

Installing the Indexer: Desktop Tools Retrofit

Overview

This document covers basic set-up and installation of the indexer for *ShopBot Desktop Tools built before October 2012*. If you have a more recent model, some of these wiring instructions may not apply to your machine.

Before you begin

You will need the following tools:

- 7/16" open ended wrench (or adjustable wrench)
- 3/16" Allen wrench
- #2 Phillips-head screwdriver
- A small flat-head screwdriver suitable for electronics

Wiring the indexer

WARNING: Unplug your ShopBot's power cord before removing the back cover or making any changes to the wiring.

Using your allen wrench, remove the two screws that hold the plexiglass cover onto the back of the machine.



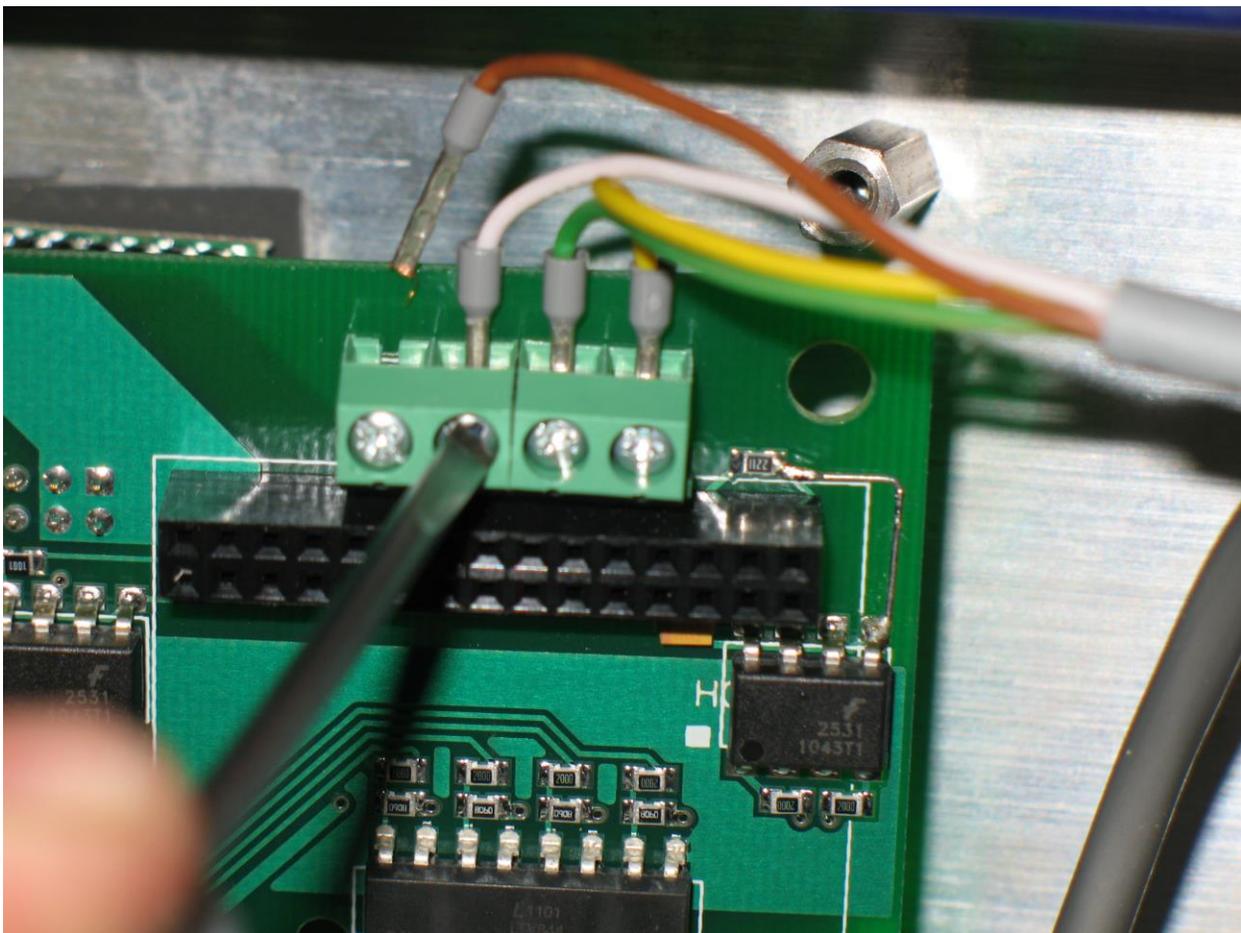


Take the loose end of the indexer wire and route it through the hole in the side of the frame.

