



# Installing the Tangential Knife System For Desktop Tools

## Overview

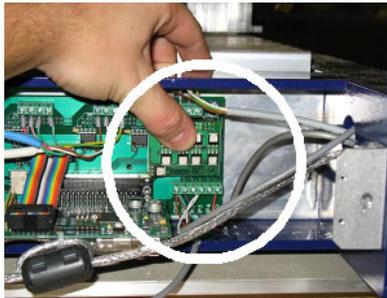
This document covers basic set-up and installation of the Tangential Knife System for the ShopBot Desktop Tool. It will guide you through the following installation steps:

1. Installing the driver card
2. Mounting the knife assembly onto the machine
3. Installing the post-processor file
4. Creating a cut file
5. Testing and using the knife

## Installing Driver Card

**WARNING: Unplug power cord before removing the back cover or touching the electronic components.**

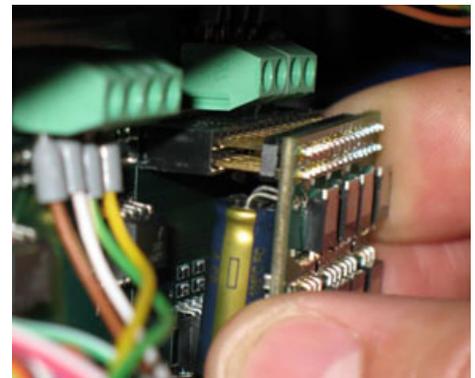
Remove two screws and plexiglass cover from the back of the machine.



Plug in the small driver card that came with indexer kit. It fits into the plug directly underneath the green terminal blocks, on the right side of the board.

By looking at the card connection from the side, it is possible to get a better view of how the pins line up with the plug. Once it's aligned, press it into the plug until it's fully seated.

**IMPORTANT:** There is a risk damaging the control board if any of the pins are out of line.



### Connecting Motor Cable

Plug one end of the motor cable into the gray Wago connector mounted on the back of the machine frame, and the other end into the matching plug on the indexer motor. Ensure that the plugs are fully seated.

Replace the plexiglass cover on the back of the machine with two screws.



### Mounting Knife Assembly

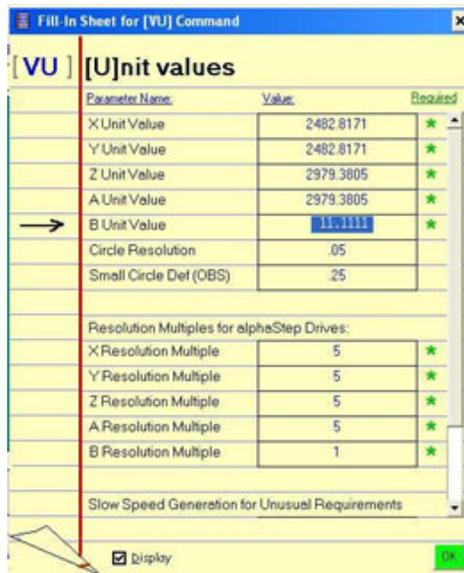
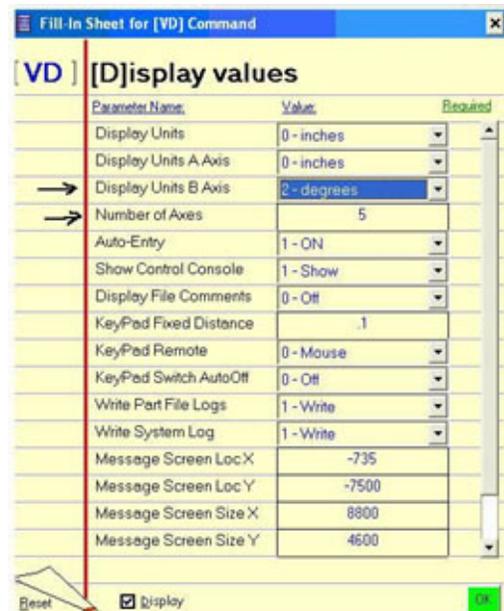
Slide the mounting bracket onto the router or spindle (pictured below) so the tangential knife sits to the right of the spindle. Tighten the bolt to secure the bracket.

