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ShopBot Quick-Start Guide
For PRSalpha and PRSstandard Tools

Software versions 3.8 and above

Table of Contents

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 untrained 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 or unsafe.

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

Main Parts of a PRS Tool (PRSalpha shown)

YZ Car

E-Chain

Gantry   Spindle

Dust Hose

Spoil Board

Rail

VFD

Frame

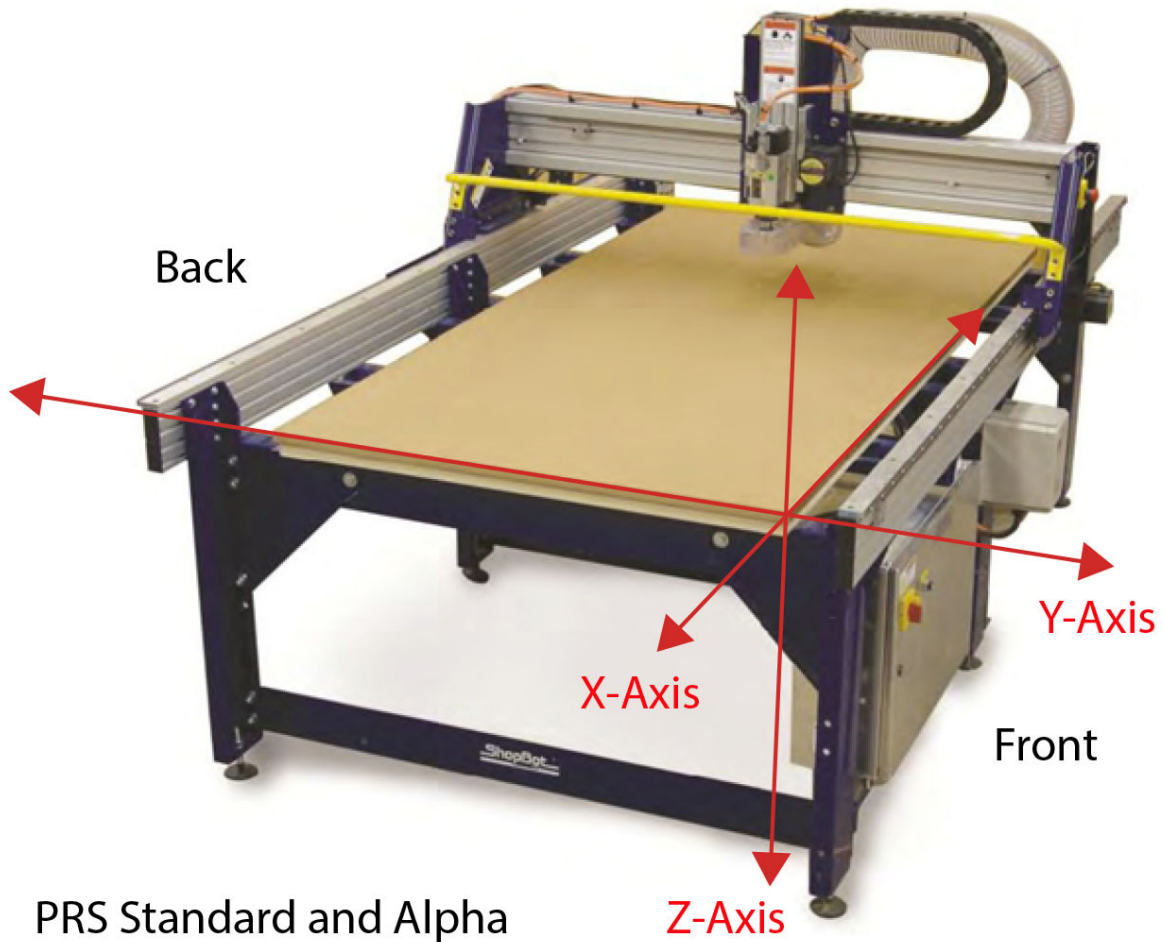Control Box
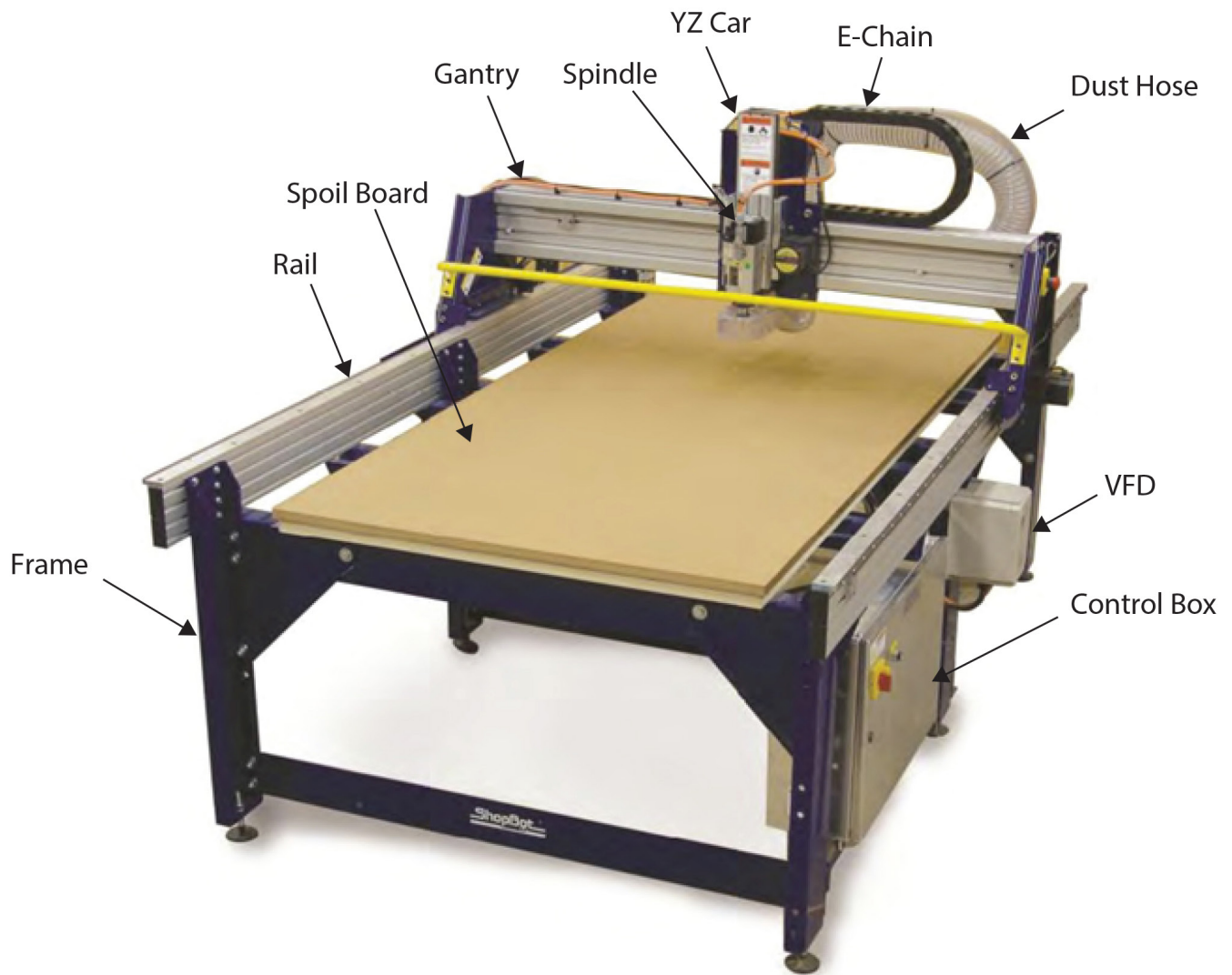
Tool Orientation and Direction of Axes

