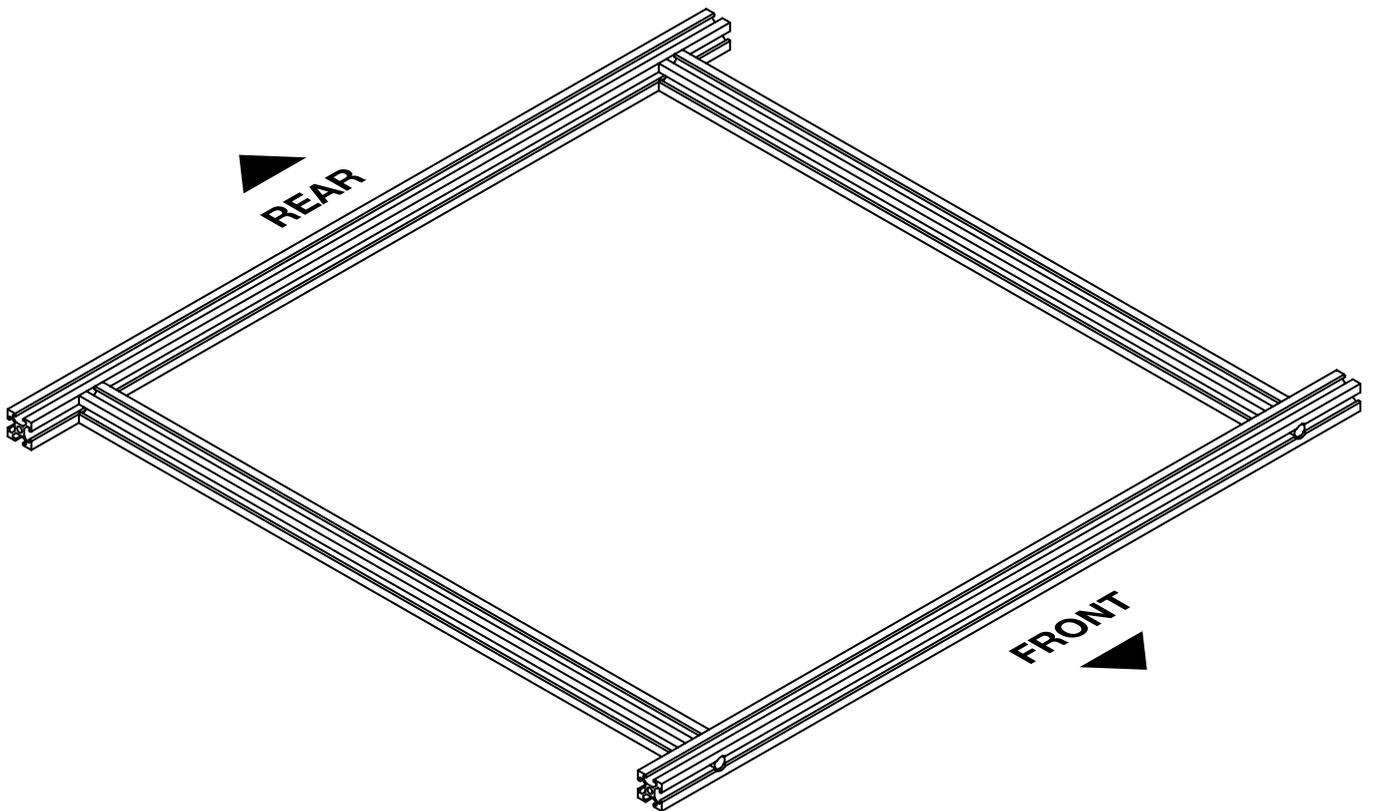
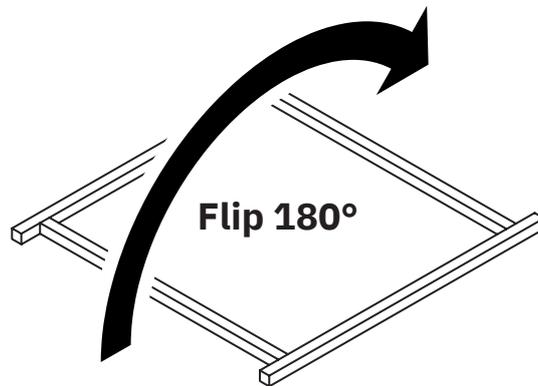
Fasten the X-Bars and Y-bars together using 4x of Screw A.



Ensure that all the screws fit flush or below the outside face of the X-Bars within the recessed openings.

4 Flip Over the Base Frame Assembly

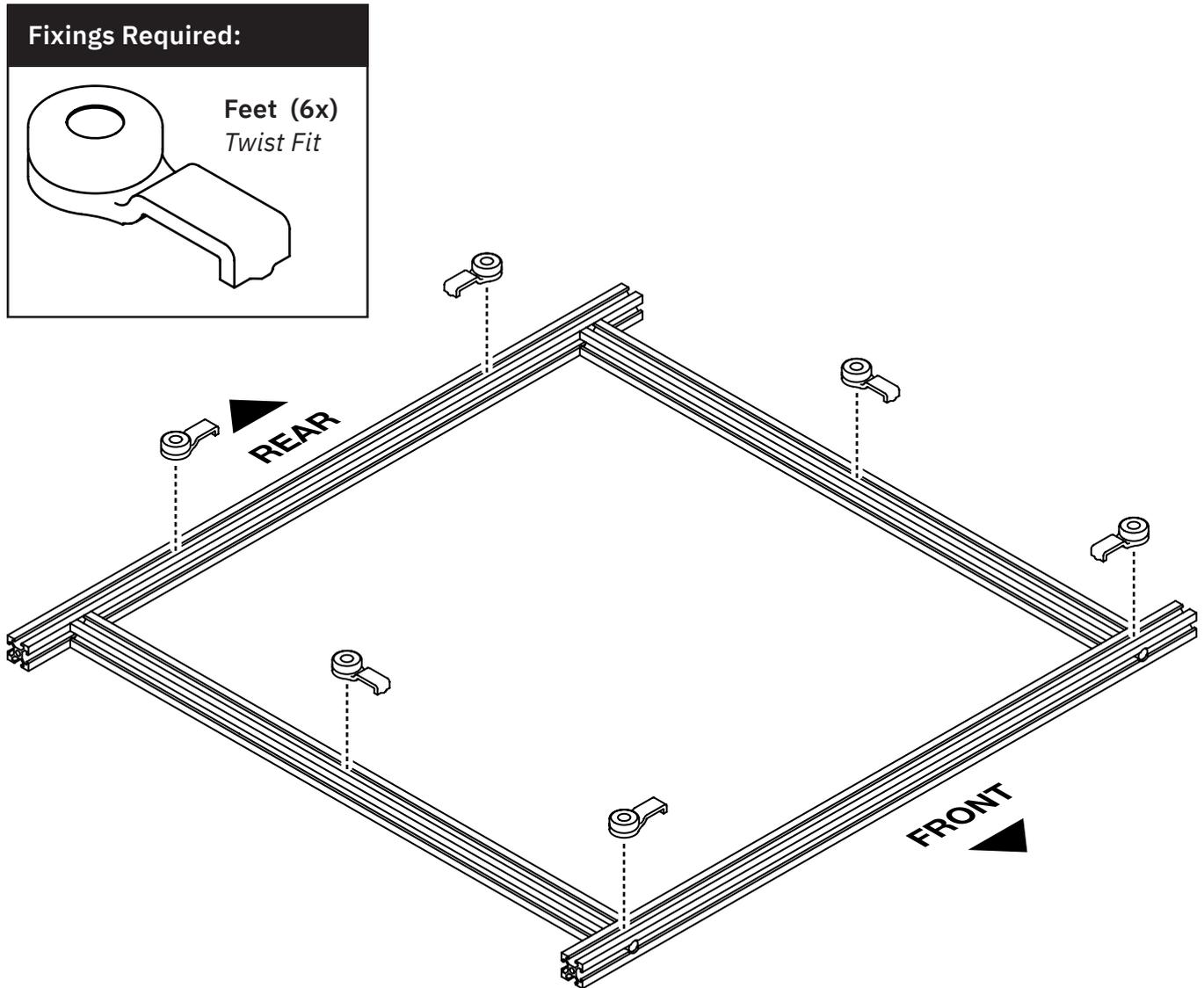
EN



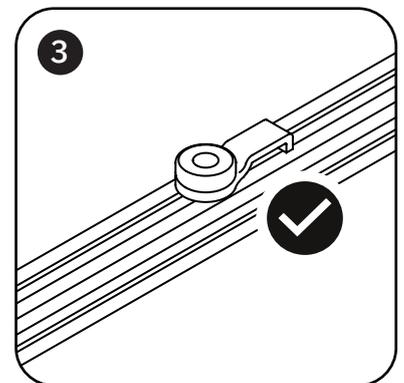
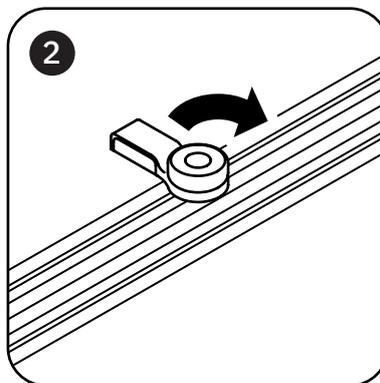
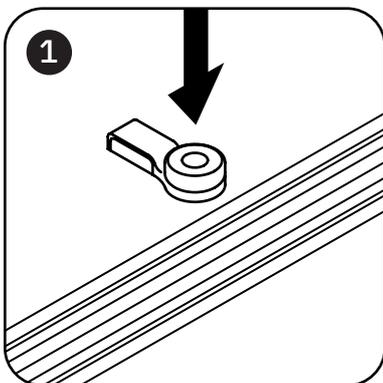
Flip the Base Frame Assembly upside down so you can access the underside of the X-Bars and Y-Bars.

5.1 Install the Feet

EN

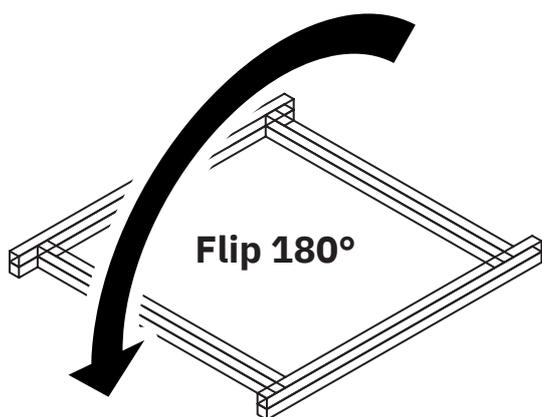


Install the feet by placing them into the T-Track in the bottom of the X-Bars and Y-Bars. Rotate them 90 degrees to lock them in place.



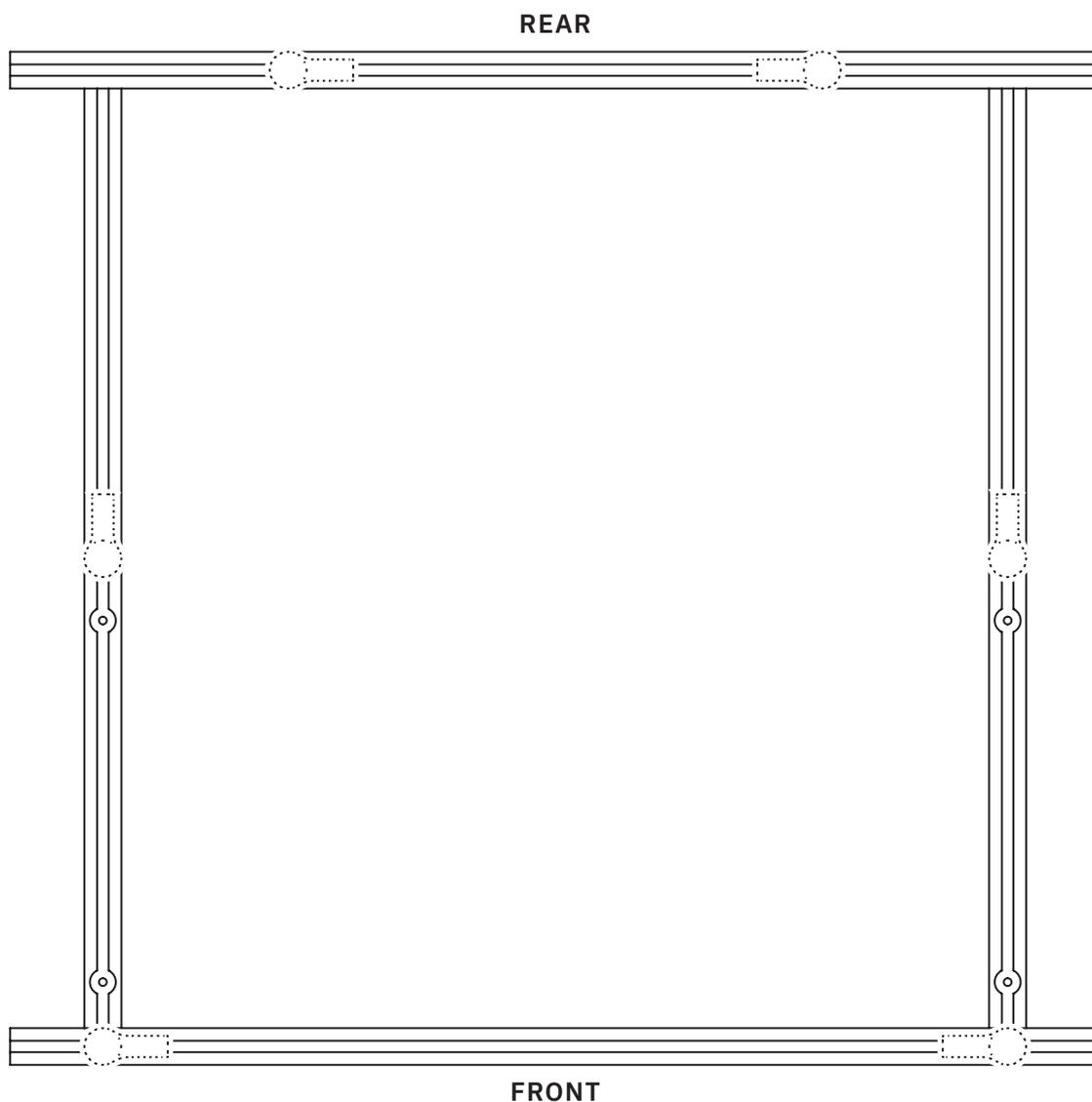
5.2 Install the Feet (Continued)

EN



Flip the Base Frame Assembly right side up so that the feet rest on your workbench top. Check that the layout of the feet approximately matches the illustration below when viewing the Base Frame Assembly from the top.

Note that your feet layout may differ depending on where you choose to position the Hold-Down Brackets (or your own clamps) in order to secure BenchPilot to your Workbench. Refer to [Step 17](#) for more information.



6 Install the Emergency Stop Box Bracket

EN

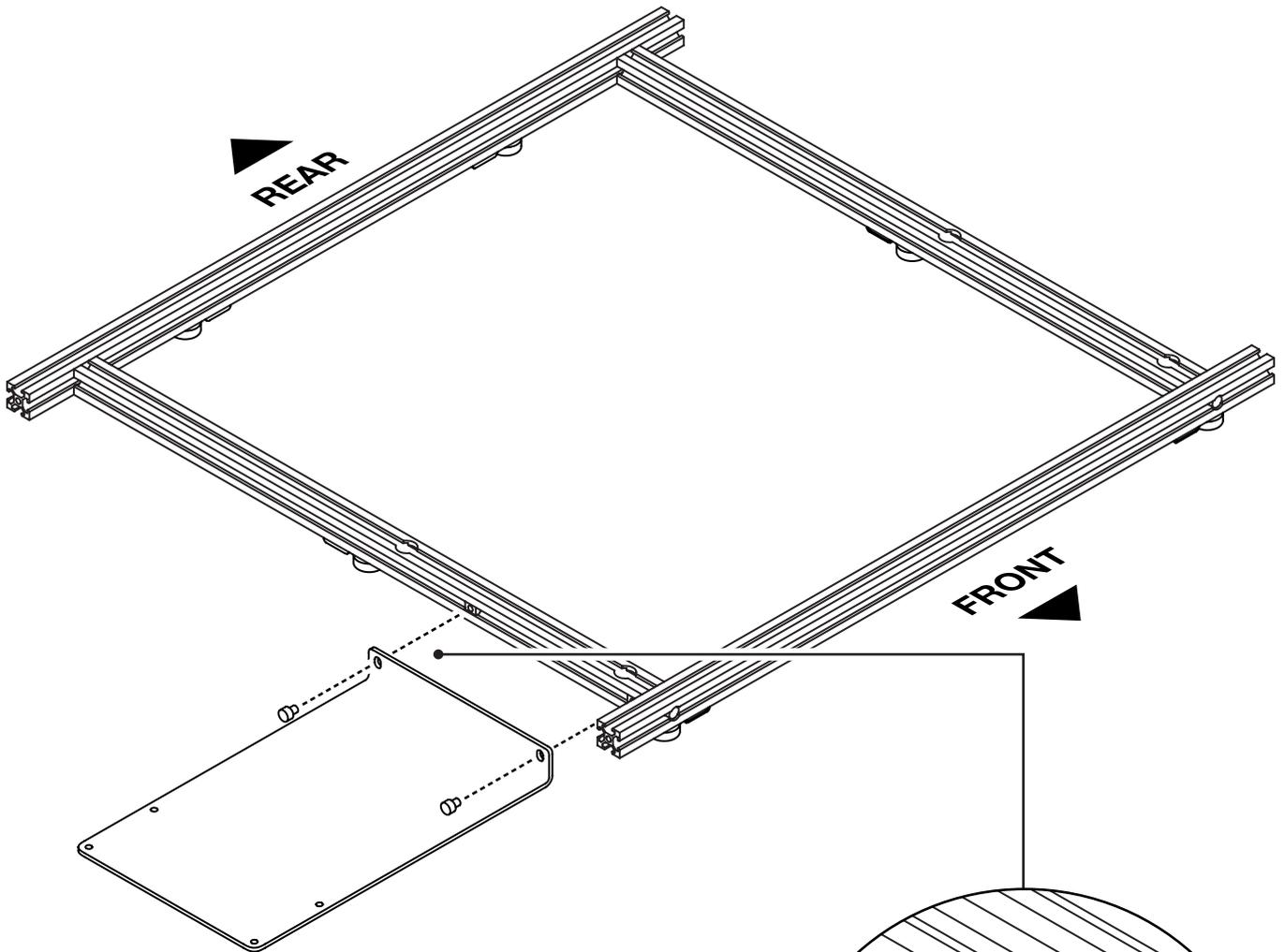
Parts Required:

- Emergency Stop Box Bracket

Fixings Required:



Screw C (2x)
4mm Hex Key



Attach the Emergency Stop Box Bracket to the left-hand side of the Base Frame Assembly. Align the T-Nuts in the left Y-Bar with the holes in the Emergency Stop Box Bracket and fasten in place with 2x of Screw C. Position the bracket near the front of the Base Frame Assembly to ensure the Emergency Stop button is within reach when operating BenchPilot.