Partially screw the bolt into the blade holder, and slip the blade into the holder so that the first notch on the top of the blade catches the bolt. Tighten the bolt to secure the blade.



## Setting Up the Software

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. Click OK at the bottom of the sheet to save changes.



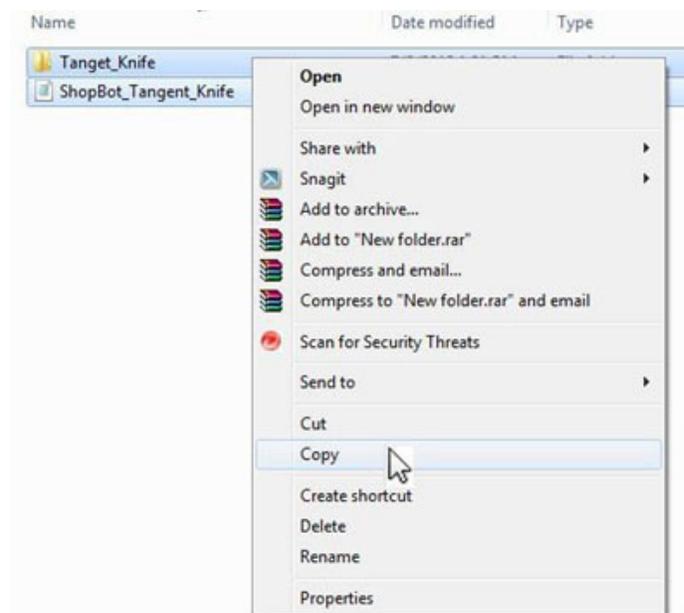
Click to Values > Unit values. Change the B Axis Unit Value to 11.1111 (go to four decimal places). Do not make changes to any of the other values. Click OK to save changes.

## Installing Post-Processor File

**NOTE:** This section applies specifically to Partworks, V-Carve Pro, and Aspire. The Tangential Knife post-processor is only compatible with these programs. If necessary, it is possible to import vectors in DXF format into one of these programs to complete the toolpath operations.

A post-processor (often called a post) is what allows a CAD/CAM program to process toolpath data into a file that your ShopBot can read. This is included on the USB thumb drive that came with the order, and can also be downloaded from the ShopBot website.

Once the post-processor file is loaded, open the shopbot\_tangent\_knife folder to view it. Two items should be listed: a sub-folder and a post-processor file. Select both items, then right-click and copy.



Open the CAD/CAM program (either Partworks, V-Carve Pro, or Aspire). Click on File > Open Application Data Folder > Post P. Right-click anywhere in the blank space of this window and choose Paste. The two items from the previous folder should appear.

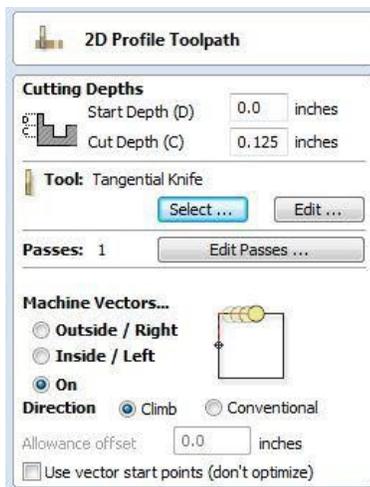
Double-click the file marked shopbot\_tangent\_knife. Scroll down just past the first page and locate the following line:

```
script_path= "C:\\ProgramData\\Vectric\\PartWorks\\V3.5\\PostP
```

Edit this line to reflect the program name and version that is being used. For example, if using Aspire version 3.0, change this line to: script\_path= "C:\\ProgramData\\Vectric\\Aspire\\V3.0\\PostP.