The picture below shows the axis orientation for the PRSalpha tool.

Normally, the 0, 0, 0 point is located at the intersection of the three axes as shown, and "front" is considered the side noted below.

Introduction:

This document covers topics required to get started with a new ShopBot PRS. For more information on any of the topics covered here, please reference the ShopBot User's Guide provided in the binder along with this tool. See also the list of resources on the back page for more information or see http://www.shopbottools.com/ShopBotDocs/.

Software and Computer Configuration

Refer to the Uninstalling and Reinstalling ShopBot and VCarve Software document in the User Guide binder for software installation.

> **Special note for schools and large companies:** ShopBot software runs best with full administrative permissions enabled. We strongly advise against setting up separate admin and user accounts on the control computer.
>
> **For International customers:** The computer used to run the machine MUST have the language set to "United States (English)" in order for the software to run correctly.

USB cable from control box
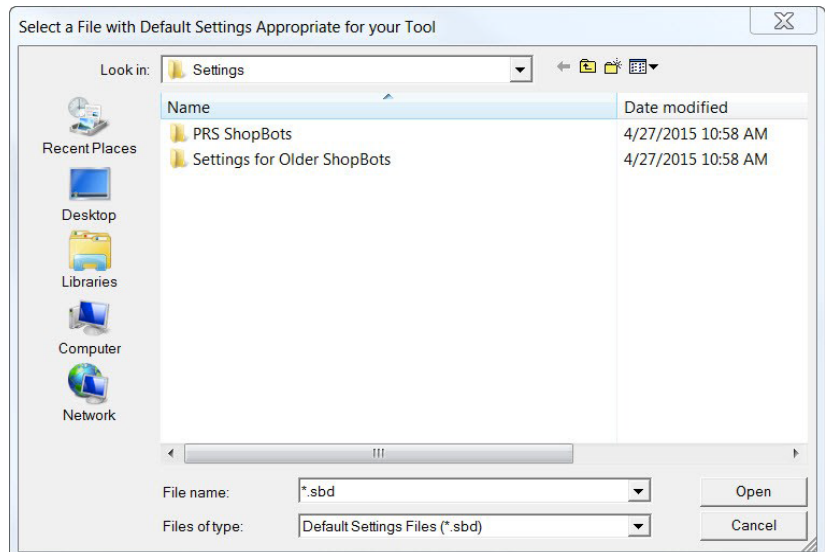
RPM controller cable from VFD
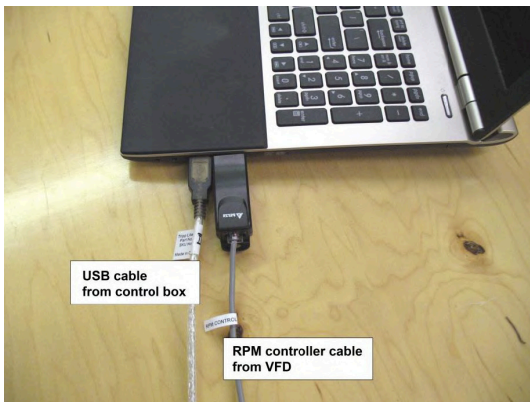
Connect ShopBot to Computer

Connect USB cable to computer and Windows will recognize a "New Device."

Note: It is best to use the same USB port every time the ShopBot is attached to the computer.

Load settings file

When prompted to load a default settings file for the first time, the following screen should appear:

Double-click on "PRS ShopBots", and choose "Standard", "Alpha", or "Buddy", depending the model. Choose the correct table size for the machine, and this will go back to the main screen.

Note: Custom tools will not have a default setting preprogrammed in the software. Choose the correct type (Alpha or Standard), and the size closest to the tool. Edit the table limits for the table size using "Values" and "Limits for table". Save the new setting as a custom settings file in the "Utilities" menu.
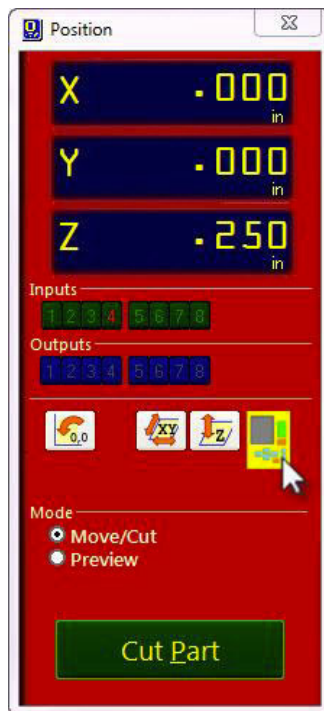
Launch Software

