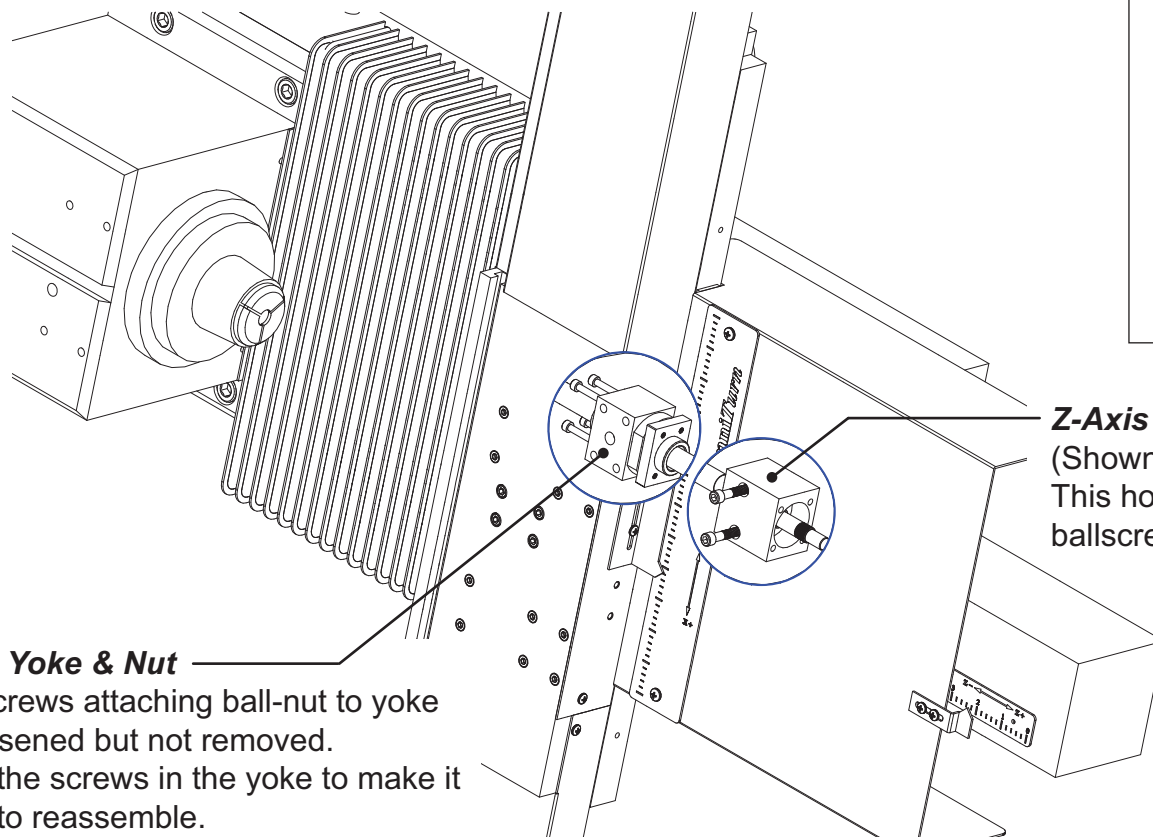


To replace Z-axis ballscrew without removing X-axis components

This document describes how to remove & replace the z-axis ballscrew without removing the x-axis components. The 'trick' is to loosen the screws that hold the ball-nut to the yoke, but leave them in place for easy reassembly, and to release the support unit housing so it comes out with the ballscrew.

- Order of Operations:**
1. Remove sheetmetal
 2. Remove servo Motor
 3. Remove support unit
 4. Loosen (4) screws holding ball-nut (LEAVE SCREWS IN YOKE)
 5. Remove support unit housing (Pinned in place; may need to be lightly tapped)
 6. Remove & replace ballscrew
 7. Attach new support unit to ballscrew
 8. Install new support unit
 9. Replace servo motor
 10. Replace all sheet metal
 11. Verify home pointer
 - 12. Re-set all tools before running!**