When finished, click File > Save to apply changes. Exit and re-start the CAD/CAM program before continuing.

## Creating a Part File



Create a Profile Toolpath. Enter the cut depth and click select to open the tool database window.

Click “new” to create a new tool. Choose a tool (end mill, V-bit, etc.). Type doesn’t matter. Enter the following parameters:

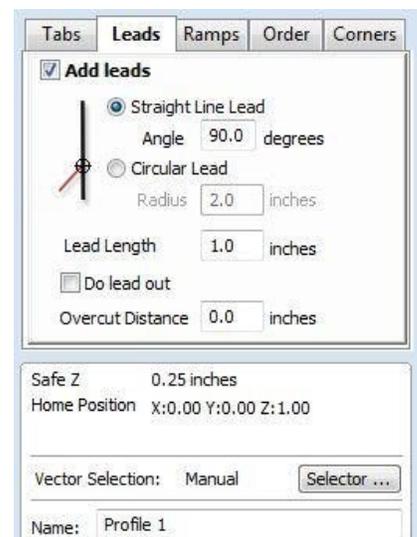
**Bit diameter: 0.05**  
**Feed rate: 2 inches/second**  
**Plunge rate: 1 inch/second**

Choose to machine “on” the vectors.

Click the “leads” tab (shown right). A lead-in will start the cut in the scrap material surrounding the vector and then move in at an angle. This is an optional step that can provide cleaner cuts in thick materials such as cardboard.

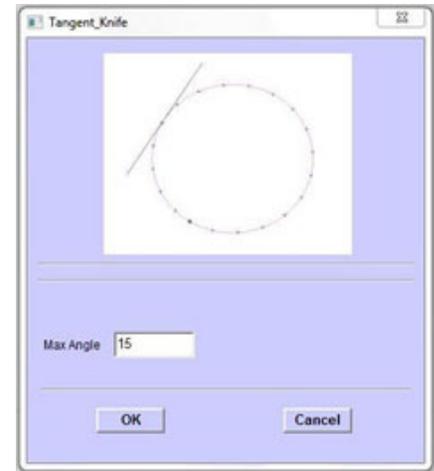
Select the vectors to include in the toolpath and click “calculate”.

To save an .SBP cut file, click “Save Toolpath” and select “Shopbot\_Tangent\_Knife” as the post-processor.



Specify the max angle, which is the angle at which the knife will pull up, rotate, and then drop back into the cut. Click OK.

Cutting a wide arc or a shallow angle can easily be done without removing the knife from the cut. However, if the knife were to remain in the cut during a 90-degree turn it would result in poor cut quality and damaged corners. Experimentation may be necessary to find the optimum max angle for the material being cut.



### Testing and Moving Tangential Knife Motor

To adjust the knife position, type an MB command (for Move B Axis) into the SB3 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 the cutter is currently at 10 degrees and the software is commanded to move to 15 degrees (type command MB 15), the total distance of travel will be 5 degrees.

**WARNING: DO NOT rotate the motor by hand when the power is off. Doing so can generate an electric charge, damaging the driver and/or control board.**

### Zeroing Tool Before a Cut

**Zeroing in B:** This axis controls the rotation of the Tangential Knife. In this case, the axis is at the zero position when the knife mounting bolt is facing the front of the machine and the blade edge runs along the X axis. When the knife is in the correct zero position, type a ZB command (for Zero B Axis).

**Zeroing in XY:** Zero the XY axis before beginning, using 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:** It is not recommended to use the Z-zero plate with the Tangential Knife. Use the keypad to get the Z axis close to the surface, and then click the button marked "Fixed." This will allow the axis to be moved in very small increments. Enter a small value (such as .05) and continue to move the Z axis down until the tip of the knife touches the material. Exit the keypad and type a ZZ command (for Zero Z Axis) to zero the Z axis in that location.