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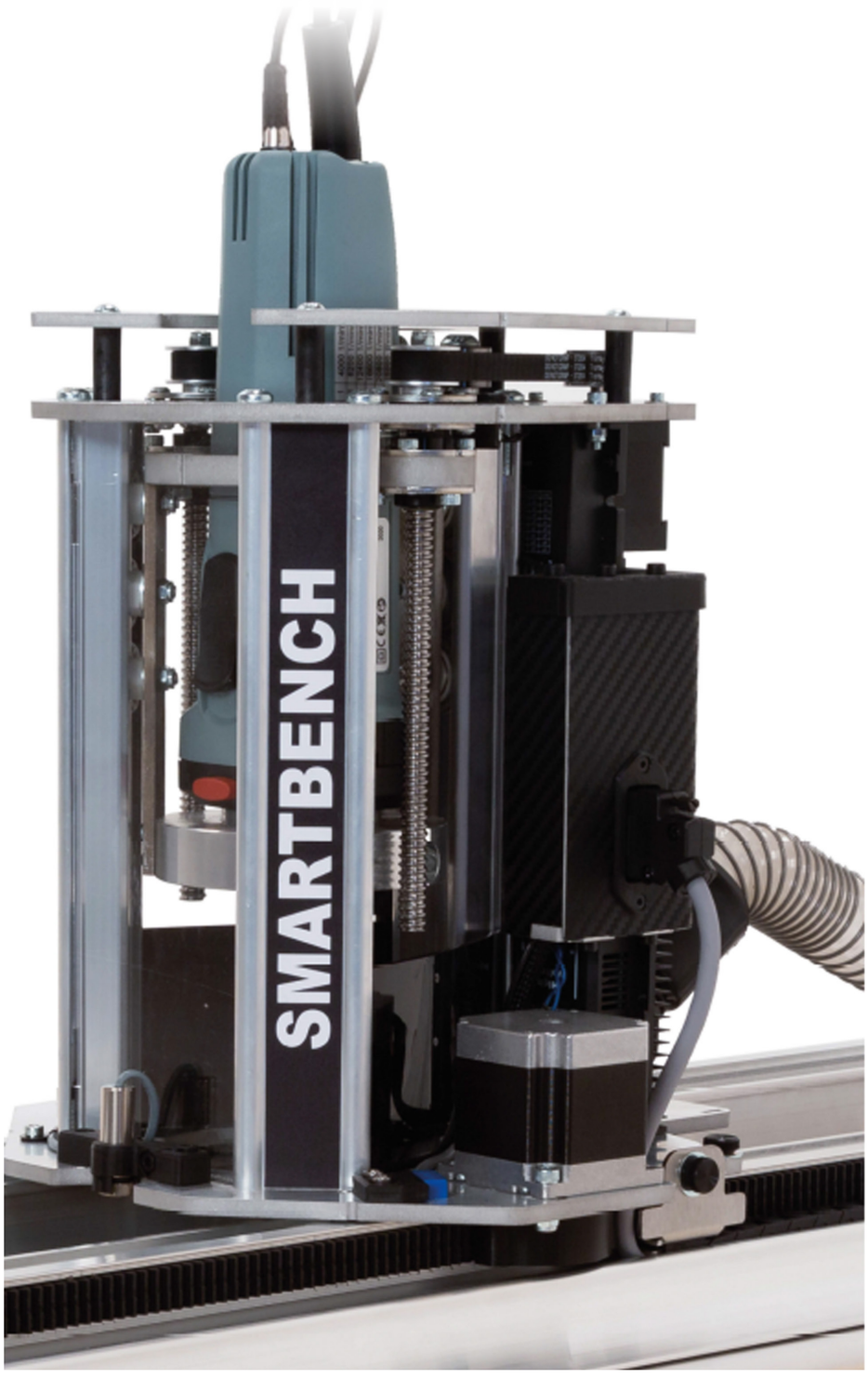
Lower Beam Trinamic Upgrade Installation Guide - v1 to v2 upgrade



Lower Beam v1 --> v2 upgrade installation guide

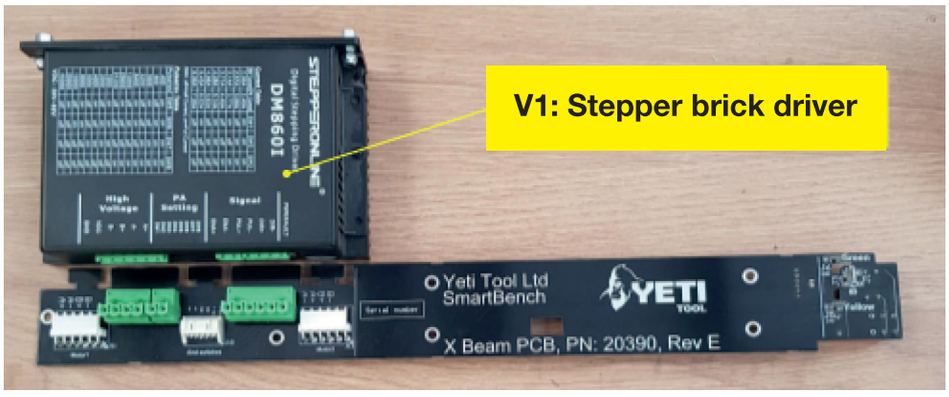
WARNING

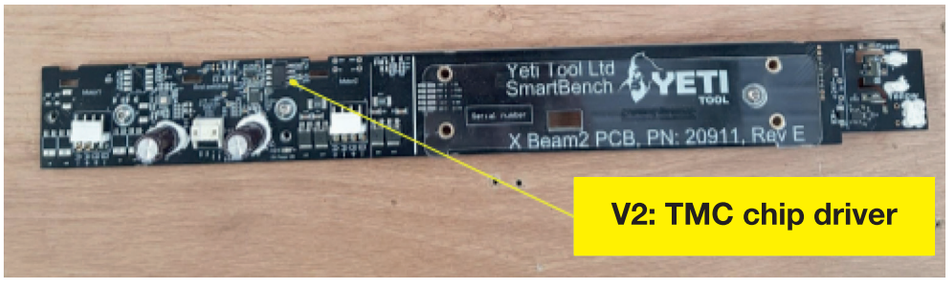
Disconnect the machine from the electrical supply before beginning. Only carry this installation if you are suitability qualified and competent to do so. Refer to the Electrical Safety Notice before proceeding.

Introduction

This kit will upgrade a SmartBench Lower Beam (LB) v1 to a v2. The primary reason is to replace the stepper motor driver bricks, with integrated Trinamic (TMC) driver chips. The finished LB continues to be compatible with SmartBench v1.1-v1.2 hardware.

