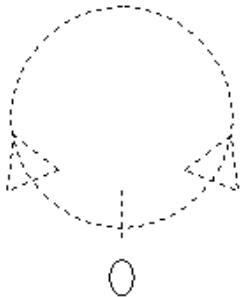
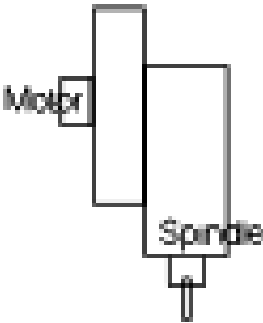
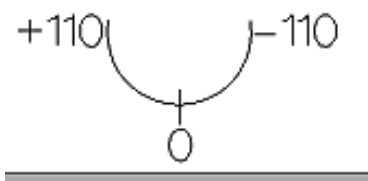


Notes on 5 axis tool

X axis moves on powerstick under spindle	Zero at user option	Linear (inches or metric)
Y moves across gantry above material	Zero at user option	Linear (inches or metric)
Z moves up and down	Zero at user option	Linear (inches or metric)
A rotates \pm 360 degrees looking down from above 	Set Zero with auto Z routine (below)  How A axis looks when A is at Zero	Degrees of rotation Axis will rotate clockwise or counterclockwise In keypad control: Alt+ PgUp (Up) is clockwise Alt + PgDn (Down) is counterclockwise
B rotates -110 through 0 to +110 Looking straight on	Zero at vertical 	Degrees of rotation In keypad control: If A is at Zero (see above) Shift + Pg Up moves tip away from you Shift + Pg Dn moves towards you

Use **VD** (Value Display)

- to change linear axes from inches to metric or
- to change an axis from rotation to linear or vice versa
- Until further notice, do all of the calibration routines below in inches

If the A or B axes is not moving the correct distance, then the unit values may be set wrong

- Use **VU** (Value Unit) to reset the unit values for the degree of rotation
- Units values should be 500 and 5 for the multiplier

Moving the Tool Around

Using the Move or Jog commands from the Tool Bar, the head can be moved in each axis individually or in combination

When moving in combinations, the order is X, Y, Z, A, B

If the location of an individual axis does not change in a combination move, use an empty value followed by a comma

Example: Move the X and A axes simultaneously to a new location, but not the Y, Z axes: M4,5,,30

Remember that X, Y and Z axes move linearly (inches or mm) while A and B axes move in degrees of rotation (see above)

Keyboard Control (K)

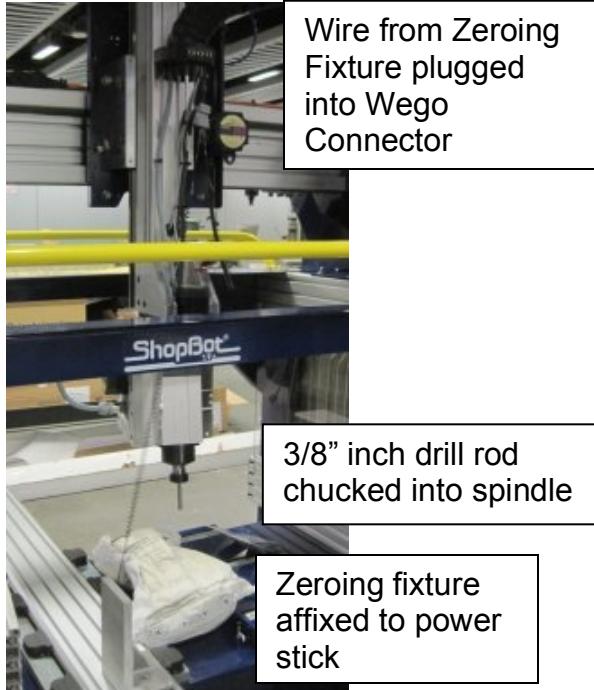
- Right and Left Arrows (keyboard or screen keypad) move the X axis (note: the power stick under the material moves)
- Up and Down Arrows (keyboard or screen keypad) move the Y axis (the spindle head moves across the gantry over the material)
- Page Up and Page Down (keyboard) or side arrows (screen keypad) moves the Z axes
- ALT plus Page up/Page Down rotates the A axis clockwise or counterclockwise
- Shift plus Page Up/Page Down rotates the B axis clockwise or counterclockwise

Squaring the A and B Axes on the 5 axis tool. Do this routine in Inches, even if you are going to machine in metric

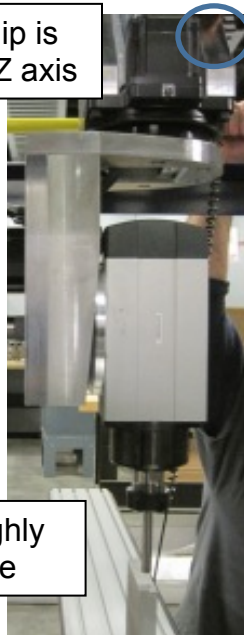
Set up and monthly check up, or whenever things seem out of square