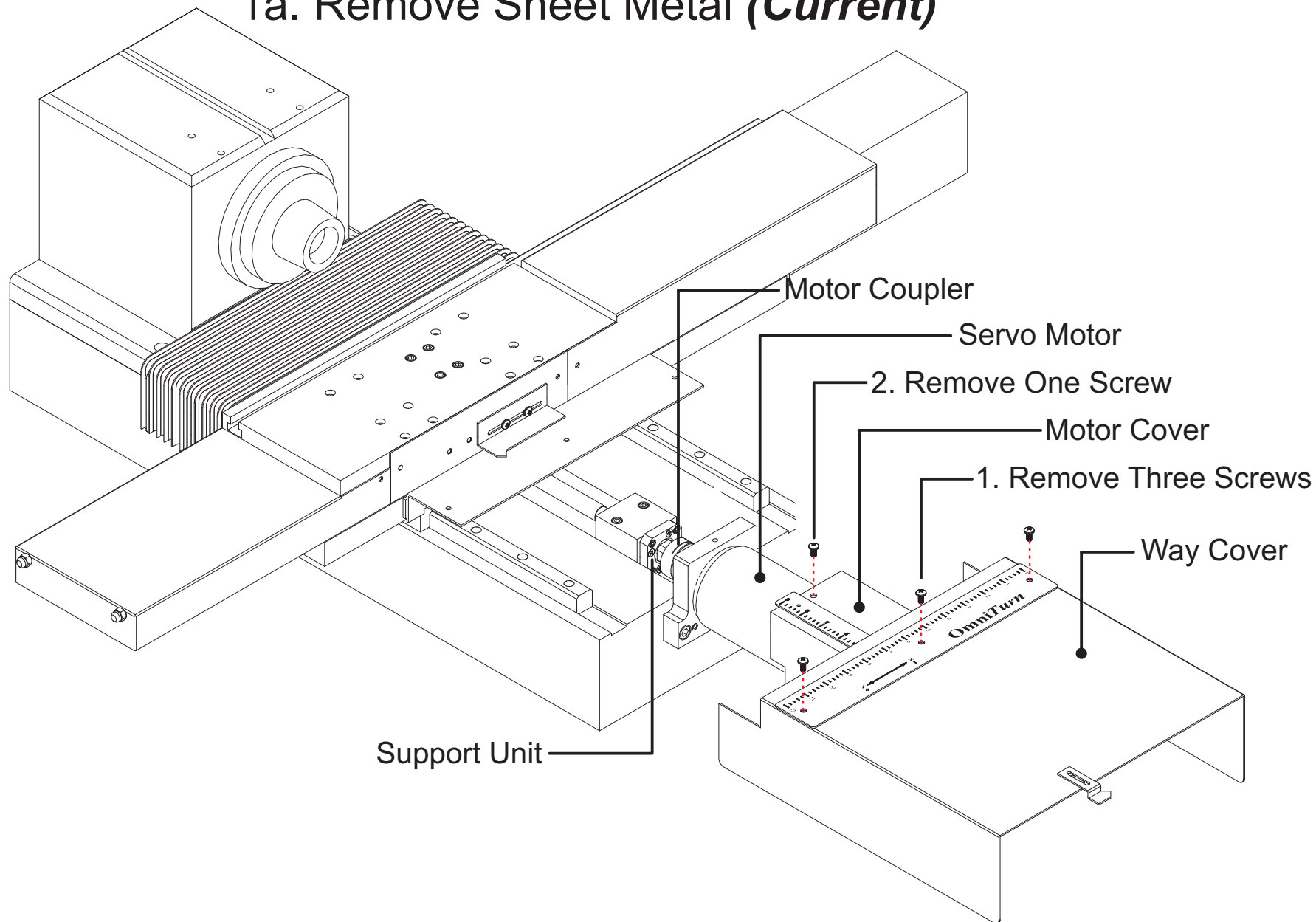
Z-Axis Yoke & Nut

Four screws attaching ball-nut to yoke are loosened but not removed. Leave the screws in the yoke to make it easier to reassemble.

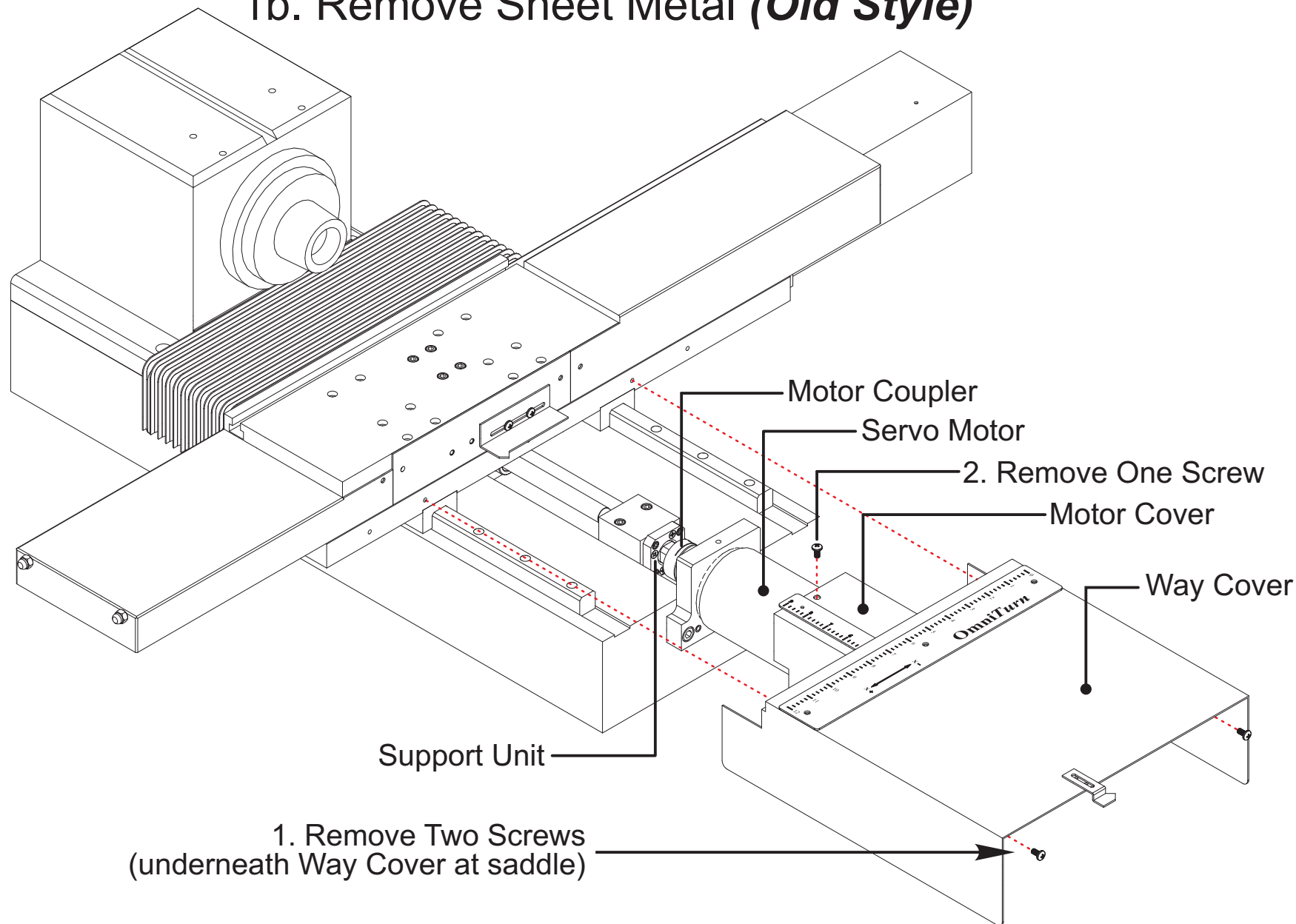
Z-Axis Support Unit Housing

(Shown with support unit removed)
This housing will be removed with the ballscrew after loosening the yoke screws