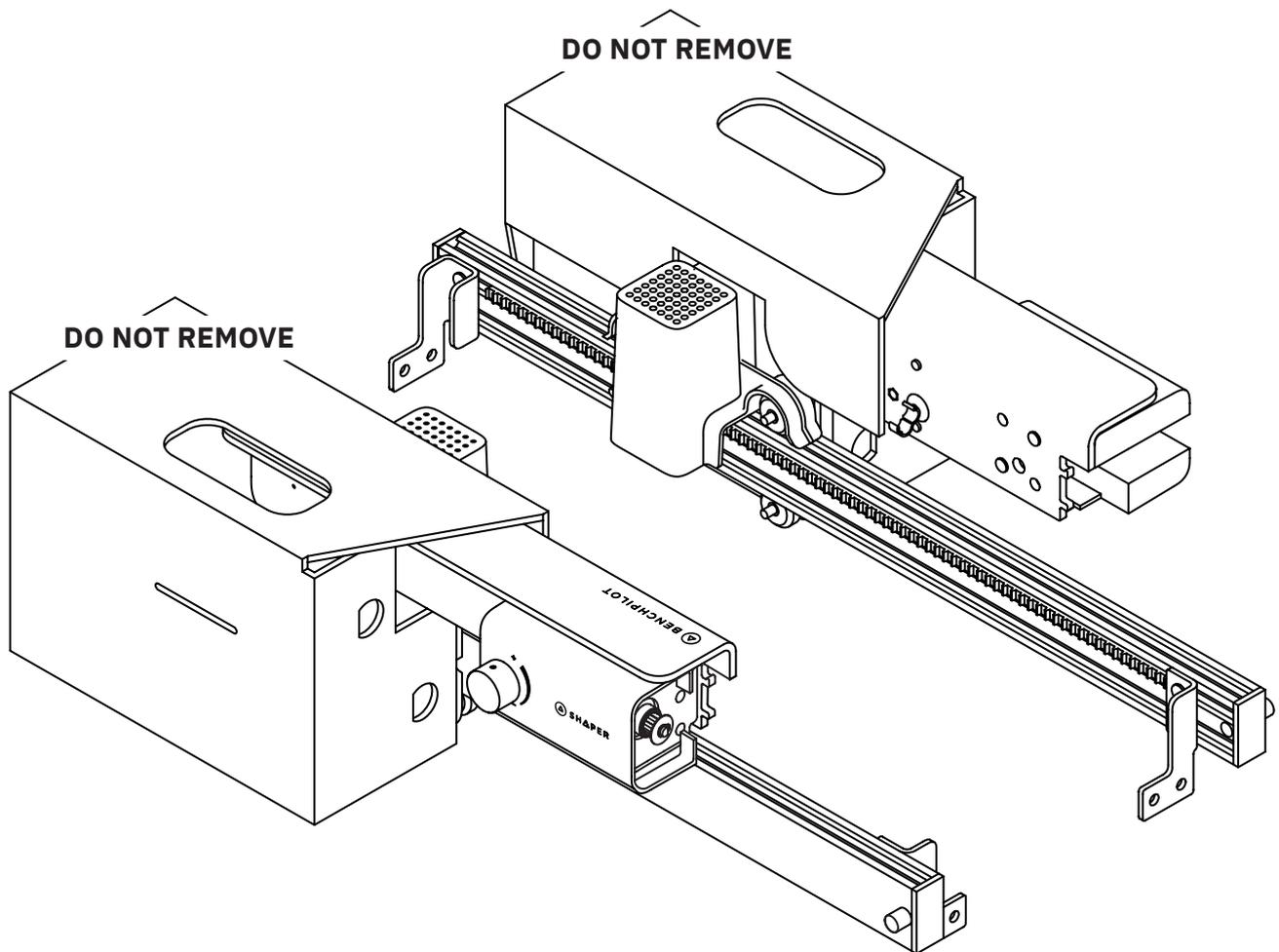
You may omit this bracket if you prefer to fasten the Emergency Stop Box to your workbench directly using its mounting holes. See Step 11.

7.1 Install the Arms

EN

Parts Required:

- Left Arm
- Right Arm



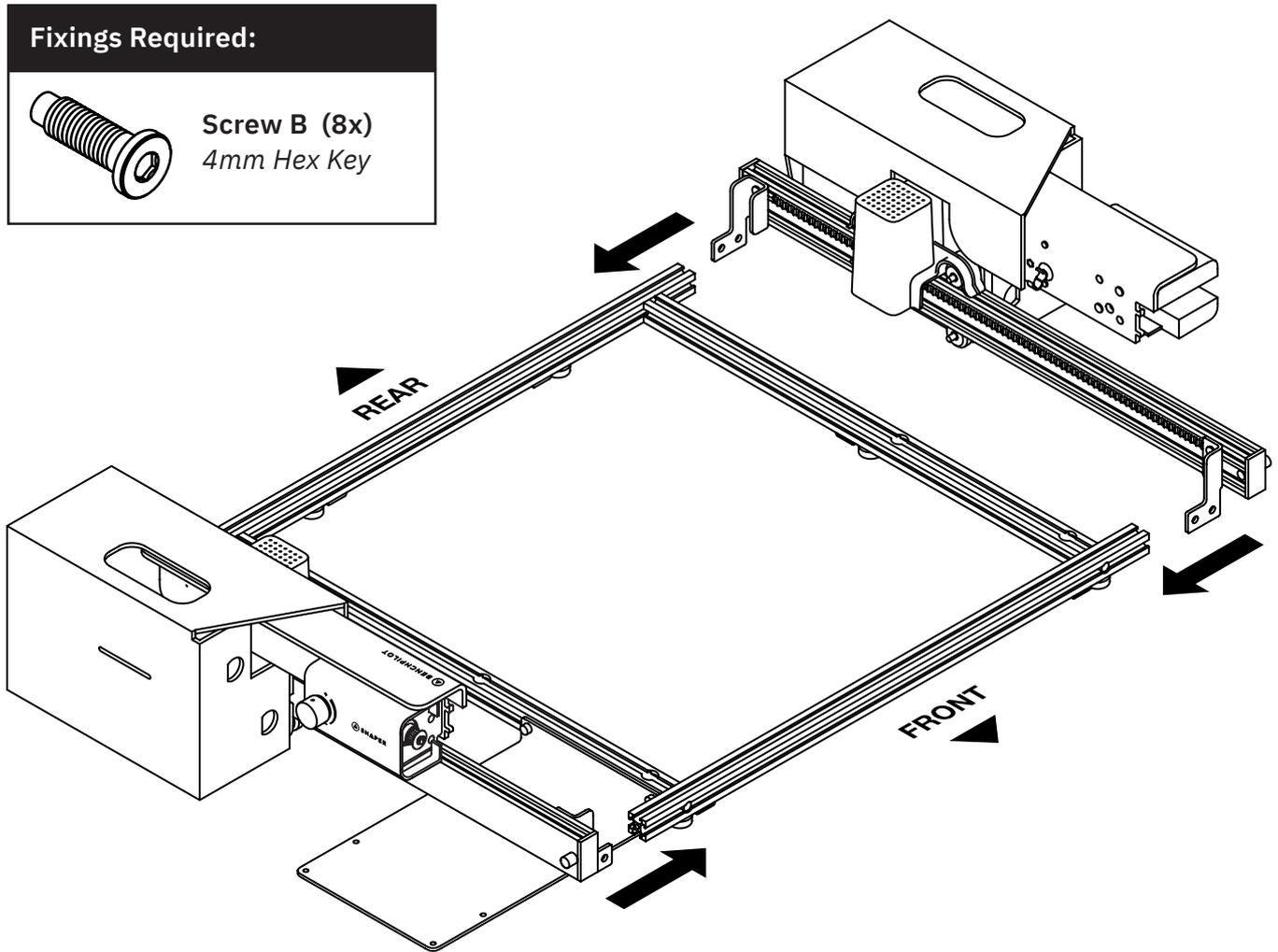
Remove the Left Arm and Right Arm from the shipping box.

DO NOT REMOVE THE CARDBOARD ASSEMBLY HARNESES.

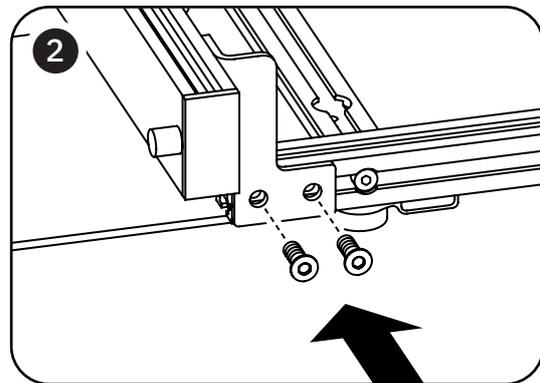
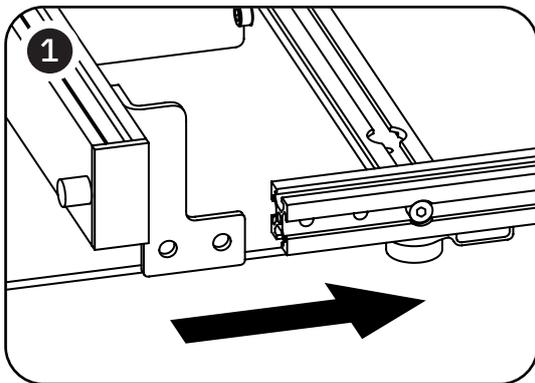
The cardboard assembly harnesses aid in the assembly process.

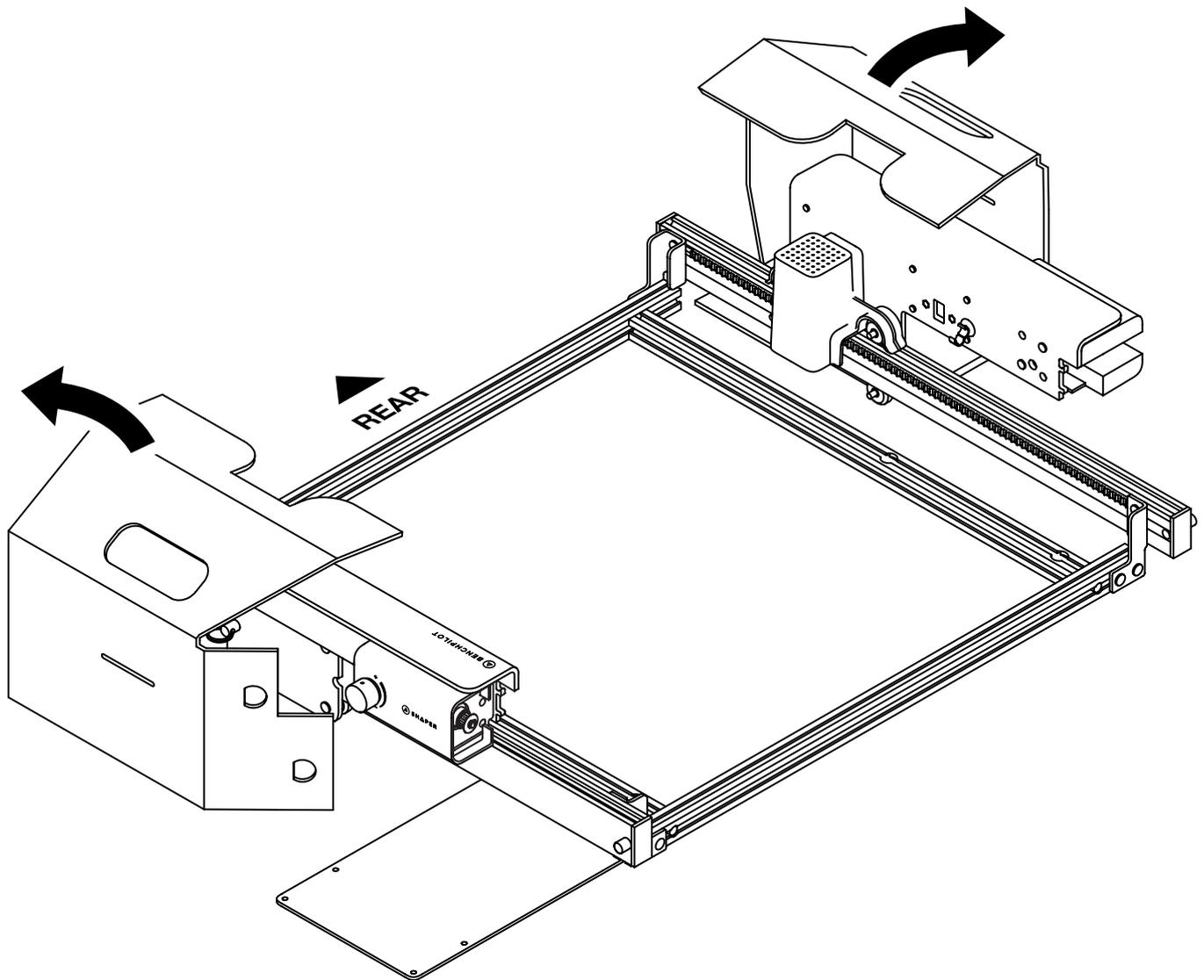
7.2 Install the Arms (*continued*)

EN



Attach the Left and Right Arms to the Base Frame Assembly by passing 2x of Screw B through the holes in the corner brackets and into the corresponding holes in the X-Bars. Repeat for all 4 corner brackets (8 screws). **To reduce risk of cross-threading**, start all screws using your hands to install finger-tight. Once all screws are inserted, tighten with the 4mm Hex Key, but not to full tightness yet.





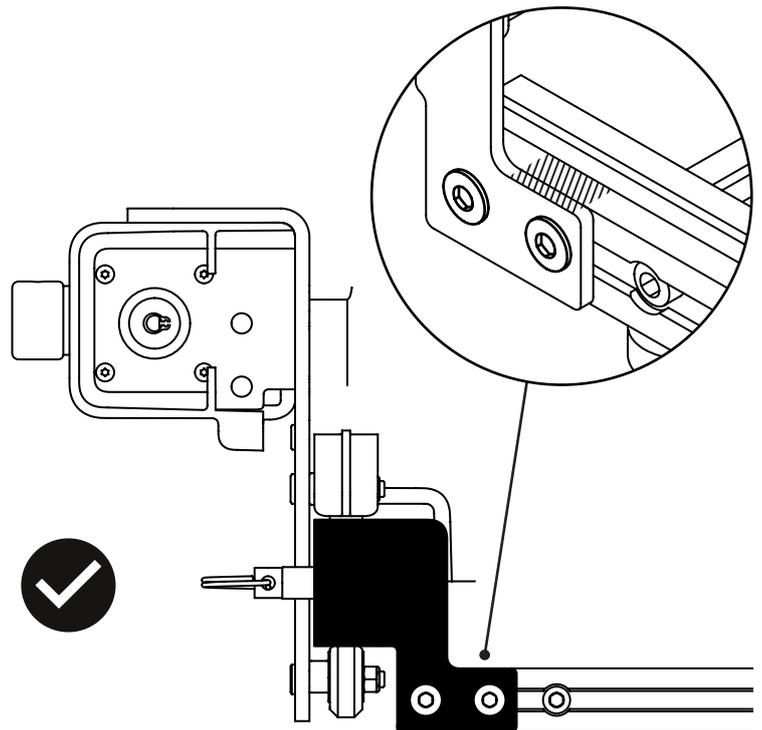
Once the Left and Right Arms are fastened to the Base Frame Assembly, you may remove the cardboard assembly harnesses. Save them for future use or recycle.

7.4 Install the Arms (*continued*)

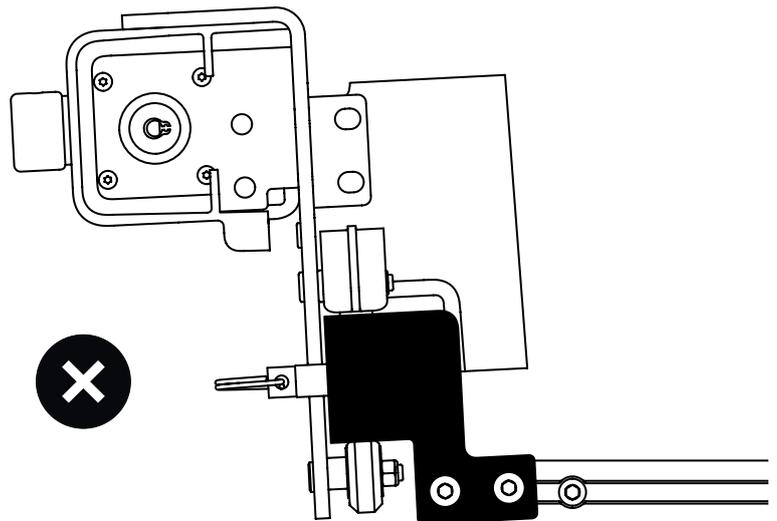
EN

Ensure that the corner brackets on the left and right arms are aligned with the X-Bars. Run your finger over the hatched area where the X-Bar and corner brackets meet. The two hatched surfaces shown in the illustration should feel flush.

Hold arm in position and fully tighten both front and rear bracket screws with arm aligned.



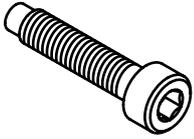
If the corner brackets are not perpendicular you will feel a bump when running your finger over the area where the X-Bar and corner brackets meet. Loosen the screws and pivot the arms until the brackets align correctly. Then, re-tighten the screws.



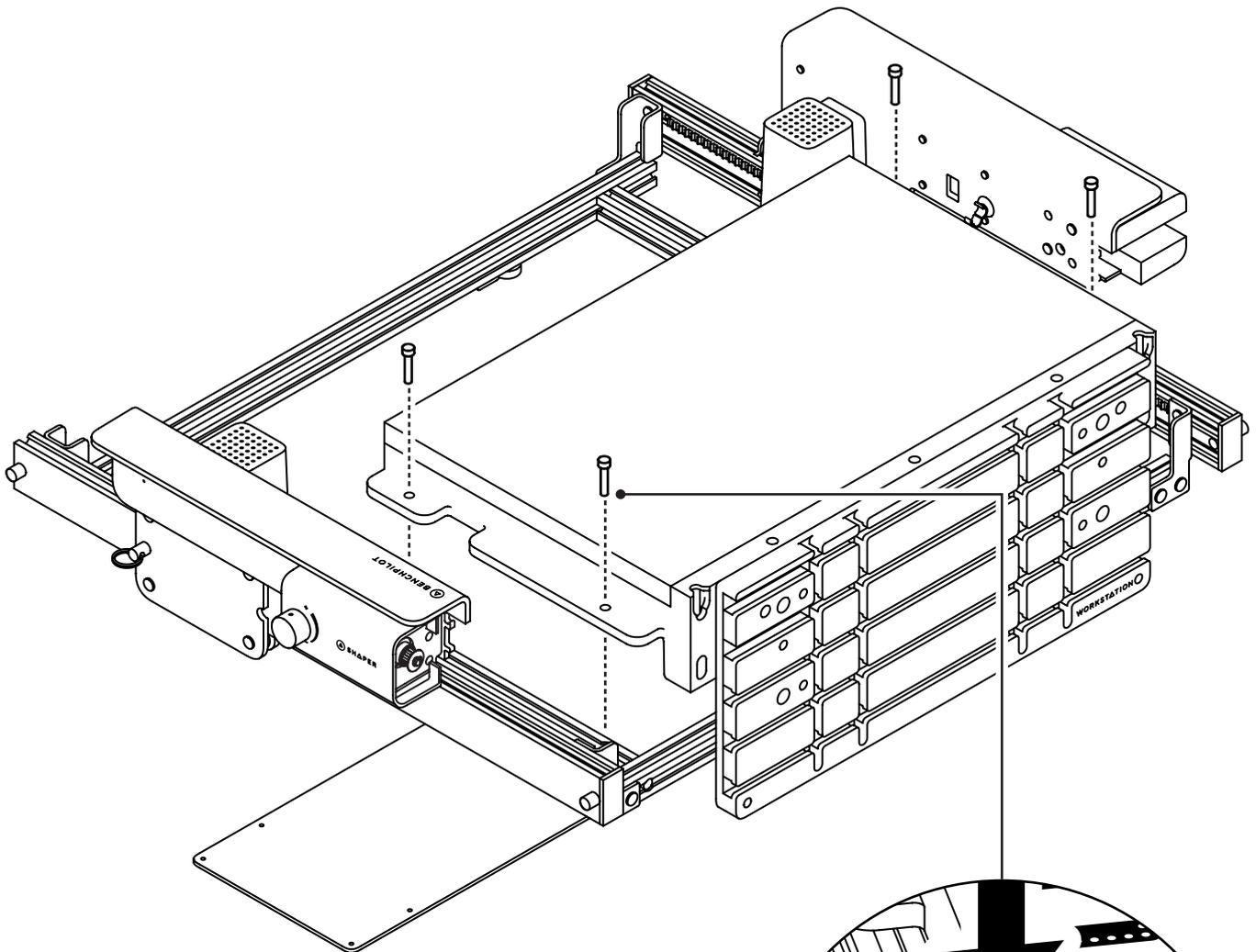
8 Install Workstation (Optional; Recommended Accessory)

EN

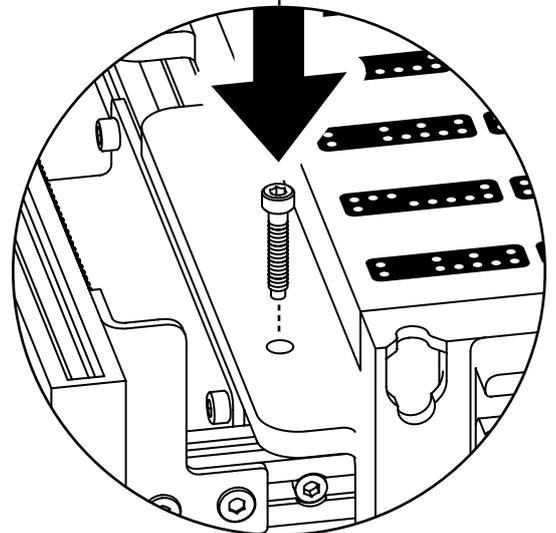
Fixings Required:



Screw A (4x)
4mm Hex Key



Install Shaper Workstation by aligning the holes in Workstation's clamping wings with the corresponding holes in each of the Y-Bars. Workstation will feel like it slots into place when located correctly on the Base Frame Assembly. Securely fasten Workstation by passing 4x of Screw A through each of the four holes.