Must be done for each computer that runs the 5 axis tool

Routine collects and stores data that will be used to square up the head



Note that the Alligator clip is clipped to metal on the Z axis



Drill rod for squaring is roughly centered over zeroing fixture

- Set up the zeroing fixture in the power stick, getting it as straight as possible, about 14" from the X 0 end
- Chuck the 3/8" drill rod into the 3/8" collet in the spindle. Leave roughly 2.6" of drill rod sticking out of collet
- Plug the wire from the zeroing fixture to the grey Wego connector found on the Z axis
- Test to make sure that you have continuity by touching the alligator clip to the zeroing fixture and looking to see if the input #1 lights up green on the red Position Screen of the ShopBot Control software
- If the #1 input does not light up green, the ShopBot will not stop when the drill rod makes contact with the zeroing fixture during the squaring routine, and bad things will happen
- Connect the alligator clip to the collet nut or a metal component on the Z axis so that the circuit will complete when the drill rod touches the zeroing fixture
- Using KeyPad Control, position the drill rod over the zeroing fixture so that it is approximately centered over the zeroing fixture about 1" above the zeroing fixture
- Use KeyPad control to get the A and B axes sort of square
- **Z5** to Zero all 5 axes in that location

Run FP,C>SBParts>**5AX_AB Center.sbp**

Watch that the cable doesn't get trapped while running the file

Keep Drill Rod and squaring rod in place if doing Part 2 of the Calibration

Calibration Part 2. Uses drill rod and zeroing fixture. (Do this in inches)

Calibrate A and B to determine an accurate zero position for those axes.

- If necessary, chuck the drill rod into the collet
- If necessary, place the zeroing fixture in place on the power stick
- Plug in the Wego connector and clip the alligator clip on the Z axis
- **FP, C>SBParts> 5AX_Tool Length Calibration.sbp**
- At end of file, Tool length will be displayed on a message screen on the Desktop
- Write down that length and save for later
- Remember to disconnect the Wego connector and alligator clip, remove zeroing fixture and drill rod, and safely store everything in a safe place

To Zero the tool on a daily basis, or when something is not vertical after a minor crash. (Do this in inches)

use C>SBParts> **5AX_XYZAB zero.sbp**

The routine will touch proximity or limit switches on each axis, then move to and zero at the location set up by the administrator. You do not need to have a bit in place to run this routine.

To change the location that the tool goes to when using the automatic zeroing routine change the value of the variable in the program

SBParts>Custom>Myvariables.sbc

(sometimes, one cannot see the .sbc files unless "all files" is chosen)

Set the desired values for location off of prox switch when zeroing in the section of myvariables.sbc that is relevant.

You need for determine the length of the bit for the Toolpath determinations. Do this routine every time that you change bits.

This routine uses the (former) Z Zero plate double-sticked to the side of the tool. (This may change)

- Before you run this routine, you must have done the Zeroing routine described above using the **5AX_XYZABzero.sbp** file above
- Chuck the bit you are going to use into collet.
- Use the Keyboard control to get the tool sort of square (but not quite so that nothing is sitting on a prox switch)
- Plug the side zero plate into the Wego on the Z axis and clip the alligator clip to the Z (DON'T FORGET THIS STEP OR BAD THINGS WILL HAPPEN)
- FP **5AX_Measure_Length_Tip_toBCenter.sbp**
- Write down the number displayed on the message screen on the Desktop. That is the center of the rotation on the B axis to the tip of the bit. Use that number to create your toolpaths.
- You want to move off the prox switches before you move any further

AT THE END OF THE DAY, ROTATE THE B axis to 90 degrees from Zero and park the spindle on a block of foam just in case there is a power failure, in which case the Z will drop dramatically.

Zero the Z axis manually until further notice.

- Put the block to be carved into place
- Use keypad control to put the Z where you want it to be
- Enter **ZZ**. Be Careful. The software will Zero the bit at that location AS SOON AS you enter the second keystroke or click on the selection from the pull down menu

To Zero the Axes manually

Move the tip of the bit to where the user wants Zero to be

Use the Zero command to Zero the axes individually (X, Y, Z, A, B) or in combinations

Other Notes on Running all ShopBots

VFD spindle speed control on box

Hit ENTER to get the U flashing

Hold the up or down arrow A LONG TIME to get the speed to go up or down

If you don't hit ENTER first, using the up or down arrows will change the display rather than changing the spindle speed

Resetting values that may have been corrupted

Values such as Ramping or speed may have been altered by the user

- Example: the ShopBot may be slamming into the sides of its parts as changes directions
- Under most of the Value settings, there is a reset in the lower left corner that will reset values to their default settings.

5 axis tool: Until further notice, do not use the Z Zero plate to Zero the Z. When and if it becomes available, here is the routine (like all the other machines.)

- Chuck the bit that the user will be using into the collet
- Attach the alligator clip from the Z Zero Plate to the bit or spindle just above the collet nut (where the upper wrench is placed)
- Touch the Z-Zero plate to the bit to check for continuity (Does the #1 input light up green on the red Position Screen of the ShopBot Control Software?)
- Place the Z-Zero plate where the user wants the Z to be (top of block?)
- Run the Z-Zero routine (use the icon or C2)
- Remember to put away the Z-Zero plate when finished

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