Here is a comparison of the different electronic hardware:





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Eligible LB's

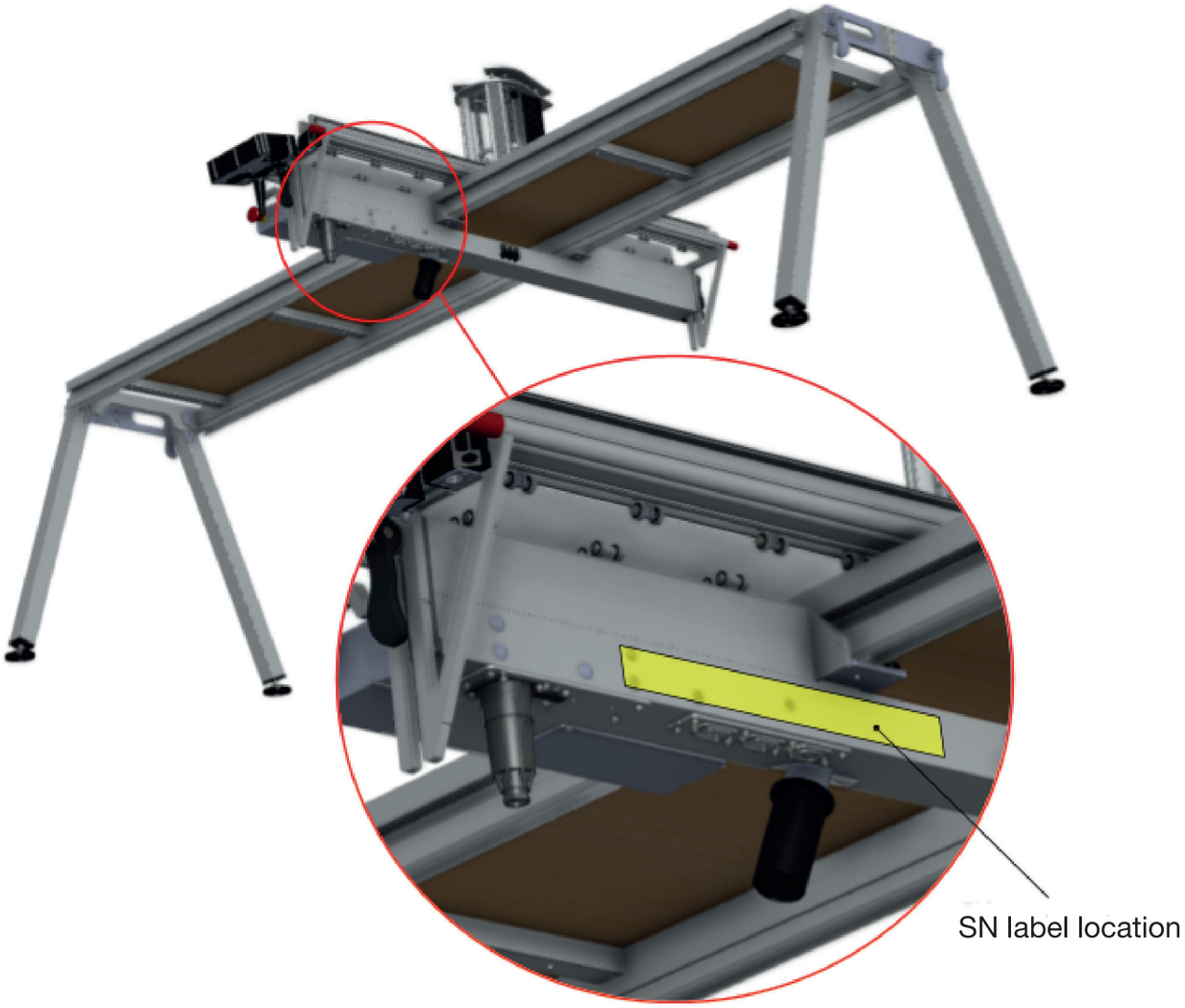
Eligible LB's i The LB v1 is the only eligible LB version for this upgrade path.

Confirmation of a LB v1 by serial number

The serial number for the LB may be found on the lower beam power template label (as shown in the image below).

Minimum serial number for a LB v1: XL0004

Maximum serial number for a LB v1: XL0759



DO NOT proceed further if the starting LB is not a v1.

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Link to video resource

Scan the QR code to illustrate the procedure

How to complete the upgrade procedure using both video and written instruction

⚠ You must use this document in conjunction with the video to complete important preparation and finishing steps.

- First, from this document: complete the next two sections:

  Upgrade kit preparation

  SmartBench preparation
- From the video, and/or this document: complete the Hardware fitting section
- Return to this document to complete the **Updating settings**.

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Upgrade kit preparation

The upgrade kit includes replacement components to install the new electronics.

Pre-assemblies

Assembly Number	Description	Qty	Image
21953	X BEAM PCB WITH SPACER (Trinamic upgrade) (Rev A)	1	 *Note this assembly includes an aluminium plate bolted to a PCB

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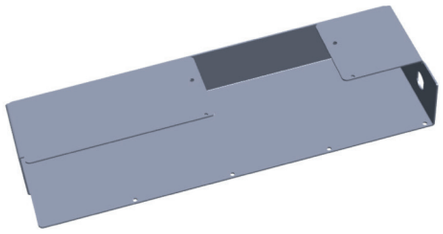
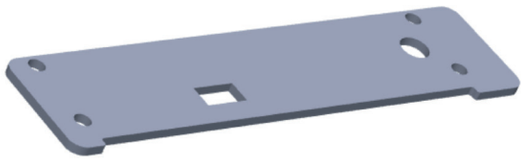
Individual Parts

Assembly Number	Description	Qty	Image
21126	Lower Beam PSU Cover	1	
21111	X Beam PCB Spacer, PSU side (Rev B)	1	
20230	M4 x 6 Dome head	2	
-	M4x16	6	
20594	12mm Hole Plug (grey)	3	
20585	Small cable tie	3	
-	Double sided adhesive tape, thin	10cm	

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Tools required

- 2.5mm Hex Driver
- 3mm Hex Driver
- 7mm Nut Spinner
- Side Cutters

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Hardware fitting

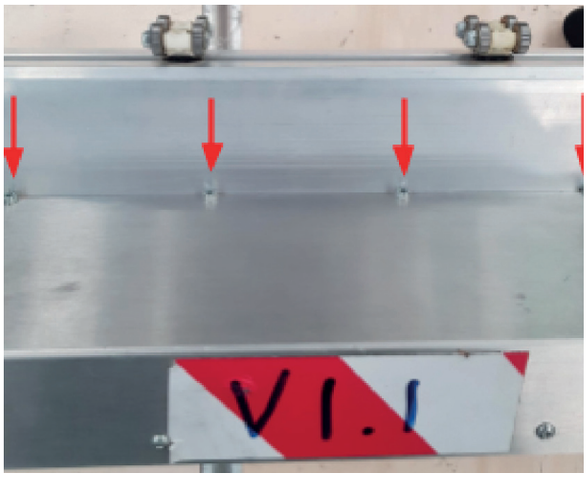
Step 0 - Disconnect the LB from SmartBench

Disconnect the LB from SmartBench and remove the assembly from SmartBench.

