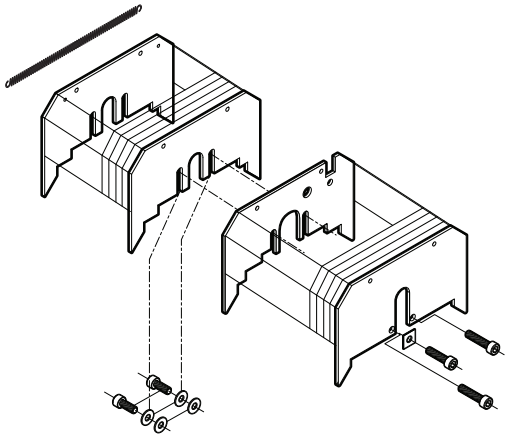


VIDEO INSTRUCTIONS AVAILABLE

For installation instructions, please visit our YouTube channel at https://youtu.be/YkJ-pbk5RXE

SHERLINE PRODUCTS

INCORPORATED 1974

Ball Screw Mill Accordion Way Cover

P/N 5920, 5958

About the Y-Axis Covers for the Ball Screw Mill Retrofit

If you have upgraded your standard leadscrew mill to a ball screw mill, you will need to install the accordion way cover and the brass tube cover on the Y-axis of the mill that shipped with your retrofit kit. These covers prevent chips from getting into your new ball leadscrew.

NOTE: Please see the Ball Screw Mill Retrofit Notice instructions for receiving and installing your new ball screw axes.

Installing the Way Covers on a Ball Screw Mill Retrofit

When you receive your X/Y ball screw retrofit, there is a square washer that is taped to the inside of the Y-axis motor mount (see Figure 1). Take the tape off of it, take the washer off, and set it aside. This washer is mounted to the mill base with a 10-32 screw.

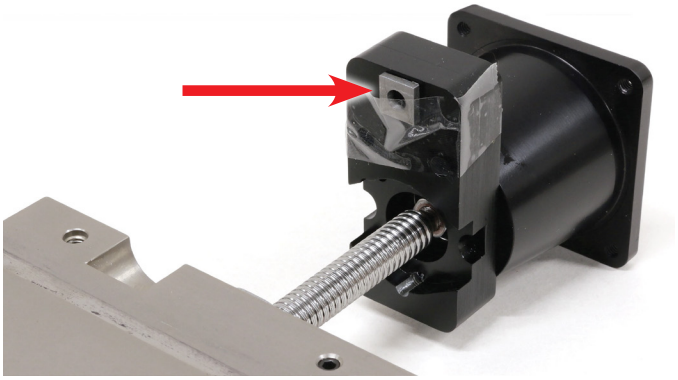


FIGURE 1—The red arrow is pointing to the square washer.

The accordion way cover has two sections: one for the front side of the mill (stepper motor side) and one for the backside of the mill (mill column base side) (see Figure 2).

The front side cover has a large slot and two holes on its front plate, and two narrow slots on its rear plate. The two holes are what's going to be mounted on to the end of your motor mount adapter to the mill base, and the slotted side is going to go toward the saddle.

Installing the Front Accordion Way Cover

The first step is to loosen all the screws on the Y-axis ball nut and the motor mount to give room for the metal plates.