9 Install the Crossbar Brackets

EN

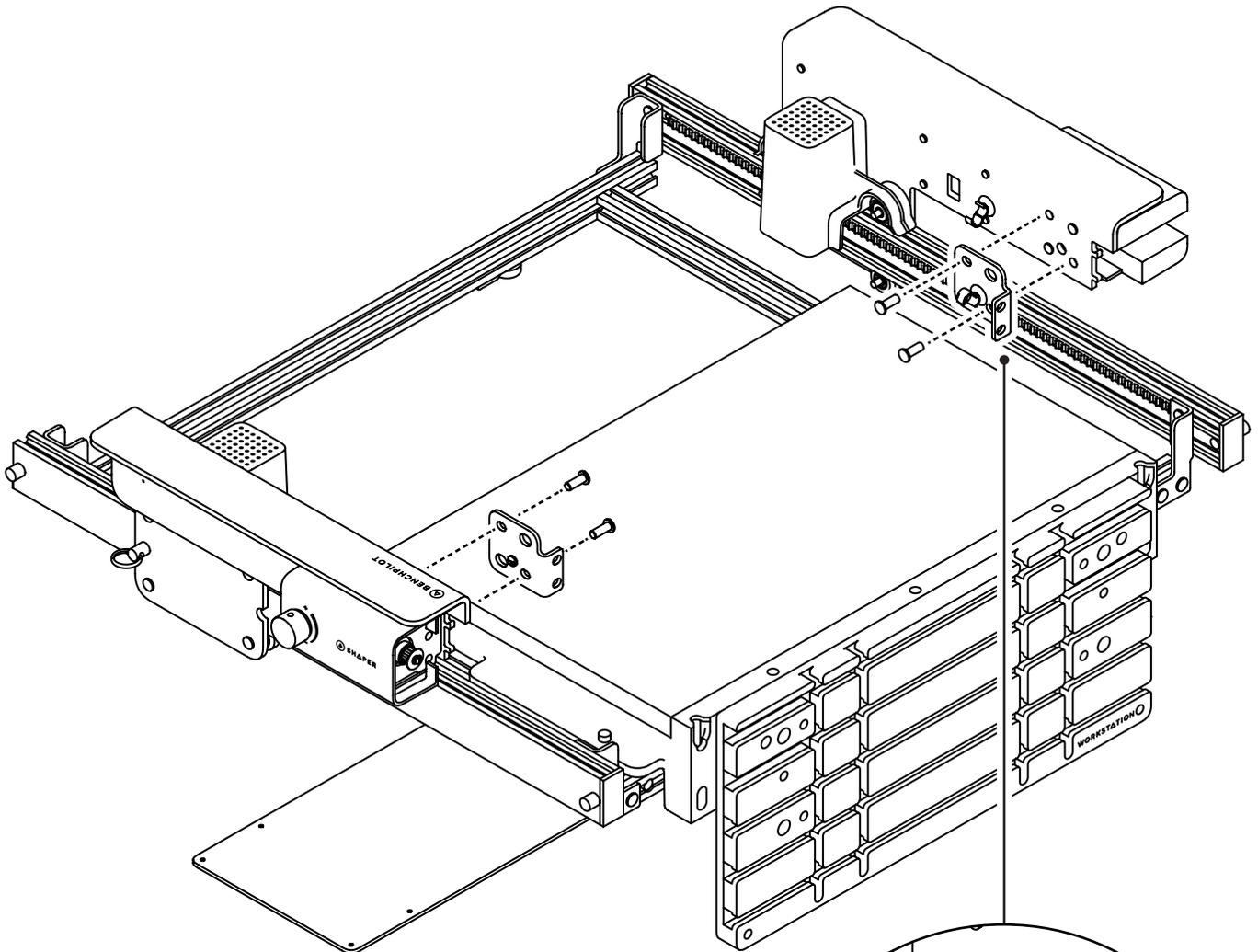
Parts Required:

- Left Crossbar Bracket
- Right Crossbar Bracket

Fixings Required:

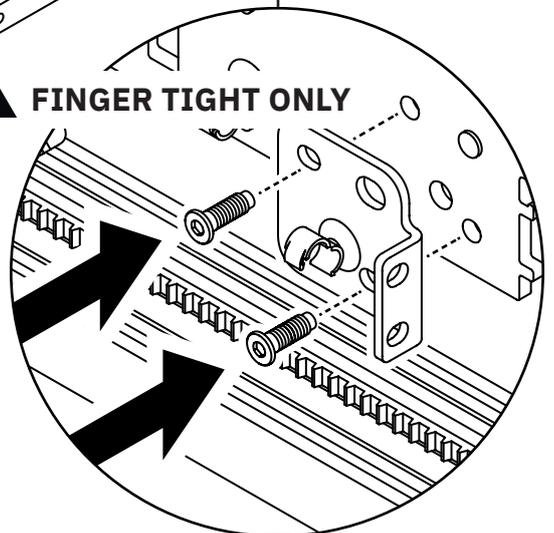


Screw B (4x)
4mm Hex Key



⚠ FINGER TIGHT ONLY

Install the Crossbar Brackets onto the Left Arm and Right Arm using 4x of Screw B. **DO NOT FULLY TIGHTEN THE SCREWS.** The Crossbar Brackets should be able to move slightly. You will fully tighten the screws later in the assembly process.

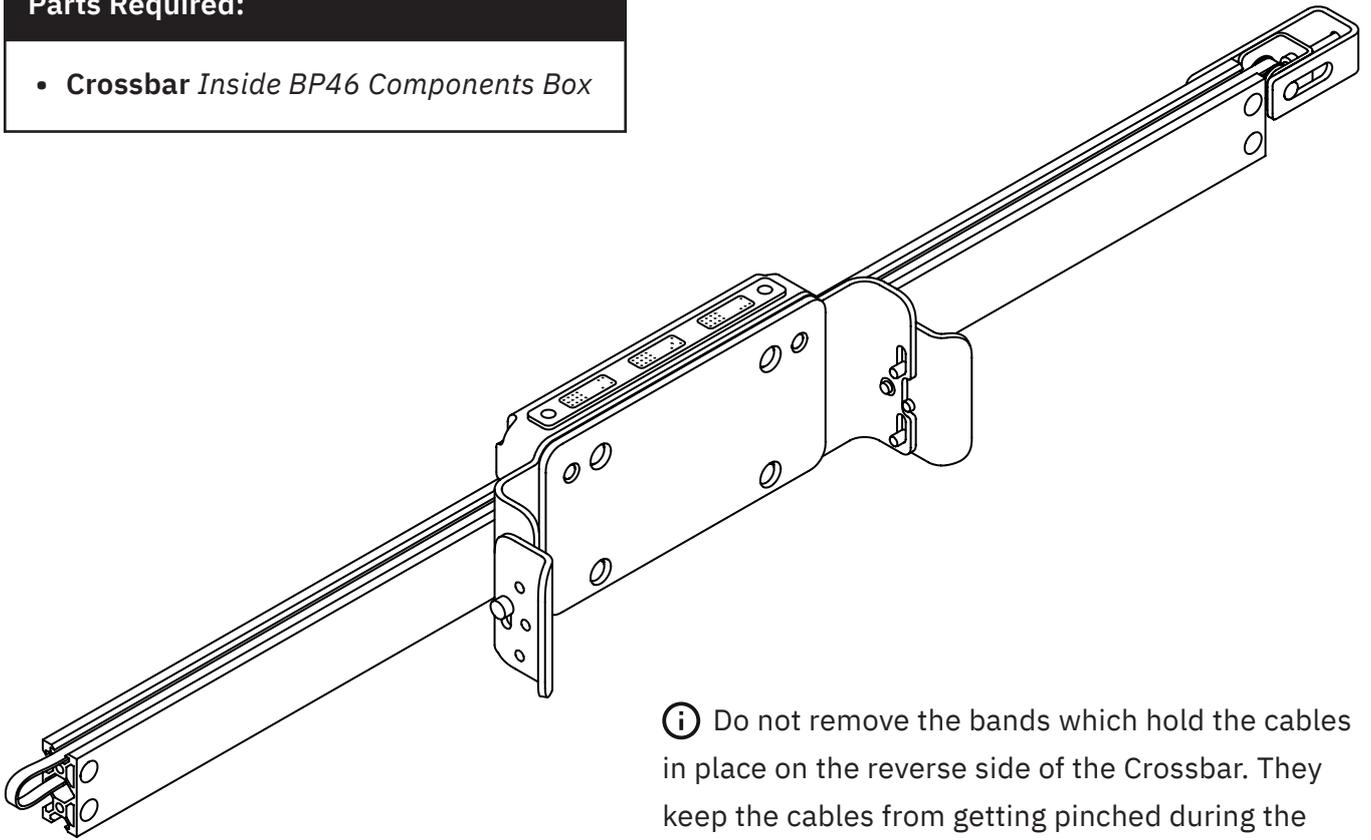


10.1 Install the Crossbar

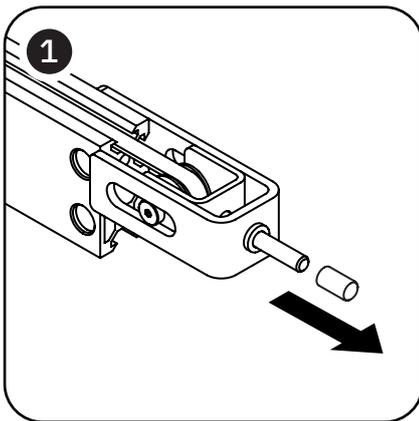
EN

Parts Required:

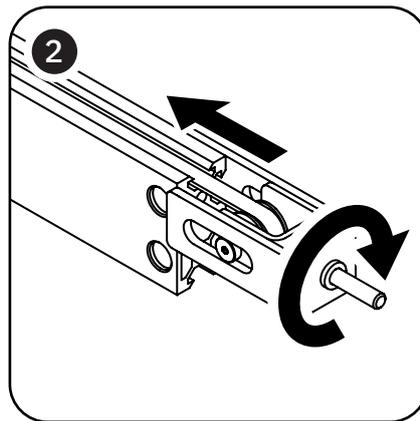
- Crossbar Inside BP46 Components Box



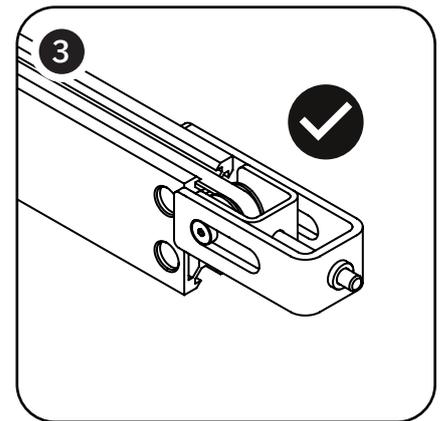
i Do not remove the bands which hold the cables in place on the reverse side of the Crossbar. They keep the cables from getting pinched during the next assembly steps. They will be removed later.



Slide off the protective cap from the end of the tensioning screw. Keep it safe, it will be reinstalled after belt tensioning.



Use the 2.5mm Hex Key to turn the tensioning screw **CLOCKWISE**. This will loosen the belt.

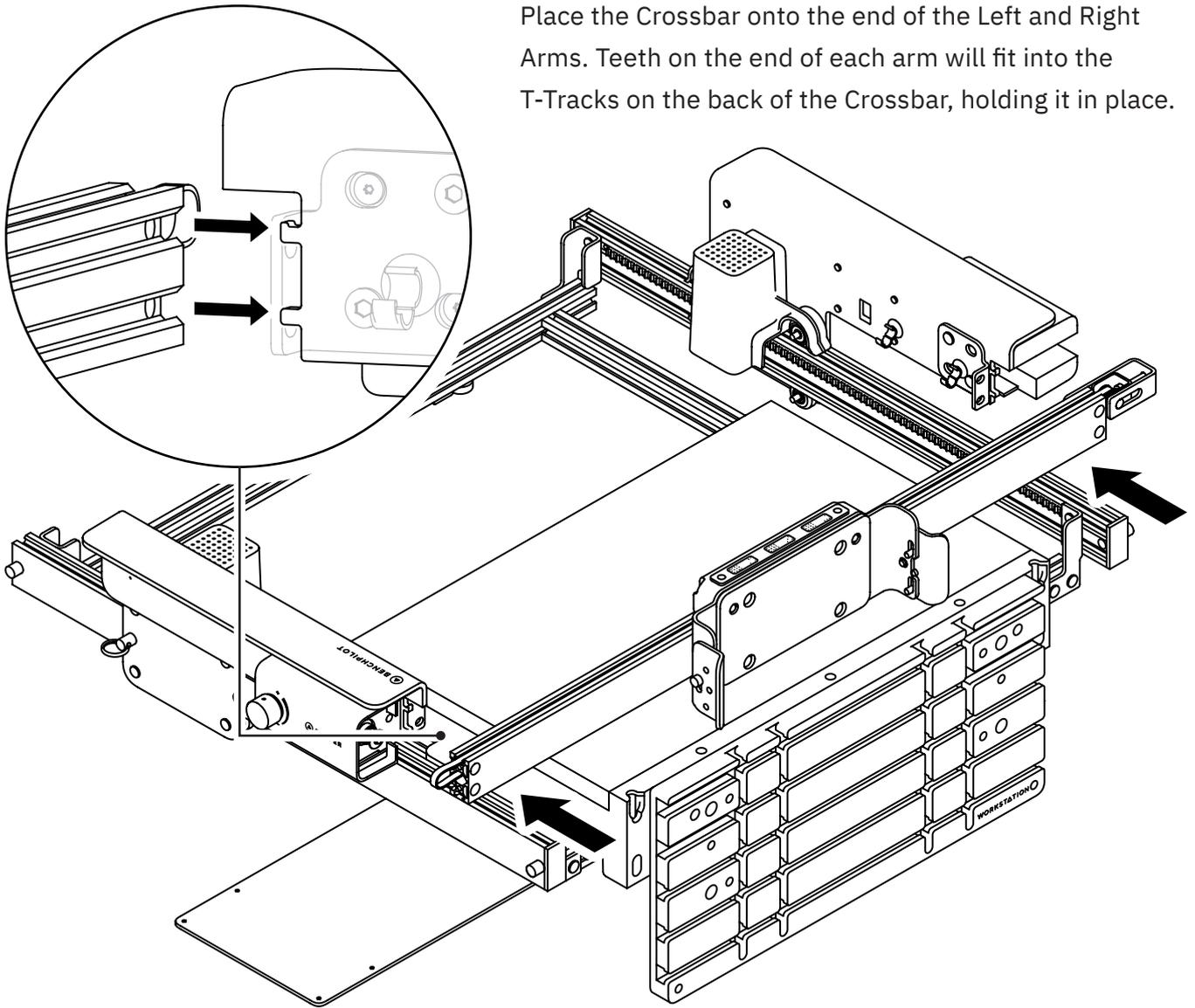


Loosen the tensioning screw until the pulley wheel is at its furthest left position. **DO NOT loosen beyond this point to prevent the tensioning screw from coming loose.**

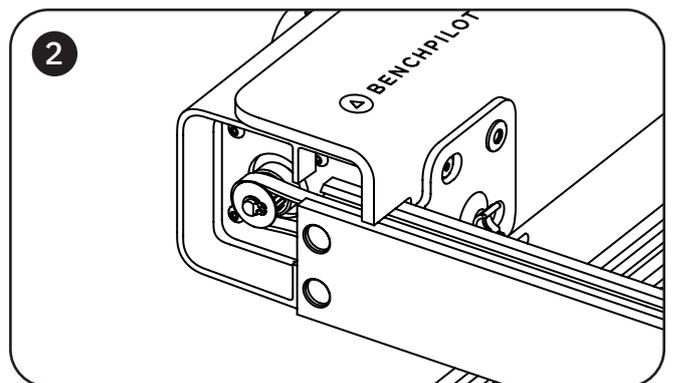
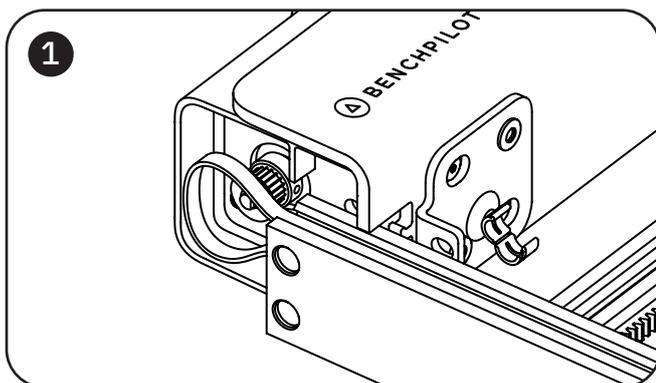
10.2 Install the Crossbar (continued)

EN

Place the Crossbar onto the end of the Left and Right Arms. Teeth on the end of each arm will fit into the T-Tracks on the back of the Crossbar, holding it in place.



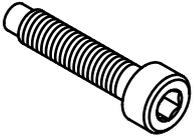
While installing the Crossbar, loop the belt over the pulley wheel on the front of the Left Arm. Ensure that the belt passes through the pulley wheels on both sides of the Crossbar. **Be careful to avoid pinching the belt or the wires on the back of the Crossbar.**



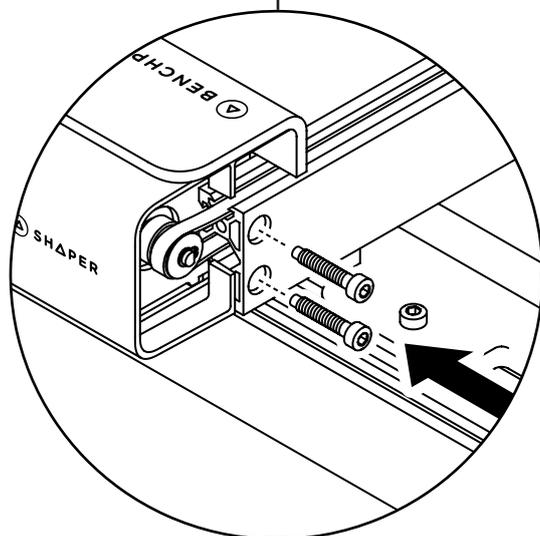
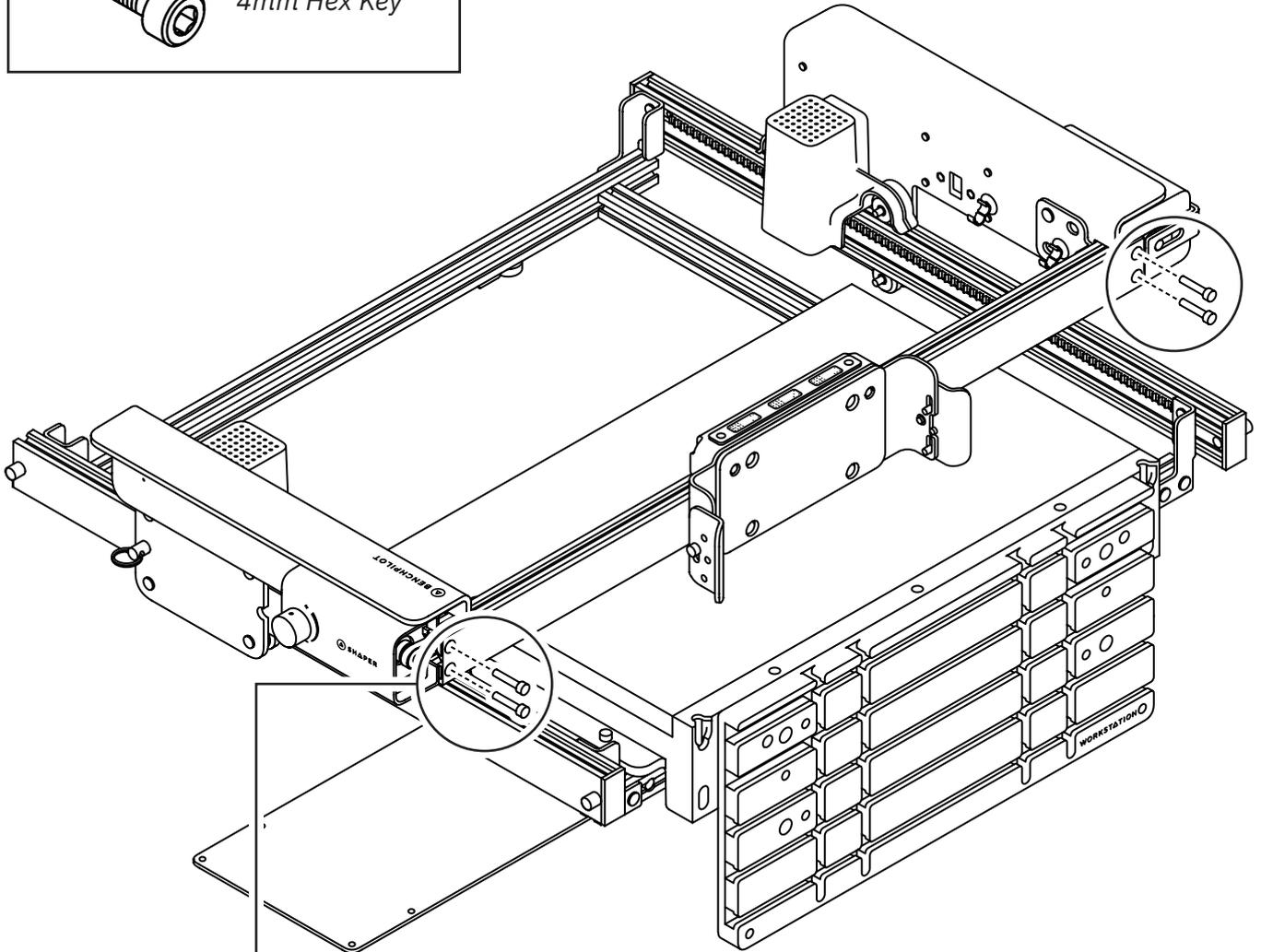
10.3 Install the Crossbar (continued)

EN

Fixings Required:



Screw A (4x)
4mm Hex Key



Fasten the Crossbar to the Left and Right Arms by passing 4x of Screw A through the holes at both ends of the Crossbar. **To reduce risk of cross-threading**, start all screws using your hands to install finger-tight. Once all screws are inserted, use the 4mm Hex Key to fully tighten.

