

# How to troubleshoot Proximity Switches On a new or upgraded Shapeoko How to adjust V-Wheels

If you have a new machine or upgraded to proximity switches and you cannot get homing to work try these steps to figure out what is wrong and fix it. Before attempting any of these instructions power off your machine and slowly move the gantry front to back and side to side slowly limit to limit. If you have any hard spots trouble shoot the mechanical problems before moving on to the switches. Do not move the machine too fast or you will create Electromotive Back Force making the belts sound like they are slipping. Rock your gantry end plates for play and also the Z axis for any play. Adjust your v wheels properly before proceeding. Your machine must work mechanically before it will work under power. The pictures are all of a Shapeoko 3 XXL with HDZ. All Shapeoko 3 models are the same except for the Z axis. The screen captures are from Carbide Motion 536 and are subject to change in the future. See end of document for v-wheel adjustment.

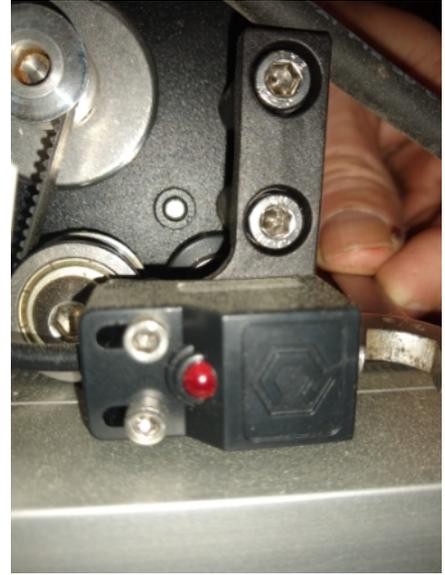
1. Power off your machine and remove the controller cover. Hook up your cables.



2. Move your gantry away from the homing position so you have access to each proximity switch.



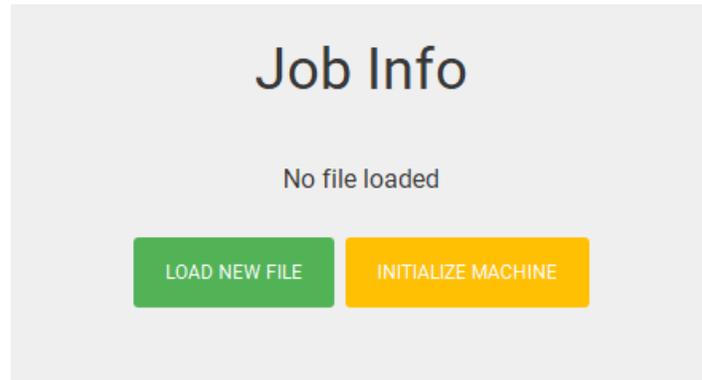
3. Power on your machine **but do not initialize**. Use a metal object, like a wrench, to place next to each proximity switch and see if the red light comes on. If all three switches turn red then the switches are working. If the red light does not come on then check your connections on the controller and you are plugged into the correct place. When you get all three switches working move on to adjustment if your homing still fails. Otherwise you are done and try to initialize.



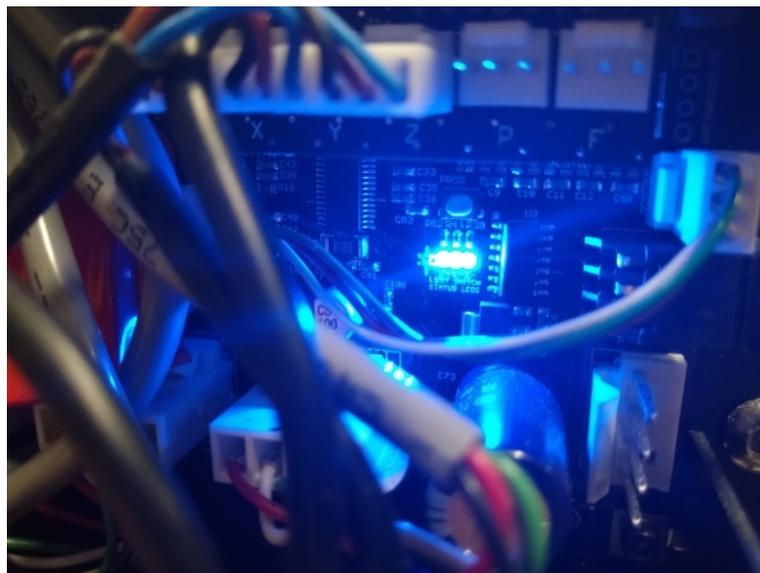
This is a picture of an HDZ. The Z-Plus switch is in a different position.