Double-click the ShopBot 3 icon to open the machine's control program.
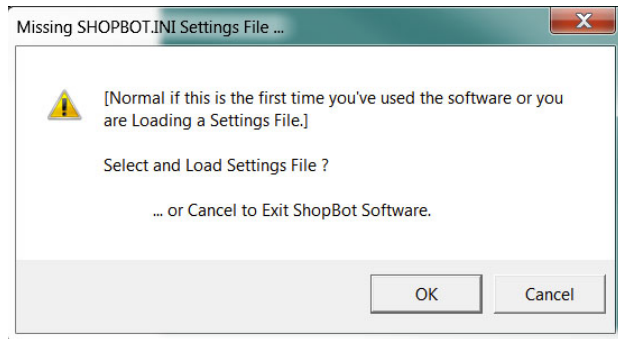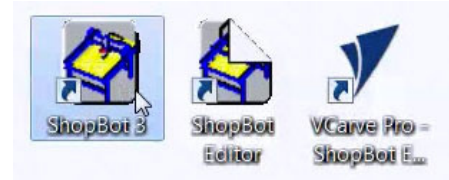
The first time the program is opened, there will not be a settings file for the machine. Click "OK" and a prompt will appear to load a settings file for the machine.

Tool Movement

The "Easy" Control Panel

This panel provides essential machine information and controls. The following steps will walk through some of the most frequently used controls, including installing a bit, zeroing the machine's three axes, and cutting a couple of sample projects.

Click on the yellow button to bring up the "KeyPad" panel.

The Keypad

This window allows the user to manually move the X-, Y,- and Z-axes of the machine. Click on the blue arrows to move the spindle/router and gantry.

X- and Y-axes can also be moved with the cursor buttons on the computer keyboard. Use the "Page Up" and "Page Down" buttons on the keyboard to move the Z-axis up and down.

Move the spindle/router to a safe Z position below the Z proximity switch and near the middle of the deck.

Click on the X in the upper right corner to close yellow KeyPad.
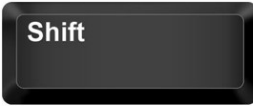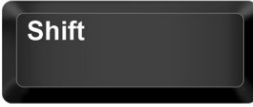
Test each axis with the keypad

Turn ON the control box. Click on the yellow keypad window icon within the red position window. If the

icon is not visible, click "move/cut" under "Mode" on the red position window.
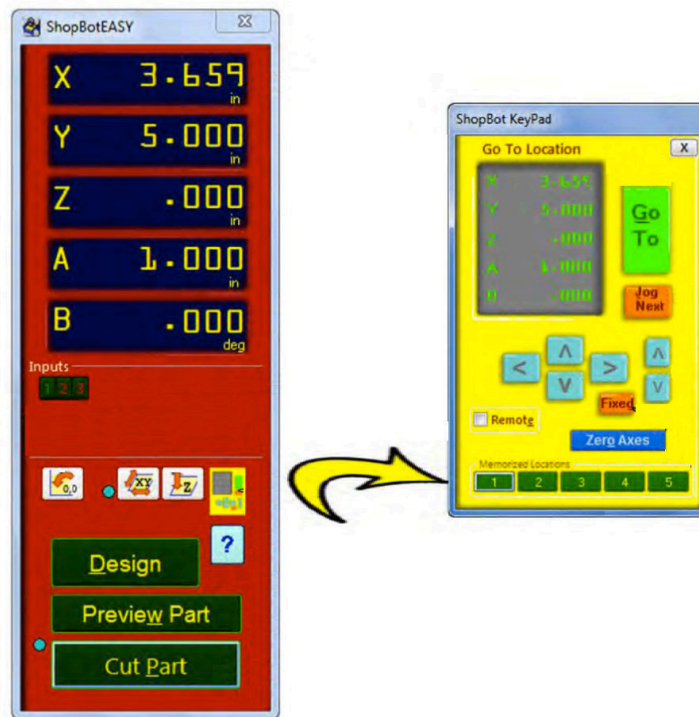
Use the buttons on the keyboard (see below) to move the spindle/router along each axis.

→   **X axis positive** (away from zero)

←   **X axis negative** (towards zero)

↑   **Y axis positive**   **Alt** + **page up**   **A axis** (second spindle) **up**

↓   **Y axis negative**   **Alt** + **page down**   **A axis down**

page up   **Z axis up**   **Shift** + **page up**   **B axis** (rotary indexer) **clockwise**

page down   **Z axis down**   **Shift** + **page down**   **B axis counter-clockwise**

Test the spindle/router

Locate the key attached to the collet wrench. Insert this key into the safety lockout next to the power switch and turn the key to "ENGAGED".

Routers: Make sure that the router's power switch is in the ON position before proceeding.