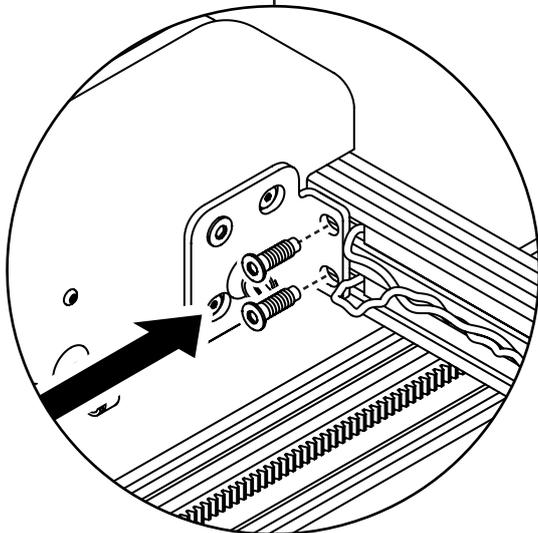
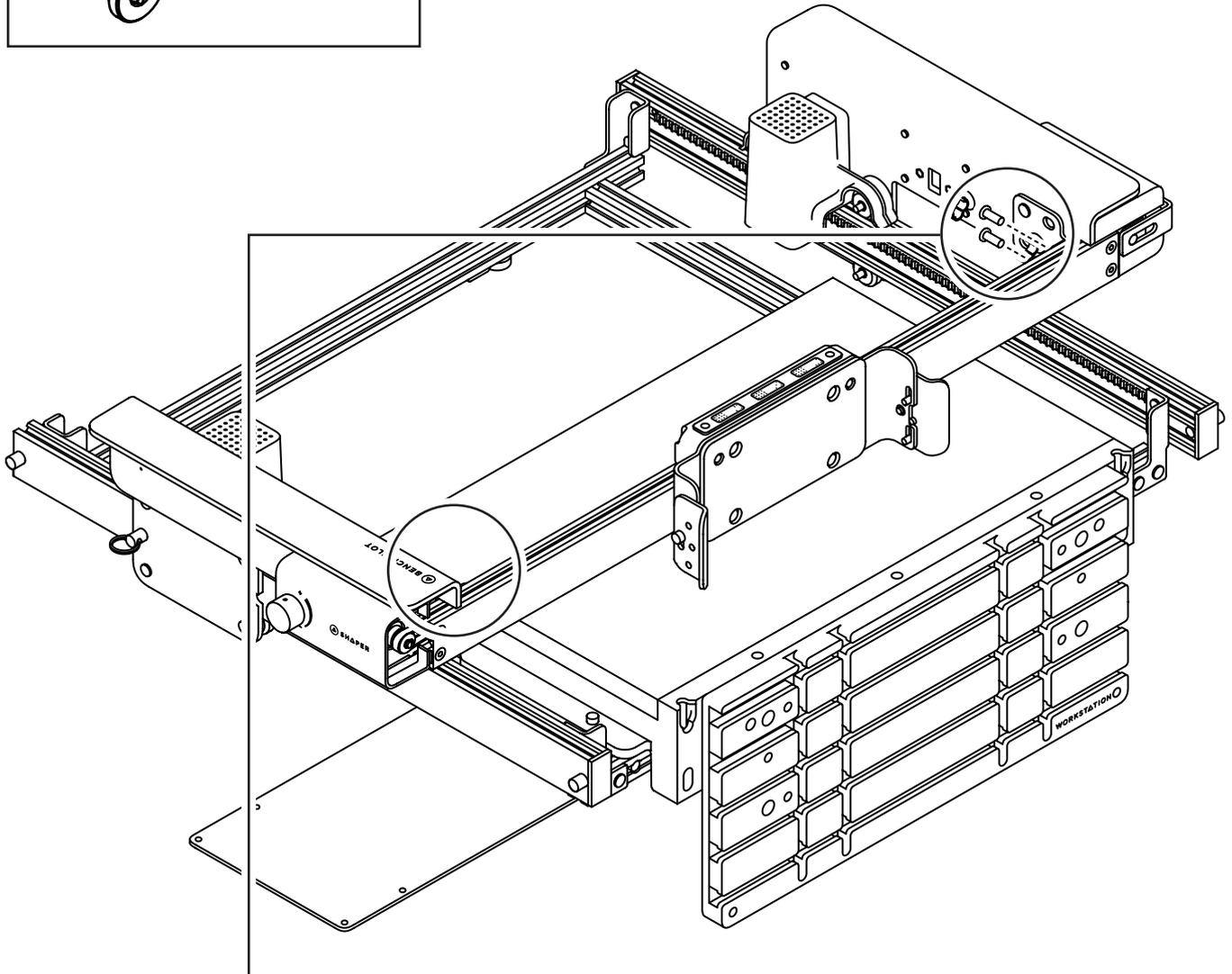
10.4 Install the Crossbar (*continued*)

EN

Fixings Required:



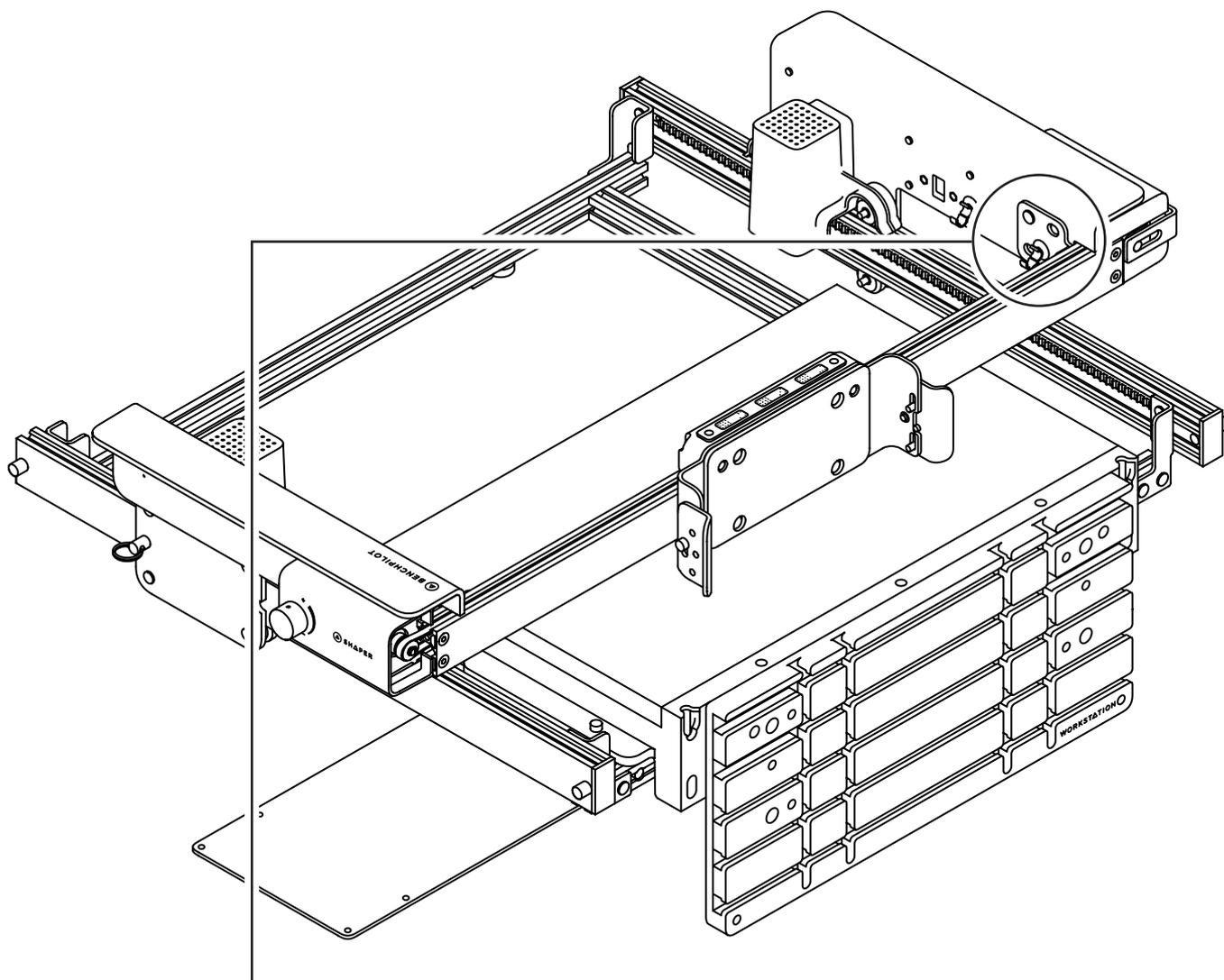
Screw B (4x)
4mm Hex Key



Continue fastening the Crossbar to the Left and Right Arms by passing 2x of Screw B through each bracket at both ends of the crossbar (total 4x screws). Ensure that the Crossbar Brackets are slightly loose as instructed on **Step 9**. This will allow the bracket to slide to meet the back face of the Crossbar. Be careful to avoid pinching the wires which protrude from each end of the Crossbar. **To reduce risk of cross-threading**, start all screws using your hands to install finger-tight. Once all screws are inserted, use the 4mm Hex Key to fully tighten.

10.5 Install the Crossbar (continued)

EN

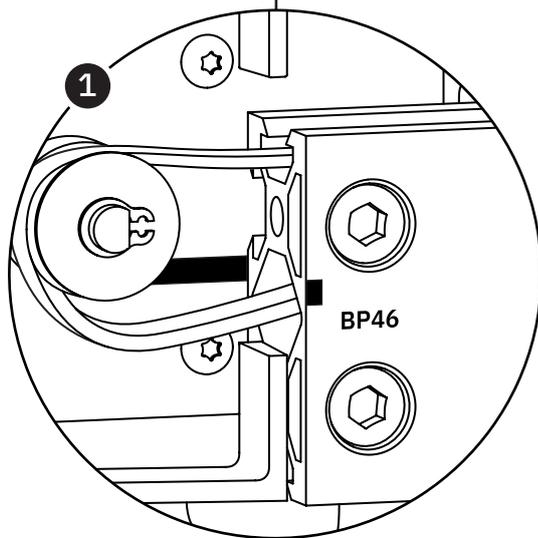
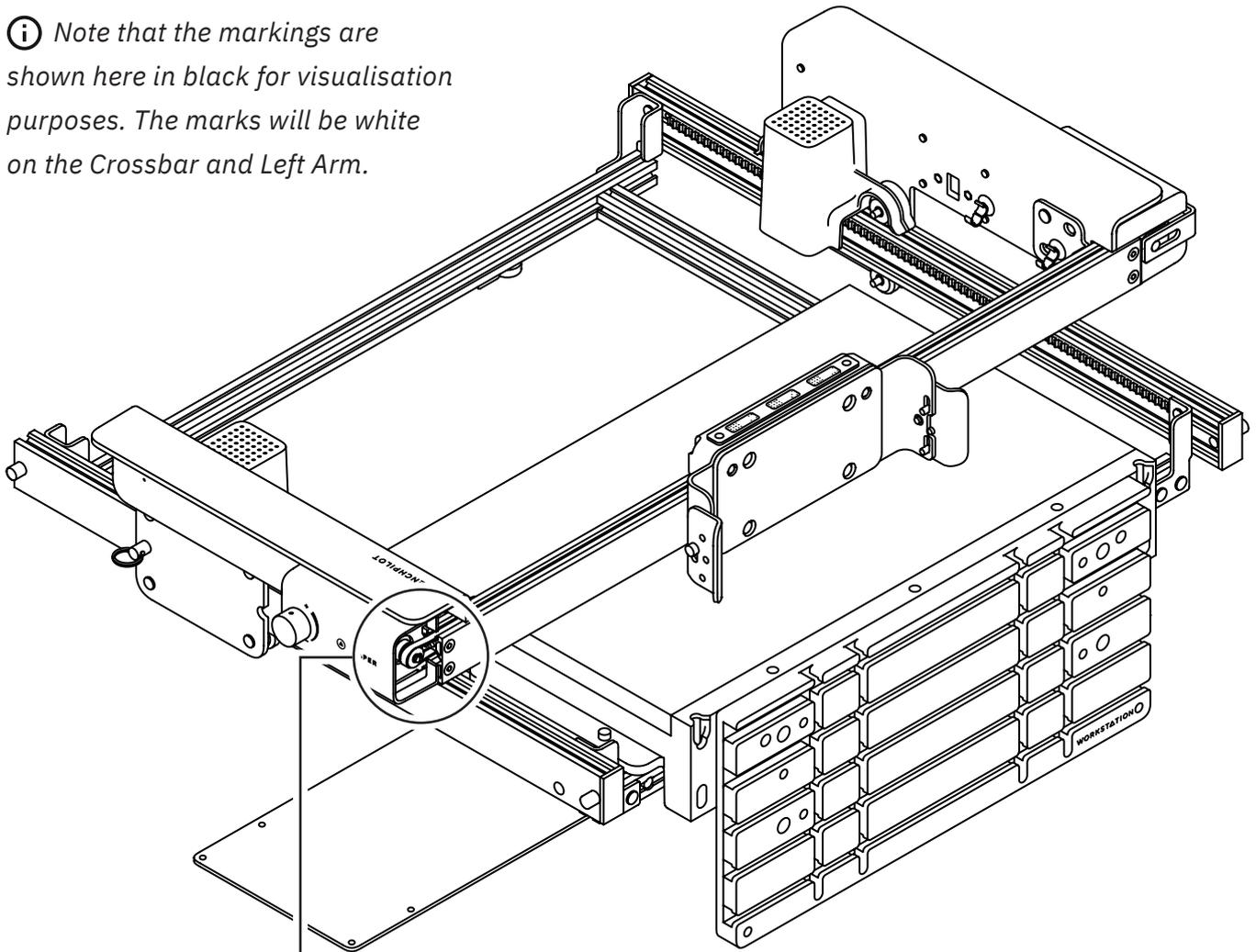


Fully tighten the screws which you installed finger tight at **Step 9** using the 4mm Hex Key.

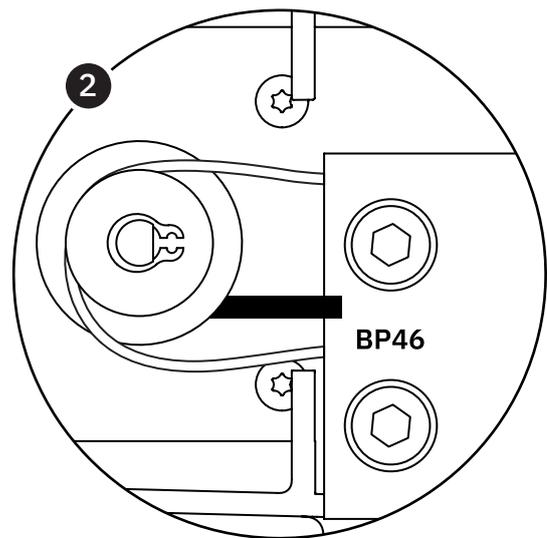
10.6 Install the Crossbar (continued)

EN

i Note that the markings are shown here in black for visualisation purposes. The marks will be white on the Crossbar and Left Arm.



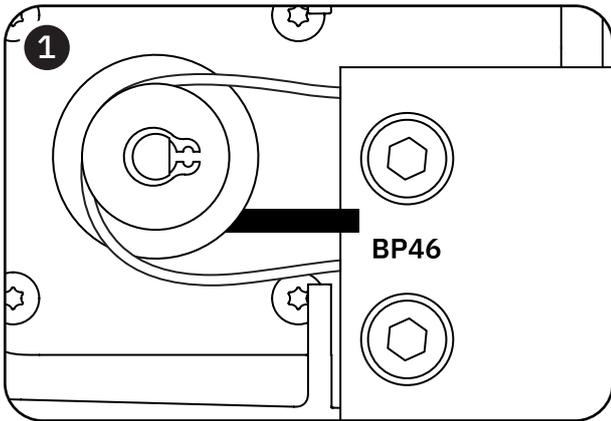
Identify the white mark on the left side of the Crossbar and front of the Left Arm (to the right of the pulley wheel).



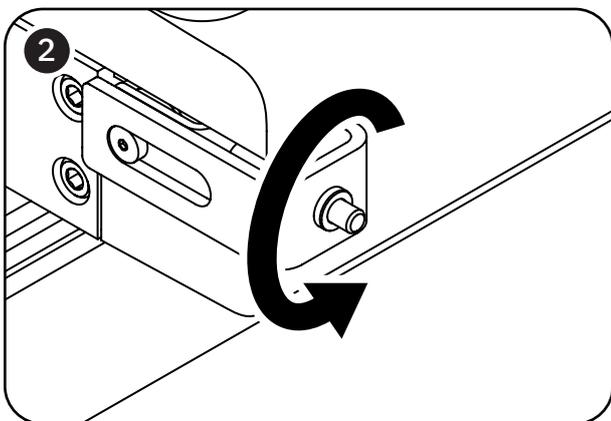
Visually align the marks as shown above by viewing the Crossbar head-on.

10.7 Install the Crossbar (*continued*)

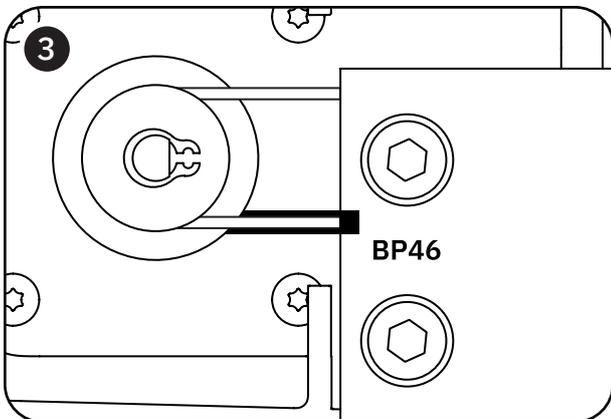
EN



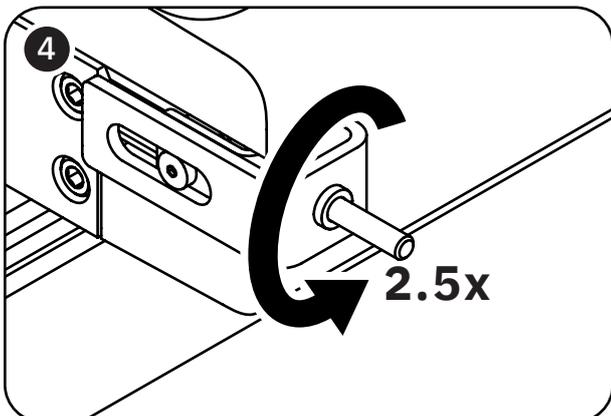
Begin with the belt loose. Ensure that the belt passes through the pulley wheel and is not caught between any pinch points.