4. If initialization still fails power off your machine and move your gantry to the homing position at the right rear. If you have a belt Z then push your Z to the top, it may drop some but later you can hold it up while turning the machine on. If you have a Z-Plus and/or HDZ use the large screw turning by hand to move the Z all the way to the top.

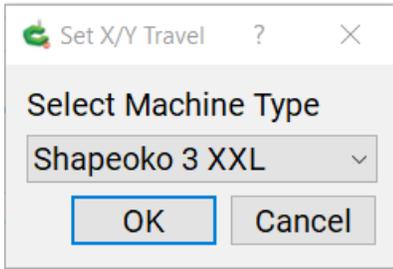
5. Power on your machine, holding the Belt Z up to the top if necessary, and connect **but do not initialize**.



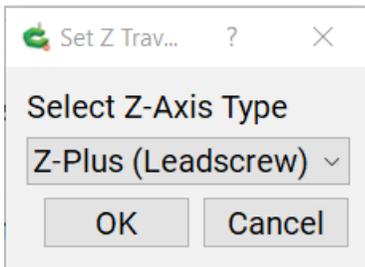
Check to see if your switch blue lights all light up. If one or more switches are not on then try adjusting the switch until the lights comes on. Once you get all three switch lights on you can try to home. If you cannot get the switch light to come on and on step 2 the switch turned red make sure you are close enough to the frames on the X and Y to trigger the switch. Mechanical issues can keep the gantry from being close enough to the frame to keep the swtich from being triggered. A Y belt can have excess belt under the tension clip that can keep the gantry from going all the way to the far back and right. Same thing for the X belt or check that your router power cable is not keeping your gantry from going all the way to the limit at the right rear. The belt tension clips can be out of alignment. Loosen the clips and hold them square with a pair of pliers and tighten the bolt. This picture shows all 3 proximity switches working and triggered.



6. Once you get all your switches lighting up go to the “Settings” menu and set the configuration for your model and Z type.

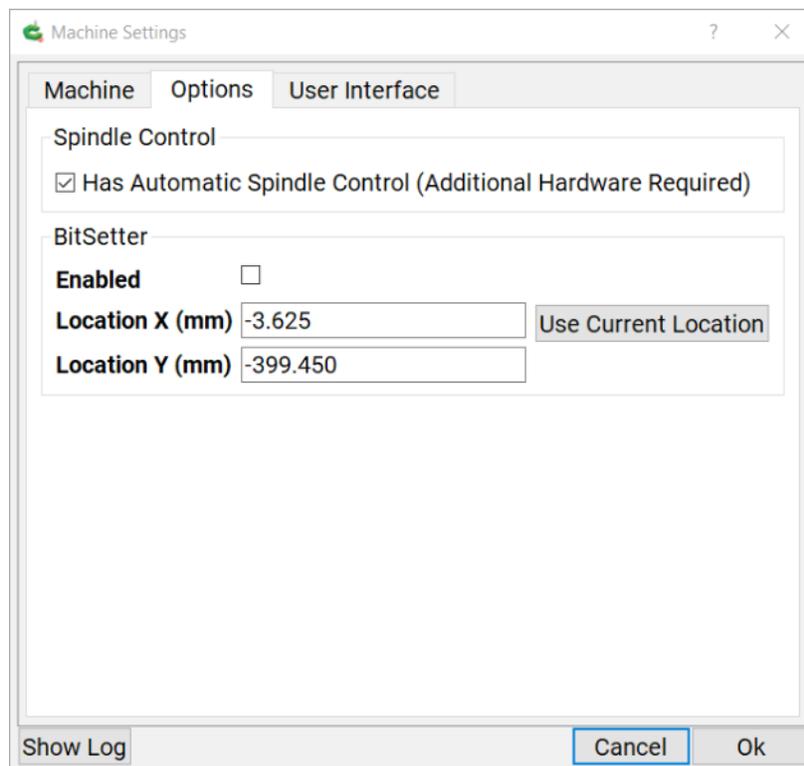


Set your machine type, this is an example. Set **your** machine type.