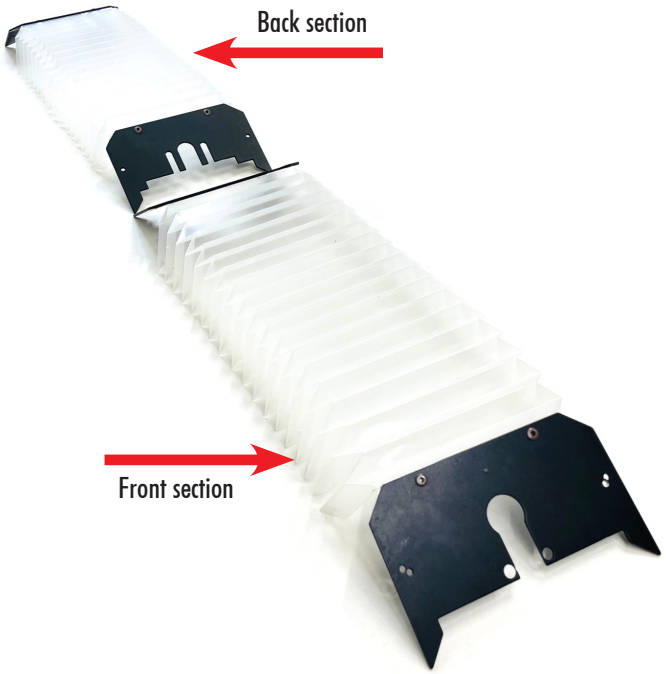


FIGURE 2—This picture shows the accordion way cover for the 18" ball screw mill (P/N 5958). A smaller version is available for the 12" and 14" ball screw mills (P/N 5920).

1. Loosen the two 10-32 screws on the ball nut mount about four turns. Do not remove the screws (see Figure 3).

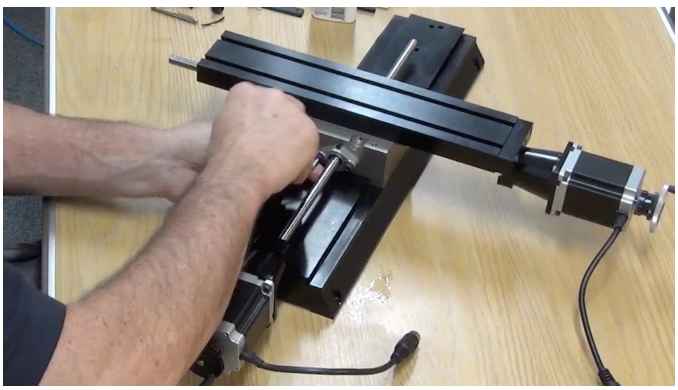


FIGURE 3—We highly recommend using a ball end Allen wrench to be able to get into the tight spaces.

2. Then loosen the 10-32 and the two 8-32 screws from the stepper motor mount adapter (see Figure 4). You can just turn them out until they are no longer threaded into the base but leave them in the holes of the adapter.

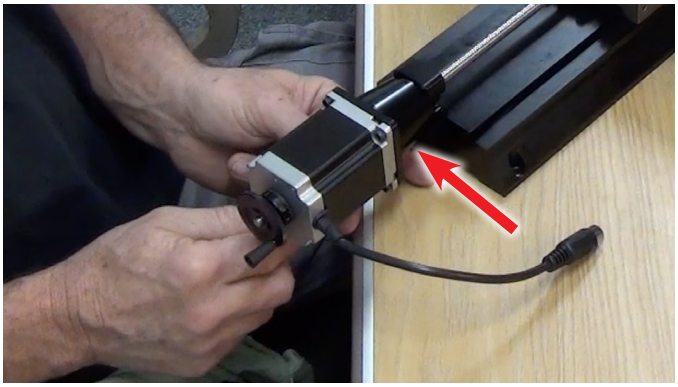


FIGURE 4—The red arrow is pointing to the three mounting holes at the base of the stepper motor mount adapter.

3. Once you have all the screws disconnected from the base, pull the saddle forward a little bit and you will have all your screws sticking out of your adapter (see Figure 5).

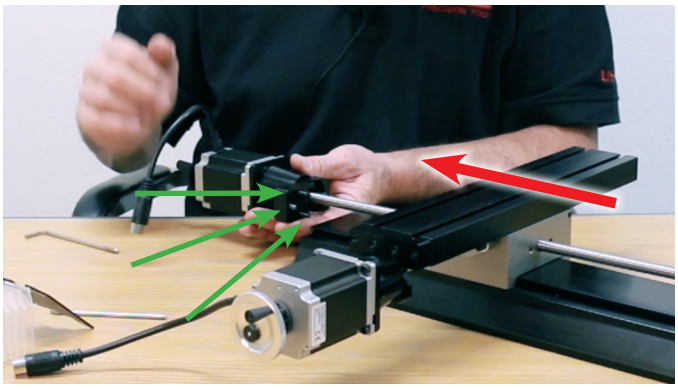


FIGURE 5—The red arrow shows the direction to pull the saddle. The green arrows are pointing to the three screws from the motor mount adapter.