In the main console window, type "K" to bring up the keypad move command. Notice that output 4 lights up in the red position window. Click output 1 to turn the output on. This will create a prompt to start the router/spindle.

For PRSstandard models, press "OK" to start the router/spindle.

For PRSalpha models, after toggling output 1, press the green "START" button on the three button pendant.

To turn the spindle off, click the output 1 switch again or close the keypad window.
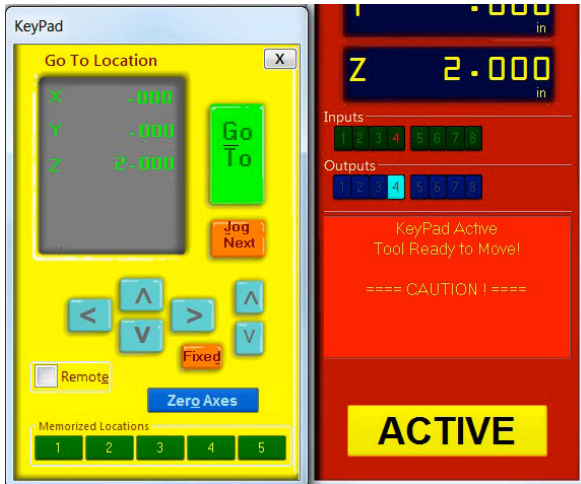
All models: turn on output 1 through keypad
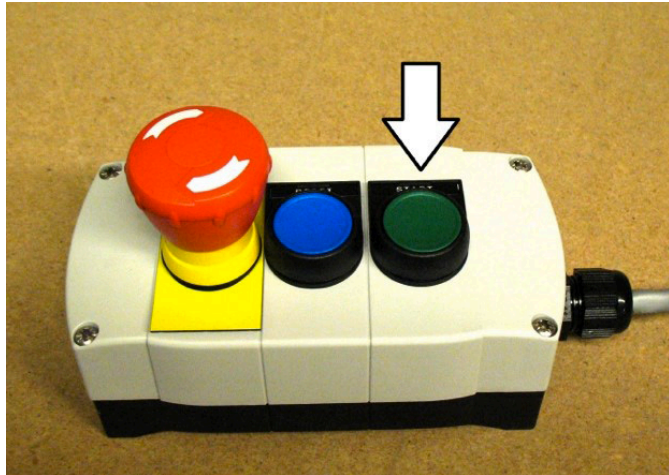
Alpha and Buddy models: press the start button

Running a Part File

This section covers setup procedures performed prior to previewing or running the part file.

Zeroing the Z-axis

The Z-axis must be zeroed each time that the machine is turned on or bits are changed. Zeroing can be done to either the top of the material or to the table surface.
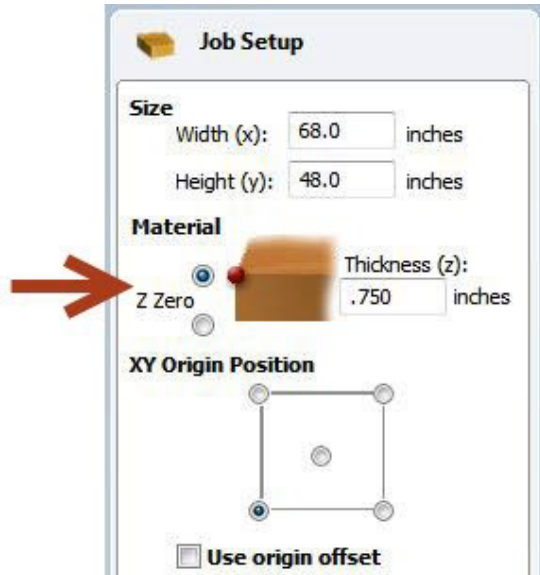
Zeroing to the top of the material is a better choice when a precise cut depth is needed (when cutting an inlay pocket, for example).

Zeroing to the table surface is a better choice when through-cutting parts in wood. Because wood products naturally vary in thickness, the top surface of any given area may be higher or lower than other areas. Zeroing to the table surface will provide the most consistent through-cutting results.

Whichever location is chosen, the location must be identified in the CAD/CAM program (as shown here for VCarve Pro). Failure to match what is specified in the software with what is done at the table can result in ruined material and/or broken bits!

Z-axis zeroing process

Ensure that the software is set to Move/Cut mode.