⚠⚠ Do not attempt any of the following operations until all looms have been disconnected and the assembly is isolated from power.

Step 1 - Remove the PSU cover

Remove the 4x M4x8mm bolts on the top side of the case with the 3mm hex driver.

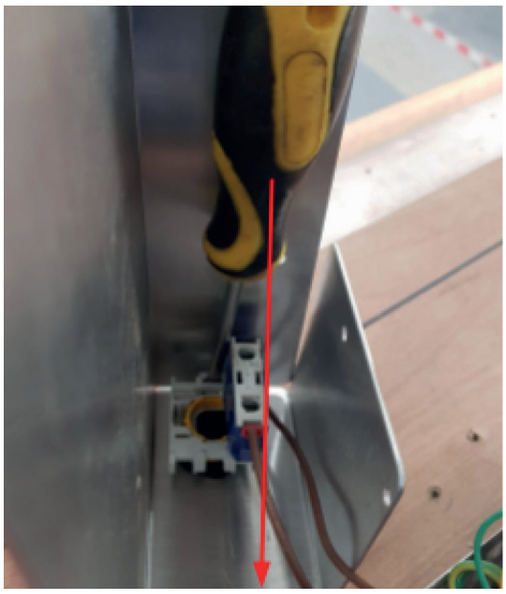


Remove the remaining 5x M3x6mm bolts using the 2.5mm hex driver.



Step 2 - Remove E-stop button

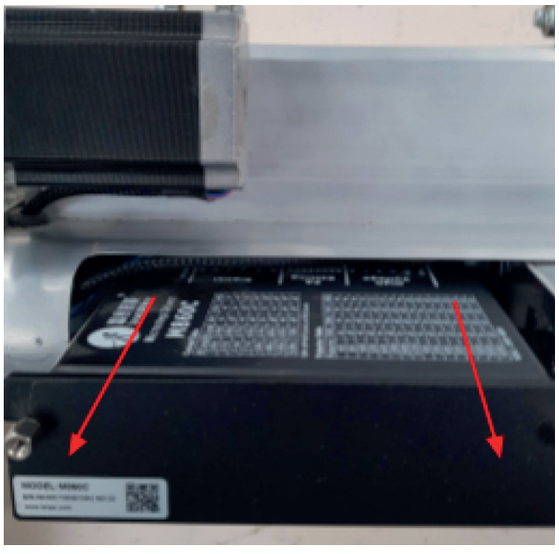
Using a flat screwdriver, insert it into the tab on the rear of the switch and gently lever it towards you. The connector will pull away from the casing.





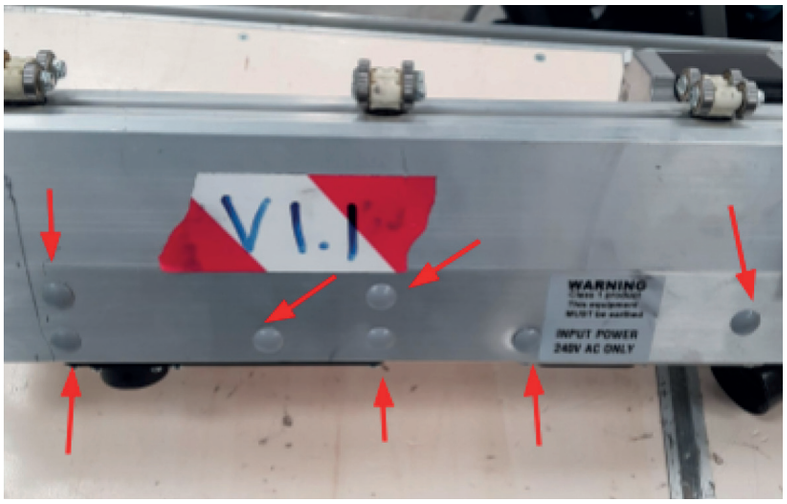
Step 3 - Remove the stepper brick

Remove the stepper brick by pulling it towards you. This is a push fit connection.



Step 4 - Remove the plastic caps

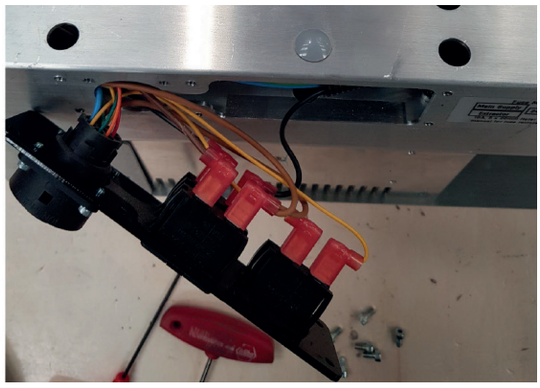
Remove the plastic caps identified below. They lift off with a flat blade screwdriver - take care not to scratch the aluminium. We have included some new caps, so do not worry if you damage them when removing them.



Step 5 - Remove the fuse plate

Remove the electrical fitting by removing the 6x M4x8mm bolts. This will help access later.





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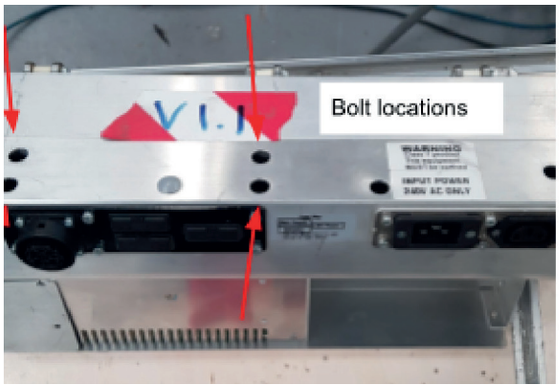
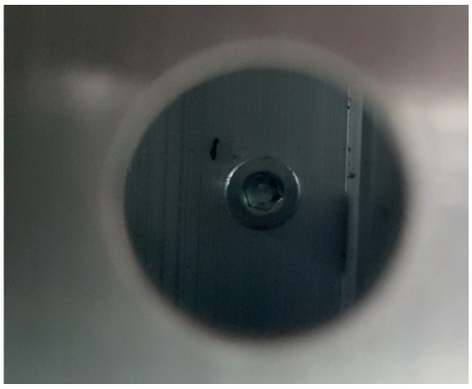
Step 6 - Unbolt the PSU

Remove the 4x M4x14mm bolts which secure the power supply unit in place with the 3mm driver.