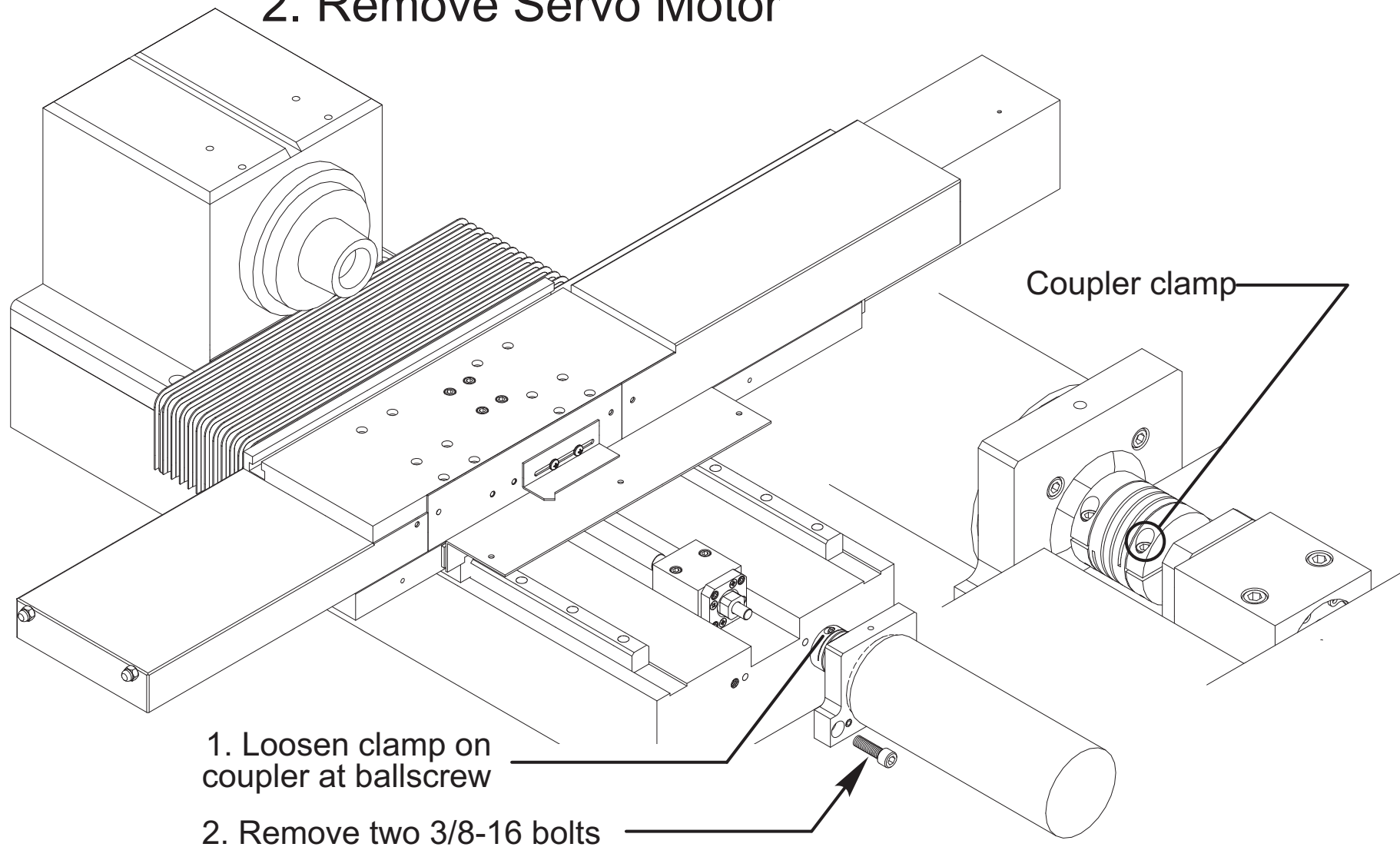
1a. Remove Sheet Metal (*Current*)



1b. Remove Sheet Metal (*Old Style*)