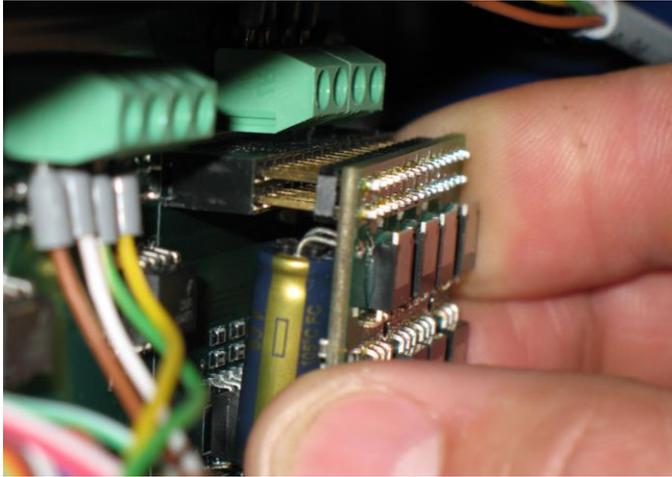
Locate the green terminal blocks on the top right corner of the board and loosen each screw. Insert one wire into the top of each block in the following order, going from left to right:

Brown – white – green – yellow

Pay close attention to the order of these. If you have trouble getting the wire ends into the terminal blocks, it may help to use a pair of small needlenose pliers. When you are finished, gently pull on each wire to make sure it is tightly screwed into the block.

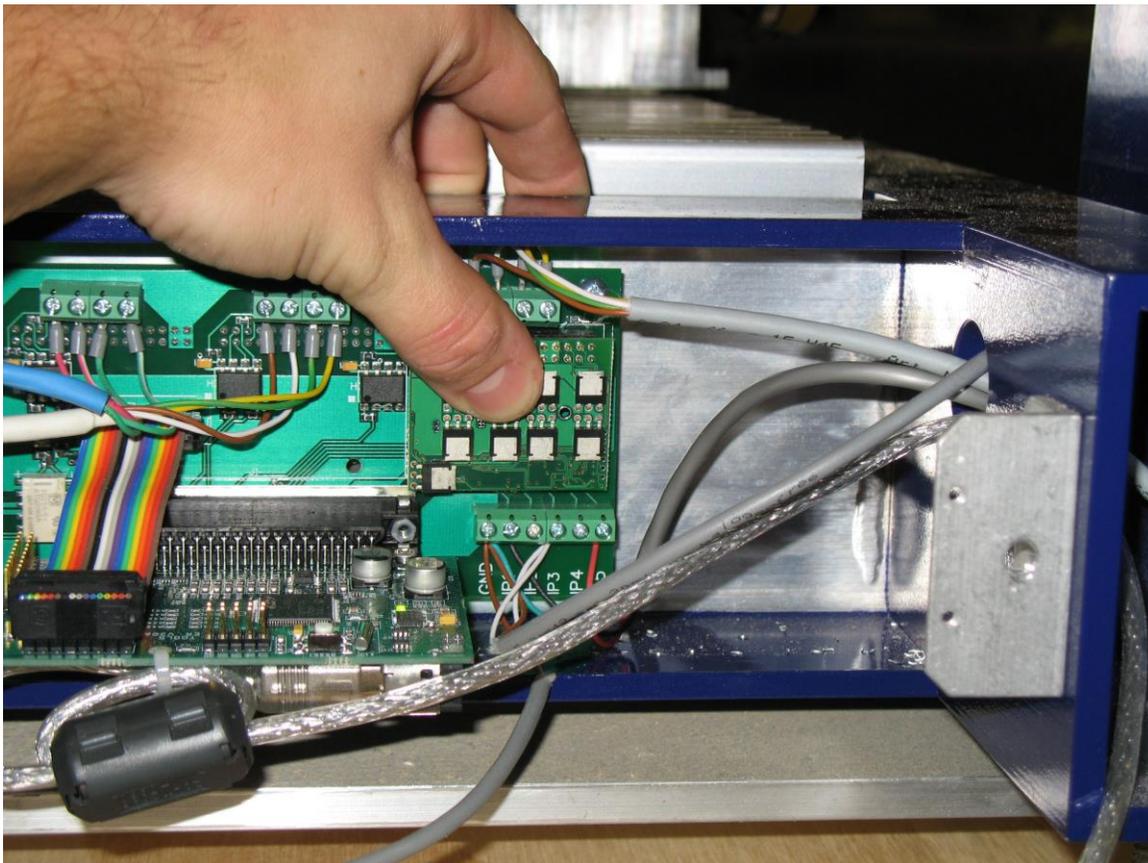


Attaching the control card



The indexer comes with its own control card that allows it to communicate with the rest of the machine. This fits into the plug directly underneath the terminal blocks. Make sure that all the pins are lined up properly before pressing it into the plug. If any of the pins are out of line, the indexer won't work and you risk damaging the board, so take care to align it properly.