Place the grounding clip on the bit, if possible. Otherwise, place it on the collet nut or shaft of the spindle.

Set the plate down directly beneath the bit.

NOTE: To test the circuit before running the zeroing routine, touch the plate to the bottom of the bit. Check that input 1 lights up on the screen and goes off as soon as contact is broken.

Click on the Z zero button, or type a C2 command. The Z-axis will touch the plate twice and then move up to a safe height. The Z-axis is now calibrated and the machine is ready to cut.

Place the Z zero plate back in its holster. Remove the grounding clip from the bit and secure it safely.

ShopBot
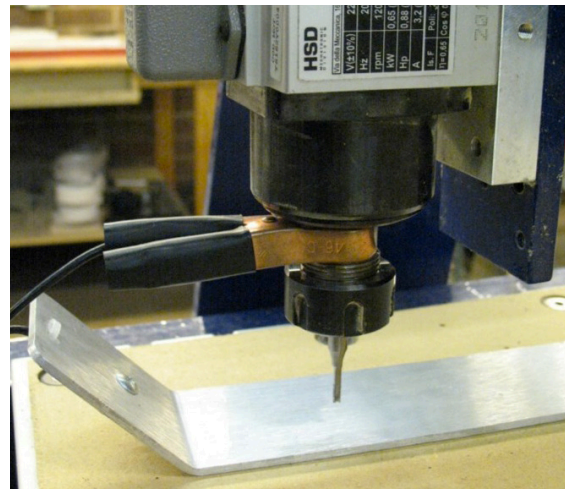
Zeroing the X- and Y-axes

The best way to zero the X- and Y-axes is by using the proximity switch homing process. This process instructs the machine to touch off from each switch to establish a zero location, which creates an accurate and repeatable start point.

Click the XY Zero button or type a **C3** command to use this feature. To make a permanent adjustment to the location of your 0,0 point based on the switches, click on [T]ools > ShopBot Setup, and "Next" until you see the screen that's marked "ShopBot setup: Prox switches." Then click "Click here to make it easy on me." The program will help set up the new permanent zero location.

To set up a temporary zero location, move the spindle/router to the desired location. Write down these coordinates to ensure the exact location for later. Type a **Z2** (for Zero 2 axes) command. Notice that the X and Y coordinates now read zero. **This is the new 0,0 location that the cut file will reference.**

Changing bits

Note: Spindles and routers have different collet styles. Instructions are included for both.

Make sure collet and nut are completely clean. If necessary, use a wire brush, compressed air, and/or mineral spirits to remove dust or excess grease.

Spindles: Before inserting the bit, press the collet into the nut and listen for the "click." If collet does not seat, press it in at a slight angle. Confirm that the collet is snapped in by holding the nut upside-down and letting the collet hang freely. Refer to "Correctly Assemble and Use a Collet" doc included if User Guide manual, sent with tool.

Routers: The router collet and nut are held together by a retaining clip. It is not necessary to disassemble the components for cleaning or bit changes.

Slide bit into collet. Make sure that the collet grips only the shank of the bit, keeping any parts of the flute outside of the collet. Ideally, the bit shank should fill at least 75% of the collet.

Thread collet and nut onto router or spindle. It should go on very easily. DO NOT apply force if nut is resistant. Stop and try again until it goes smoothly. Once the nut is finger-tight, check the bit again to make sure that it has not slipped. Use the included wrenches to fully tighten nut.

Spindles: snap collet into nut, then flip it over to ensure it is snapped in securely

Ensure no part of flute enters collet

Setting up the RPM control

This section only applies to tools equipped with a spindle.

Ensure the RPM controller USB plug (from VFD unit) is connected to the computer.

In the main console window (should have a pic to identify this window), click on "Tools" and then "Spindle RPM Control." Drag the box below the position window to keep it out of the way. It must remain open at all times for the software to communicate with the VFD unit.

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Click on "RPM" in the left corner of the Spindle RPM box to open a settings window. Change the fol-low-ing parameters in the settings window:

Start when SB3 Starts:	**1**
Hertz: varies by country	**60** (US, Canada, Mexico and Japan)
	50 (Europe, and most other regions)
Hertz Scale:	Same as Hertz setting unless adjustment is required to match VFD unit and software RPM displays.
VFD 1:	**Yaskawa V1000**
VFD 2:	Leave blank unless tool is equipped with two spindles.

