



6" Indexer Installation

For PRSstandard RBK Tools



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General Safety and Precautions

This safety summary contains general safety warnings that should be understood during operation of this machine. Failure to observe these precautions could result in injury.



Learn and understand safe use of the machine. Do not allow individuals to operate the machine without supervision. Be aware of the location of the Emergency Stop switches at all times.



Eye and ear protection **MUST** be worn by the machine operator as well as any bystanders or observers. Flying sawdust, material chips, and other debris can cause serious eye injury.



Wear closed-toe shoes at all times.



Make sure that your material is properly secured before cutting, and be aware of any small parts that may come loose after being cut. If a small part catches the edge of a spinning bit, it can be thrown forcefully in any direction, causing injury or damage.



Never place your hands on the rails of the ShopBot. Be aware that the machine may move unexpectedly in any direction, which can cause serious injury if your hands are in the path of movement.



Never wear gloves while operating the machine. As with any power tool, a glove can get caught in moving or spinning parts and pull your hand into the machinery.



Never leave a machine running and unattended. Understand that a spinning tool generates friction and heat, creating a risk of fire. This risk is minimized by using correct chip load, using sharp bits, and by always double-checking your files before cutting. Be prepared to pause or stop the cut if something seems incorrect.

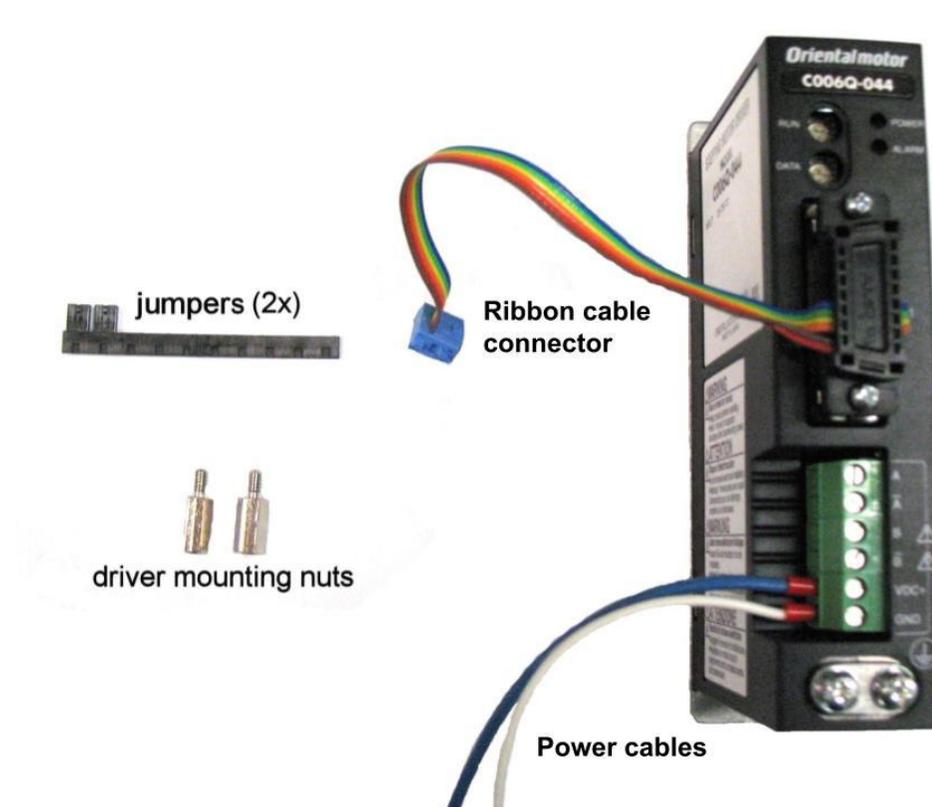


Keep a working fire extinguisher within reach of the machine, for the reasons listed above.

Installing the Driver and Cables

Before you start

Note: If you purchased the indexer as part of a new machine, the following wiring steps will have already been completed at ShopBot. Skip to page 11.

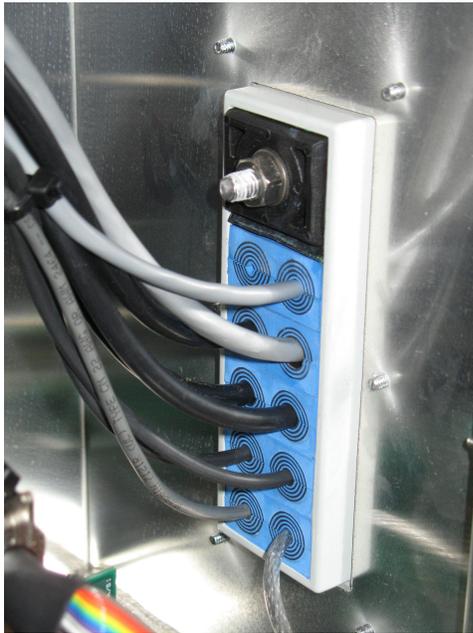


RISK OF ELECTRIC SHOCK: Unplug the power to your ShopBot before you start. Failure to do this can result in electric shock and/or damage to your ShopBot.