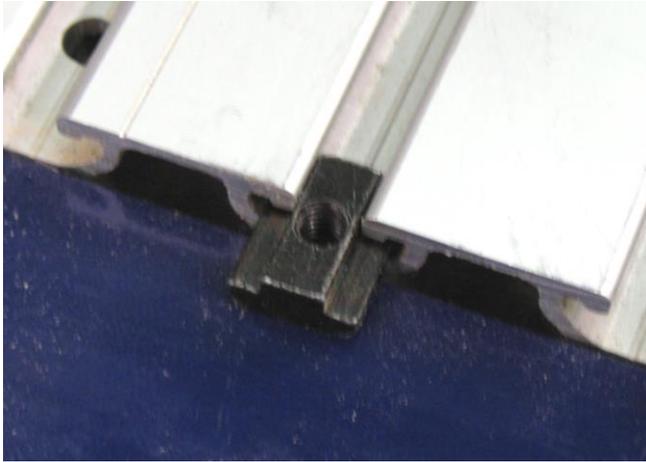
If you look at it from the side you can get a better view of how the pins are lining up. Once it's aligned, press it into the plug until it's fully seated.



If everything looks good so far, you can replace the plexiglass cover on the back of the machine and continue with the mechanical part of the installation.

Installing the headstock

You can install the headstock anywhere on the left side of the table. Choose two adjacent grooves and slide a pair of T-nuts into each of them. Position the headstock over the T-nuts, then thread the screws into the nuts and tighten them down. Follow the same process for the tailstock, but don't tighten the screws fully. Leaving the screws a little loose will allow you to slide the tailstock along the grooves, which you'll need to do when setting up your material.



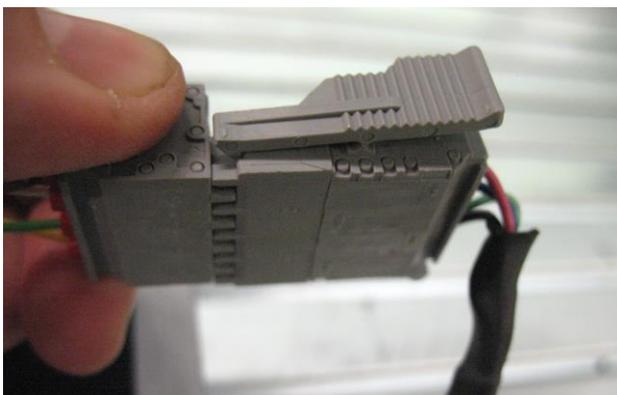
Sliding the T-nuts into the groove



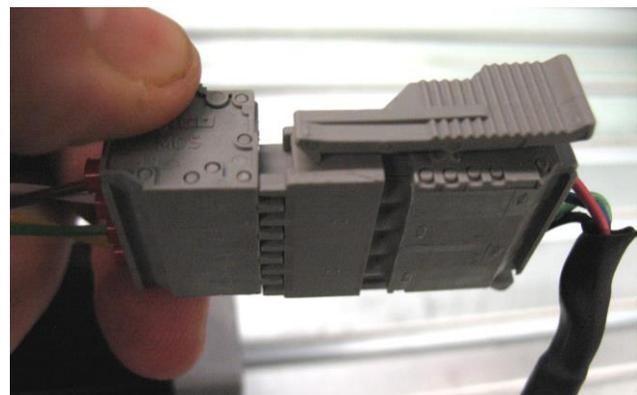
Tightening the screws on the headstock

Plug in the Wago connector

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

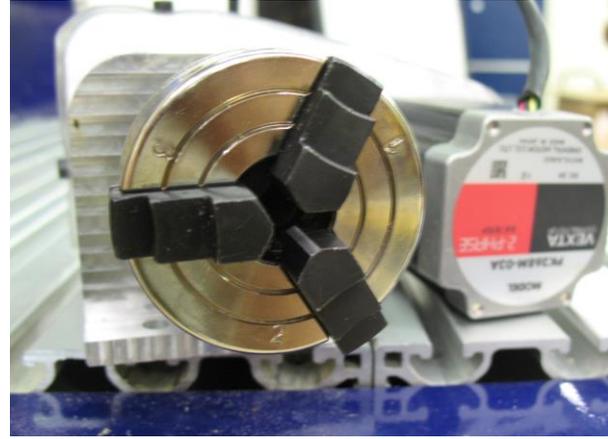
Using the chuck

Opening and closing the chuck jaws is done by rotating the knurled ring behind the chuck body. Rough adjustments can be made by hand, but for better leverage you can insert the tommy bars into the holes on the chuck body and knurled ring. If you are looking at the face of the chuck, rotating the ring clockwise will tighten the jaws, counter-clockwise will loosen it.