⚠⚠ Remove any “lost nuts & bolts” with a magnet. It is essential that all are retrieved, since a floating bolt near the power electronics would be a serious hazard.

⚠ When rolling the beam around for access, take extra care to manage any loose devices to prevent putting any cables under tension.

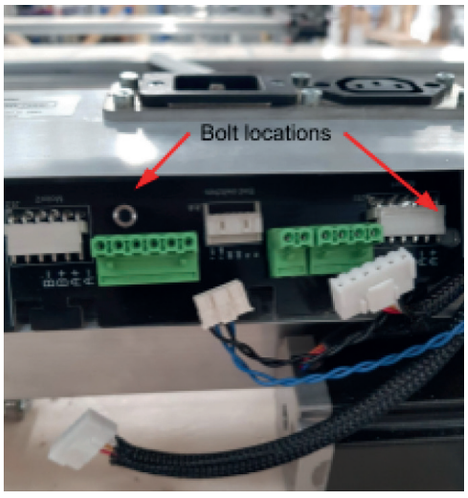
Step 7 - Unplug looms

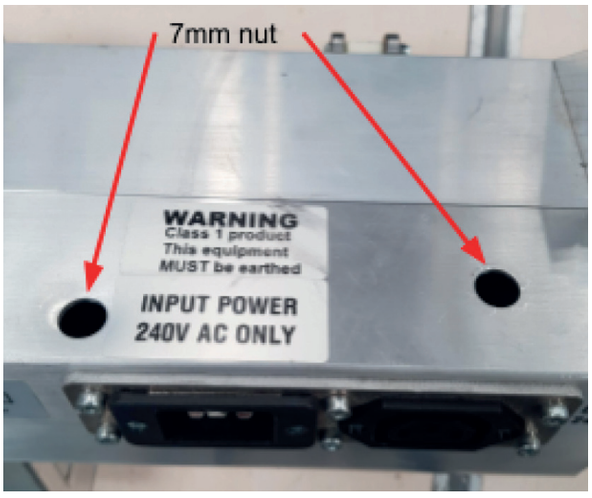
Cut the cable ties holding each of the looms in place. Be very careful not to damage the wiring. Unplug the 3 looms, taking care to pull on the plugs, NOT the wires.



Step 8 - Unbolt the PCB

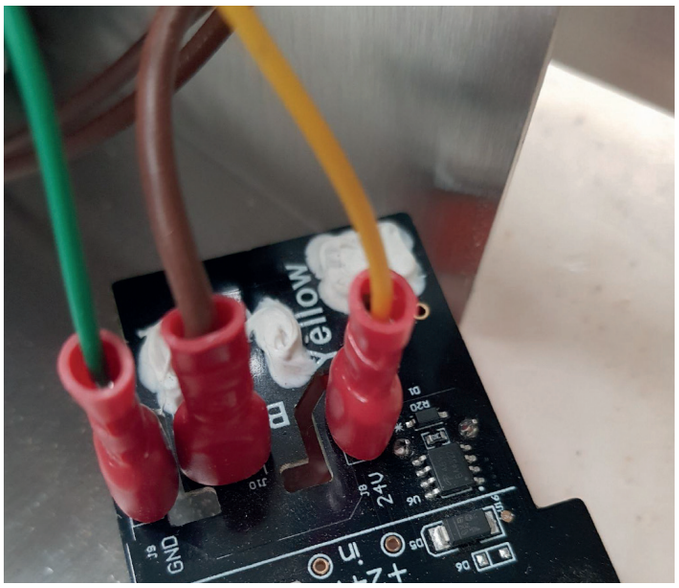
Remove the 2x M4x12mm bolts with a 3mm driver which fastens the PCB. These are held on with 2x 7mm nuts on the rear - use the 7mm nut spinner to keep these in place while removing the bolts.





Step 9 - Unplug front face PCB connections

Remove the three plugs on the front face of the PCB. You may need to use a pair of pliers.



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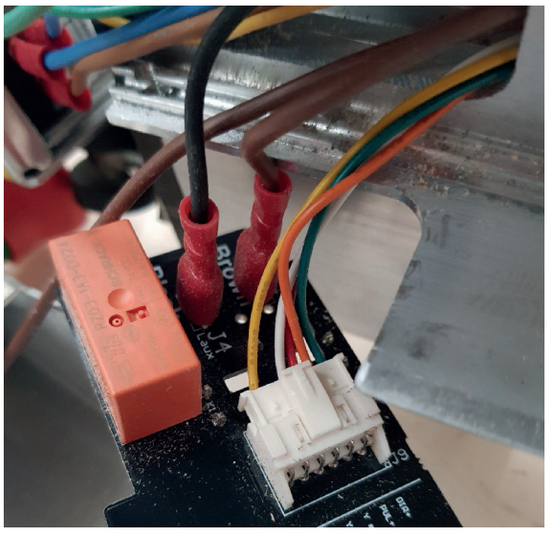
Step 10 - Unplug back face connectors

Remove the two plugs and the connector on the rear of the PCB.



Both old acrylic PCB and PSU spacers are no longer required - new parts will replace them.



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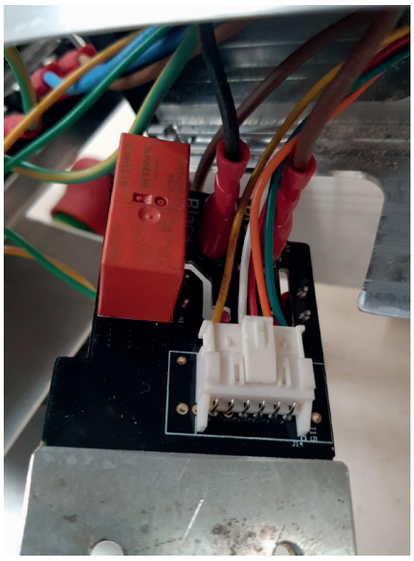
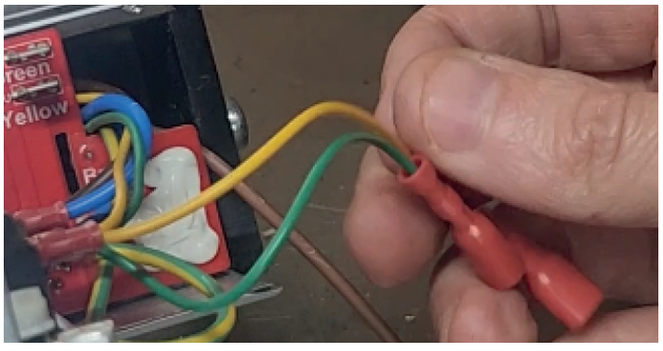
Step 11 - Fitting the new PCB

Connect the PCB's plugs on the back side (the metal heatsink is on the back of the new PCB for reference).