Tools you'll need:

- #2 Phillips-head screwdriver
- Small flat-head screwdriver suitable for electronics
- Standard sized flat-head screwdriver
- 1/2" wrench or socket (or adjustable wrench)

Route the cable into the box



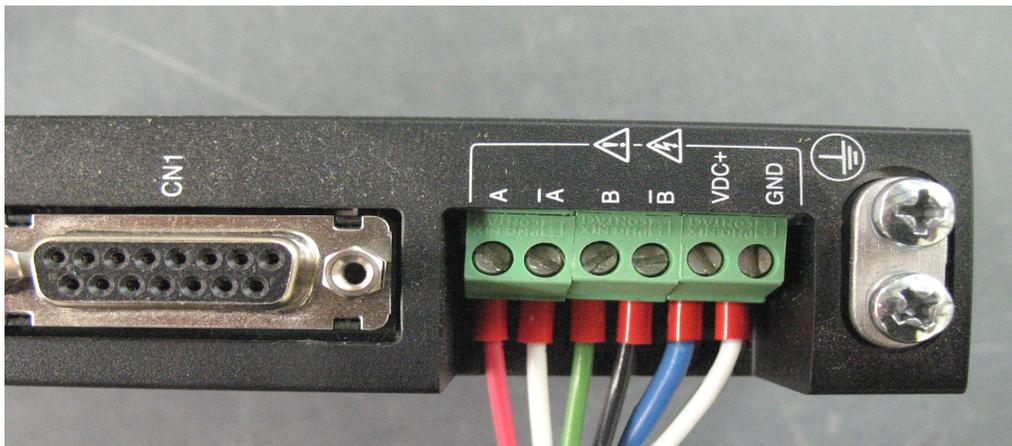
Open the Roxtec cord fixture on the side of your control box. Depending on the age and model of your Shopbot, the fixture is closed either with a bolt on the inside of the box (shown in the photo), or a plastic clamp.

If your box has a bolt, loosen it several turns from the inside of the box with an adjustable wrench or a pair of pliers.

If your box has the plastic clamp, insert a screwdriver underneath it and gently lift upwards.

Now, gently pull upwards on the wires to loosen the rubber pieces that hold the cables in place. Route the indexer cable through any available opening. Pull it into the box so that it can reach the driver with a little slack left over, then tighten the fixture back down onto the cables.

Wire the indexer cable to the driver



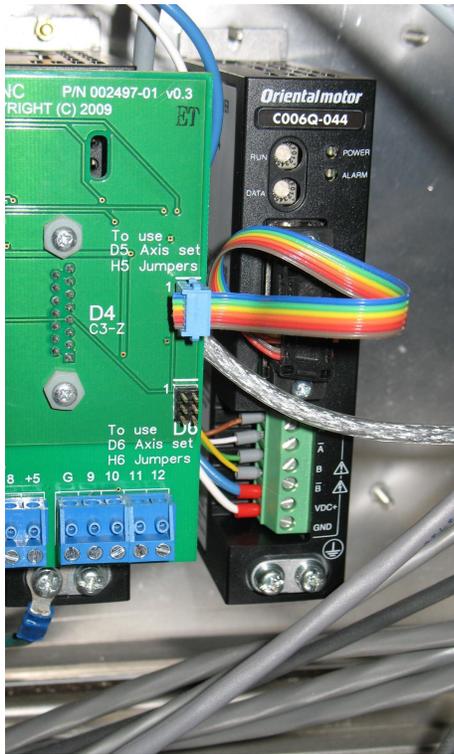
Take your small screwdriver and loosen the screws on the green terminal blocks. Insert the wires from the indexer motor cable as shown in the photo (from left to right):

RED – WHITE – GREEN – BLACK.

Tighten the screws over each wire, then pull on each wire to make sure it is secure. If the blue and white power wires have not already been attached, you will need to put the blue wire to VDC+ and the white wire to GND.

It is extremely important that you wire all of these in the correct order. Failure to do so can damage the driver. Double-check your work before proceeding.