The chuck jaws can be reversed for gripping the inside of a surface (for example, a hole created with a forstner bit). This is useful for working on large-diameter stock.



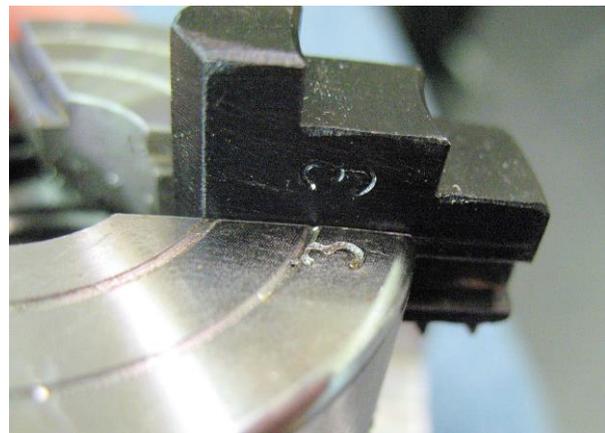
Chuck jaw configuration: gripping inwards



Gripping outwards

To remove the chuck jaws, open the chuck as wide as it will go and pull the jaws out one at a time. If they don't come out at first, wiggle the knurled ring back and forth while pulling outwards on the jaw until it comes free.

To put the jaws back in, they each need to sit in the correct slot. Notice that the slots are numbered 1 through 3 on the chuck face. This corresponds to the number stamped on the chuck jaw. Jaw #2 always sits in the same slot, but jaws 1 and 3 need to switch places when you switch from inwards-gripping to outwards-gripping. This is not as complicated as it might sound. Just align the jaws so that the slot number on the chuck matches the number on the side of the jaw that faces it.