Place the PCB assembly against the beam, running the wires to the PSU through the corner gap:



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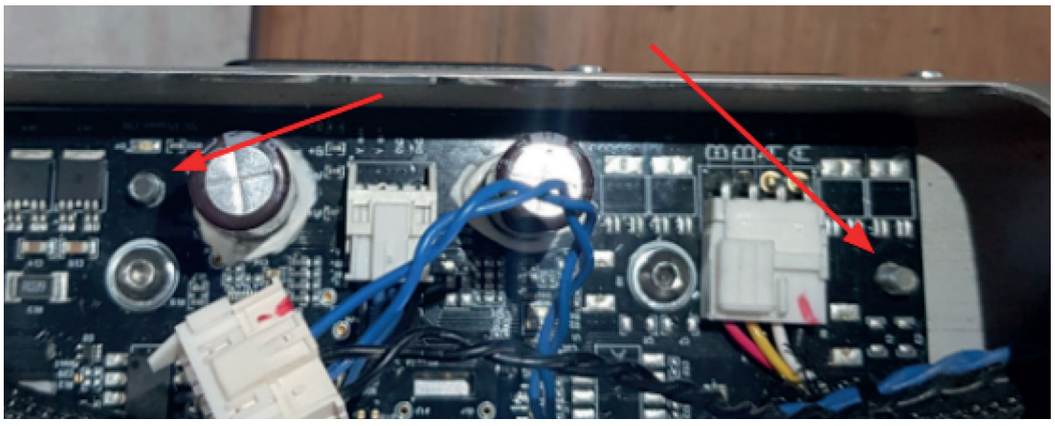
Step 12 - Attach the new PCB

Position the PCB



Attach the PCB to the lower beam using 2x M4x16mm supplied, but from the rear of the beam instead.

Do not attach the nut again, it is no longer needed and may damage the board.



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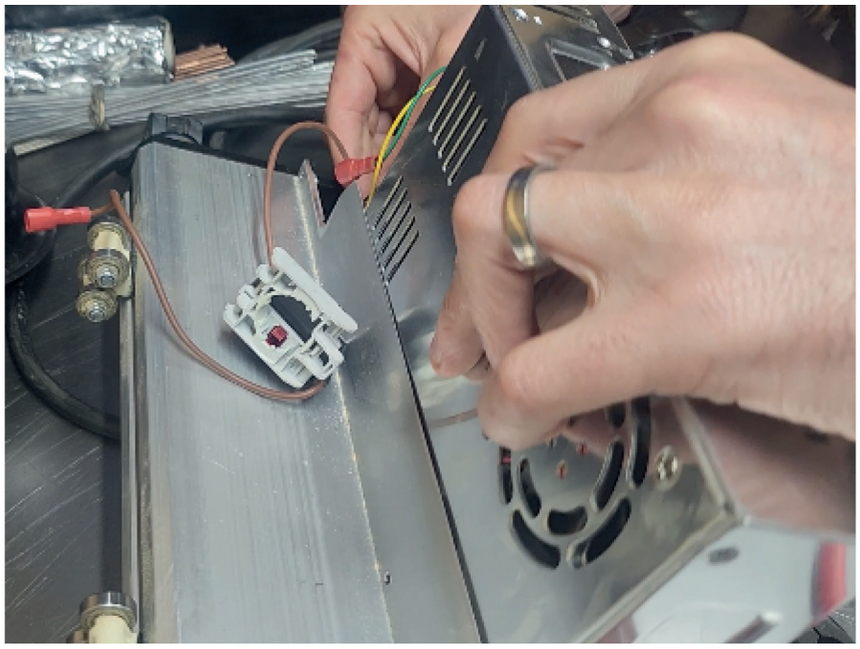
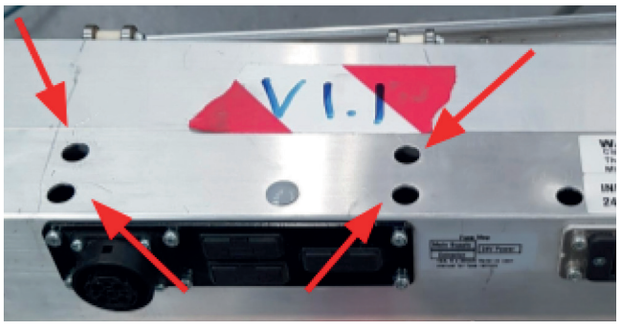
Step 13 - Fit the PSU

Loosely attach the new acrylic spacer to the PCB with thin double sided tape, centring on the bolt holes which fasten the PSU.

Offer up the PSU to the lower beam.

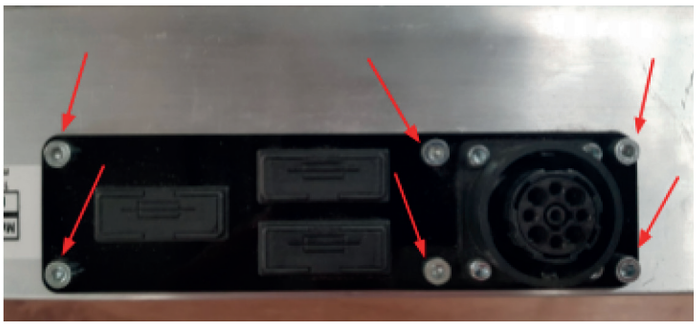


Fix in place with the 4x M4x16mm bolts supplied with the 3mm hex driver. (The existing M4x14mm bolts are difficult to fit hence why we supply slightly longer M4x16's).

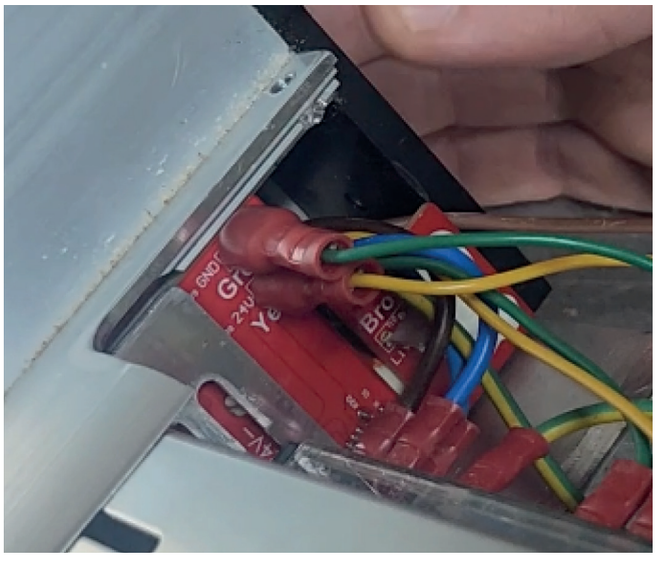


⚠ Be careful not to pinch any wires when fitting the bolts. Carry out a visual check and pull test while the fuse plate is detached.