Mount the driver and connect the remaining wires

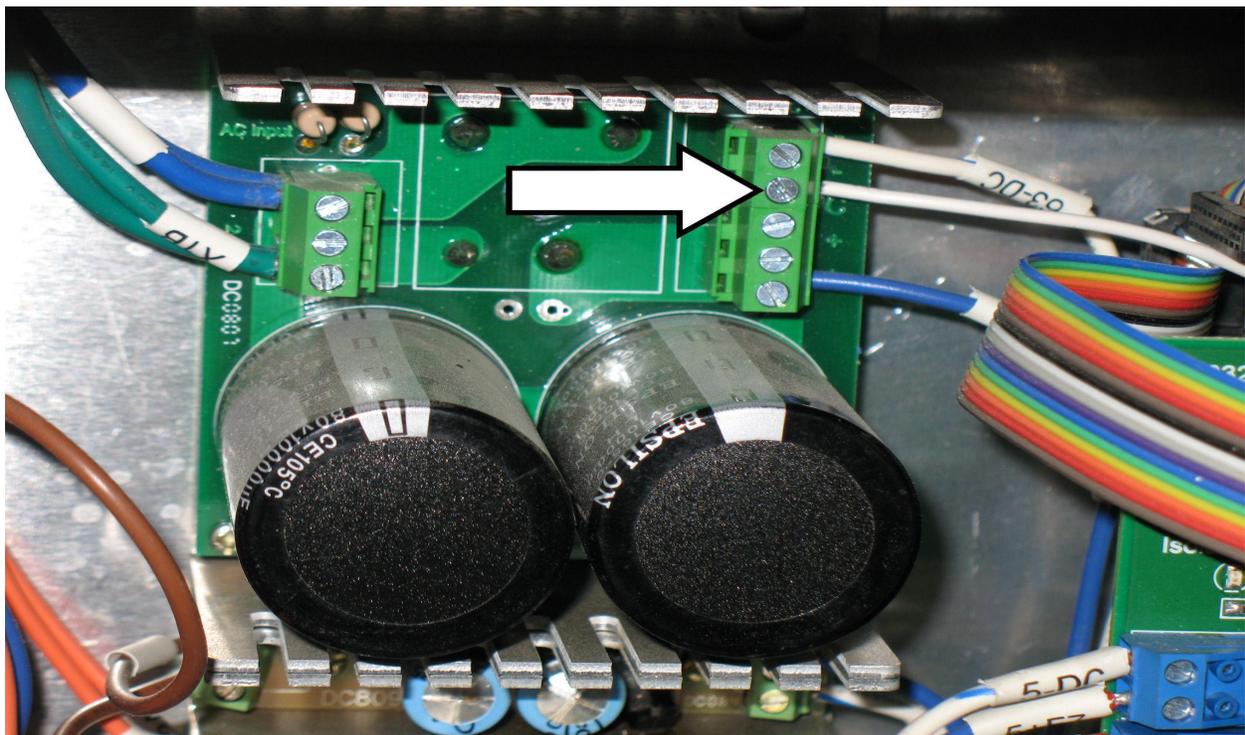


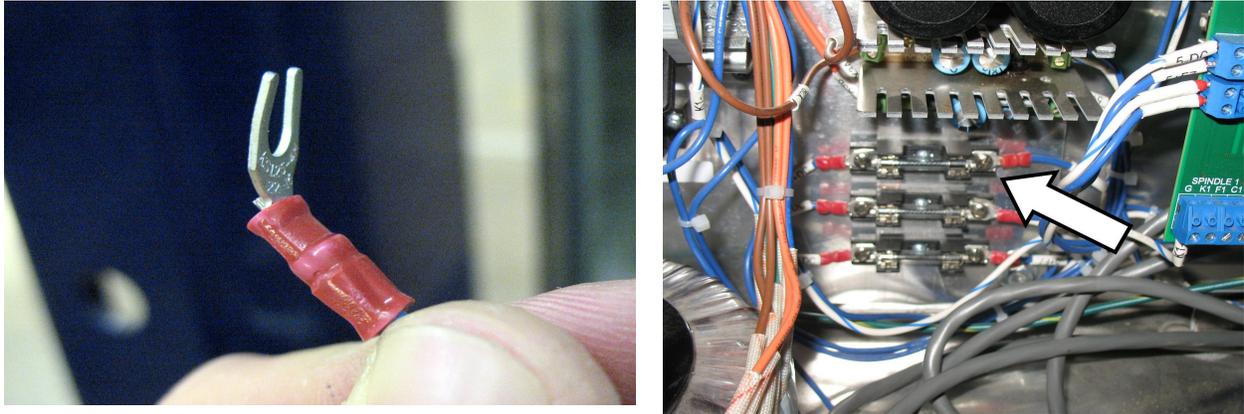
Notice the way that the other drivers are mounted into the box. Fit the new driver onto the extra set of screw posts to the right of the control board, and secure it using the mounting nuts included with your kit. You can tighten it with your fingers, it's not necessary to use a wrench or socket.

Connect the ribbon cable to the upper set of pins as shown in the photo.

Now take the end of the white power wire (neutral) coming from the driver, and locate the power supply to the left of the control board.