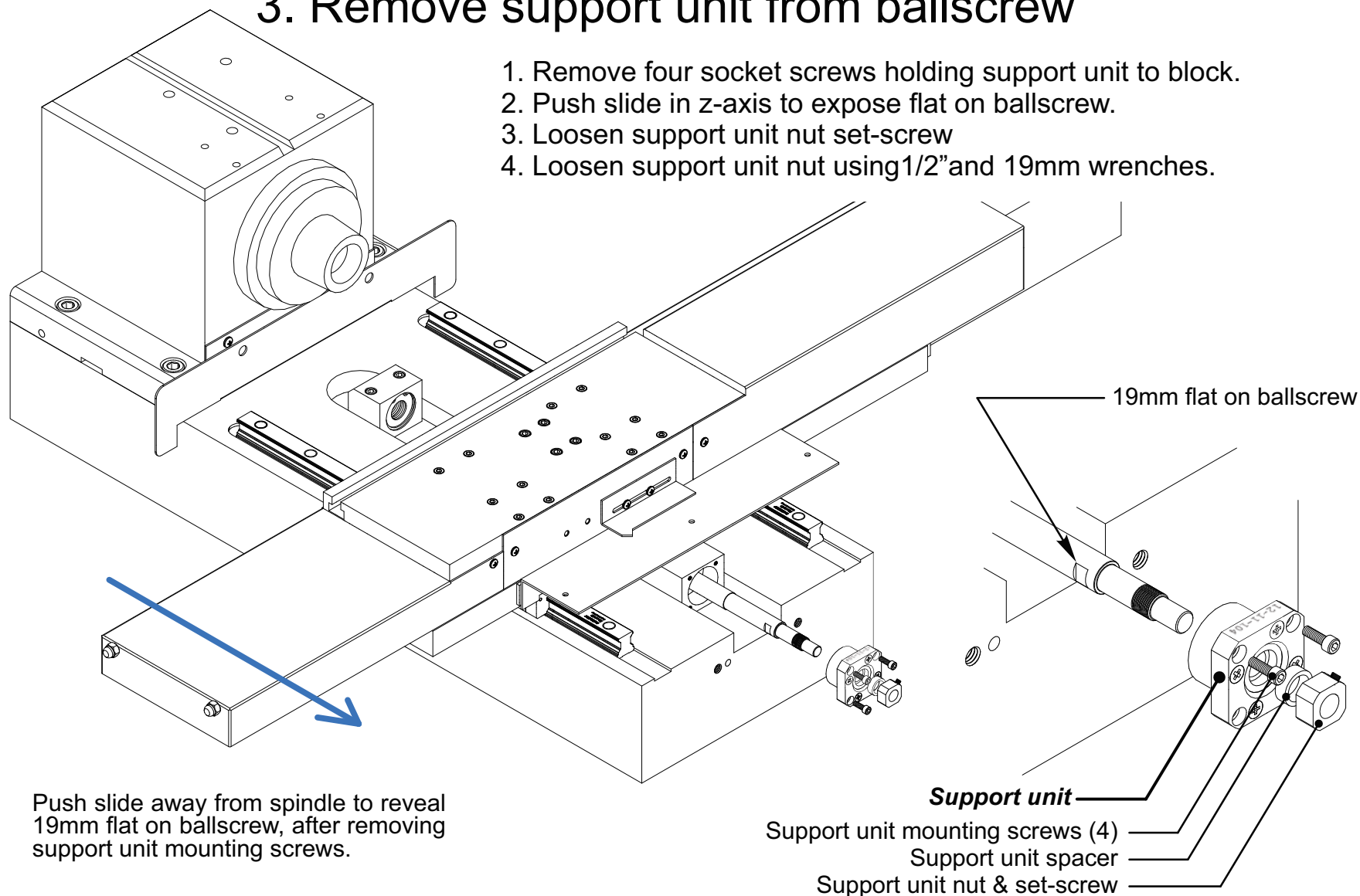


2. Remove Servo Motor



3. Remove support unit from ballscrew

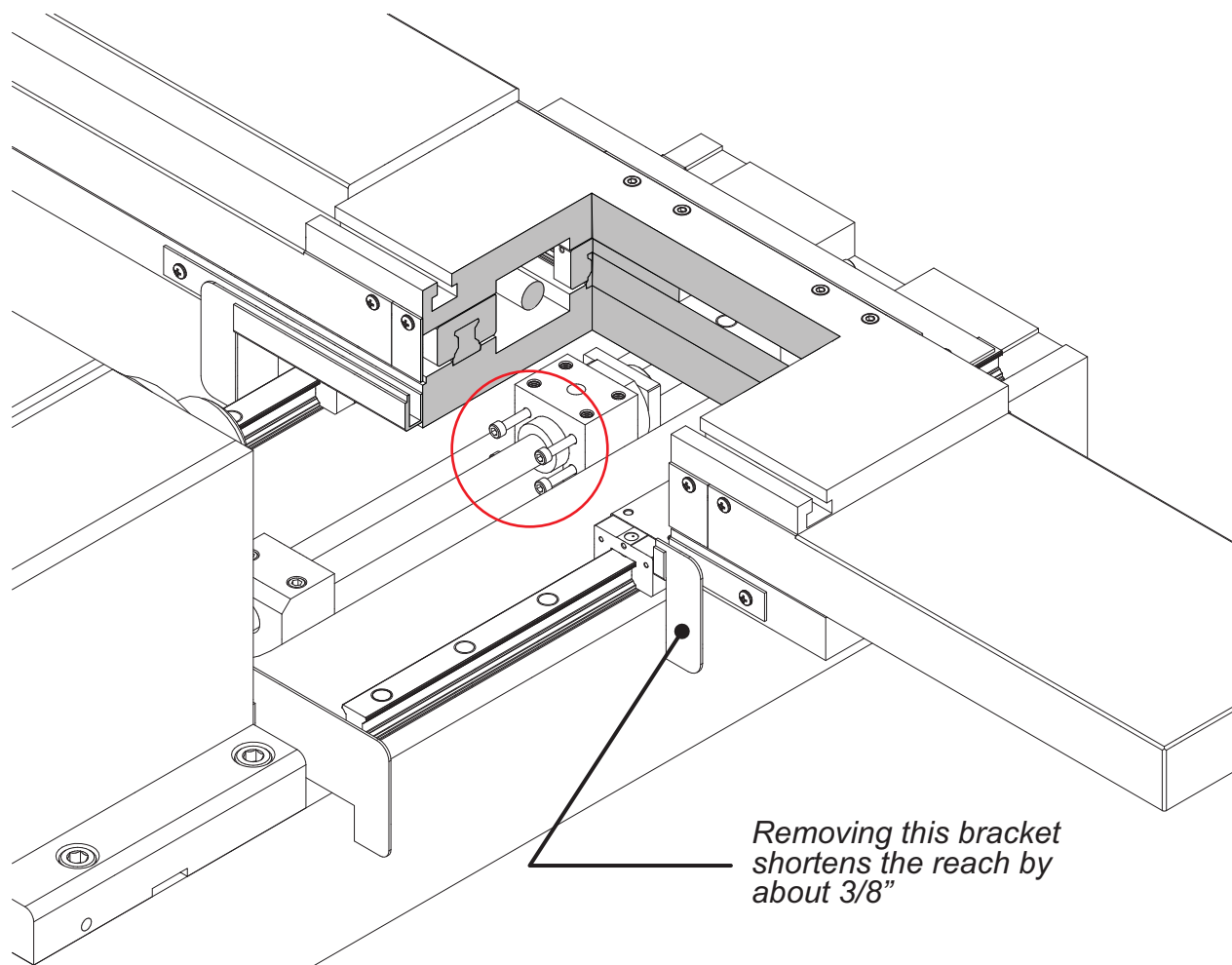
1. Remove four socket screws holding support unit to block.
2. Push slide in z-axis to expose flat on ballscrew.
3. Loosen support unit nut set-screw
4. Loosen support unit nut using 1/2" and 19mm wrenches.