Click "OK" to save settings.

To test the function of the RPM controller, turn on the spindle and click on the listed RPM value in the spindle control window. Change it to something different and then click "Enter". The value on the VFD unit display should match what was just entered.

Holding down material

Small parts can be caught by the cutter and thrown, potentially causing serious injury or damage. It is imperative to choose the proper hold-down method for the project. Refer to "Holding Down Material for Cutting" in the User Guide binder provided with this tool.

Warming up the spindle

Note: This step is not necessary for ShopBot machines with routers.

To maximize the life of spindle bearings, warm up the spindle before cutting, after letting it sit idle for longer than 4 hours. Click on "Tools" then "Spindle RPM control" to open the spindle control window. Leaving this window open, start the spindle warm up routine (C5 command). This will run the spindle at 9000, 10000, and 12000 RPM for 3 minutes each, and will turn off the spindle when finished.

Previewing a file with an offset

There are several ways to perform a "test run" without actually cutting the material. First, enter Move/Cut mode, and click on the "Cut Part" button (or "File" and "Part File Load"). Select part file, and the following screen will appear.

Locate the line marked "Offset in 2D or 3D."

A **2D offset** will cut the file at normal depth in a different X,Y location on the table. Once the X-, Y-, and Z-axes are zeroed, simply move the cutter to the new location and load the part file with a 2D offset. Its current location will be used as 0,0.

A **3D offset** will cut at a different X, Y, and Z position. This is often referred to as "air cutting," since it runs through the file in the air above the material. To avoid cutting into the workpiece, make sure that the starting distance between the bit and the material is greater than the maximum cut depth.
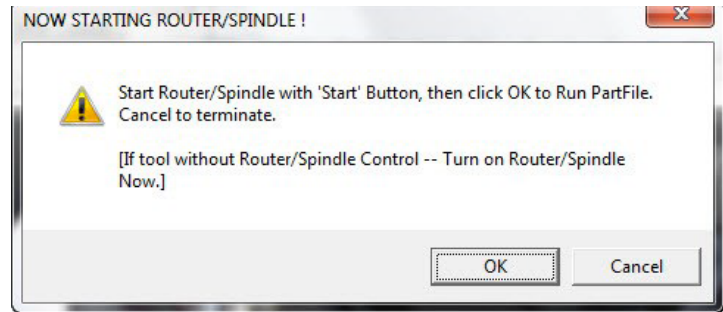
Click "START" or Enter on the keyboard to proceed.
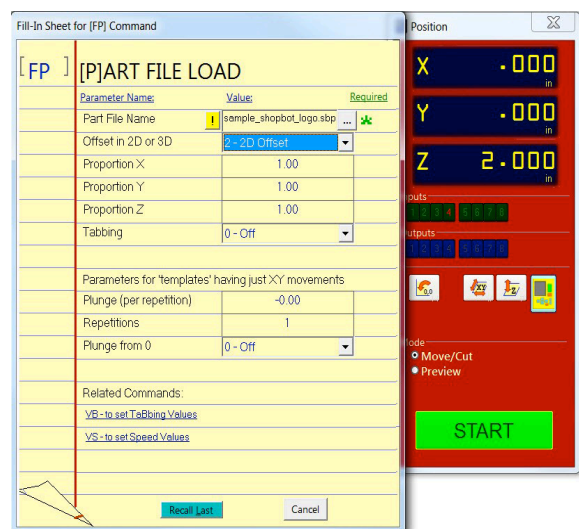
Running the cut

If the test run looks good, click on "Cut Part" (or type **FP** command), and select part file. At the Part File (FP) setup screen (shown above), ensure "Offset in 2D or 3D" is set to "No Offset." Click "START," or Enter on your keyboard. You'll see the following screen:

For **PRSalpha** and **Buddy** models, press the "Start" button on the three button pendant BEFORE clicking OK.

For **PRSstandard** models, click "OK" and the router/spindle will start automatically.

Pausing or stopping a cut

There are two ways to stop the tool while it is moving or cutting a part file. An emergency stop cuts power to the tool and stops it the fastest. A software controlled stop, or pause, will decelerate the tool, lift the Z axis to a safe height and stop the router/spindle.