On the right side of the power supply board, loosen the terminal screw directly under the existing white wire. Use your fingers to twist the wire strands together, and then insert it into the terminal block. Then tighten the screw and double-check that the wire is secure.

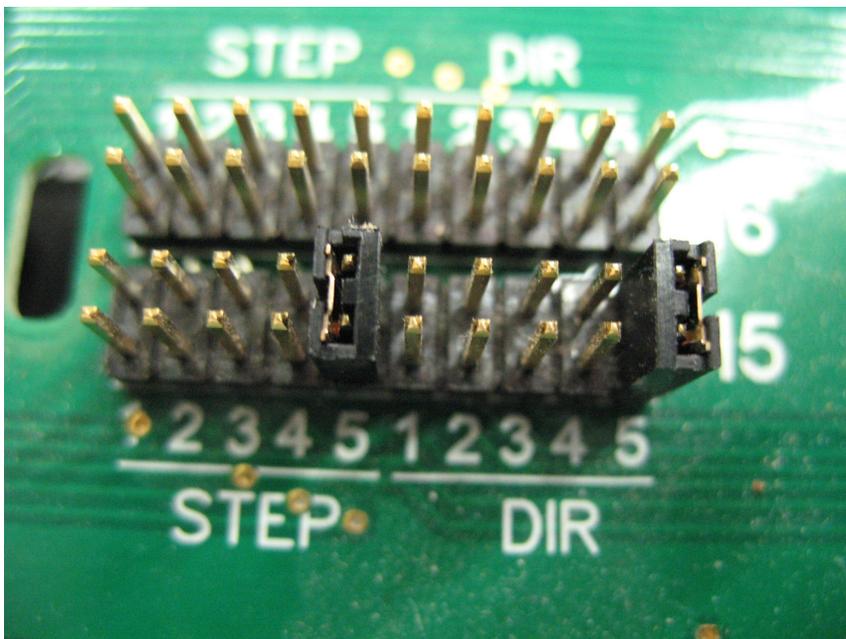




Take the spade connector on the end of the blue wire and bend it slightly, as shown above. Now locate the glass fuses to the right side of the board. The one on top is the 63v fuse, which is marked by a white label on the incoming wire. On the outgoing (right) side of this fuse, loosen the screw that holds the existing spade connector on. Fit the end of the new spade connector underneath the screw head and tighten it down, making sure that the old wire still has a good connection. Pull on both wires to make sure they are tight.

Add the jumpers

To complete the installation, locate the set of pins on the control board marked H5. Snap the two black jumper pieces off of the plastic handle that came with your kit. Then align each jumper with the set of pins on STEP 5 and DIR 5. Press the jumpers fully onto the pins so that they are seated against the base. You are now finished with the installation.

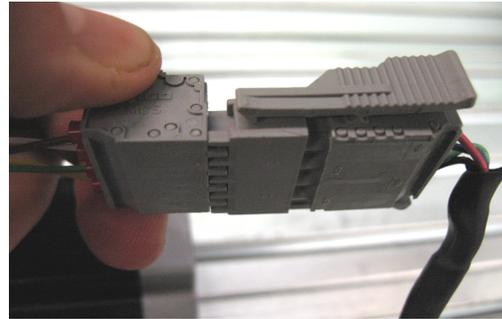


Plug in the motor cable

The gray Wago connector is the indexer's link to the machine for data and power. Clip these together and make sure that the two sides of the connector are fully pressed together.



RIGHT: both ends tightly connected

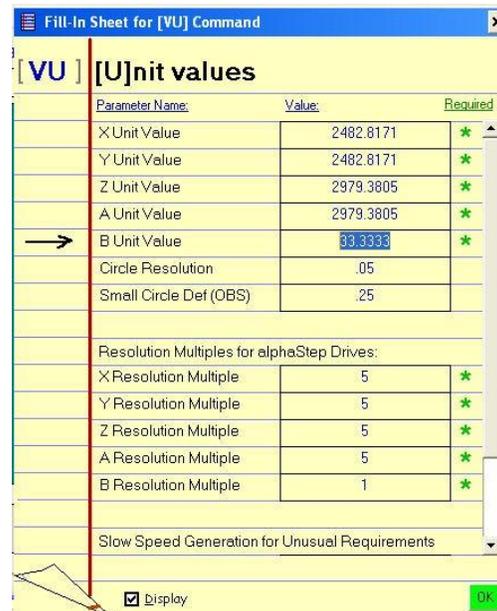
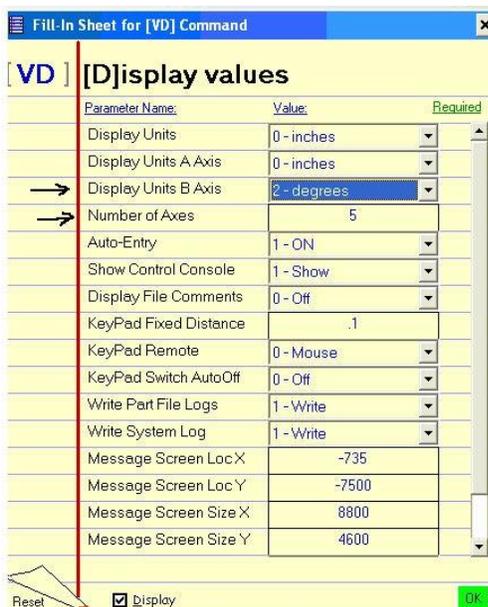