Use the 2.5mm Hex Key to turn the tensioning screw COUNTER-CLOCKWISE to add tension to the belt.



While tightening the tensioning screw, monitor the bottom of the belt on the left side of the Crossbar. Stop tensioning when the bottom of the belt passes through the center of the marks when viewed head-on.



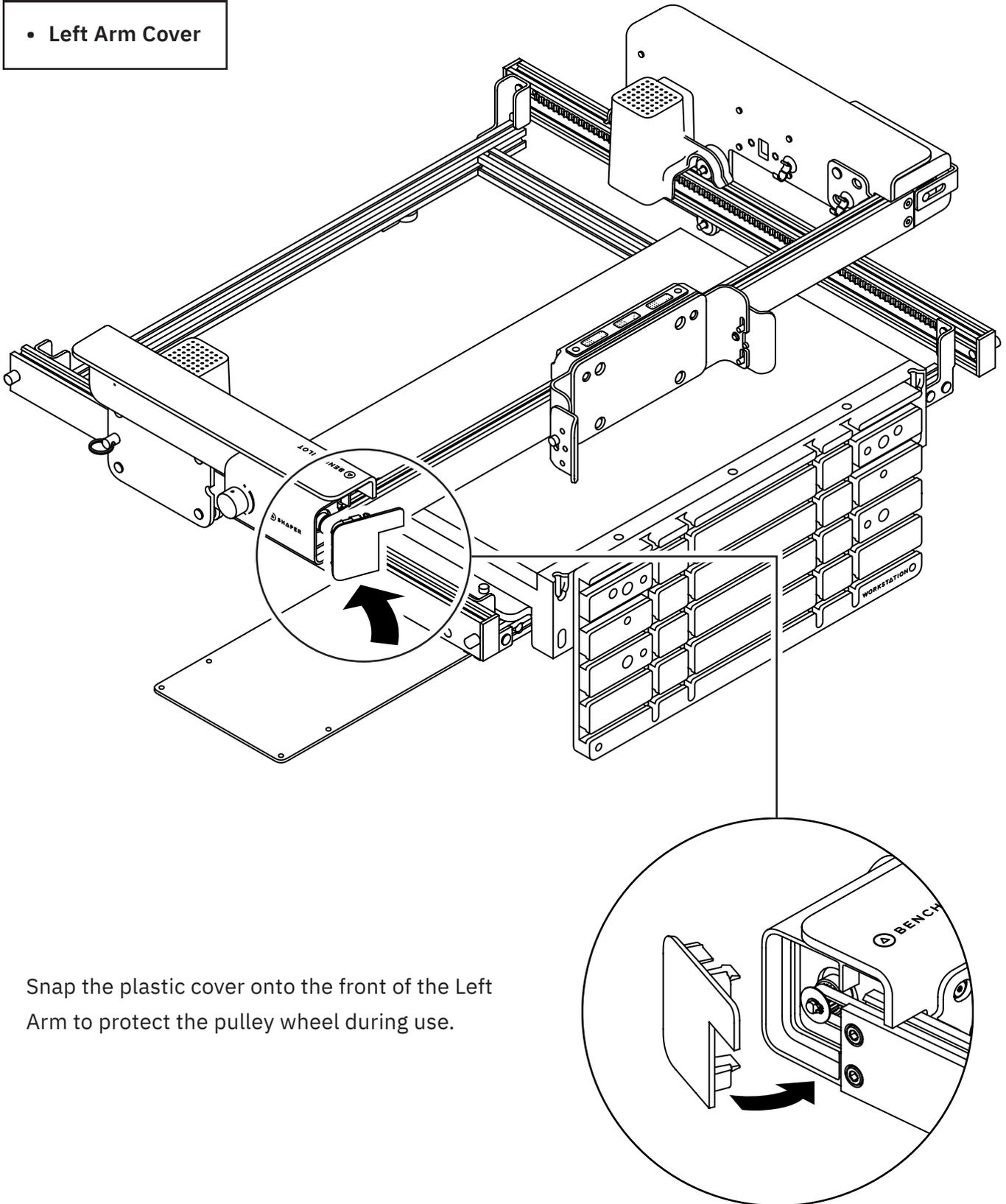
Once the bottom of the belt is centered through the marks, use the 2.5mm Hex Key to turn the tensioning screw an additional 2.5 turns. This will set the belt to the correct tension - **DO NOT OVERTIGHTEN**. Reinstall the protective cap that you removed in step 10.1.

10.8 Install the Crossbar (continued)

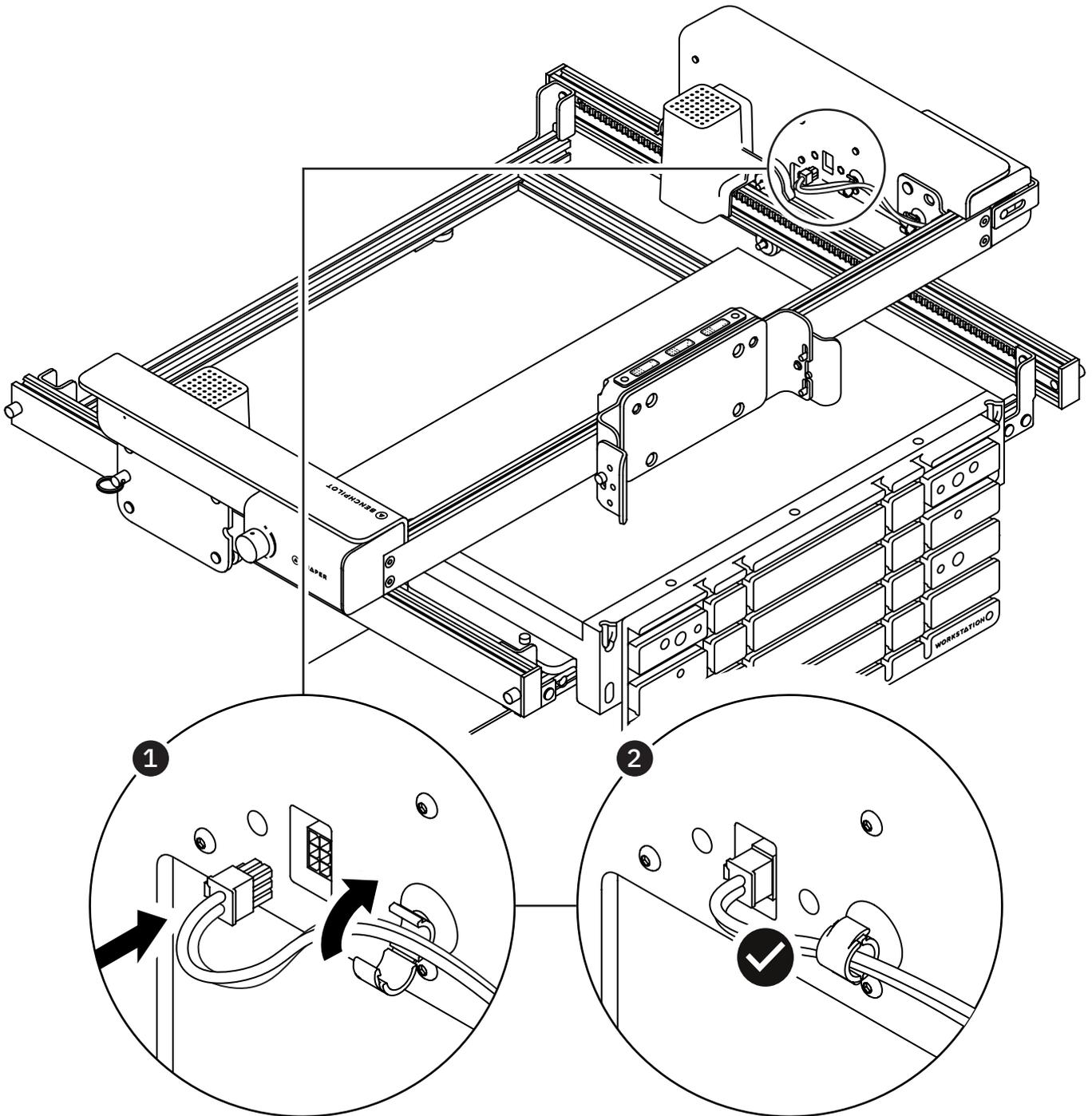
EN

Parts Required:

- Left Arm Cover



Snap the plastic cover onto the front of the Left Arm to protect the pulley wheel during use.



Remove the bands which hold the cables in place on the reverse side of the Crossbar. Pass the wires through the Cable Retention Clips and into the connector socket on the inside of the Left and Right Arms. The connector plug will click into place. Fasten the Cable Retention Clips shut to secure the cables.

WARNING: The Crossbar cable should not be plugged/unplugged while BenchPilot is powered. Ensure no power is applied to BenchPilot during this operation.

11 Install the Emergency Stop Box

EN

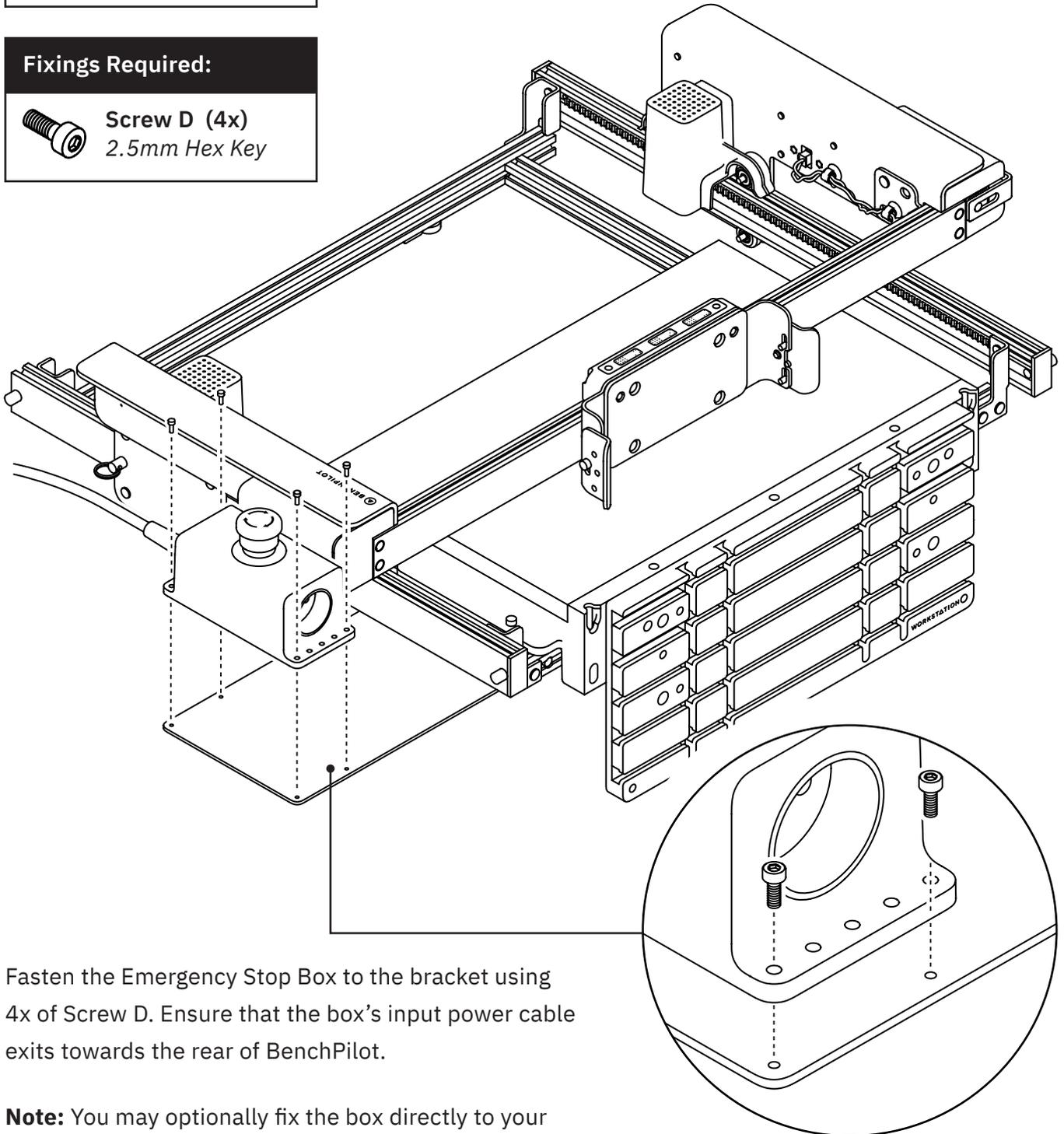
Parts Required:

- Emergency Stop Box

Fixings Required:



Screw D (4x)
2.5mm Hex Key



Fasten the Emergency Stop Box to the bracket using 4x of Screw D. Ensure that the box's input power cable exits towards the rear of BenchPilot.

Note: You may optionally fix the box directly to your workbench instead of using the bracket (see note on Step 6). Ensure the button is fixed in a reachable location with appropriate room for attached cables.

12.1 Install the Origin Harness

EN

Fixings Required:



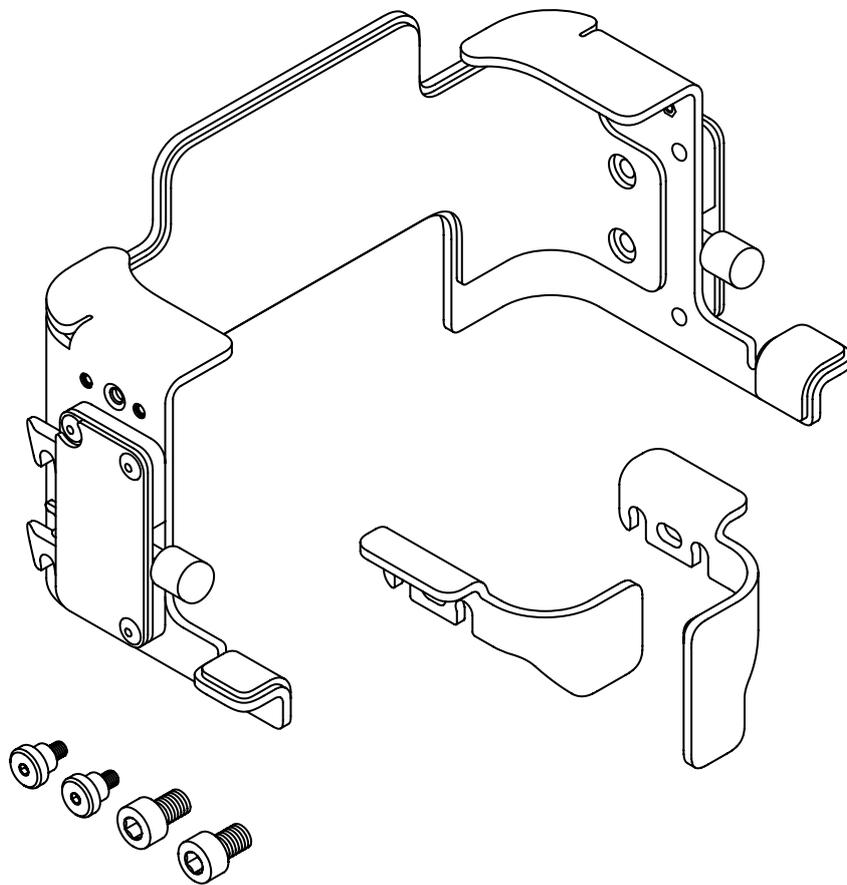
Screw C (2x)
4mm Hex Key



Screw E (2x)
2.5mm Hex Key

Parts Required:

- **Origin Harness**
- **Left Shoulder Bracket**
- **Right Shoulder Bracket**

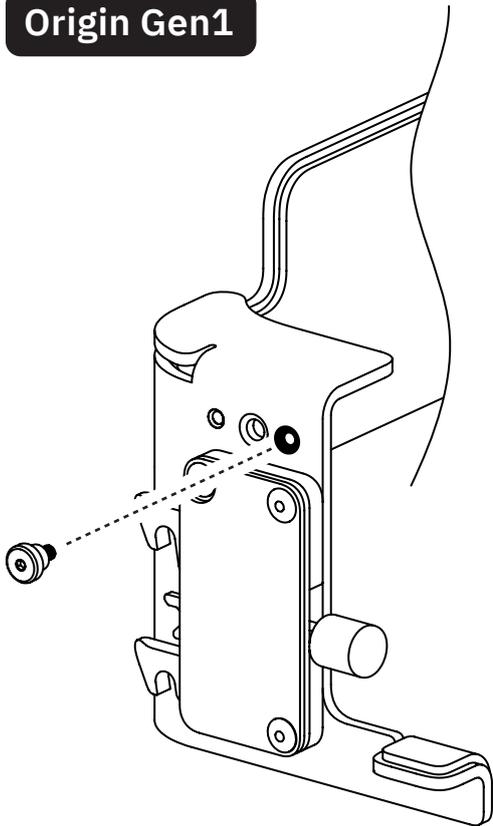


Locate the Origin Harness, Left Shoulder Bracket, Right Shoulder Bracket, Screw C (2x), and Screw E (2x) before proceeding to the next assembly step.

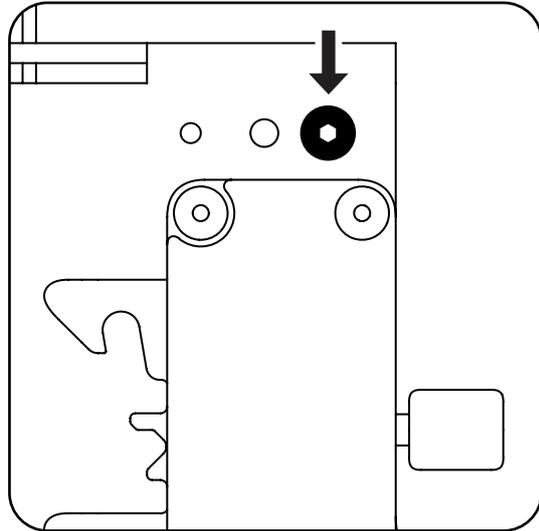
12.2 Install the Origin Harness (*continued*)

EN

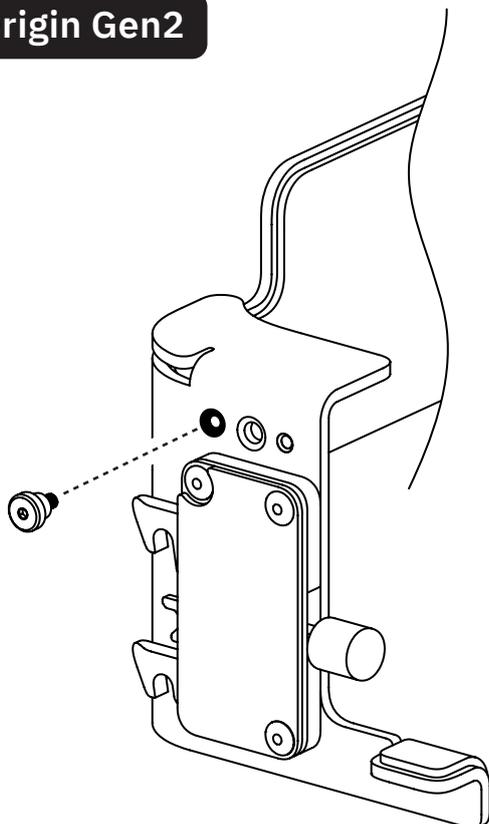
Origin Gen1



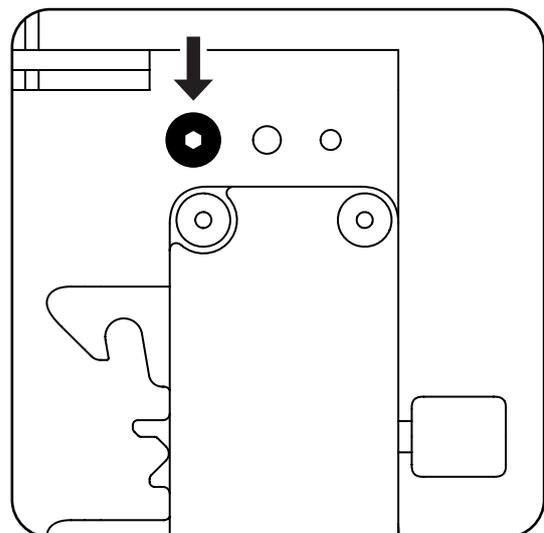
If you will be using **Origin Gen1** with BenchPilot, insert Screw E into the rear hole on both sides of the Harness.



