Service Bulletin 1008
Minimizing Backlash on Mini Mills

Date

Issued 5-October 2012

Product

3900 Tilting Column HiTorque Mini Mills

3960 Solid Column HiTorque Mini Mills

SIEG X2 Mini Mills and other Mini Mills

Issue

Every machine exhibits backlash on parts that move back and forth. This can be minimized but never eliminated.

Symptoms

Excessive backlash on the X-, Y- and/or Z-axes.

Solution

Adjust the components that cause backlash. By making the adjustments described below, you should be able to reduce backlash to:

- X-axis, 0.003" (0.08 mm) or less
- Y-axis, 0.005" (0.13 mm) or less
- Z-axis, 0.03" (0.8 mm) or less

For most operations, backlash does not affect your accuracy. As long as you move the hand wheel in the same direction (as when taking multiple passes), backlash has no effect. Even if you back out between passes, simply back out far enough to pass the backlash. When you return to the working position, you will be in the correct place.

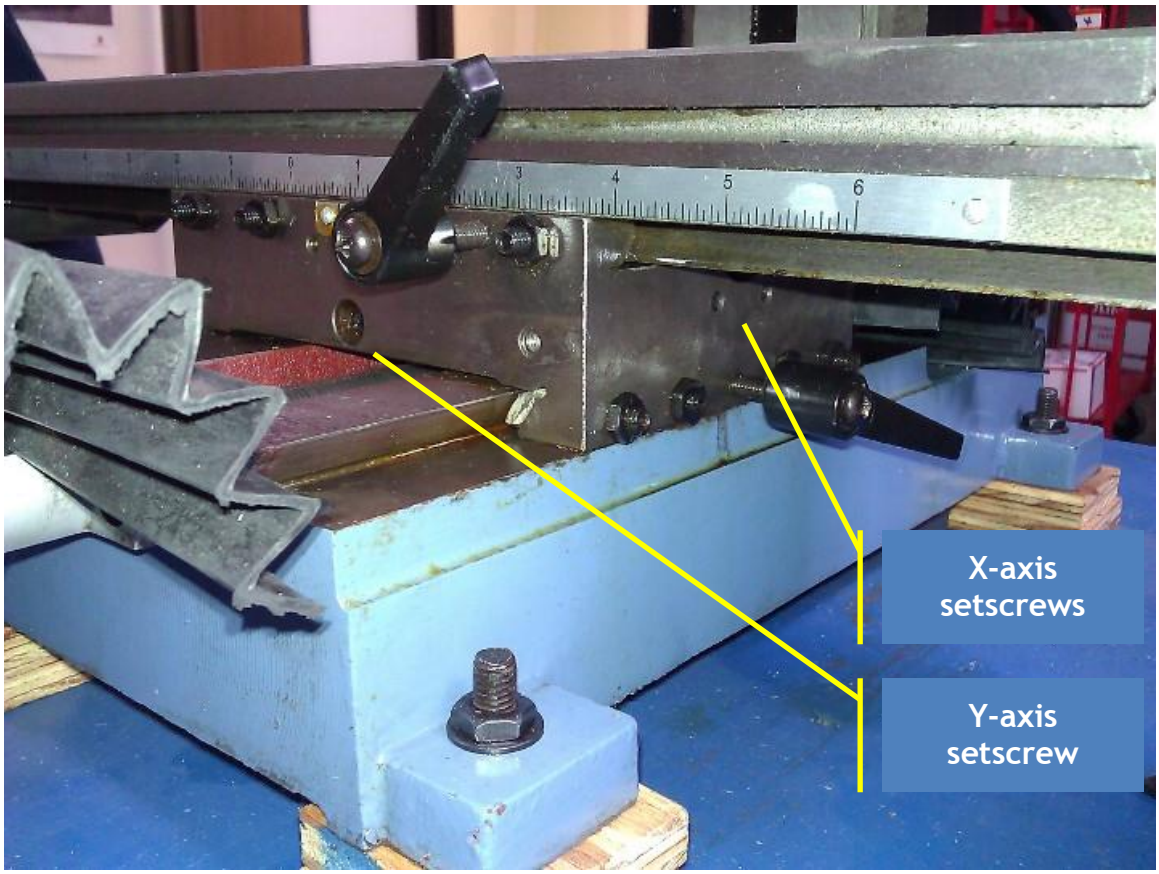
X-Axis Adjustment

There are two areas that can cause backlash on the X-axis. Follow these steps to make adjustments.

1. There are two setscrews in the side of the saddle behind the X-axis hand wheel. (See photo on next page.) These setscrews clamp the X-axis feed

nut in place. Adjust these setscrews so they are snug, but not tight enough to keep the nut from moving slightly as you move the X-axis.

2. The X-axis hand wheel is secured with two lock nuts. Remove the outer lock nut. Adjust the inner lock nut to minimize the play in the thrust bearings behind the hand wheel. When the adjustment is complete, replace and tighten the outer lock nut without changing the adjustment.



Y-Axis Adjustment

There are two areas that can cause backlash on the Y-axis. Follow these steps to make adjustments.

1. There is a setscrew in the front of the saddle behind the Y-axis hand wheel and under the bellows. (See photo.) This setscrew clamps the Y-axis feed nut in place. Adjust the setscrew so it is snug, but not tight enough to keep the nut from moving slightly as you move the Y-axis.
2. The Y-axis hand wheel is secured with two lock nuts. Remove the outer lock nut. Adjust the inner lock nut to minimize the play in the hand wheel. When the adjustment is complete, replace and tighten the outer lock nut without changing the adjustment.

Z-Axis Adjustment

There are many areas that can cause backlash on the Z-axis. Do not expect to eliminate all, or even most of the backlash. Here are some things you can do to minimize the problem.

1. The most important thing to do has nothing to do with the backlash, but provides a good workaround. Tighten the Z-axis gibs enough that the head will not fall under its own weight. This eliminates the biggest problem of the head dropping unexpectedly. Once this is done, you will have very good control over the Z-axis position even with significant backlash. Be sure that you follow good practice and always lock the Z-axis when making a cut.
2. You can reduce the Z-axis significantly by shimming the rack out from the column. This will eliminate much of the play between the rack and the drive gear.
3. While there are other areas that cause backlash in the Z-axis, the laws of diminishing returns suggest that it's not worth the effort to work on them.

Chris' Tip: *An Air Spring Kit (LittleMachineShop.com part numbers 2258 and 4005) makes the Z-axis a lot more bearable. It provides even support for the head throughout its range of travel. And, as a bonus it provides a greater range of travel.*