Software controlled stop

The gentlest way to stop the machine during a cut is to hit the space bar on the keyboard. This will bring the machine to a "soft stop," and will retain zero locations. The soft stop is useful during non-emergency situations when adjustments or corrections are needed.
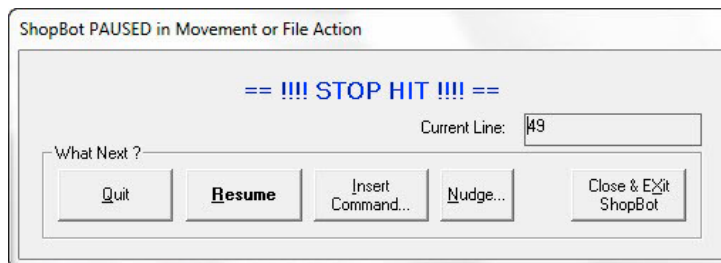
Note: The "Stop" button on **PRSstandard** acts as a soft stop. For a true emergency stop twist the main stop switch on the cover of the control box.

Emergency stop

To immediately stop the spindle/router and all motors, use the red emergency stop button or switch, which will cut off power to all systems. To continue, you will need to re-zero all axes because the locations will no longer be accurate.
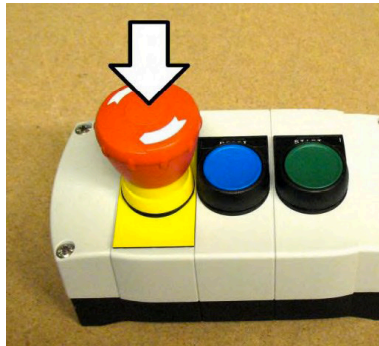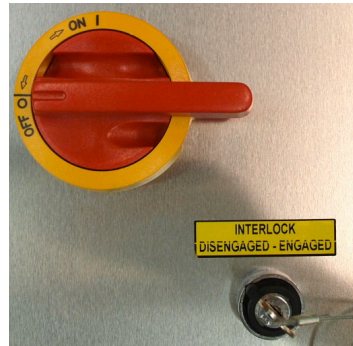
PRSalpha models   PRSstandard models

Basic Information

The ShopBot website (www.shopbottools.com) houses many documents that can help with understanding additional uses of this tool. Information can also be found in the User's Guide binder (provided with the tool), or from the resources listed in the back of this guide.

Bits (Refer to "Feeds and Speeds" document provided in User's Guide manual)

Machine Maintenance (Refer to "PRS Maintenance Schedule" located at http://www.shopbottools.com/ShopBotDocs/files/PRSMaintenanceSchedule.pdf for additional information)

ShopBot machines require very little maintenance, but to keep the machine running at its best, verify the following items each day:

- **For spindles only,** warm up the spindle using the spindle warm up routine (C5).

- Clean collet, nut, and all bits, and check for signs of wear or damage. Clean collet and nut with a brass brush and/or compressed air. Clean bits with an appropriate solvent that removes any residue or gunk. Discard dull or damaged bits.

- Visually inspect all wiring and hoses. Check for cuts, scrapes, or pinch points on the cables. If motor cable is damaged, DO NOT run the machine as motor and driver damage is at risk. Call Shop-Bot tech support (919-680-4800) for advice on how to proceed.

- Ensure the machine and the area around it are clean. Check for any obstructions on the rails and brush away any debris.

- Turn on the power. Push and pull the machine near each motor, along its axis of movement. The motors should be locked in place with no movement. Mechanical looseness in any of the axes should be corrected before proceeding. Contact ShopBot tech support (919-680-4800) for detailed instructions specific to the machine.

- Check the gear rack on each axis and make sure that it is clean and free of any obstructions (large chips, material scraps, etc.).

Resources

To the best of our knowledge, these links are current. If you find that any of them are no longer working, please contact us so that we can update them accordingly.

Detailed chip load charts:
http://www.onsrud.com/plusdocs/Doc/index.html?model.code=FeedSpeeds

ShopBot user's forum:
http://www.talkShopBot.com/forum

Vectric training videos:
http://www.vectric.com/WebSite/Vectric/support/support_vcw_tutorials.htm

Additional Vectric support available within VCarve software: click on Help > Help Contents for an interactive PDF file.

100K Garages:
Post information, bid on projects, and connect with people who want to get things made!
http://www.100kgarages.com