WRONG: notice the gap on the right side

Making changes to your ShopBot software

There are just a couple of changes you need to make to your software settings before you are ready to use the indexer. Start by opening the control software and click to Values > Display Values on the top menu bar. A yellow fill-in sheet will appear, as shown in the picture below. Change **Display units B axis** to **degrees**, and change **Number of Axes** to **5**. Then click OK at the bottom of this sheet to save your changes.

Then click to Values > Unit values. Change the **B Axis Unit Value** to **33.3333** (go to four decimal places). Do not make changes to any of the other values. Now click OK to save these changes.



Setup and Operation of Indexer

Testing the Indexer

CAUTION: Avoid rotating the motor by hand when power is off. Doing so can generate an electric charge, which may damage the driver and/or control board.

If you haven't already done so, plug in the other end of the accessory cable into the motor cable located on the headstock.

Turn on the ShopBot and ensure software is in move/cut mode.

Type a ZB command (Zero B-axis). This sets the current location of the indexer to 0. Now, type in MB 360 (Move B-axis to 360) and watch the indexer. Confirm that the indexer turned 360 degrees from the starting point. If it didn't, refer to page 15 and confirm you entered the correct value in the VU command.

Zeroing the Tool Before a Cut

Zeroing in B: If turning the stock to a finished shape, there is no need to zero the B-axis before cutting. However, if making cuts in a very specific location, rotate the axis with move commands until the desired face or point is facing straight up (level/parallel with the table surface) - then type a ZB command for Zero B-axis.

NOTE: This step will be done after you zero the other axes and load your material

Zeroing in Z: Zero to the center point (Cylinder axis) or to the top of the material (Cylinder surface). Whichever location is chosen, make sure that the Z zero setting in the software matches what happens at the machine.

If zeroing to the center point, see the following page for **Zeroing Point and Setup**.

If zeroing to the top of the material, use the Z zero plate as usual.

Zeroing Point and Setup

To find the center of the indexer axis, insert a pointed bit in both the headstock and the spindle.

Note: This section is written for all indexer styles. The indexing head pictured may not match the indexer on hand, but the procedure will be the same.

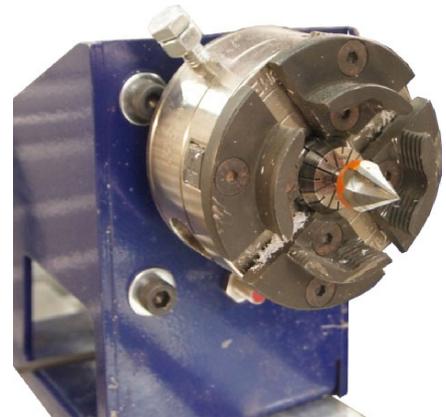


Click on the yellow button in the position window or push the “K” key to pull up the keypad window for positioning and setup of the tool head. Use the keyboard direction arrows or the blue buttons for coarse movements.

Push the “Fixed” button when finer control is needed. A numerical display box will appear, and tool distance can be specified with each push of a button. A good starting value is 0.050, while a finer value might be 0.003 inches per press.

Finding Zero location for X, Y and Z axes

To find the center of the axis, chuck up a pointed bit in the head stock. Rotate the B axis to show any offset that may be present in the bit. Correct any offset to ensure accurate positioning.



Chuck another fine bit into the spindle. Sharp ended bits allow precise identification of position relative to one another. Use the keypad to move the spindle bit about 1/8” in front of the center bit.



Center the spindle, as close as possible, relative to the headstock. Once in place, use the fixed mode on the keypad to make fine adjustments.

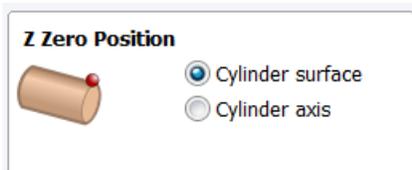
Move the spindle down the indexer axis so that the spindle bit is within 1/8" of the tailstock. The bit should be level and centered as it was at the headstock. If it is not, adjust the square of the indexer setup or the height of the headstock or tailstock.