4. Put the square washer on the 10-32 screw, which is the screw in the bottom most hole of the adapter. It is critical to install the washer to keep the cover plate square and perpendicular to the end of the mill base, so the ball screw is parallel to the dovetails.

5. Now put on the way cover, and line up the 8-32 screws with the two holes in the cover, and push them through the holes but don't thread them into the base yet. Fold the way cover toward the stepper motor so you can see the screws (see Figure 6). Move the saddle away until the screws come in contact with the mill base. Get one of the 8-32 screws started in the hole. You may have to lift the assembly to get the screw to align to the hole in the base. Once all three screws have been started, you can push the saddle away again, and that will pull the stepper motor up against the end of the mill base. Go ahead and tighten the 8-32 screws and the 10-32 screw to the mill base.

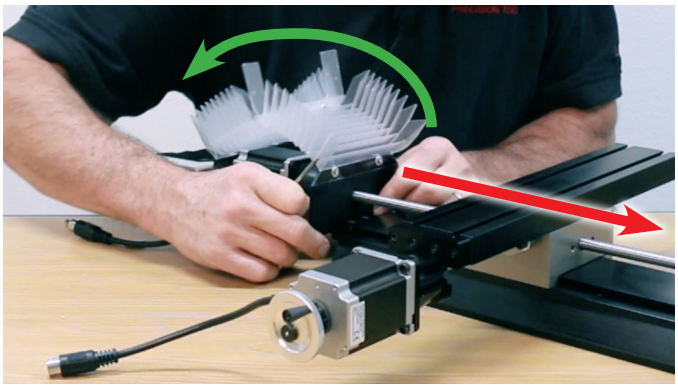


FIGURE 6—The green arrow shows the way cover folded over for easier viewing of the mounting screws. The red arrow shows the direction to push the saddle to bring the cover plate and adapter into contact with the mill base.

6. Now use the handwheel to move the ball nut away from the saddle, so you have a space to put the rear cover plate over the screws. Flip the cover back over to align the slots in the front saddle cover plate with the ball nut screws (see Figures 7 and 8). If you push the cover plate down too hard, you are most likely going to have a section of the way cover mounting plate rubbing on your base. We'll address this in the coming steps.

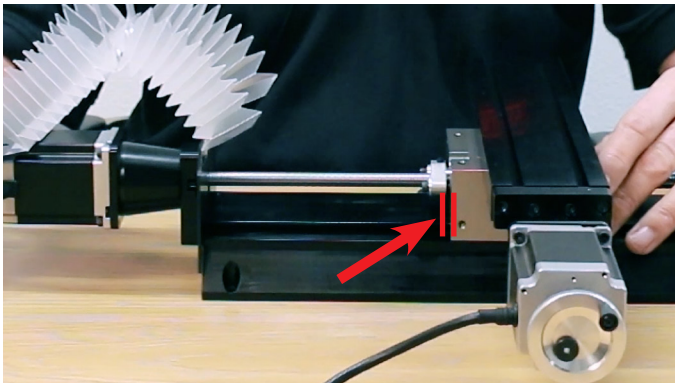


FIGURE 7—The two red lines indicate the gap between the ball nut and the saddle. This gap allows space for the saddle cover plate.