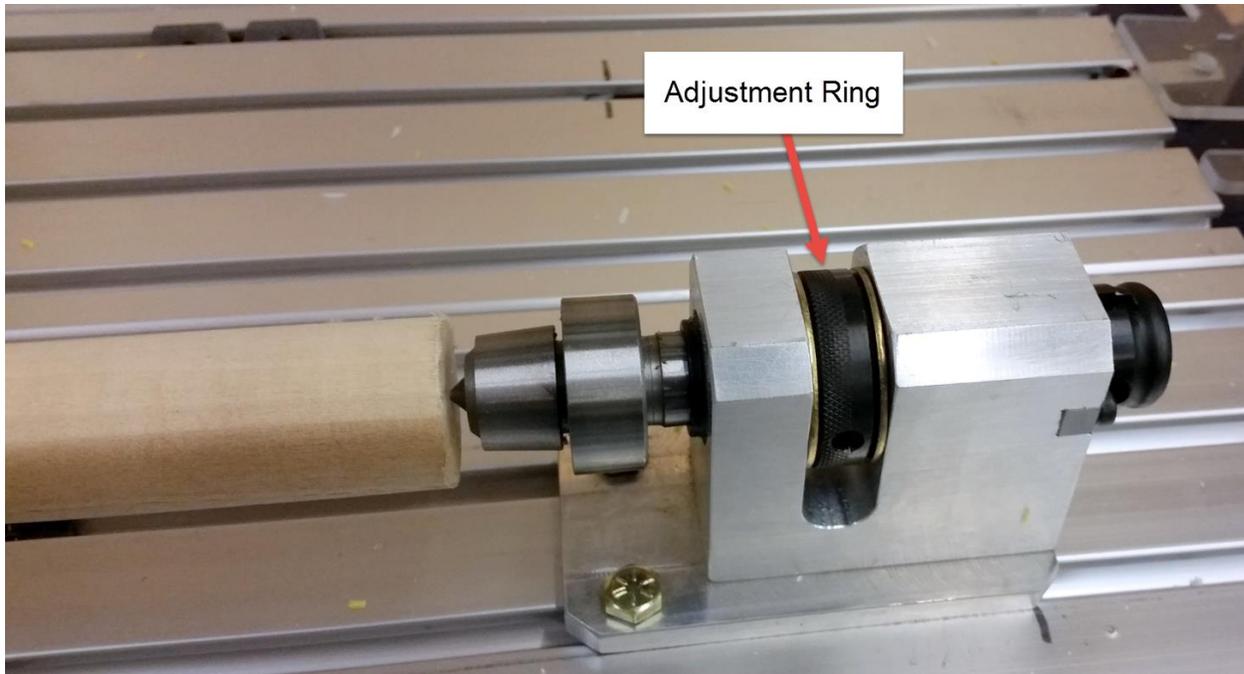




Once you have the jaws in the correct slots, maintain even pressure on each jaw while rotating the knurled ring clockwise. You don't need to apply much pressure, just enough to keep them aligned until the threads catch. Be sure that the jaws are moving evenly towards the center of the chuck. If they seem uneven, reverse direction and remove the jaws to start over.

Adjusting the tailstock

The knurled ring on the body of the tailstock allows you to adjust the pressure of the center point against the material. Once you have your material clamped in the chuck jaws, rotate this ring so that the center point recedes back into the tailstock. Then slide the tailstock up against the material and tighten the screws down. Now rotate the ring in the opposite direction to push the center point into the material. You can use the tommy bars for greater leverage if necessary.



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 type a **VD command** into the yellow command box (or 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 type a **VU command** or 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. Then click OK to save these changes.

Fill-In Sheet for [VD] Command		
[VD]	[D]isplay values	
Parameter Name:	Value:	Required
Display Units	0 - inches	
Display Units A Axis	0 - inches	
→ Display Units B Axis	2 - degrees	
→ Number of Axes	5	
Auto-Entry	1 - ON	
Show Control Console	1 - Show	
Display File Comments	0 - Off	
KeyPad Fixed Distance	.1	
KeyPad Remote	0 - Mouse	
KeyPad Switch AutoOff	0 - Off	
Write Part File Logs	1 - Write	
Write System Log	1 - Write	
Message Screen Loc X	-735	
Message Screen Loc Y	-7500	
Message Screen Size X	8800	
Message Screen Size Y	4600	
<input type="checkbox"/> Reset <input checked="" type="checkbox"/> Display <input type="button" value="OK"/>		

Fill-In Sheet for [VU] Command		
[VU]	[U]nit values	
Parameter Name:	Value:	Required
X Unit Value	2482.8171	*
Y Unit Value	2482.8171	*
Z Unit Value	2979.3805	*
A Unit Value	2979.3805	*
→ B Unit Value	33.3333	*
Circle Resolution	.05	
Small Circle Def (OBS)	.25	
Resolution Multiples for alphaStep Drives:		
X Resolution Multiple	5	*
Y Resolution Multiple	5	*
Z Resolution Multiple	5	*
A Resolution Multiple	5	*
B Resolution Multiple	1	*
Slow Speed Generation for Unusual Requirements		
<input type="checkbox"/> Reset <input checked="" type="checkbox"/> Display <input type="button" value="OK"/>		

Testing the indexer

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

Turn your Shopbot back on and switch your software to move/cut mode if you have not already done so.

You can move the indexer just like any other axis by giving it a move command. Type an **MB** command (for Move B Axis) into the command box, followed by a degree value. Degrees are absolute, meaning that they are all referenced from zero. For example, if the screen reads that you are currently at 10 degrees and you command the software to move to 15 degrees (type command MB 15), your total distance of travel will be 5 degrees.

Zeroing the tool before a cut

Zeroing in B: If you are turning the stock to a finished shape, generally you won't need to zero the B axis before cutting. However, if you are using it to make cuts in a very specific location, rotate the axis using move commands until the desired face or point is pointing straight up (perpendicular to the table surface), then type a **ZB** command for Zero B Axis.

Zeroing in XY: As with any other cut file, you will need to zero the XY axis before beginning. You can use the **C3** command to run the XY homing routine, and/or move the tool to the desired start location on the table and type a **Z2** command to zero it in that location.

Zeroing in Z: You have the option of either zeroing to the center point, or the top of the material (outer diameter). Whichever location you choose, make sure that your chosen z-zero setting in the software matches what you do at the machine.

If you zero to the center point, you will need to move the Z axis to that point using the keypad. First use the arrow keys to get it close, then click the button marked "**Fixed**" within the keypad move window. This will allow you to move the axis in very small increments. Enter a small value (such as .05) and continue to move the Z axis down until the bottom of the bit is on the same level as the centerpoint. Then exit the keypad and type a **ZZ** command to zero the Z axis in that location.

If you prefer to zero to the top of the material, you can use the z-zero plate as usual.