Origin Gen2



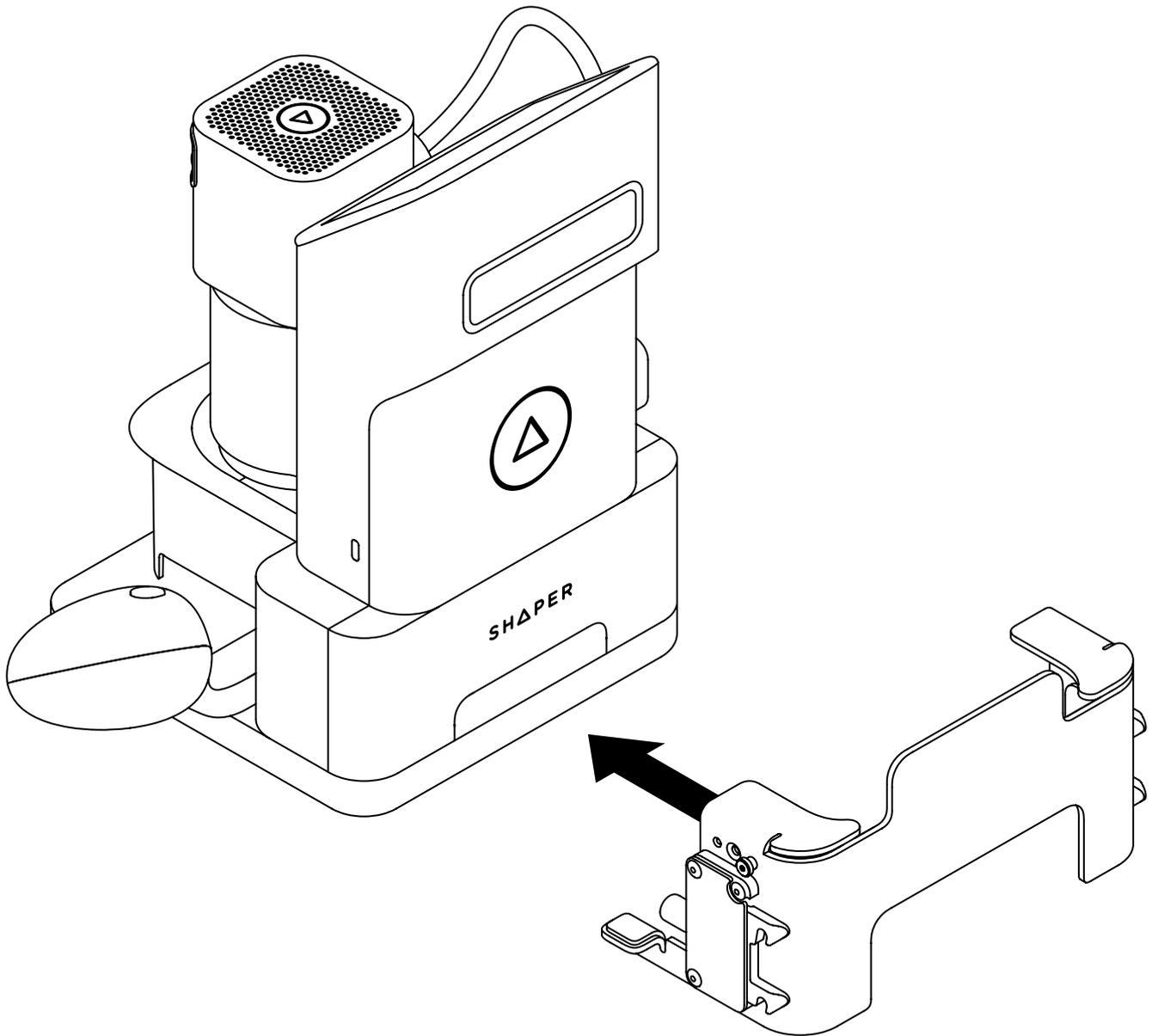
If you will be using **Origin Gen2** with BenchPilot, insert Screw E into the front hole on both sides of the Harness.



12.3 Install the Origin Harness (continued)

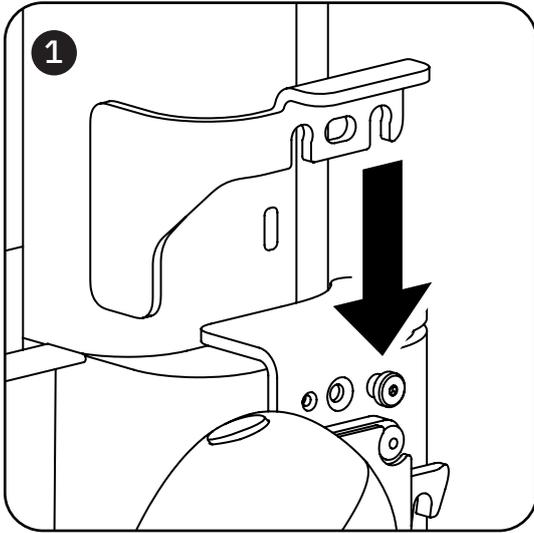
EN

Slide the Harness onto the back of Origin until it can be pushed no further.

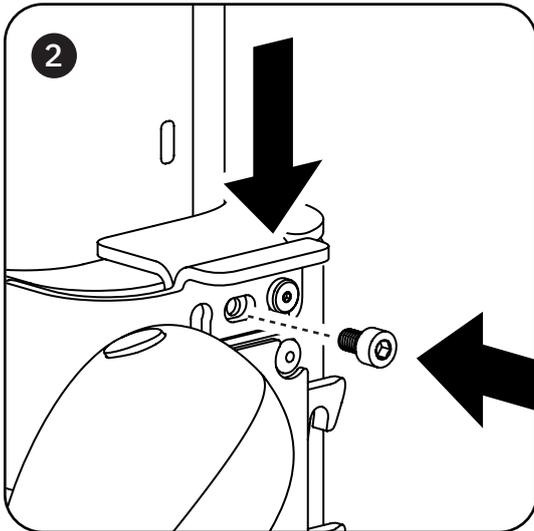


12.4 Install the Origin Harness (*continued*)

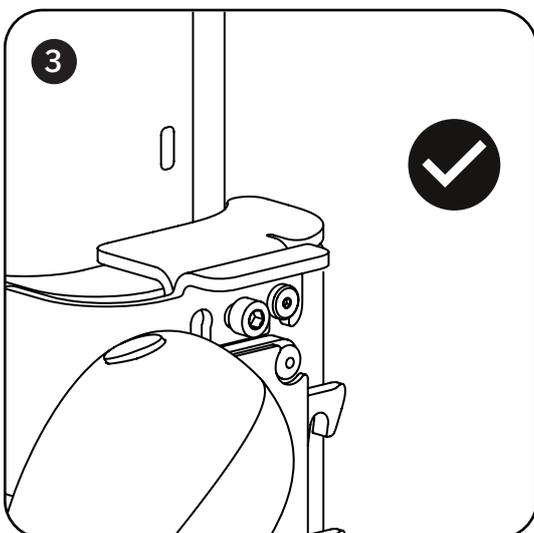
EN



Place both Shoulder Brackets over each side of the Harness so that Screw E aligns with the corresponding slot in the Shoulder Bracket. Push down firmly on the Shoulder Bracket to seat it on the screw.



Push down firmly on the Shoulder Brackets and insert Screw C through the hole illustrated. Secure both screws on each side of the Harness.



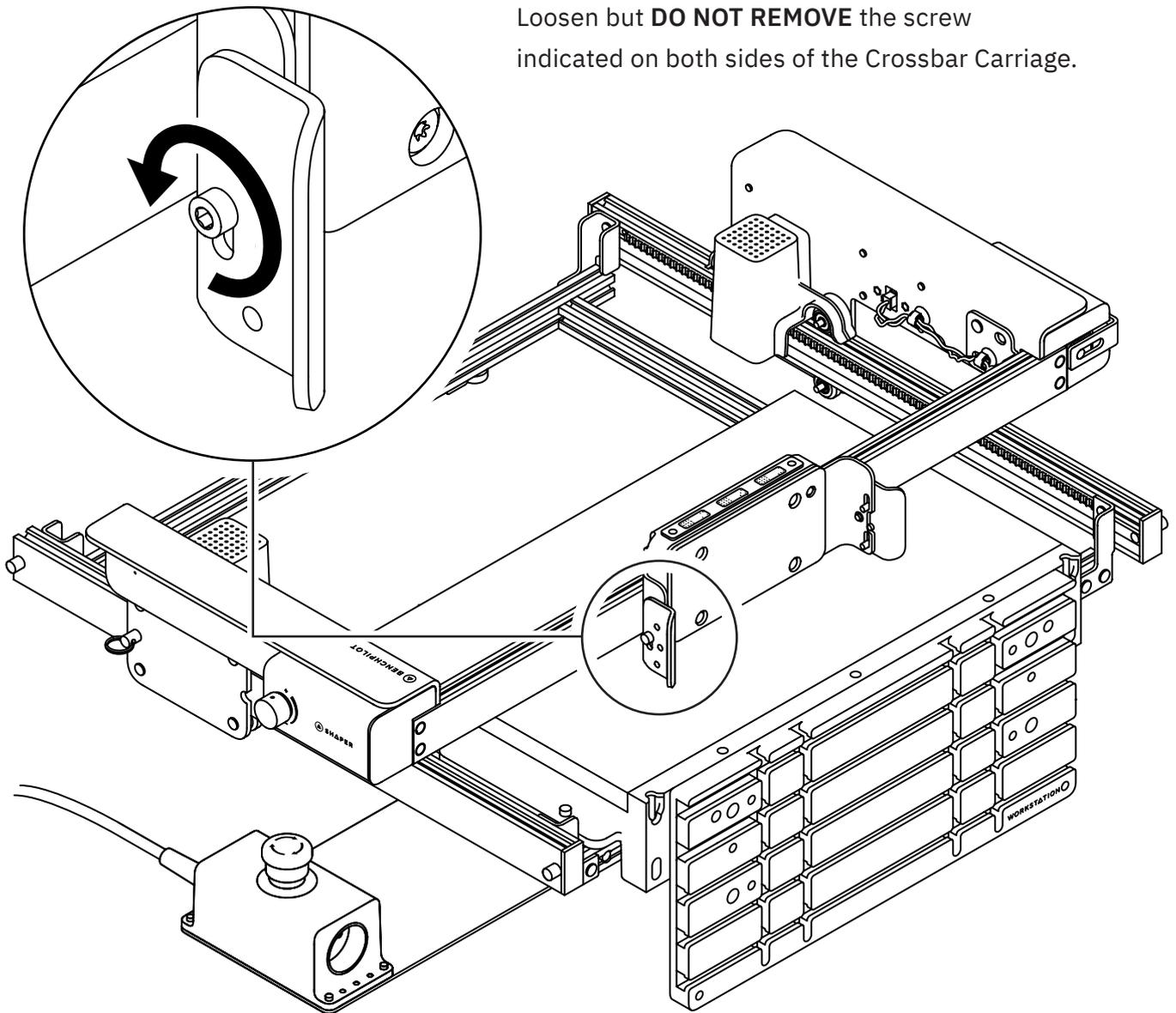
The Harness should be firmly secured with no movement between the Harness and Origin.

*Illustrations show Origin Gen 2
Harness Configuration*

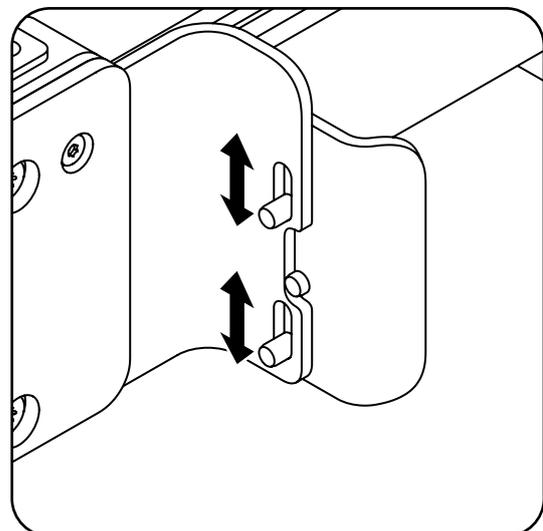
13.1 Dock Origin onto BenchPilot

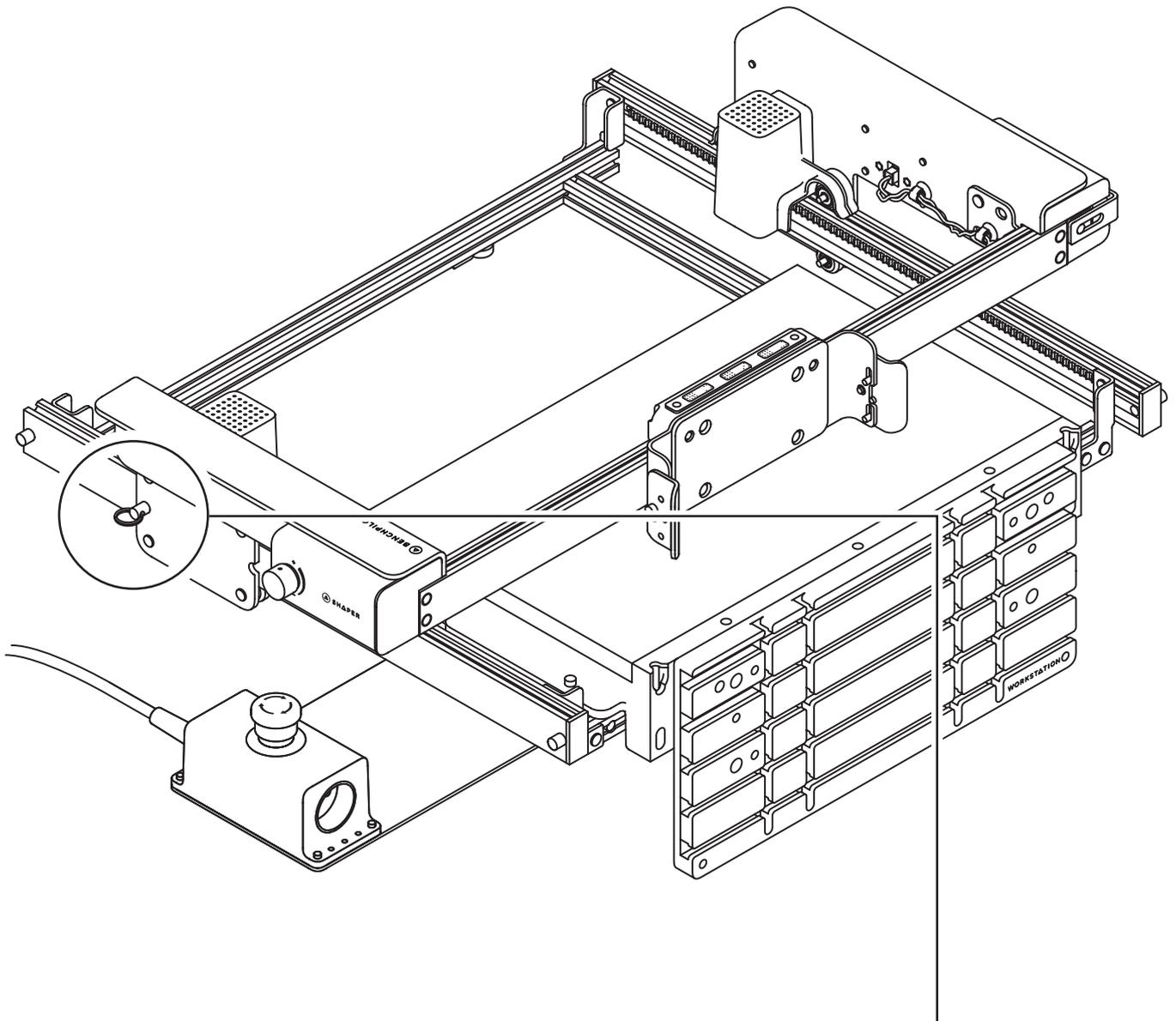
EN

Loosen but **DO NOT REMOVE** the screw indicated on both sides of the Crossbar Carriage.

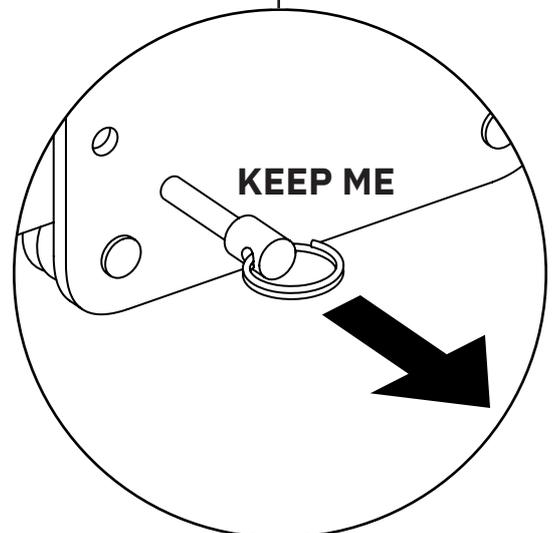


Once the screw has been loosened, it should be possible to move the pins indicated up and down freely within their slots.





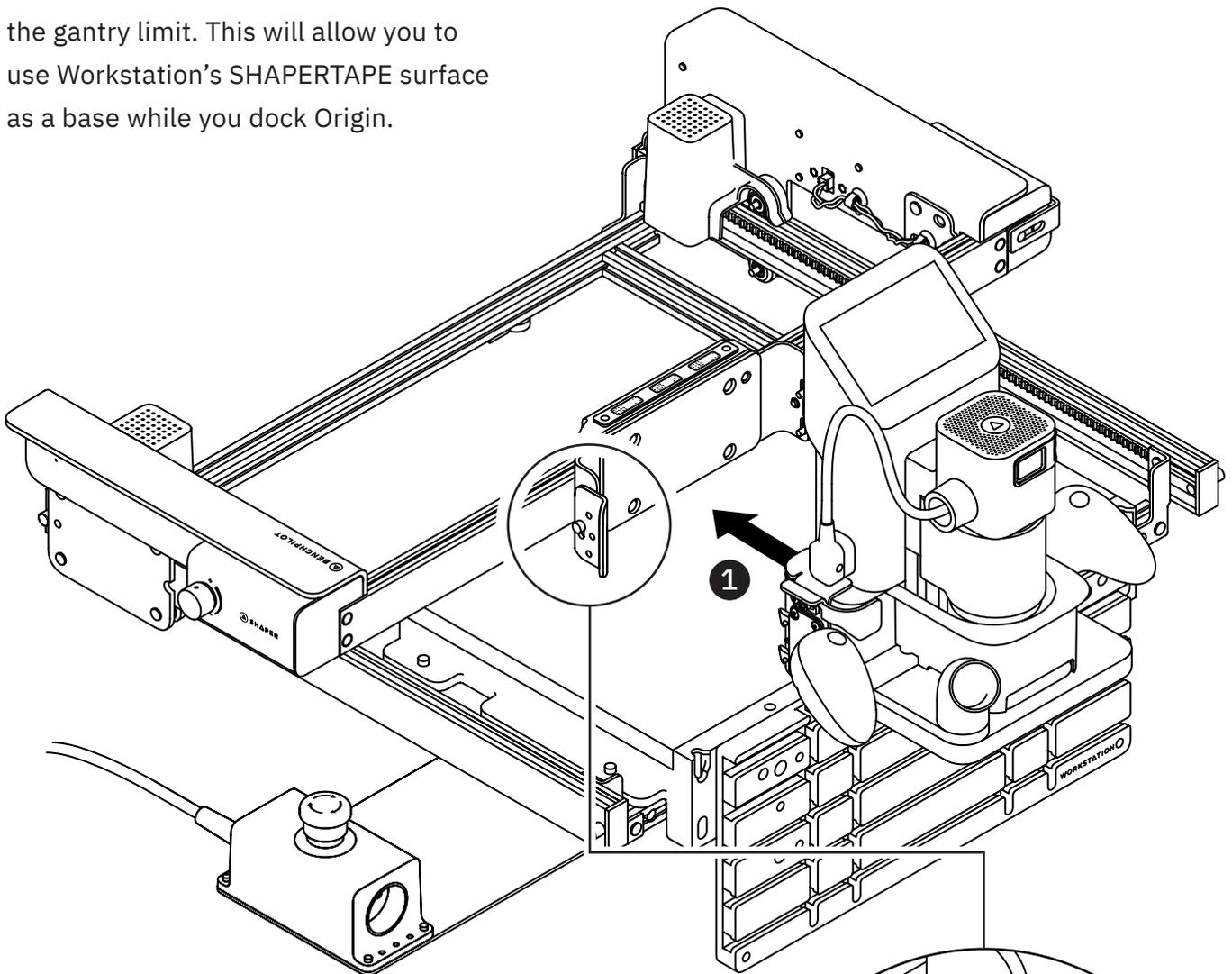
Remove the Locking Pins from the Left and Right Arms so that the Crossbar can move backwards and forwards freely. Always reinstall the Locking Pins when transporting or stowing BenchPilot - they keep the Arms fixed during transport to prevent damage or personal injury.