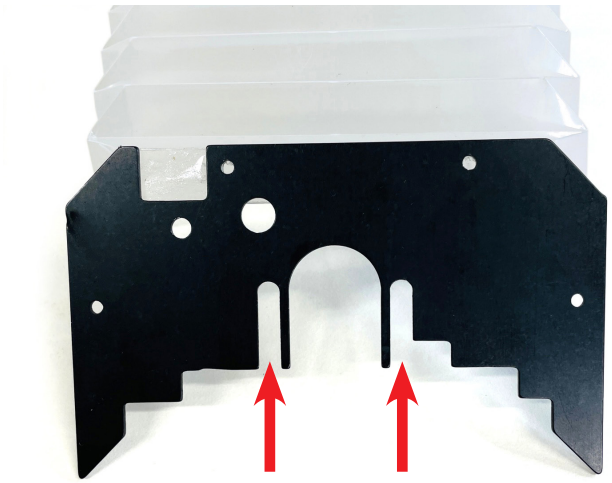


FIGURE 8—The red arrows indicate the two narrow slots that slide over the ball nut mounting screws and into the gap between the ball nut and the saddle. The larger slot in the middle goes over the ball screw.

7. Move the saddle all the way up to the end of travel. This will realign the ball nut to the stepper motor.

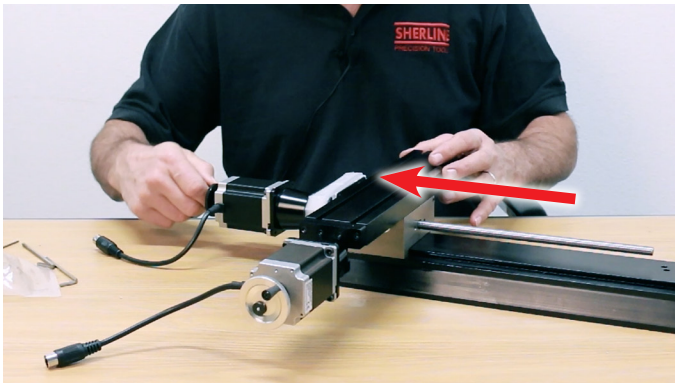


FIGURE 9—Use the Y-axis handwheel to move the saddle toward the stepper motor.

8. Once you have moved the saddle to the end of travel, move the handwheel back and forth a few times to make sure there is no binding or scrapping, and that you have free movement of the saddle.

9. Now move the saddle back out to about the middle of the mill base, so you can get enough room to get the ball end Allen wrench in to tighten the ball nut mounting screws and secure the rear way cover mounting plate. Make sure to keep pressure on the backside of the saddle as you move it out. This backside force will help keep the ball nut mount in place until you get the screws tightened.

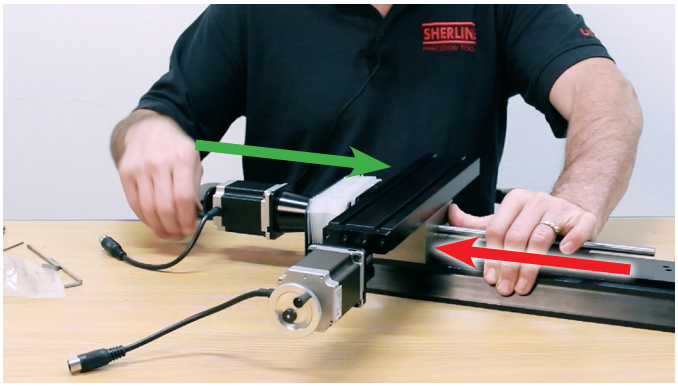


FIGURE 10—Move the saddle back out (in the direction of the green arrow), while keeping pressure on the backside of the saddle (in the direction of the red arrow).

10. Slip the ball end Allen wrench under the way cover, snug down one of the 10-32 screws, and repeat the step on the other screw (see Figure 11). Before tightening down the screws, make sure the metal cover plate is not rubbing anywhere on the mill base, especially the dovetails. Once your are confident that you have enough clearance, you can go ahead and finish tightening the ball nut mounting screws. You can use a closed-end wrench as a cheater bar to get leverage to help cinch down the screws. Put the closed end of the wrench over the short end of the Allen wrench and finish tightening the screws (see Figure 12).

