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## Adjusting the PRS Z-Axis Bearings





## Introduction

This document describes how to adjust the bearings on the Z-axis captured rail type of PRS tools.

The PRS Z-axis has been calibrated before leaving ShopBot. However the bearings on the Z-axis may need to be adjusted after a period of use or unexpected stress. Here are some of the possible issues and how to adjust them.

## Test the Z-Axis Response

Turn off ShopBot power. Push the Z-axis down and release it. Normally, it should move upward under spring tension. The presence of a spindle or air drills may affect the speed and distance of this motion, but the overall movement should be smooth and fluid.

### Bearings are too loose if

- Top and/or lower bearings spin freely and are not in contact with inner part of the captured rail.
- There are lateral inconsistencies in Z-axis (commonly called “slop”).

### Bearings are too tight if

- Z-axis loses steps/position, binds or even stops abruptly.
- There is premature wear to the inner part of the captured rail.

If the Z-axis moves smoothly, and none of the above issues are present, then the bearings do not need adjusting.

## How to Adjust the Z-Axis

All adjustments take place on the front face of the PRS Z-axis. Note that the steps to adjust the left and right sides differ in the direction the wrench is turned.



There are five bearings on each side of the Z-axis - three concentric, alternating with two eccentric. The concentric bearings are in line and need no adjustment. The 2nd and 4th bearings from the top are the eccentric bearings and may be adjusted. Slide the flat bar wrench (available from ShopBot if necessary) between the bearing block and the captured rail until the wrench engages one of the eccentric bearings. Use the pictures above for reference (Left or Right, facing the Z-axis) to loosen or tighten the bearings.

To Tighten-

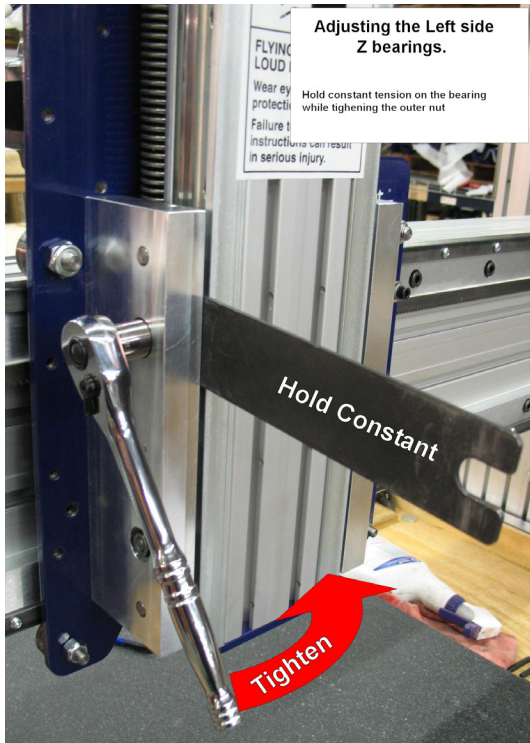
- Do not over-tighten. If bearings are forced completely around, it may cause premature failure, loss of position, or damage to the inside of the captured rail. Tighten only until slight resistance is felt on the finger tips, then check results. Repeat if necessary. Because the bearing is quite smooth, it may feel that it is still loose when a finger is gliding over the bearing. Consider marking the bearing with a small dot for a visual indication.
- Follow the direction of the arrows in the pictures depending on which side of the Z-axis is being adjusted. This allows for tightening of the bearings without loosening the nut that holds the eccentric bearing.
- Tighten the bearing until the top or lower bearing stops spinning freely or the Z-axis does not move laterally.

To Loosen-

After loosening the bearing, check the nut on the outer edge of the bearing block. Loosening rotates the bearings in the same direction as necessary to remove the nut. This can lead to other complications if not corrected. It may be necessary to remove the Y-motor to access the nuts on the right side of the Z-axis.

**Tightening the Eccentric Nuts**

**Left Side of Z-Axis**



After adjusting the eccentric bearing to the proper tension as instructed above, hold the position of the bearing constant with the flat bar wrench while using a 13mm socket wrench to tighten the outer nut.

**Right Side of Z-Axis**

It will probably be necessary to remove the Y-axis motor to tighten the nuts on the right side. Use a 3/16" hex key to remove the Y-axis motor. After adjusting the eccentric bearing to the proper tension as instructed above, hold the position of the bearing constant with the flat bar wrench while using a 13mm socket wrench to tighten the outer nut. Reattach and engage Y-axis motor.