4. Loosen four 10-24 SHCS that attach ball-nut to yoke

Leave screws in yoke to facilitate re-assembly. If they fall out, it's hard to get them back into the holes in the yoke.

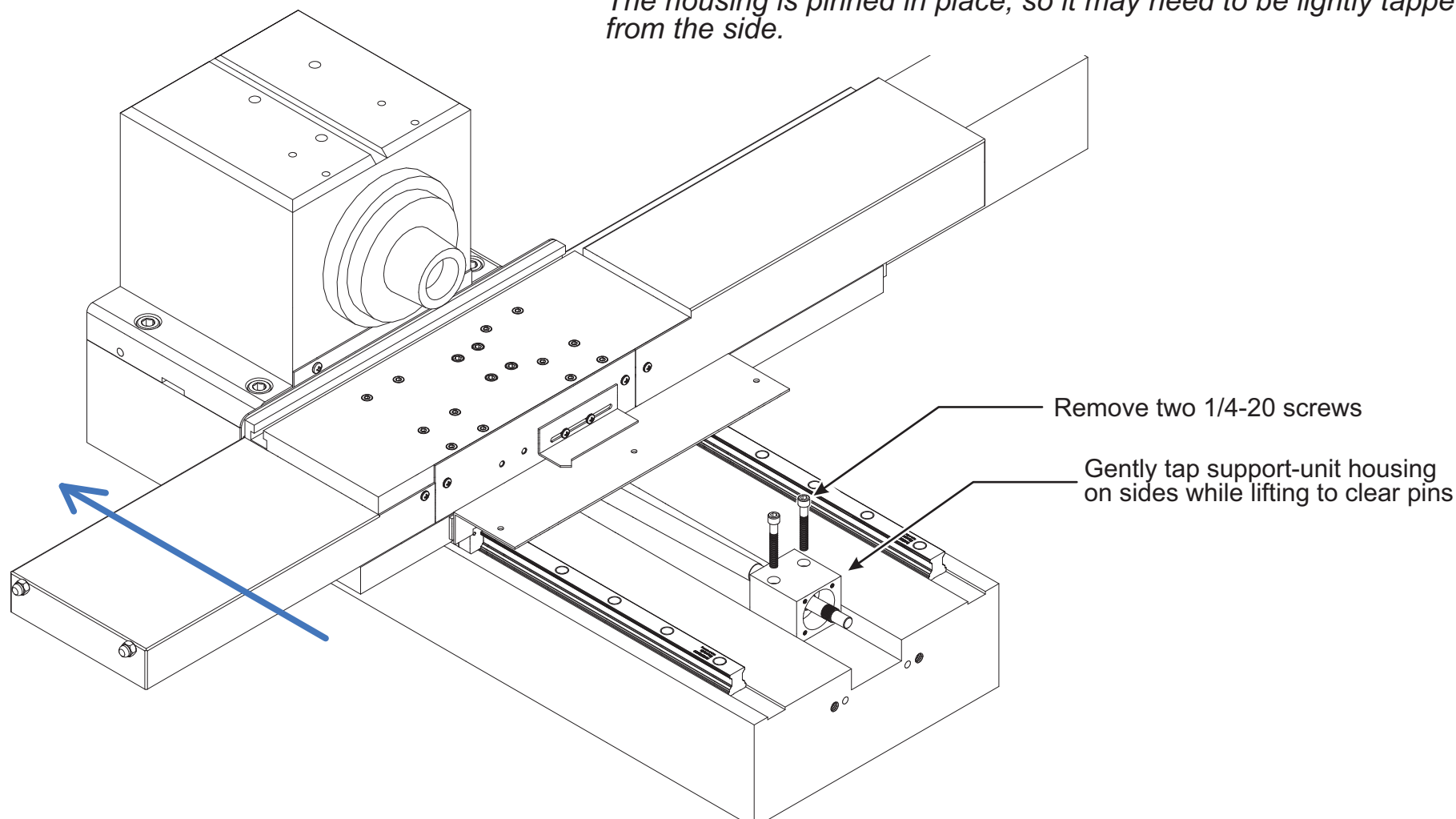
Remove accordion way cover, then position slide so you can reach the screws with 5/32 hex wrench.



5. Remove support unit housing

Gently push tooling plate all the way to headstock to allow maximum play in ballscrew while removing support unit housing.

The housing is pinned in place, so it may need to be lightly tapped from the side.