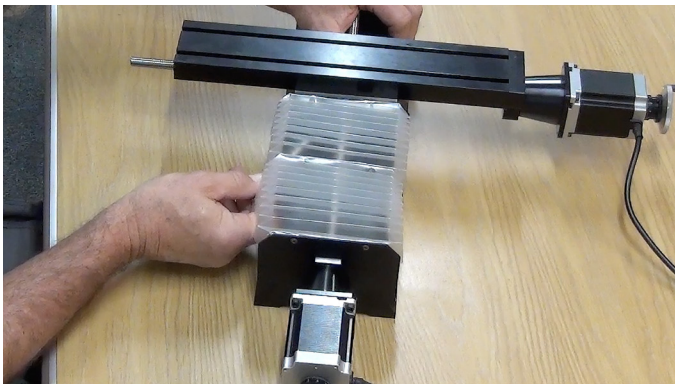


FIGURE 11—Snug and then tighten the ball nut mounting screws under the accordion way cover.

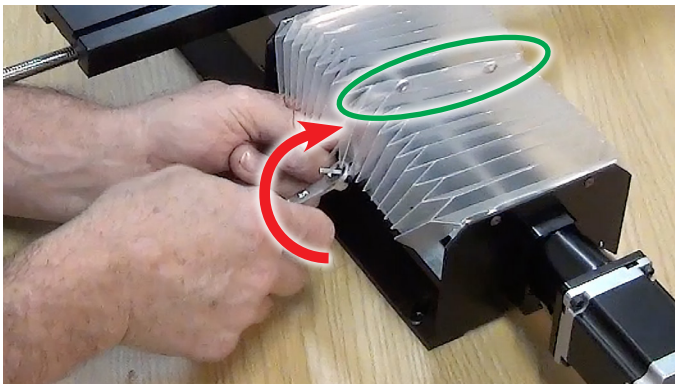


FIGURE 12—Finish tightening the ball nut mounting screws with help of a closed-end wrench for leverage. NOTE: The way cover in the photo is an older style two-piece cover (notice the rivots circled by the green oval). The new covers are made from a single piece of polypropylene.

11. After you have finished tightening the ball nut mounting screws, move the Y-axis all the way forward to check the travel is free and that there is no binding.

Lubrication

You will need to install the saddle oiler and lubricate the ball screws before adding the backside way cover(s).

Dovetail Surfaces: Install the Saddle Oiler Cup and use "3-in-1" oil or a light sewing machine oil to lubricate the dovetail surfaces. Fill the oiler cup on the mill saddle and screw on the lid. Use your finger to apply oil to the bed dovetails and the mill table dovetails.

Ball Screws: The ball screws are lubricated at the factory but when you do need to lubricate them, the ball screw manufacturer recommends NSK Grease AS2 for the ball leadscrews. Move the axes to the end of travel and put a minimal amount of grease on your fingertip. Apply it along the length of the leadscrew from the ball nut to the stepper motor mount.

Installing the Back Brass Cover Tube

You now need to install the brass cover tube over the back end of the ball screw. The brass tube slides over the ball screw, through the column base, and will fit snugly into the backside of the saddle.

1. First, install your mill column base using the two 1/4-20 screws, making sure that all mating surfaces between the column base and the mill base are clean and free of any chips, dings, or debris. Clean surfaces will guarantees that your column is square and perpendicular. Get both screws snug before completely tightening them down.
2. Put the brass cover through the hole in the column base and slide it over the ball screw. It should fit snugly into the backside of the saddle, but you can use silicone or E6000 goop to keep the cover in place when you are moving the axis back and forth. Apply the silicone to the brass tube in a thin coat, using your finger, while rotating the tube. Make sure that you keep the first half inch of the tube clean. You DON'T want to get any foreign substance on the ball screw (see Figure 13).