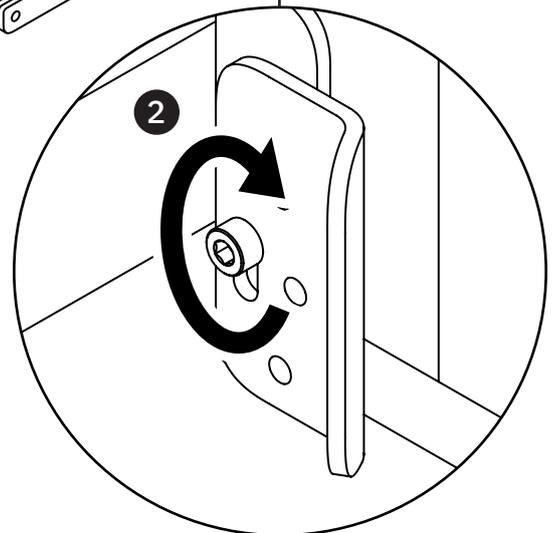
13.3 Dock Origin onto BenchPilot (continued)

EN

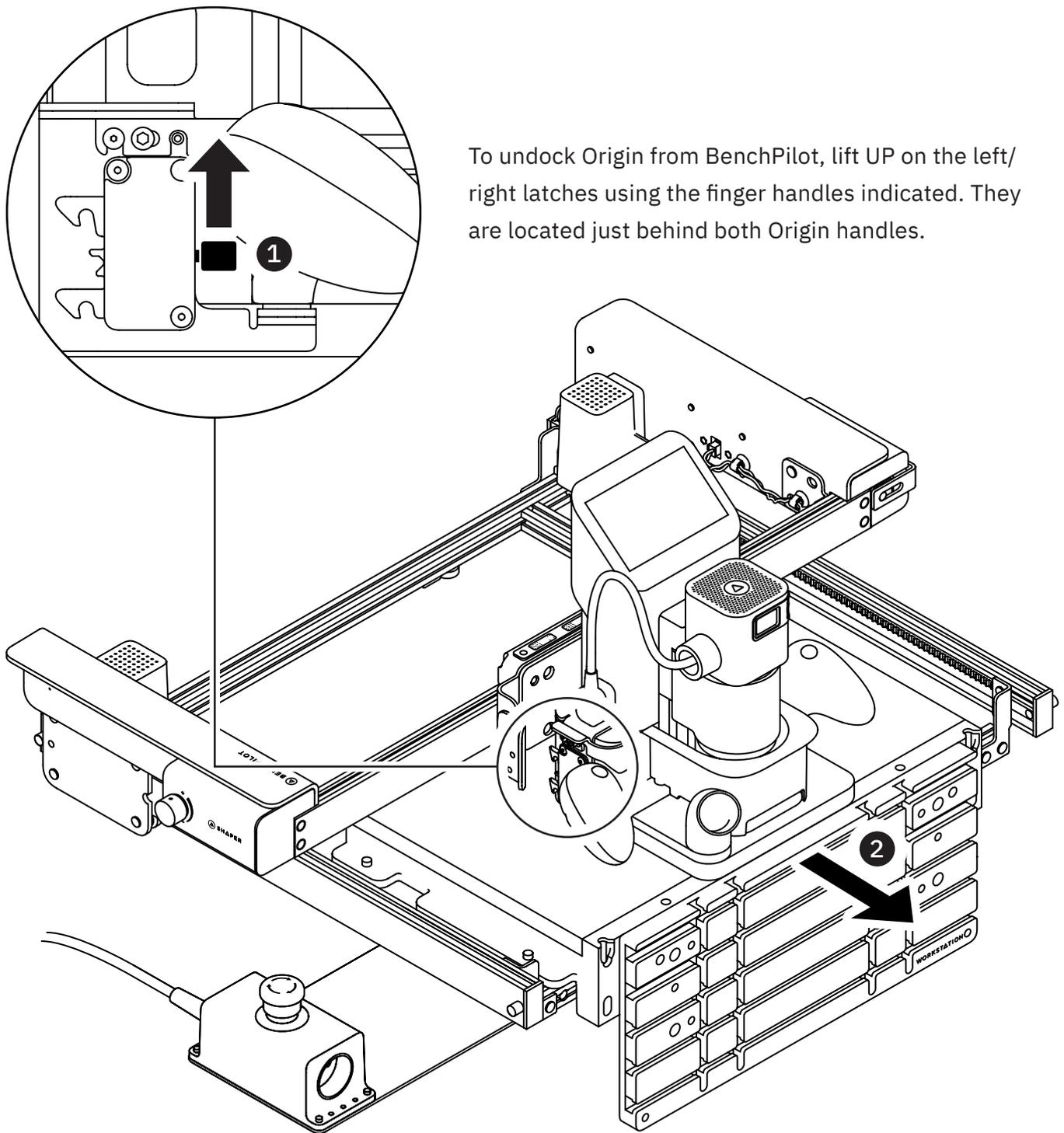
Push the crossbar back until it reaches the gantry limit. This will allow you to use Workstation's SHAPERTAPE surface as a base while you dock Origin.



Slide Origin firmly into the center of the Crossbar Carriage until you hear a click to indicate that the latches on the Harness have engaged with the pins on the Crossbar Carriage. With Origin installed, **re-tighten the screws** which you previously loosened on the Crossbar Carriage to set the latch height on the left and right side. Give Origin a wiggle to ensure it is securely locked in.



Note: This step must be repeated if the height of Workstation changes, if you use BenchPilot with a different Origin, or if you augment Origin with a larger baseplate.



To undock Origin from BenchPilot, lift UP on the left/right latches using the finger handles indicated. They are located just behind both Origin handles.

While holding the finger handles in the UP position, pull Origin away from BenchPilot to release it.

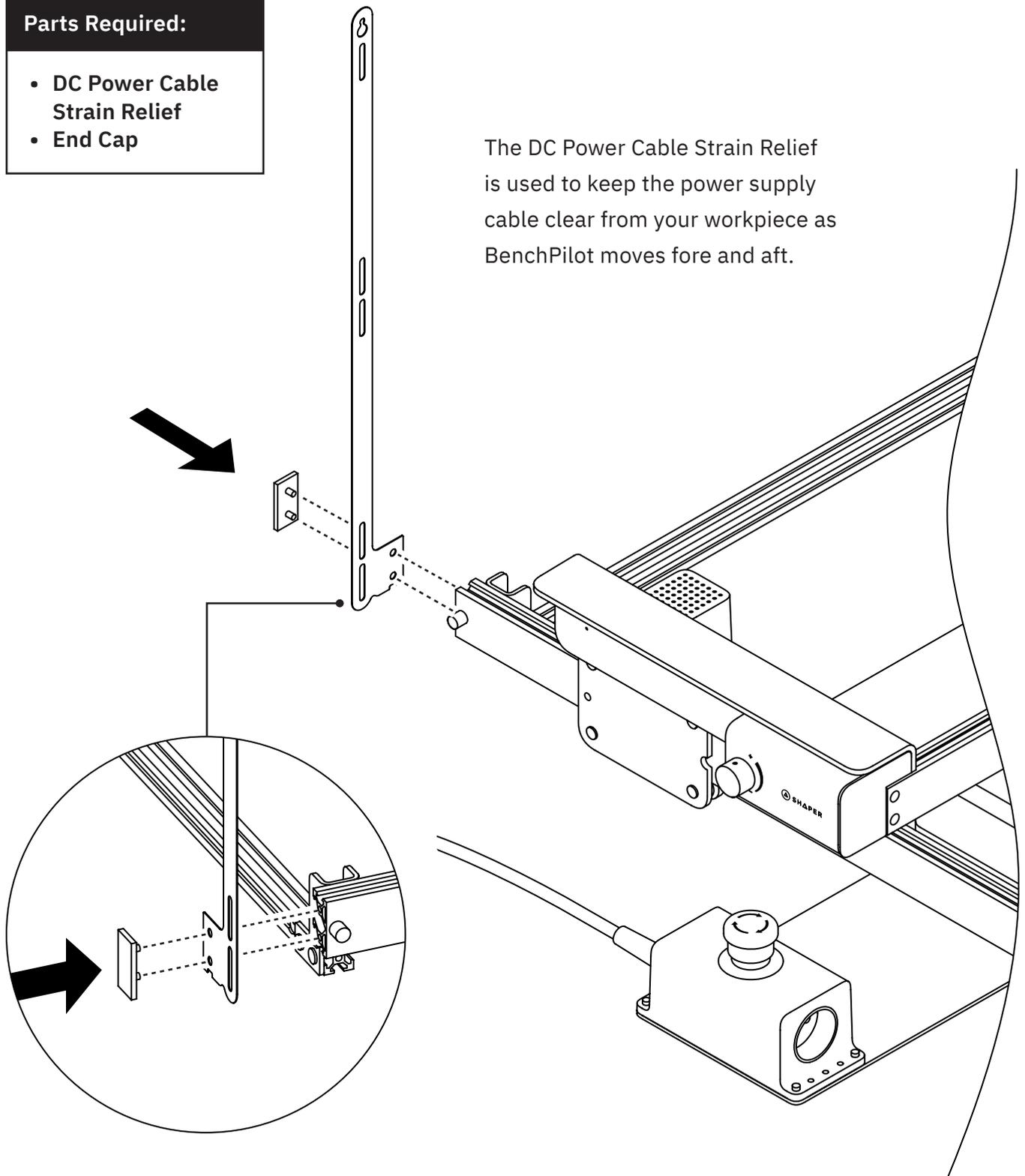
15.1 Install the DC Power Cable Strain Relief

EN

Parts Required:

- DC Power Cable Strain Relief
- End Cap

The DC Power Cable Strain Relief is used to keep the power supply cable clear from your workpiece as BenchPilot moves fore and aft.



Install the DC Power Cable Strain Relief by sandwiching it between the End Cap and Left Arm. Press the End Cap onto the end of the Left Arm firmly to anchor the DC Power Cable Strain Relief in place.

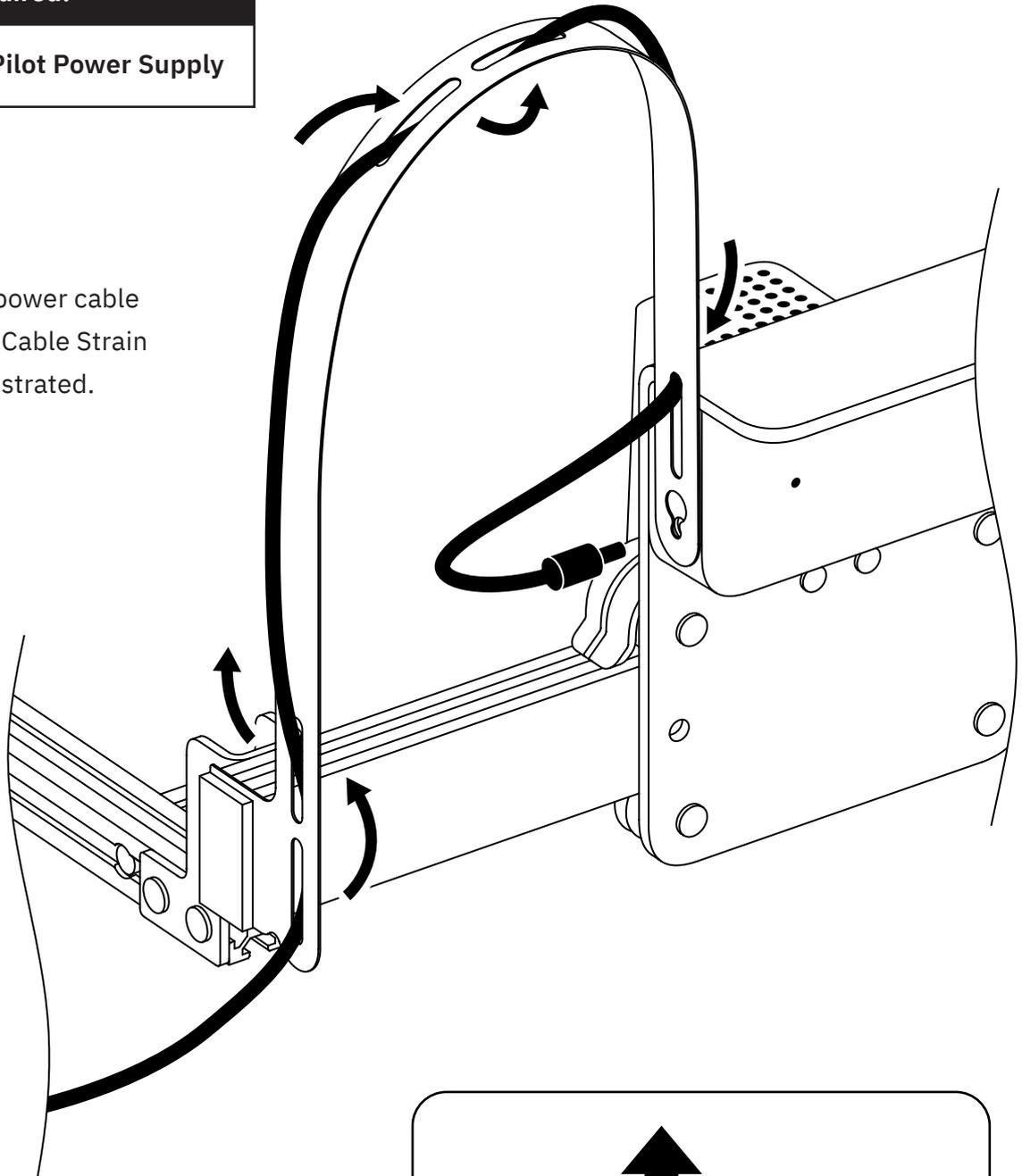
15.2 Install the DC Power Cable Strain Relief (continued)

EN

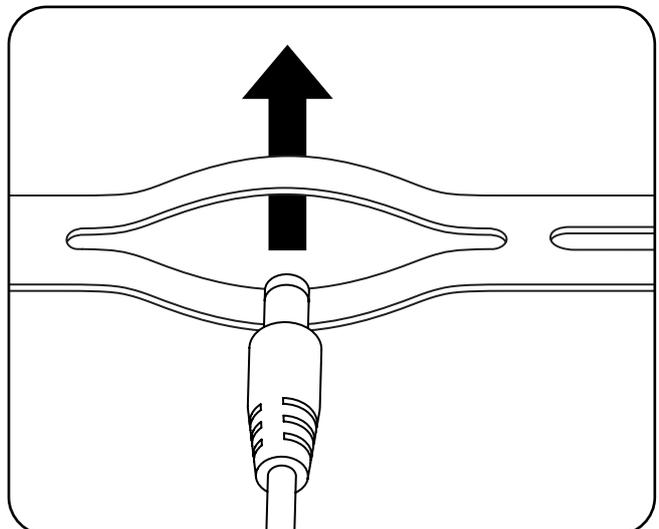
Parts Required:

- BenchPilot Power Supply

Thread the power cable through the Cable Strain Relief as illustrated.

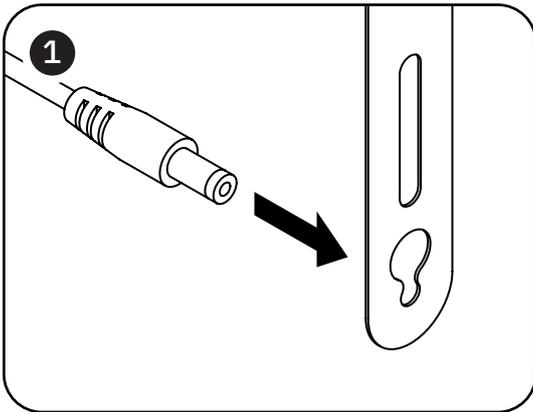


Widen each cable pass-through by pushing each side in opposite directions. This will allow you to slot the cable end through the opening.

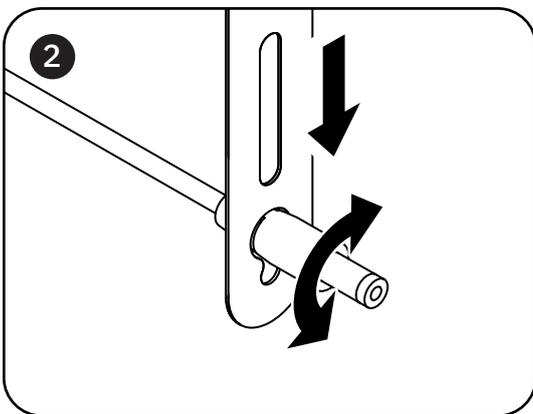


15.3 Install the DC Power Cable Strain Relief (*continued*)

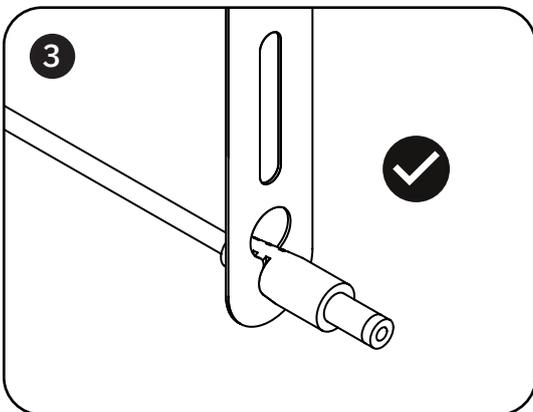
EN



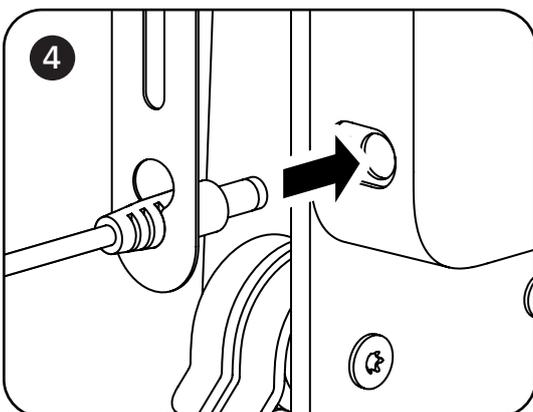
Pass the end of the power cable through the wider opening in the end of the Cable Strain Relief.



Twist the end of the power cable back and forth while pushing DOWN in order to seat the end of the power cable in the smaller opening.



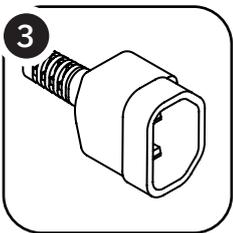
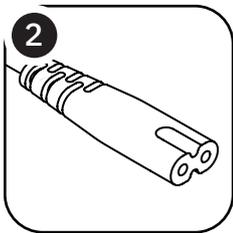
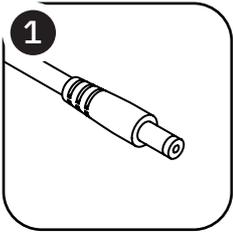
The end of the power cable should be firmly retained in the end of the Cable Strain Relief.



Plug the end of the power cable into the power connector plug on the reverse of the Left Arm.