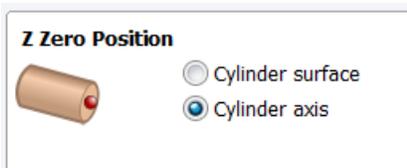
From here, where you zero your axes depends on how your drawing file is set up and how you've mounted your indexer.

In your CAD software (examples below are from Vcarve) there should be a Job Setup screen. In this screen, you will be able to specify zero locations for the X, Y and Z axes.

NOTE: Make sure all the software settings match what happens at the machine.



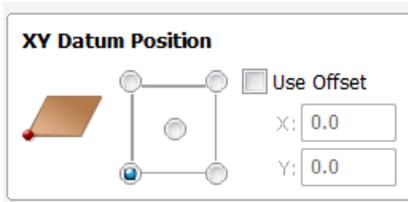
If zeroing Z to the surface, use the Z zero plate as usual.



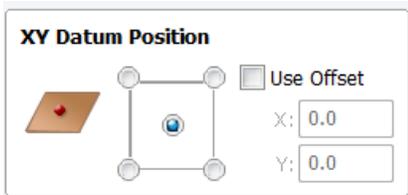
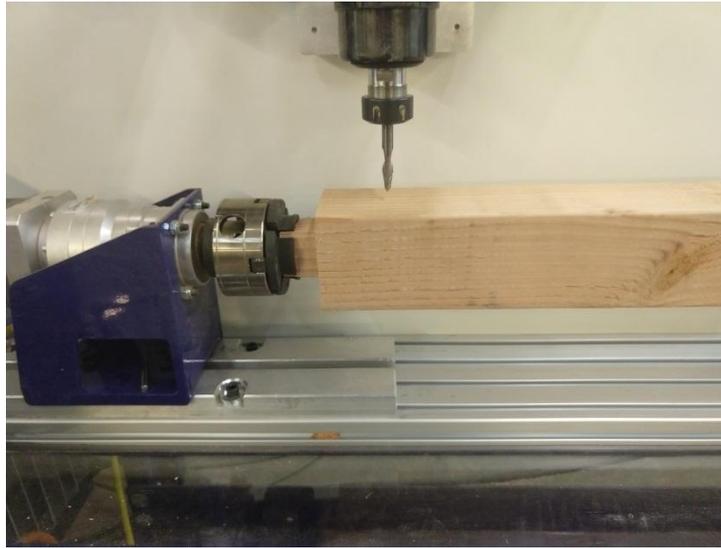
If zeroing Z to the cylinder axis, type a ZZ command while the spindle bit is centered with the bit in the headstock.

Now it gets a little tricky. If the spindle will be moving in the X direction while cutting, then you will want to type a ZY command now, since the Y axis won't be moving. Similarly, if the spindle is moving in the Y direction while cutting, then you would type a ZX command now, since the X axis won't be moving. All of this is determined by how you mounted your indexer.

Lastly, you will need to determine the zero location for the final axis (X or Y).



If you plan on starting the cutting at one end of your material, then you'll zero the axis in the appropriate spot. The corner represents the end of the material when doing rotary cutting. **(See picture below)**



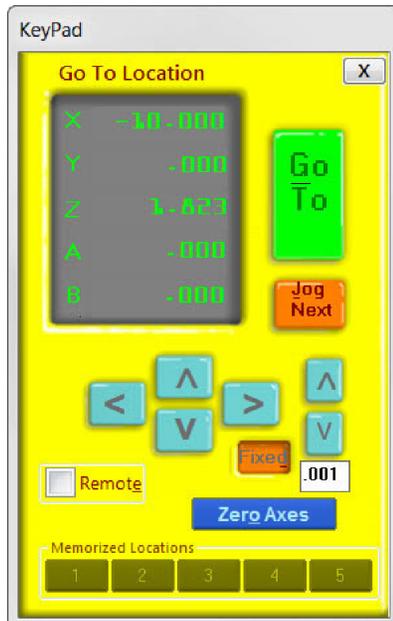
If you plan on starting the cutting in the middle of the material, then move the spindle so it is located directly in the middle of the material, and zero the axis here. **(See picture below)**



Finding Z Zero Offset (if zeroing at cylinder axis)

The Z Zero offset will allow for quickly locating the center of the indexer using the Z zero plate.

Confirm that the Z-axis is level with the headstock bit when at 0, then move the Z-axis high enough that the bit will clear the top of the indexer head.