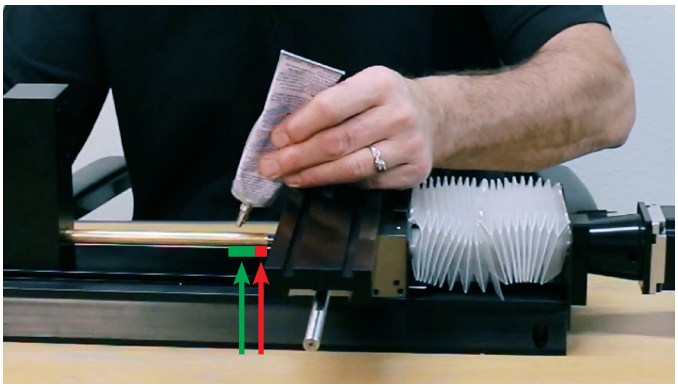


FIGURE 13—The green section above shows where to apply the silicone. The red section needs to be kept clear.

3. Guide the brass cover into the saddle. If you feel any resistance, get a piece of wood and push the back end of the cover with the wood, or tap the piece of wood with a hammer. It only has to go in about 3/4 of an inch to stay in place.

Installing the Back Accordion Way Cover

The brass tube cover should be enough protection for your ball leadscrew, so adding the accordion way cover to the backside of the Y-axis is optional. The following instructions cover the steps for installing the backside accordion way cover.

1. If your column still has the bed and everything else on it, remove the four screws that hold the column bed to the column base. You will have to true in your head after you have finished installing the accordion cover.
2. Take the two 10-32 screws (10-32 x 1/2″ SHCS, P/N 40670), put two included washers (#10 3/16″ Washer, P/N 40660) on each screw, and then get them started into the two screw holes about half way on the backside of the saddle. One washer will go on the front side of the rear saddle mounting plate and another will go on the backside of the plate. The washers closest to the saddle allow enough space so the rivet heads don't scratch the back of your mill table. You can use your Allen wrench to help make some space between the two washers on each screw (see Figure 14).

FIGURE 14—You can use your Allen wrench to create a gap between the washers that allows space for the front rear saddle mounting plate. The two red lines indicate the gap between the two washers on each 10-32 screw.

3. Slide the front plate with the cutouts over the two screws, and between the washers, that you just threaded onto the saddle.

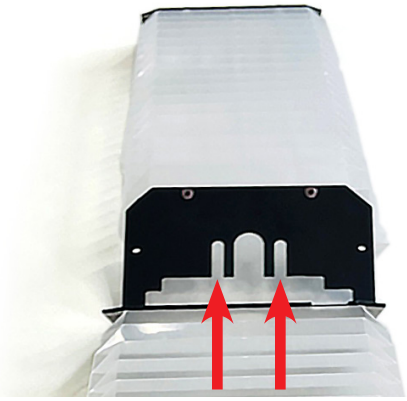


FIGURE 15—The red arrows indicate the two narrow slots that slide over the 10-32 screws and between the washers. The larger slot in the middle goes over the ball screw cover tube.

4. Pull the way cover over the mill table just as you did for the front side cover.
5. Tighten the 10-32 screws, making sure the saddle cover plate does not scrape against the mill table, especially the dovetails.
6. Finish by moving the back of the way cover over the base and placing the provided spring around the mill column base.

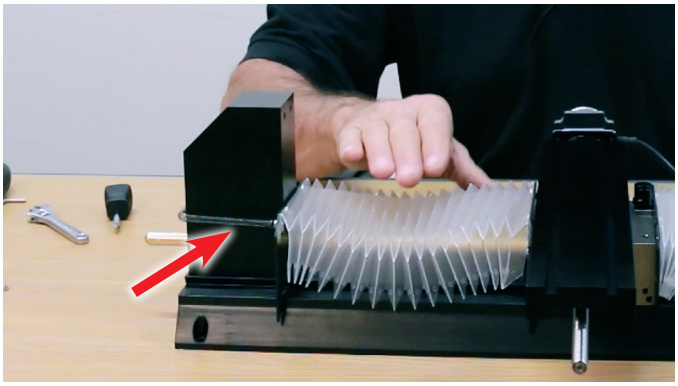


FIGURE 16—The red arrow is pointing to the spring that secures the back mounting plate to the mill column base.