Parts Required:

- Emergency Stop Box
- Power Supply AC Cable
- BenchPilot Power Supply



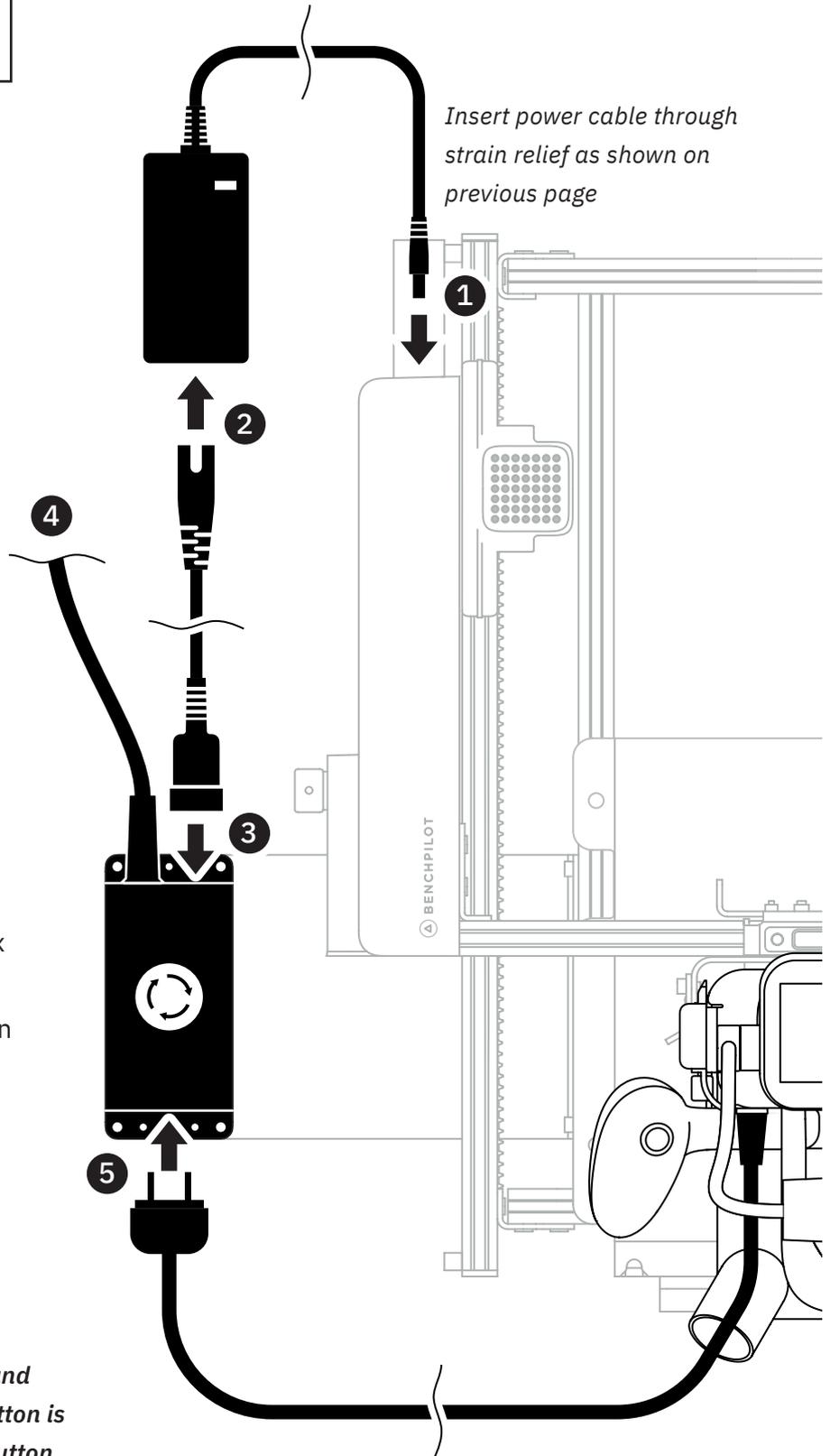
4
Connect the Emergency Stop Box input power cable to wall power. Follow power guidelines in the safety manual.

5
Connect Origin's power cable to the power outlet on the front of the Emergency Stop Box.

Power is removed from BenchPilot and Origin when the Emergency Stop Button is depressed. Twist Emergency Stop Button to release it and to restore power.

Cable lengths shortened for visualization purposes

Insert power cable through strain relief as shown on previous page



17.1 Secure BenchPilot to your Workbench

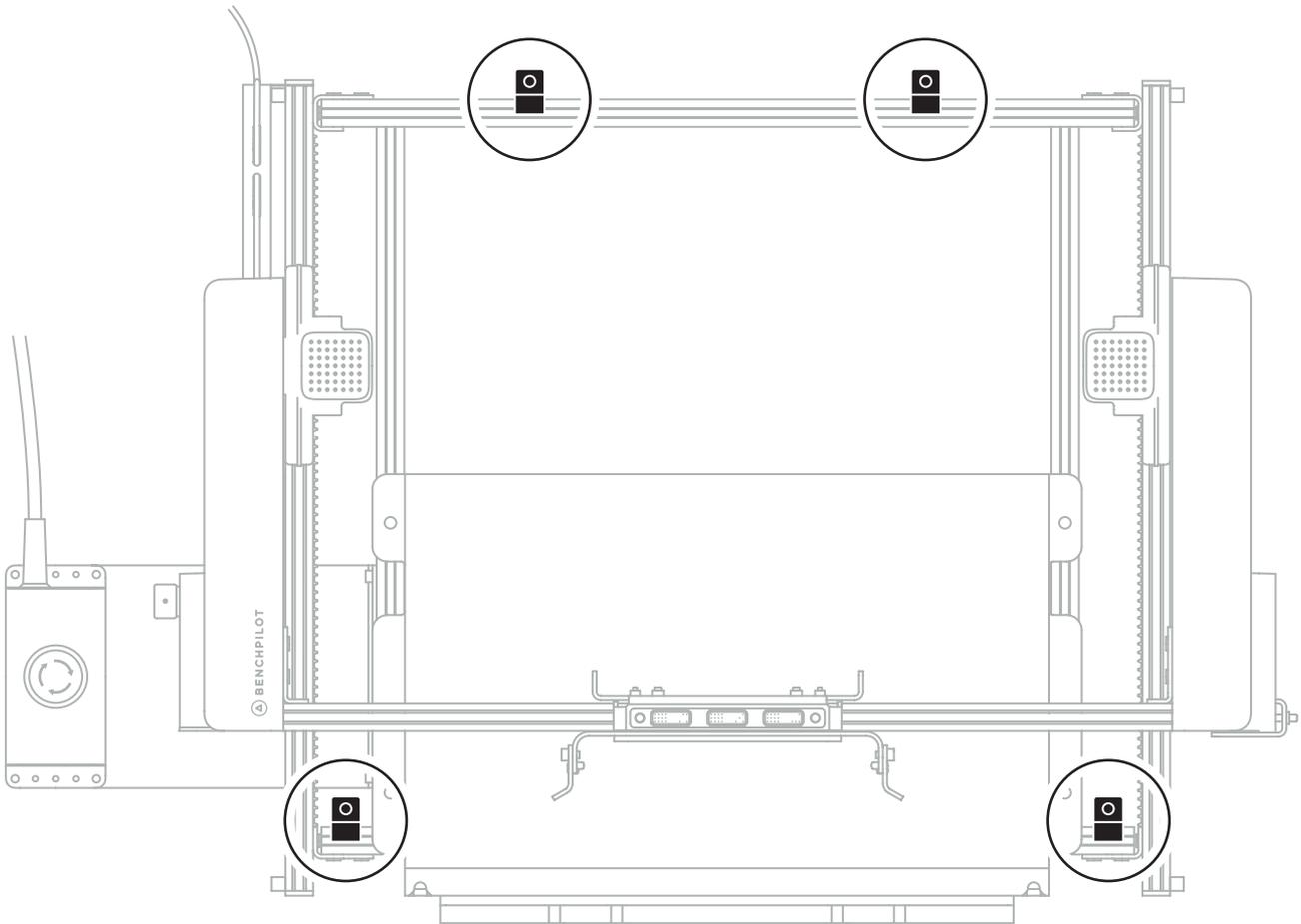
EN

Parts Required:

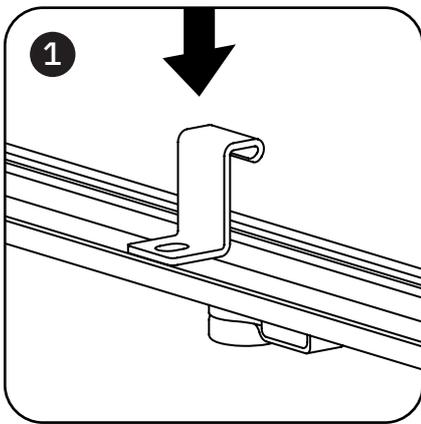
- Hold Down Brackets (4x)



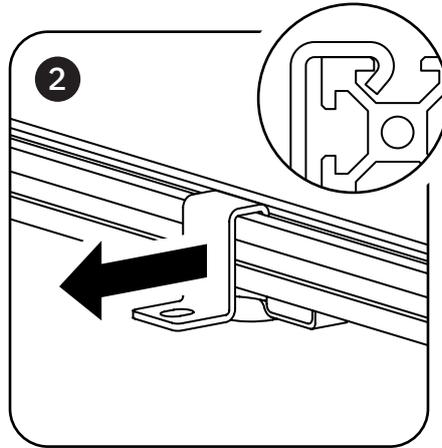
WARNING: BenchPilot must be securely attached to your workbench before use, either using clamps or the provided brackets.



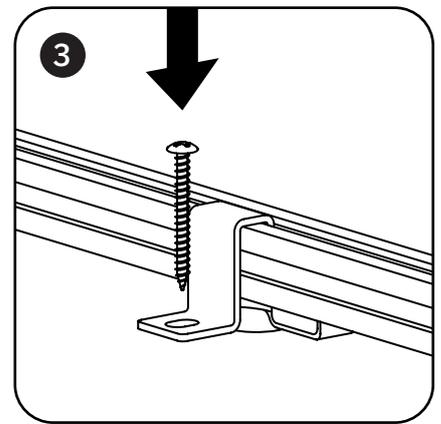
Place 4x Hold Down Brackets on the X-Bars in the locations shown above. Alternatively you may use your own clamps in place of the Hold Down Brackets. **Ensure that feet are directly beneath each Hold Down Bracket or clamped location.**



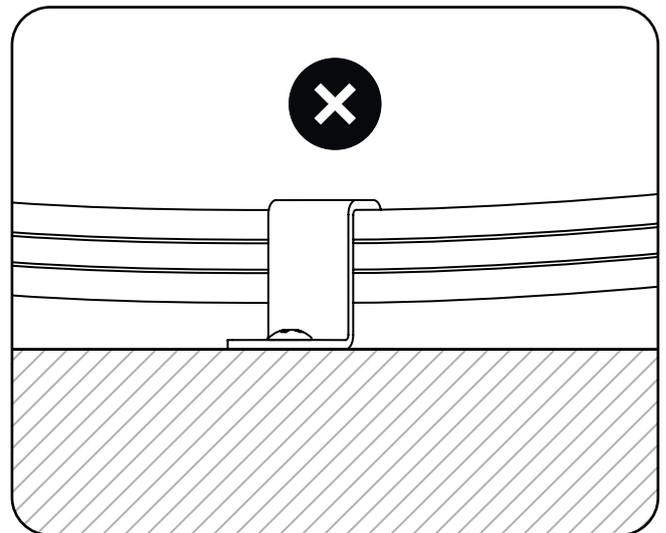
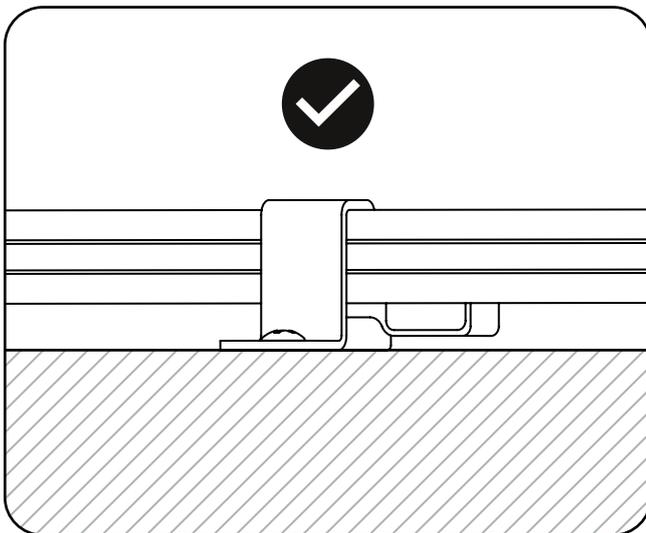
Slot each Hold Down Bracket onto the X-Bars so that they hook into the T-Track.



Pull the bracket outwards so that the hook firmly engages within the T-Track.



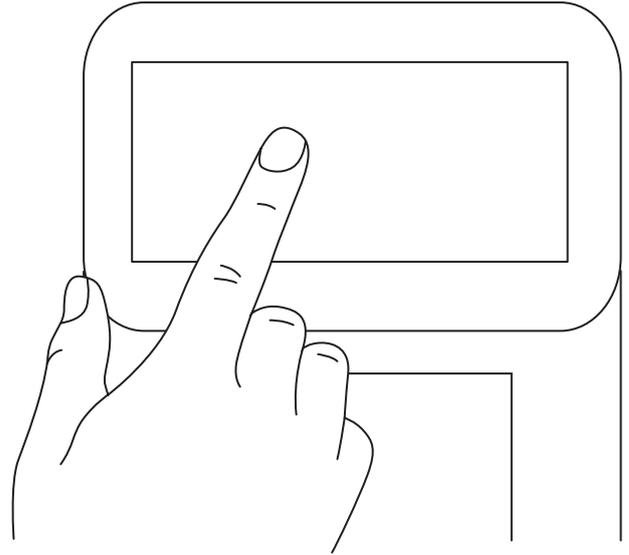
Use appropriate fasteners of your choice to firmly secure each Hold Down Bracket to your workbench.



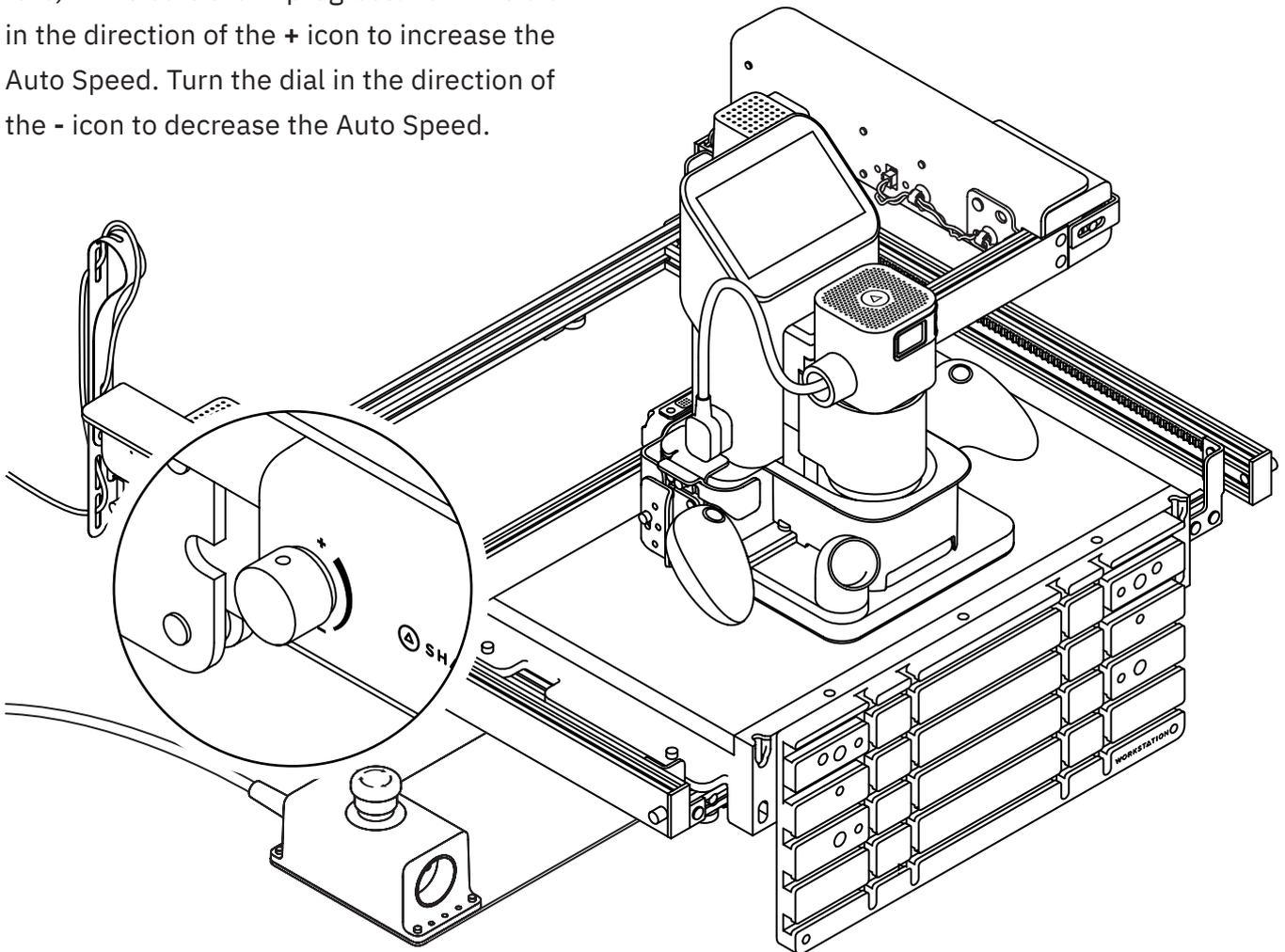
DO NOT BEND BASE FRAME - ensure that feet are directly beneath each Hold Down Bracket or clamped location.

Plug in Origin, connect to WiFi, download and install the latest system update.

When you dock Origin to BenchPilot, Origin will automatically connect wirelessly. Follow the on-screen instructions when prompted to get up and running.



When Origin is connected to BenchPilot, you can use the dial on the Left Arm to adjust Origin's Auto Speed (also known as feed rate) while cuts are in progress. Turn the dial in the direction of the + icon to increase the Auto Speed. Turn the dial in the direction of the - icon to decrease the Auto Speed.



BenchPilot **MUST** be secured to your workbench before use.

Shaper BenchPilot is only designed for use with Shaper Origin. Read Origin's Safety Guide before use.

Only operate Shaper Origin with the finger guard installed.

Use a dust extractor to remove dust from BenchPilot after each use. Be sure to remove dust from the tracks which the gantry wheels run along.

It may be necessary to occasionally re-tension the belt. Refer to Step 10 for instructions.

Always use eye and ear protection when operating Origin or Origin+BenchPilot.

NEVER leave BenchPilot running unattended.

NEVER oil the gantry wheels or the track which the wheel runs along. The wheels are self-lubricating.

Keep the domino markers on top of the crossbar carriage free of sawdust/debris to prevent Origin from encountering connection issues with BenchPilot. Do not use liquid cleaning agents.

An LED light can be found towards the rear of the Left Arm. This light indicates which operating mode BenchPilot is in.

Solid White Light

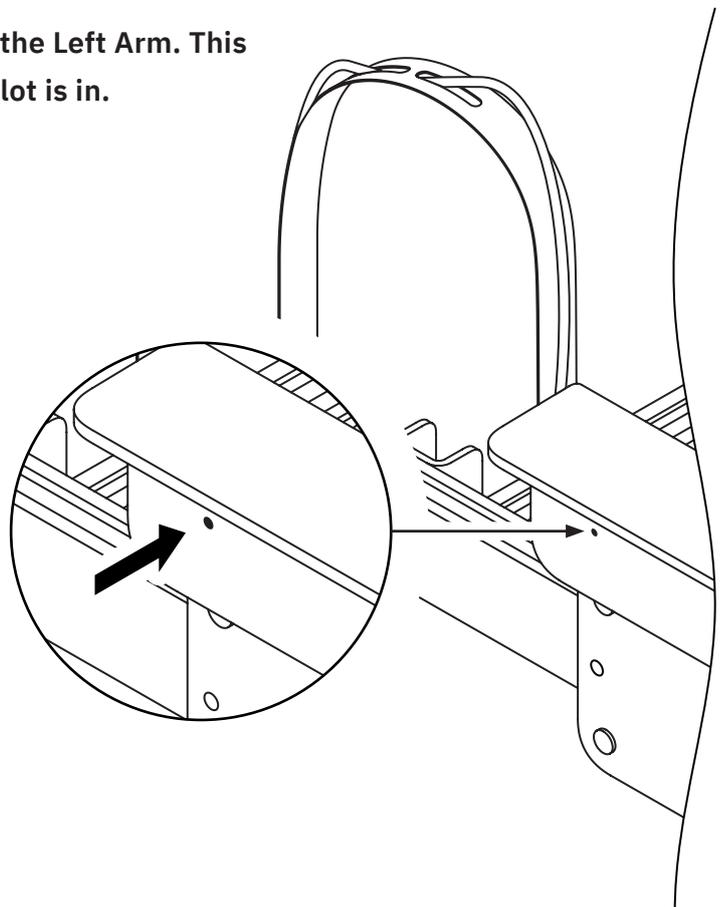
BenchPilot is connected to a nearby Origin.

Flashing White Light

BenchPilot is searching for a nearby Origin to connect too.

Flashing Red Light

BenchPilot has encountered a system error. Contact Shaper Support if the issue persists.





Visit our Help Center for additional information about setting up and operating BenchPilot with Origin.

support.shapertools.com/benchpilot



This manual is available in more languages.

shapertools.com/bp-manual-languages

Accessories & consumables for Shaper Products:
shapertools.com/accessories

For help and troubleshooting:
support.shapertools.com

Spare Parts for Shaper products:
shapertools.com/spare-parts

Patent Information:
shapertools.com/patents

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