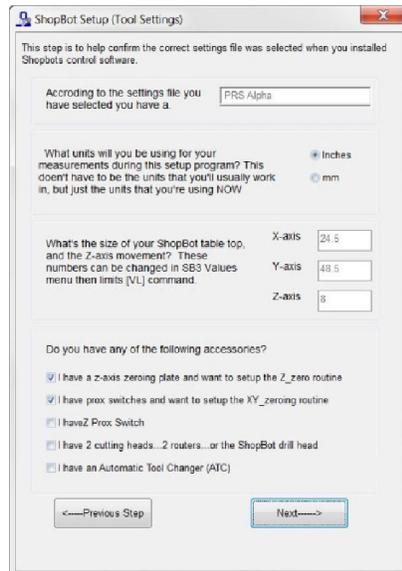


Identify the location where the z zero plate can be laid flat and move the spindle over this location. Note and record the X or Y offset from the zero position - in this example -10 inches. This will be programmed into the software later.

Place the zeroing alligator clip on the collet and the plate on the reference surface. Use the keypad to lower the bit until it just touches the zeroing plate (use fixed key when bit is close to plate). The Input 1 indicator on the position window will light up when the bit touches the plate. Note and record the Z-axis offset measurement.



Setting up the software



Open the ShopBot Setup program in the Tools tab. Read through the directions and then choose “Next.”

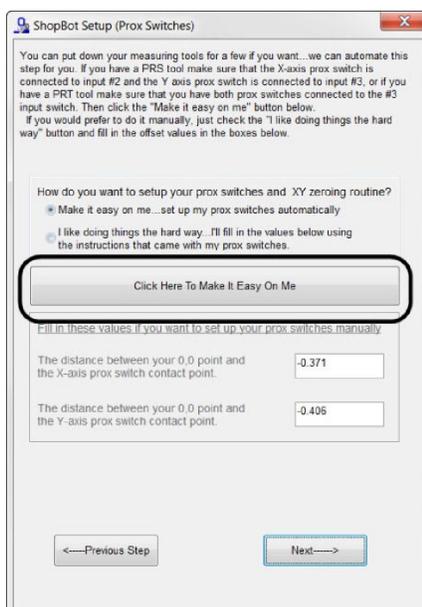
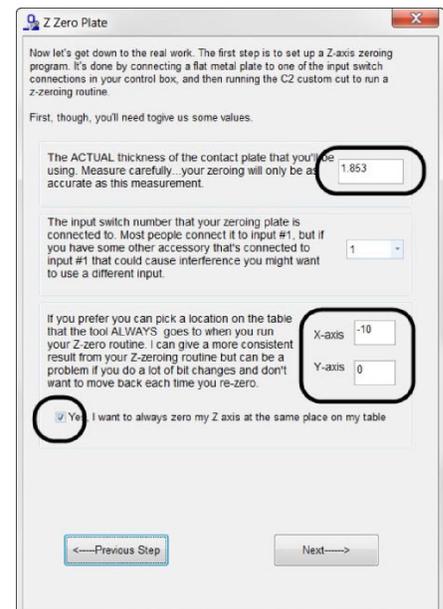
ShopBot Setup can double-check the correct type and size of tool selected, and modify the offsets used for zeroing the tool.

Confirm settings file, units, and table dimensions are correct.

Check boxes for setup of the Z and XY zeroing routines, then click next.

The next screen sets up the Z zero routine, which uses the Z zero plate and a clip to create a simple circuit, telling the machine when it has reached a certain point. Insert the offset value between Z ZERO and the reference plate.

Check the box for zeroing at the same place, and input the position identified for performing the Z zeroing routine. Click “Next”.



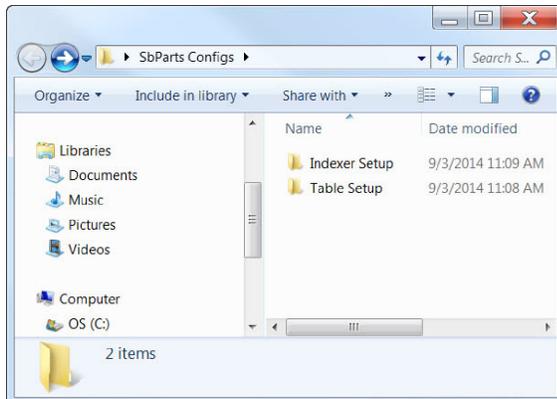
Click the button “Click Here To Make It Easy On Me.”

The software will go through the process of moving to the zero point using the keypad. Once the keypad is closed, the tool will move to find the X and Y proximity sensor targets one at a time. The distance traveled will then be recorded and used during the XY zeroing routine (C3).

Tip: Record these offsets for future reference in case it’s necessary to switch to different table configuration offsets.