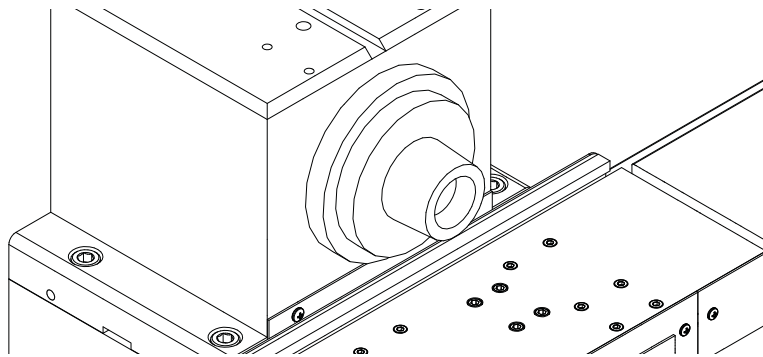
6. Remove and replace ballscrew

Remove the housing, then gently slide ballscrew assembly out.

Lubrication: If you use oil coolant, the screw never needs lubrication; with water-based coolant, lubricate every 4 to 6 months. Lubricate with a drizzle of Slick-50, E900, white lithium grease or any suitable ball screw lubricant over the entire exposed length.

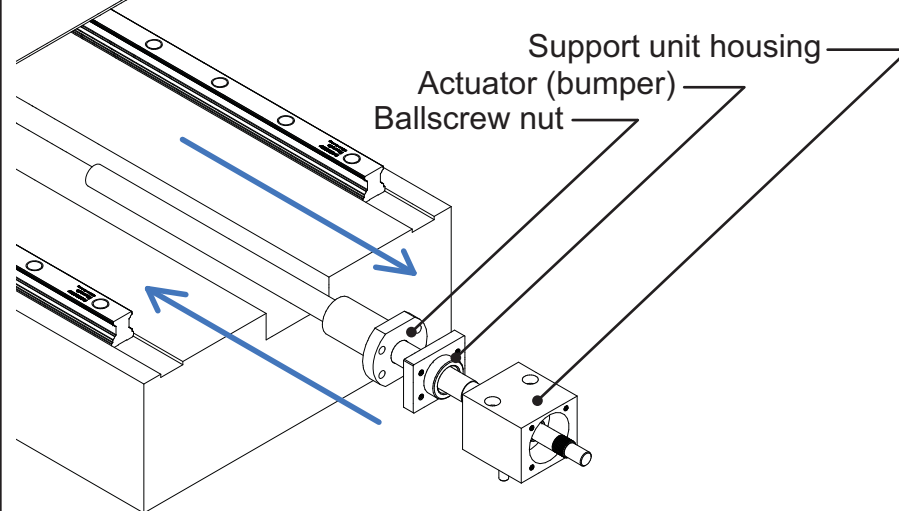
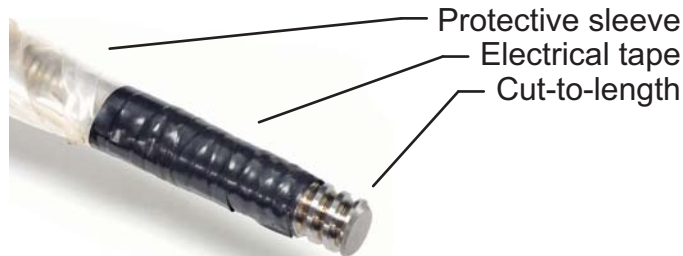
Before installing new ballscrew, measure your old ballscrew and compare it to the new one; may be necessary to cut the new ballscrew on an abrasive cut-off wheel to match the length of the old one.

To prevent contamination while cutting, poke the end out of the bag and tie off the bag. Wash cut end with solvent before removing ballscrew from bag.