Reconnect the fuse plate holder with the 6x M4x8mm bolts.



Connect the remaining spades on the front of the PCB as indicated on the PCB (Green, Yellow & Brown).



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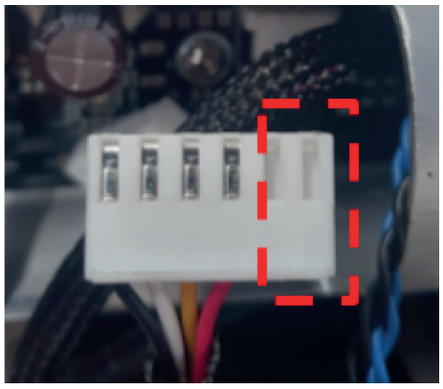
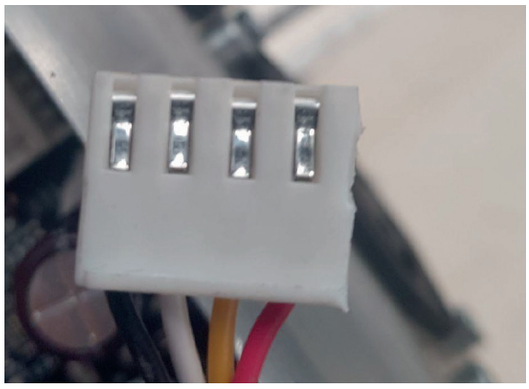
Step 14 - Trim the motor connectors

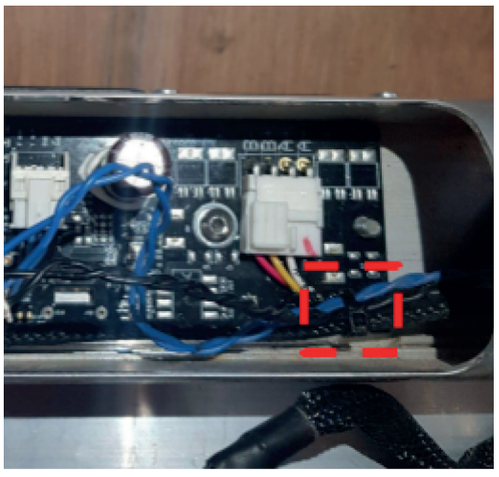
Cut the two motor connectors where there are two missing pins as per the below photo. Do not cut into any of the existing pins or into the housing of those pins. Connect the motor connectors up again after the cut.

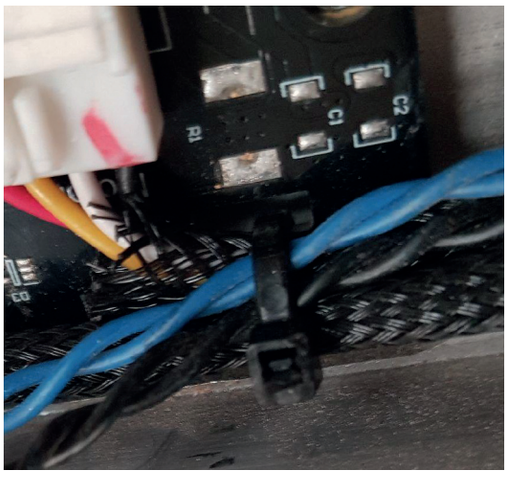




Step 15 - Strain relief cables

Connect the reduced motor connectors to their original positions and plug in the limit switch connector. Use the cable tie to keep all of the cables together as shown below.





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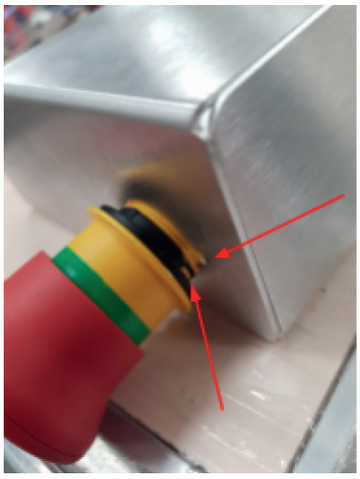
Step 16 - Attach the E-stop

Attach the new E-stop button supplied to the new PSU cover. Align the yellow tab with the notch in the cover, push fit firmly and then screw on the retaining nut to the rear.

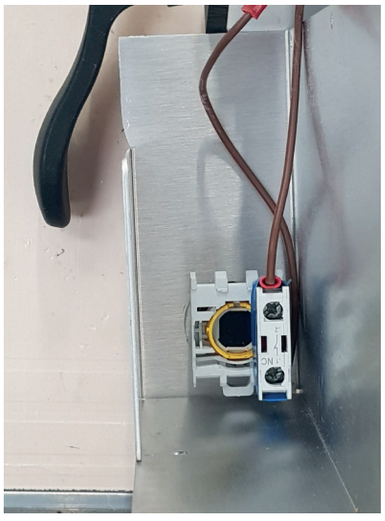
(E-stop may already be fitted), if so go to Step 17.





Step 17 - Attach E-stop rear

Attach the E-stop button connector. This is just a push click fitting. The orientation is important here.



⚠ Fully test this specific fitting procedure, by cycling the e-stop push and release at least 5x, and making sure that the switch body has not come loose.

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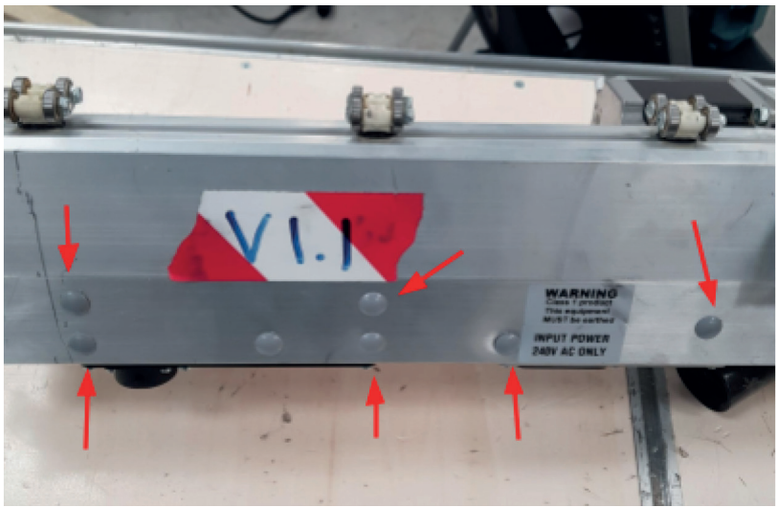
Step 18 - Fit PSU cover

Reattach the new PSU cover. We have included 2x new M3 x 6mm bolts for the additional fixing positions below.