Switching Between Indexer and Table Configurations

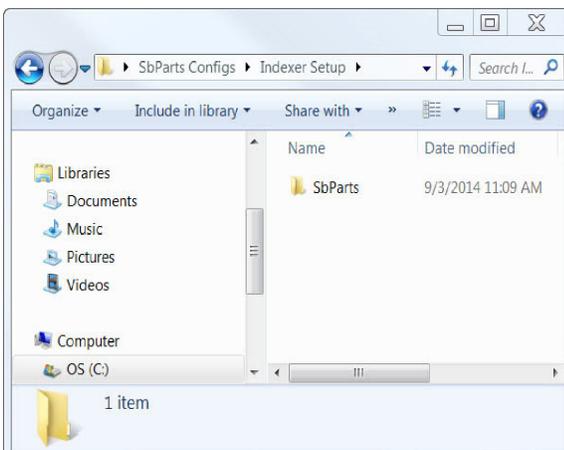
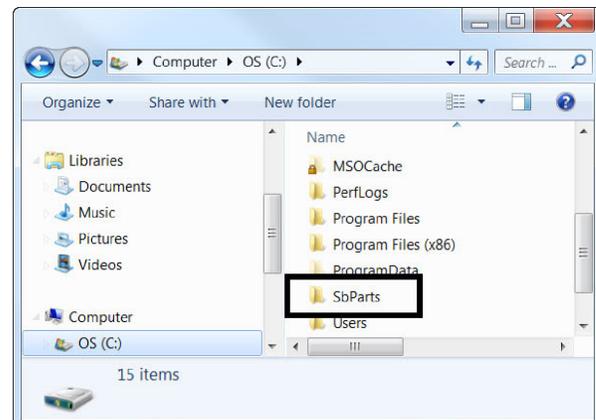
The offsets used for the X, Y, and Z zeroing routines are generally different from those used for standard 2D cutting. These settings, along with many other user variables, are stored in the SbParts folder installed on the computer's C drive. The simplest way to switch between setups is to change out the SbParts folder. This requires creating a setup file for both configurations.



Create a folder to store both indexer and table setup files. In this example, a folder was created on the desktop.

A copy of this file must be in the C:/SbParts folder for the ShopBot software to operate correctly.

If setup has already been completed for the standard table, then copy and paste this folder into the Table Setup folder created earlier.



Make sure an SbParts folder is still on the C drive. Go through the ShopBot setup routine outlined in this document, test that the routines work as needed, and the tool behaves as you expect. The current SbParts folder is now configured for indexer operation. Copy and paste this folder from the C drive into the Indexer Setup Folder.

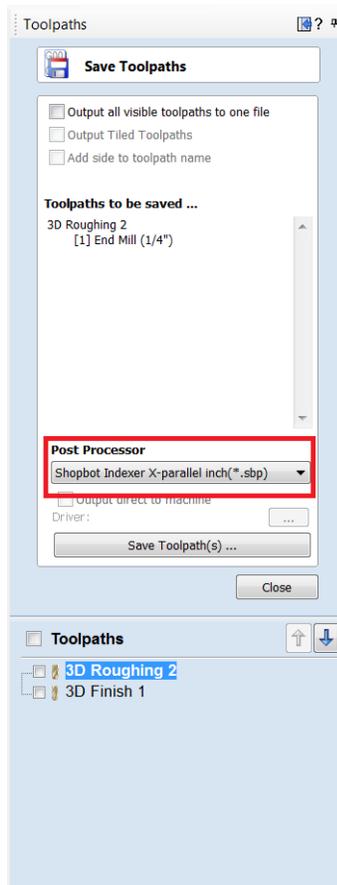
location.

Once both configurations are saved and stored, it is possible to change between them by replacing the file on the C drive with one from the needed save

Setting up the Post Processor

Once you've created your drawing and calculated the toolpaths, the last step will be to save your toolpaths.

- Click on the "File" tab at the top left of the screen in Aspire or Vcarve
- Click on "Open Application Data Folder..."
- Double-click the "My_PostP" folder and leave open, you will copy new post processors here
- On your computer's desktop, right click Windows Explorer, and open another Windows Explorer
- Locate and open "SbParts" in the new Windows Explorer screen
- Open the "PartWorksPosts" folder
- Copy and paste both the "ShopBot_TC_inch.pp" and "ShopBot_TC_MM.pp" files into the "My_PostP" window that you opened earlier
- Now back to the other window, open "PartWorksPosts_ARCHIVAL"
- Copy and paste both the "ShopBot_Indexer_X_inch.pp" and "ShopBot_Indexer_Y_Inch.pp" files into the "MyPostP" window.
- Close and re-open Aspire. This needs to be done to create the new post processor list in Aspire



Now, when you click on "Save Toolpath", the post processors you need will be listed in the drop-down menu.

Select "ShopBot Indexer X-parallel inch(*.sbp)" if the spindle will be moving back and forth along the X axis.

Select "ShopBot Indexer Y-parallel inch(*sbp)" if the spindle will be moving back and forth along the Y axis.