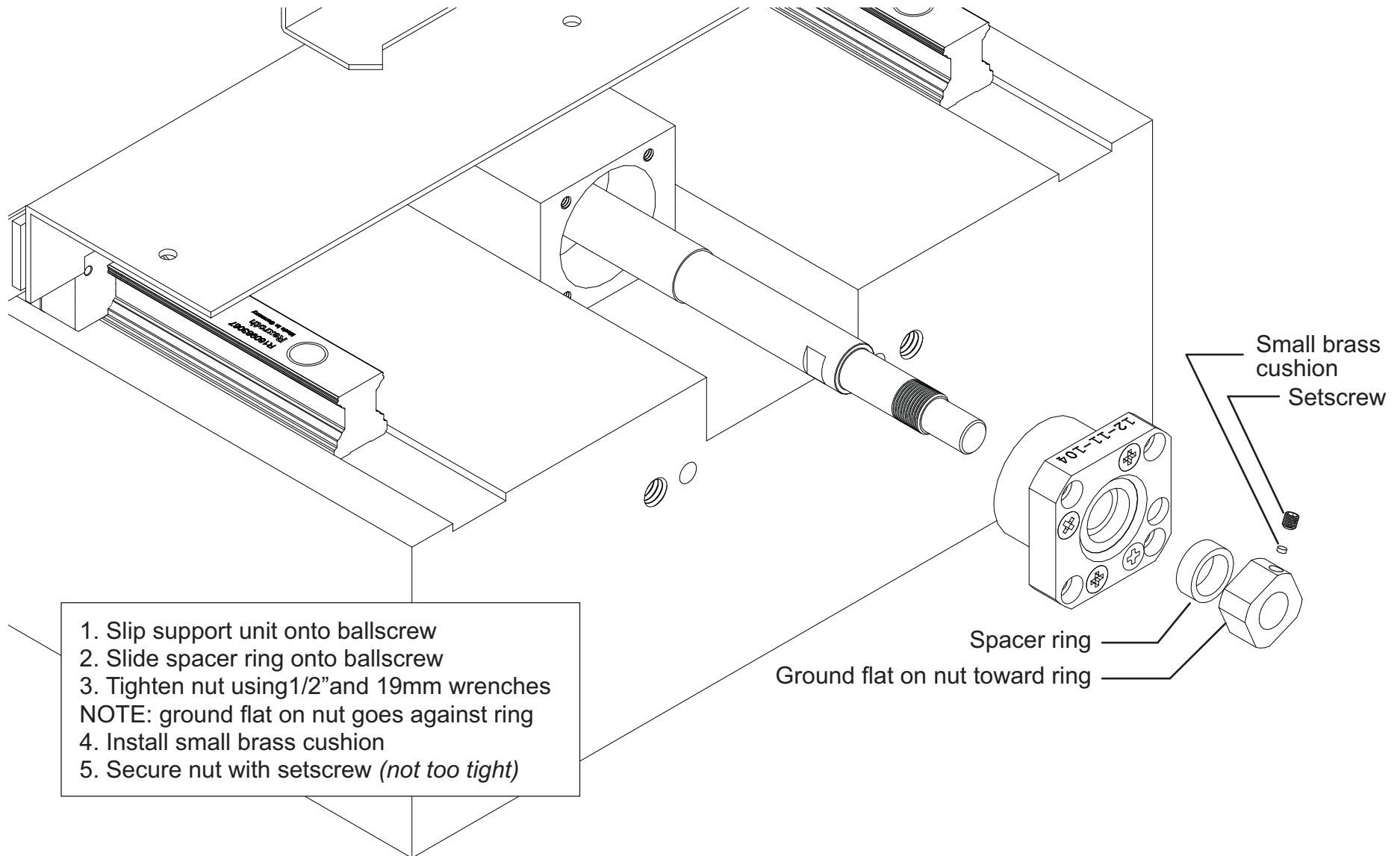


Install new ballscrew: guide the ballscrew nut into the yoke, engage the four mounting screws but do not tighten yet. Reinstall the support unit housing, (torque two 1/4-20 SHCS to 80 in/lb), then install support unit as shown on next two pages. After installing the support unit, pull slide up against support unit housing and tighten the four mounting screws to 50 in/lbs with a 5/32 hex wrench.

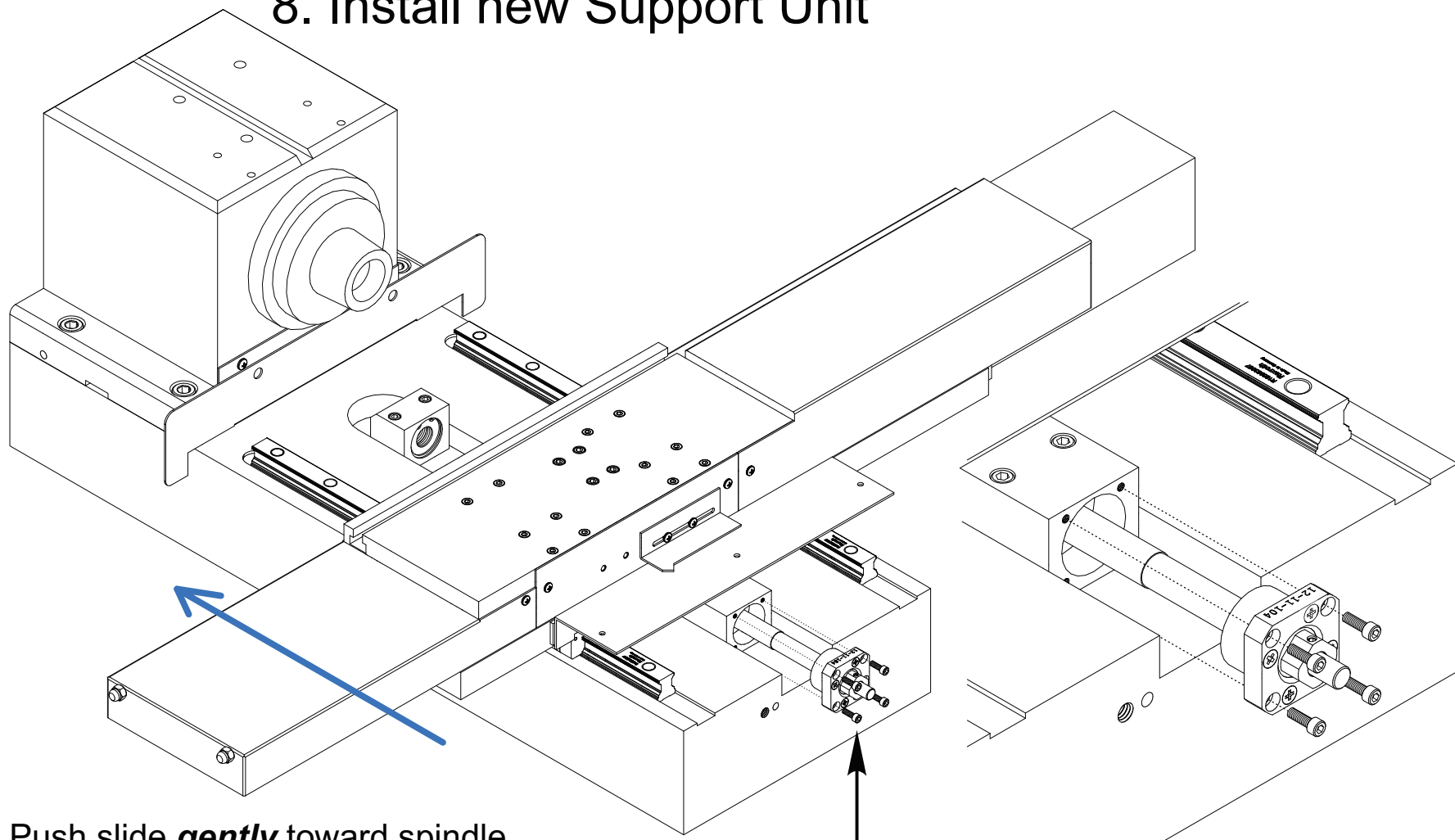
IMPORTANT!: The ballscrew must be cut to length. Measure your old ballscrew and cut the new one to same length.
Use an abrasive cut-off saw because the ballscrew is hardened. Keep the ballscrew in the protective sleeve, with part to cut off extending. Wrap the sleeve and ballscrew with tape to keep abrasive dust off screw.