7. After you have finished installing the backside accordion way cover, move the Y-axis back and forth a few times to check that the travel is free and that there is no binding.
8. If you notice the backside mounting plate starts to ride up the column base all the time, just move the spring underneath the brass tube (see Figure 17).

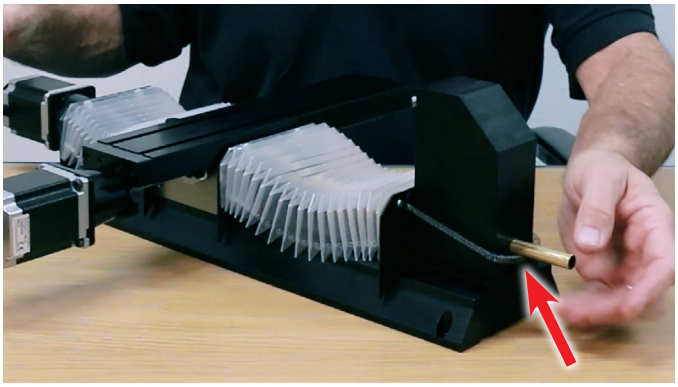


FIGURE 17—The red arrow is pointing to the backside mounting plate spring located under the brass cover tube.

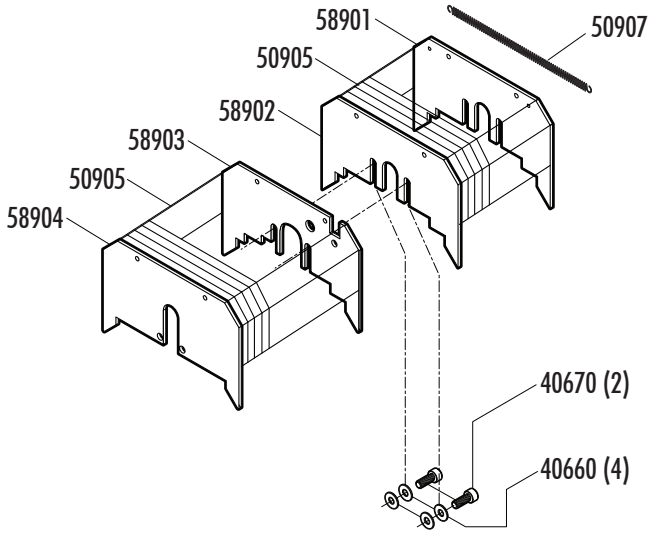
9. Reinstall your Z-axis column bed onto the mill column base, and square it up as necessary.

Keeping Your Y-Axis Leadscrew Chip Free

1. Your machine must have a brass Y-axis tube cover, and Y-axis accordion covers on it to prevent chips from getting on your ball leadscrew.
2. DO NOT use pressurized air to blow chips off your machine. Use a small brush or rag to wipe the chips off. The use of pressurized air will eventually force chips onto the ball leadscrew, and this will, in turn, damage the ball nut.
3. Brush chips off the top of the Y-axis accordion cover while you are machining to avoid excessive chip buildup on the covers. Excessive chips on the Y-axis cover will eventually restrict the axis movement and cause the stepper motor to stall and miss steps.

Thank you,
Sherline Products

Exploded View



Parts List

NO. REQ.	PART NO.	DESCRIPTION
4	40660	#10 3/16" Washer
2	40670	10-32 x 1/2" SHCS
2	50905	Polypropylene accordion way cover (12" and 14" ball screw mills only)
2	TBD	Polypropylene accordion way cover (18" ball screw mill only)
1	50907	Way cover rear spring
1	58901	Way cover rear mounting plate
1	58902	Way cover rear saddle mounting plate
1	58903	Way cover front saddle mounting plate
1	58904	Way cover front mounting plate