Step 19 - Fit caps

Reinstall the back grey caps. . We include replacement ones just in case the old ones are damaged.



Step 20 - Isolation power up test

Before reassembling to SmartBench, power test the unit. This should be done by a qualified electrician, ensuring protection by an RCD. Connect power to the Lower Beam via the SmartBench Input power socket, and turn it on by releasing the E-stop. Check:

- the PSU fan starts
- the Y-motors lock

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Updating settings

Turn on your SmartBench

Re-assemble the LB on to your SmartBench and turn it on.

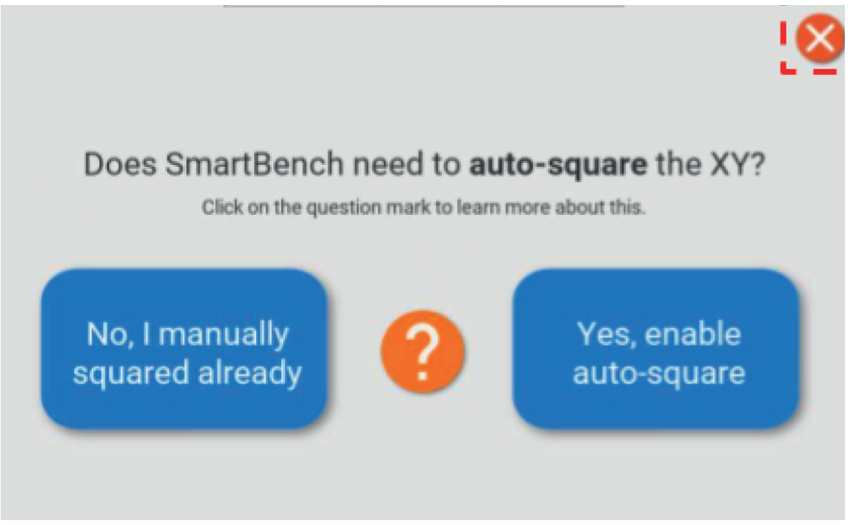
Test the homing direction

Depending on the age of the Z-Head you may need to change the motor direction. You can test this by attempting homing.

The Z-Axis should move upwards towards the limit switch and the X and Y should move towards the home corner.

If all homing directions areas expected: your upgrade is complete.

If a homing direction is in the wrong direction: cancel the homing. Then skip the homing procedure with the red X in the top right corner if needed to proceed to the next step



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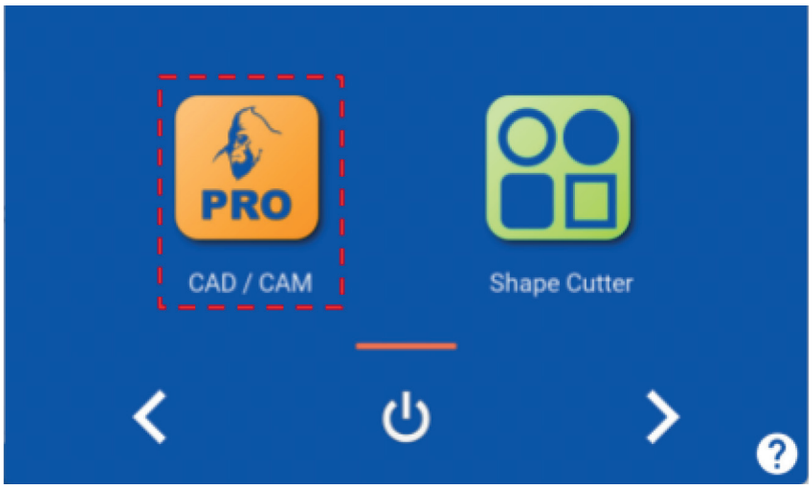
Modify the motor direction, if required

If your homing sequence moved the Y axis in the wrong direction:

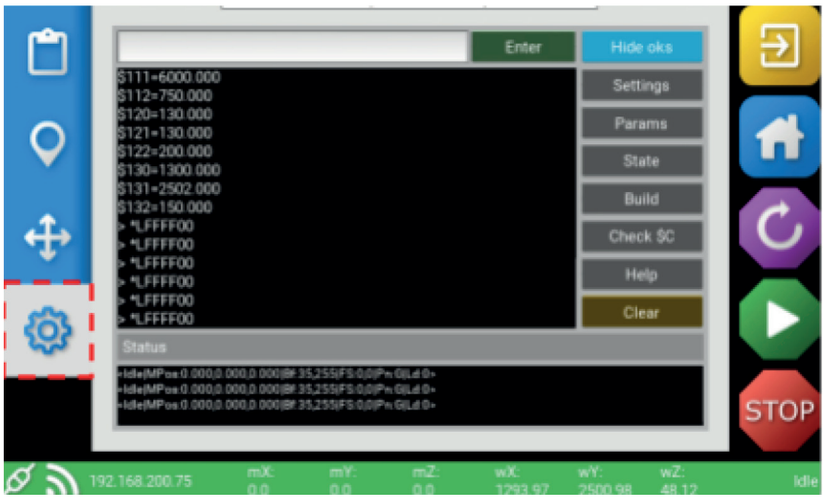
- Inspect the value shown in the GRBL settings for $3.
- The value can either be 1, 3, 5 or 7. The most likely value to work is 3.
- Make a note to change to the alternative value - this needs to be added to the $ values to be updated in the next steps.

i Note this will change the direction for the whole axis both homing jobs and general move commands.

Navigate to the Pro CAD/CAM application on the console.



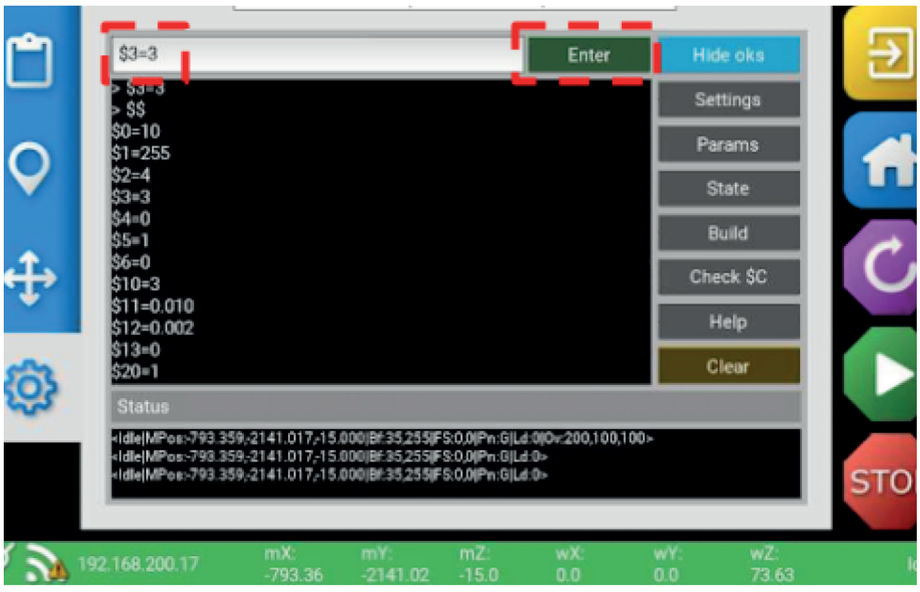
Press the gear icon to enter the GRBL settings.