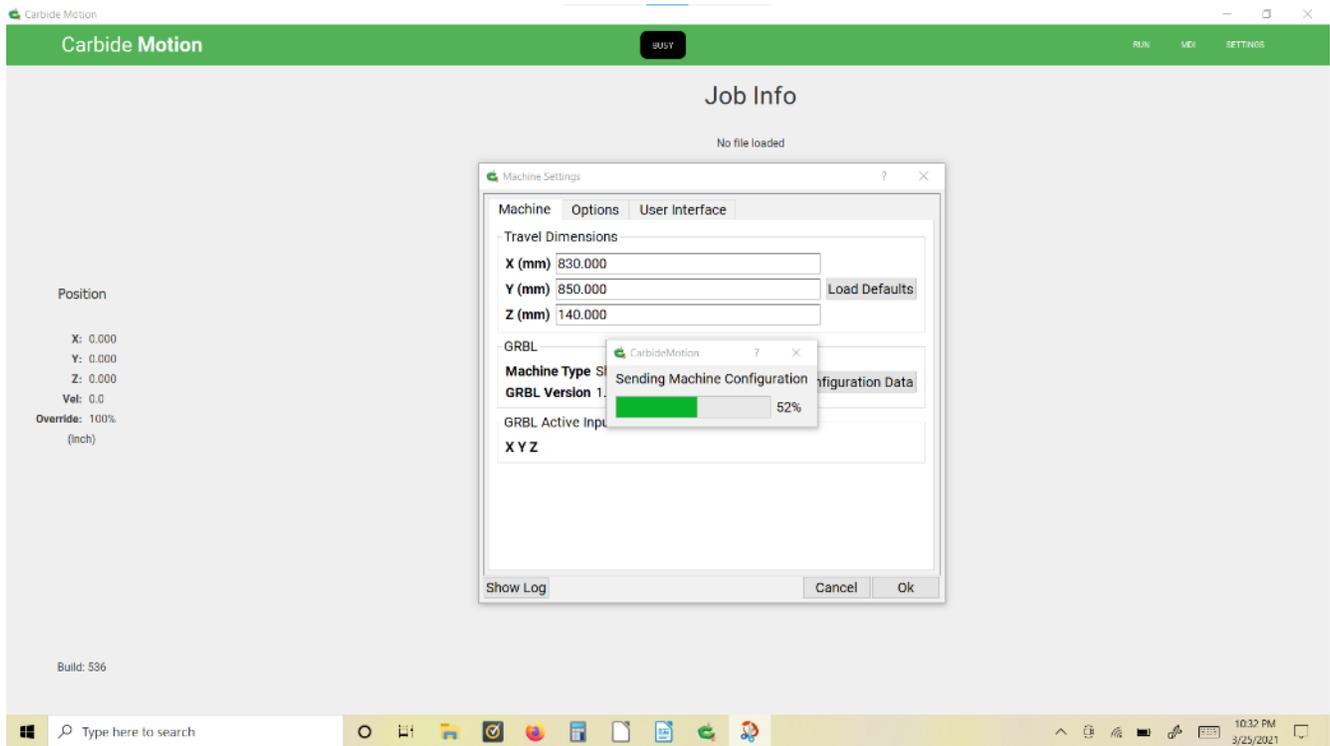


Set your Z type, this is an example. The choices are Z Belt, Z-Plus, HDZ. Most new machines come with Z-Plus, older ones may have Belt and/or HDZ. Just pick what you have. Make sure you know which one your have before proceeding.

Then go the second tab and make sure BitSetter is **unchecked**. If you have a BitSetter you will set that up after homing is complete. You can check the automatic router control if you want but for the BitSetter will wait until later when setting of the configuration is complete and homing is successful.



Go back to the first tab and “Send Configuration”. This only takes a few seconds to complete.