7 Attach new support unit to ballscrew



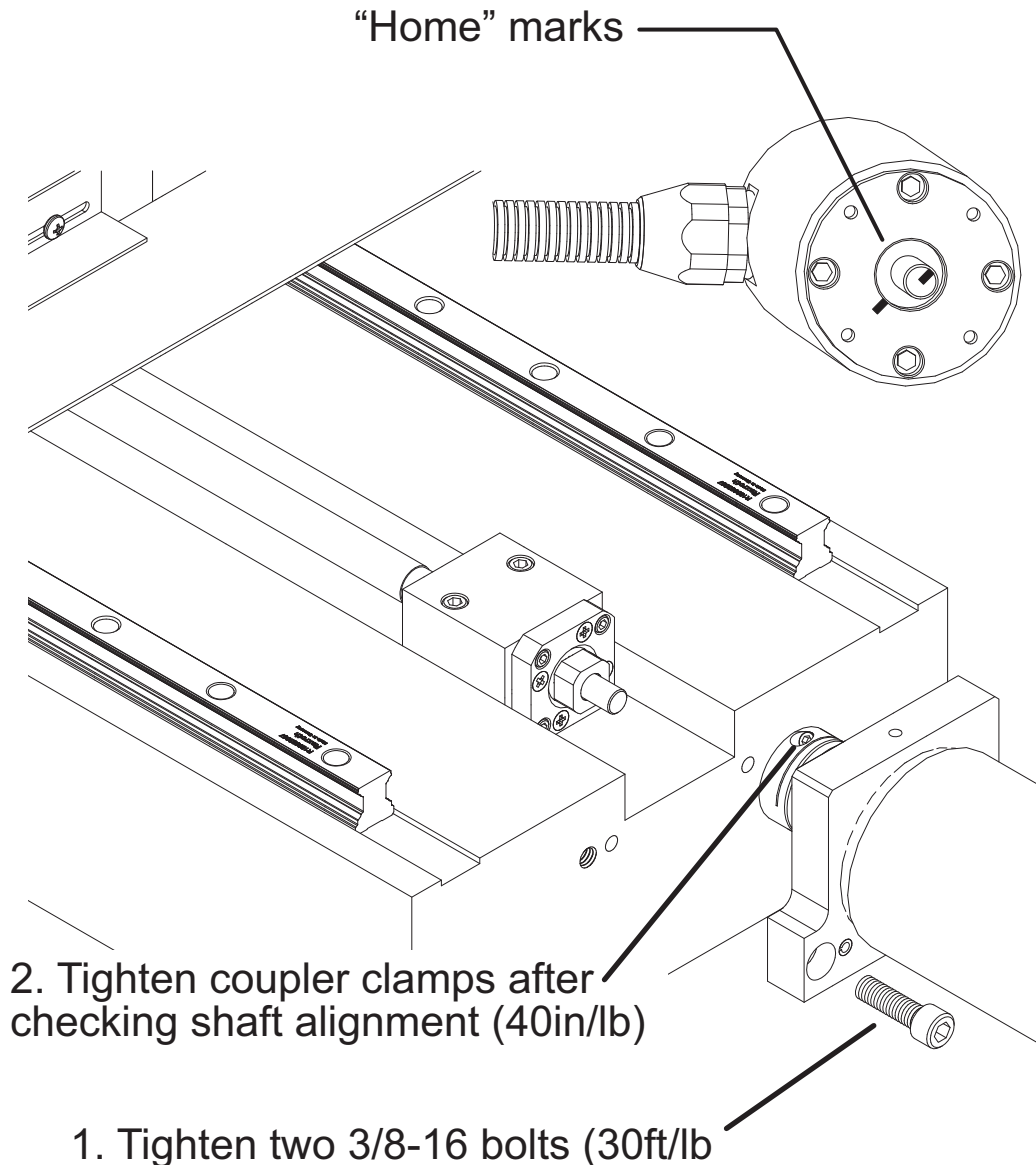
8. Install new Support Unit



1. Push slide **gently** toward spindle to seat support unit in block.

2. Tighten four mounting screws (20lb/in).

9. Replace Servo Motor



Notice the mark on the end of the motor shaft and another on the face of the motor. These marks are aligned when the motor is at "home". Turn the motor shaft so that the marks are 180° apart; that is 1/2 turn. This provides about 0.100" clearance past home.

Install the motor with the table all the way down, against the soft stop.

Attach the motor mount to the base, slipping the shaft into the coupler. Don't let the shaft turn much. The motor mount has roll pins to insure proper alignment of motor shaft and ball screw.

Tighten the motor mount to the machine before tightening the clamp on the coupler. Verify shaft alignment by loosening motor-side coupler clamp and sliding the coupler back and forth. Tighten both coupler clamps to 40 in/lb. Tighten motor mount screws to 30 ft/lb.

Replace all sheetmetal.

After re-assembly, jog the axis toward home, and verify that the scale pointer will go just slightly past "0"; jog back to about 0.100, then establish Home as usual. If the pointer is not at "0", loosen it and move it as required.

Re-set all tools before running.