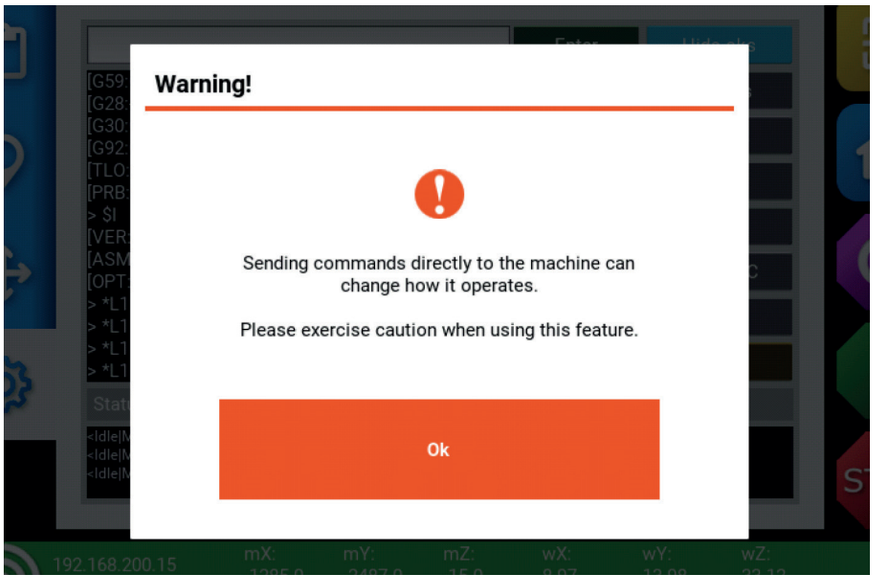
Press the white field at the top to bring up the keyboard. Enter the following without spaces.

$3=3

Press the green enter button.



You will see a pop up with a warning, press ok.



Then press the green enter button again - this will actually set it.

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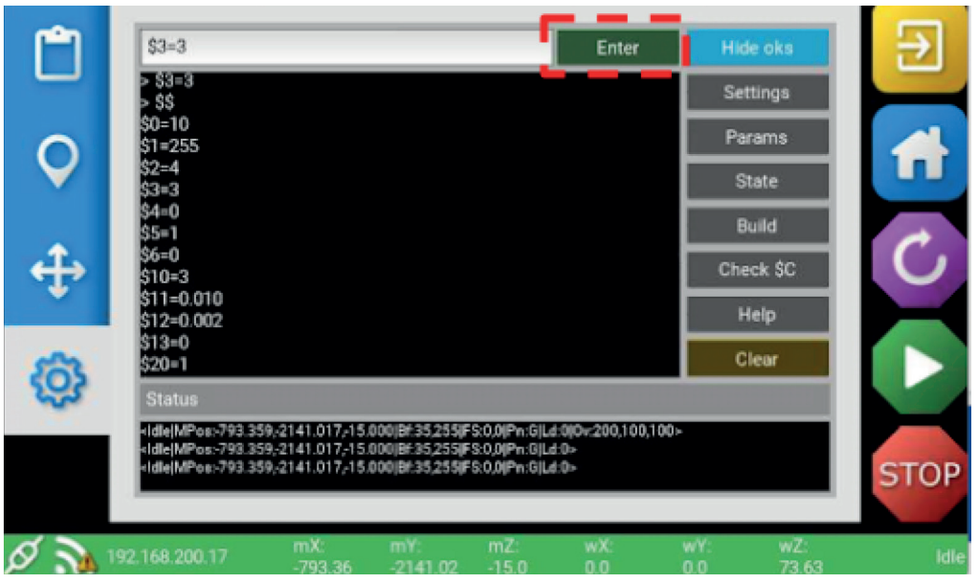
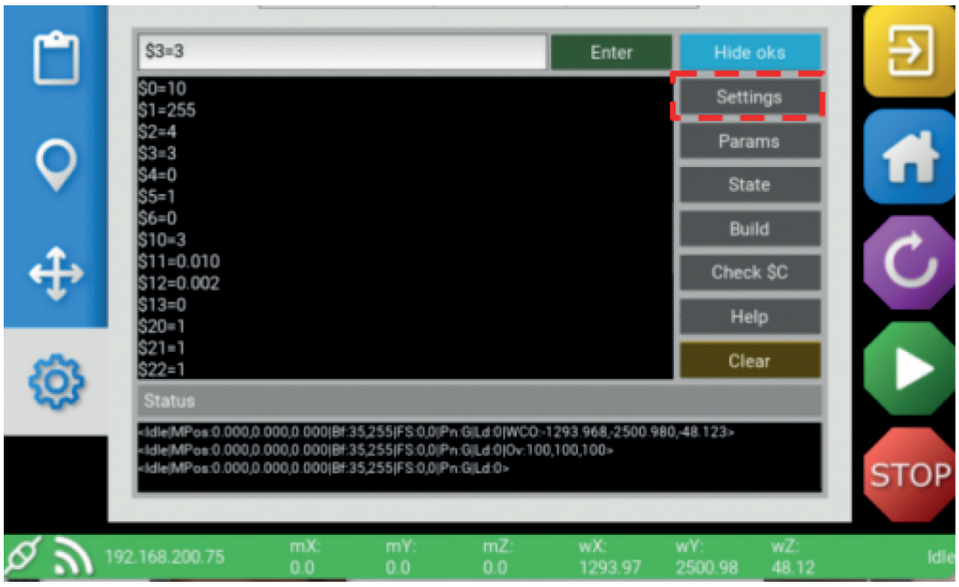


Press the grey settings button on the right to reload everything.



You are now able to ensure the settings are correctly set by scrolling through the dollar settings. Ensure $3=3 and not the original $3=1

If you still find movement direction issues the alternative is to try $3=7.

End

This marks the end of the procedure.

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Support

If you require any additional support, please visit our website, and raise a support ticket
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