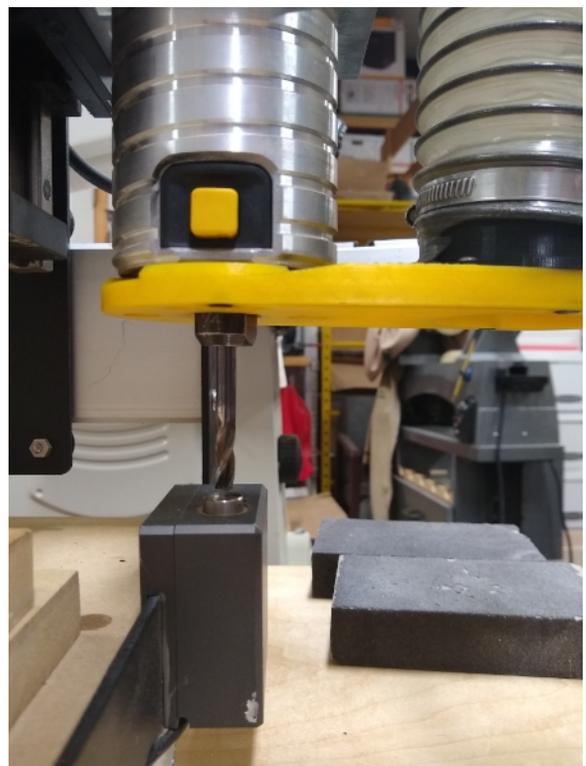
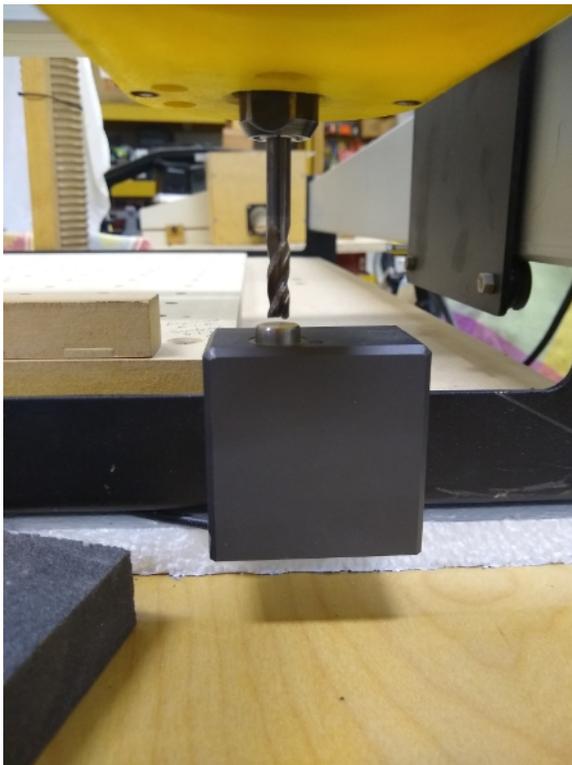


You can then initialize. If all is successful then you can set up your BitSetter by opening the Jog Menu and open the Set Zero and clear all offsets.

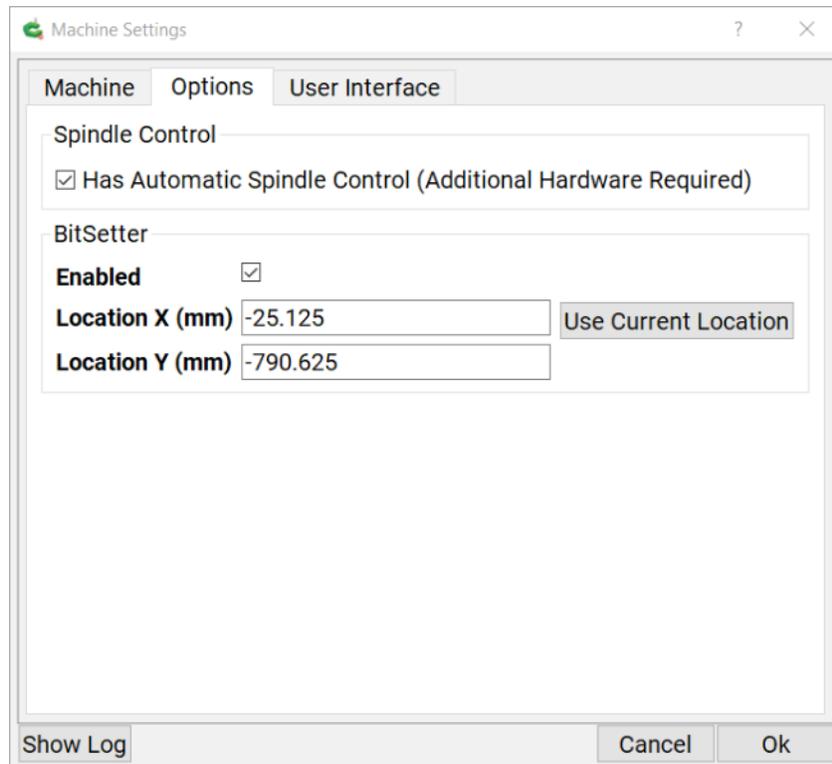
## Set Current Position

X:	<input type="text" value="-0.433"/>	<input type="button" value="ZERO X"/>
Y:	<input type="text" value="-30.709"/>	<input type="button" value="ZERO Y"/>
Z:	<input type="text" value="-0.118"/>	<input type="button" value="ZERO Z"/>

Then jog your machine over to the BitSetter so the bit is centered in the X and Y directions with the bit close to the BitSetter Button.



With the bit still centered over the BitSetter open the Settings menu and set the configuration again with machine type and Z, then go to the second tab and **check** BitSetter and use the current location to set the position of the BitSetter. Set your automatic spindle control if not previously set. Go back to the first tab and send configuration.



When sending is complete initialize and you should be homing properly and set up with your configuration and ready to start working.

## How to Adjust V-Wheels

A new machine should be clean and not need cleaning. If your machine has been used clean all the v-wheels with a stiff nylon brush before proceeding and clean the extrusion rails v with a non abrasive material like the 3M Fine and/or Super Fine Finishing Pad. Do not use sand paper or any abrasive material to clean. You can use mineral spirits or other cleaner just take precautions for flammable chemicals. Tools needed are a 3MM Allen and an 8MM or 10MM wrench



### Y Gantry V-Wheels

The end plates on each side of the gantry have 8 v-wheels total. The top 4, 2 on each side, are fixed and are not adjustable. The bottom 4, 2 on each side, are adjustable.

To adjust the v-wheel use a metric allen wrench to loosen the bolt. The older eccentrics use an 8MM wrench and the newer HD eccentric nuts use a 10MM wrench. Using a wrench adjust the eccentric in the clockwise position to tighten or counter clockwise to loosen. Loosen the v-wheel until it free wheels when you try to rotate it. Adjust the wrench clockwise to tighten the v-wheel until it just wont turn with your finger trying to move it. Hold the wrench in place and tighten the allen bolt keeping the v-wheel from moving. After tightening try to move the v-wheel and it should move the gantry and not spin freely. Move to all 4 of the v-wheels and adjust.

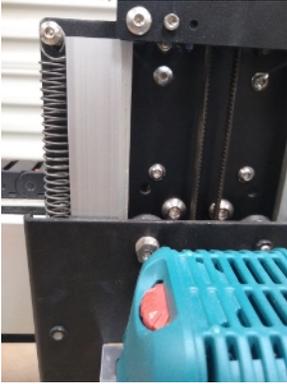
### X Axis V-Wheels

The X axis v-wheels are adjusted the same for all Z type axis. There are 4 v-wheels. The top two are fixed and are not adjustable. The lower two are adjustable. Loosen the allen bolt slightly and use a wrench to adjust the v-wheels. The older eccentrics use an 8MM wrench and the newer HD eccentric nuts use a 10MM wrench. Clockwise tightens the v-wheels and counter clockwise loosens them. As with the Y v-wheels turn the eccentric nut counter clockwise to loosen the v-wheel and then turn it clockwise to tighten the v-wheel until it is just tight. Hold the wrench in place and tighten the allen bolt until snug. Repeat for all 4 v-wheels.

### Belt Z Axis

The Belt Z axis has 4 v-wheels. Two are fixed and not adjustable and two have eccentric nuts. The eccentrics are located on the left side of the Belt Z axis. The two on right are fixed and not adjustable. Adjust the v-wheels the same as previous v-wheels. The v-wheels are behind the Z plate and not visible but you can feel the v-wheels from the top and bottom of the Belt Z axis. There are two holes in

the Belt Z plate to access the bolts, one near the top and another near the bottom. Loosen the allen bolt and turn the wrench counter clockwise to loosen and clockwise to tighten. Loosen by turning counter clockwise and then tighten by turning clockwise until the v-wheel is just tight. Hold the wrench in place and tighten the allen bolt. Try moving the v-wheels by using your finger. The v-wheels should be tight but not overly tight. When finished take hold of the Z axis top and bottom and try to wiggle it front to back and side to side. There should not be any play or movement if the v-wheels are adjusted correctly.



#### HDZ Z Axis

The HDZ has no v-wheels. The HDZ has a ball screw and linear bearings that are not adjustable. There are still 4 v-wheels on the X axis on the gantry but none on the HDZ Z axis.

#### Z-Plus Axis

The Z-Plus has no V-wheels. The Z-Plus has a lead screw and linear bearings that are not adjustable. There are still 4 v-wheels on the X axis on the gantry but none on the Z-Plus Axis.

Document prepared March 25, 2021

NOTES: These instructions are not meant to override any instructions you get from Carbide3d Support. If these instructions do not work contact Carbide3d Support by email at [support@carbide3d.com](mailto:support@carbide3d.com) or (310) 504-3637 (9am - 3pm, PST M-F and 7am - 3pm PST on Saturday) as of March 26, 2021.