



Spectra TFinity Library

Coupler Replacement



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Part Number

90940120 Revision C

Revision History

Revision	Date	Description
A	January 2013	Initial release
B	March 2013	Added steps for applying Loctite to the HAX motor pulley.
C	April 2015	Updated for replacement alignment gear added to kit. Updated trademarks.

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COUPLER REPLACEMENT

These instructions describe replacing couplers in a TeraPorter in the Spectra TFinity library. The library contains two TeraPorters. TeraPorter 1, is on the left when viewed from the front of the library, and TeraPorter 2, is on the right. The two TeraPorters are referred to as Robot 1 and Robot 2, respectively, in the BlueScale user interface.

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BEFORE YOU BEGIN...

Before beginning this replacement procedure, make sure that you address the requirements in the following sections.



Important

Having two people available to perform this procedure is strongly recommended. Keeping the VAX column upright and balanced while performing parts of the procedure is very challenging for one person.

Estimated Time to Complete


Replacing the couplers in a TeraPorter VAX column requires approximately 2 hours.

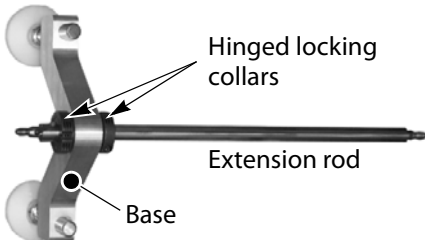

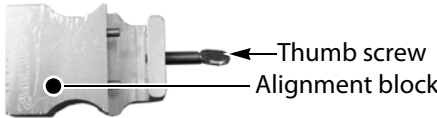

Power Down Recommendation

The library does not need to be powered down for coupler replacement, but it is recommended.

Gather Tools and Supplies

You must have the following to complete this procedure:

Item	Description
Replacement Couplers (3)	 <p>PN: 9374 - the top and bottom coupler. PN: 90945381 - the middle coupler with:</p> <ul style="list-style-type: none"> PN: 90946085 - alignment gear PN: 4384 - screw, 4-40X5/16, PHILPAN, PATCH
Tools From Original Library Tool Kit	<ul style="list-style-type: none"> A #1 Phillips screwdriver A #2 Phillips screwdriver The following Allen wrenches or T-handle hex wrenches: <ul style="list-style-type: none"> 1/8-inch 3/32-inch 5/32-inch 5/64-inch 7/64-inch
Referenced Documents	<ul style="list-style-type: none"> <i>Spectra TFinity Library Transporter Replacement</i> <p>Note: You must be logged in to your Spectra Logic Technical Support portal account to access this document.</p>

Item	Description
Additional Tools Shipped with Library	<ul style="list-style-type: none"> ▪ The VAX column support stand. This view shows the stand assembled.   <p>Hinged locking collar</p> <ul style="list-style-type: none"> ▪ VAX column alignment blocks (two required)  <p>Thumb screw Alignment block</p>
Additional Tools and Supplies	<ul style="list-style-type: none"> ▪ Needle nose pliers or small flathead screwdriver ▪ 3/8-inch (.375) external retaining ring installation tool ▪ ESD protection gear ▪ A medium binder clip ▪ Loctite® Threadlocker Blue 242 ▪ A sturdy work surface that is: <ul style="list-style-type: none"> ▪ approximately 4 feet x 2 feet (120 cm x 60 cm) ▪ able to support approximately 60 pounds (27 kg) ▪ A second person to help move the VAX column
Optional Items	<ul style="list-style-type: none"> ▪ A step-stool (to reach the top of the VAX column) ▪ Rack and pinion latching tool (usually shipped with the library) 

Prepare a Work Surface

A sturdy work surface, approximately 4 feet x 2 feet (120 cm x 60 cm), is required to support the VAX column when it is out of the library.

- Notes:**
- This is the minimum length required to adequately support the VAX column and prevent it from flexing.
 - The maximum length of the table cannot exceed 5 feet 4 inches (163 cm).

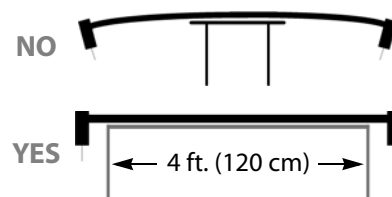
Ensure that you have prepared the work surface before removing the VAX column from the library. The work surface must be long enough, wide enough, and sturdy enough to properly support the assembly.



Caution

Do not let the VAX column bend by allowing it to hang over a short work surface during this procedure.

The work surface must be approximately 4 feet long x 2 feet wide (120 cm x 60 cm) to adequately support the VAX column.



Ensure ESD Protection

The repair environment for the library must be free of conditions that could cause electrostatic discharge (ESD). To protect the library from ESD, follow these procedures when repairing or testing the library:

- Place a static protection mat on the work surface used while removing and installing library components. Use a 1-megohm resistor to ground the static protection mat.
- Wear a static protection wrist band whenever you handle library components that have been removed from their antistatic bags. Connect this wrist band to the static protection mat or to other suitable ESD grounding.
- Keep all electronic components in antistatic bags when not in use.

PREPARE TO REMOVE THE VAX COLUMN

Before the couplers can be replaced, the VAX column must be removed from the library.

Move the TeraPorter Into the Service Bay

Use the following steps to move the TeraPorter to a service bay.

1. If you have not already done so, log into the library as a superuser or administrator.
2. From the toolbar menu, select **General** → **General Status** to display the library's General Status screen.
3. Click **Robotics** to display the Robotics Status screen.

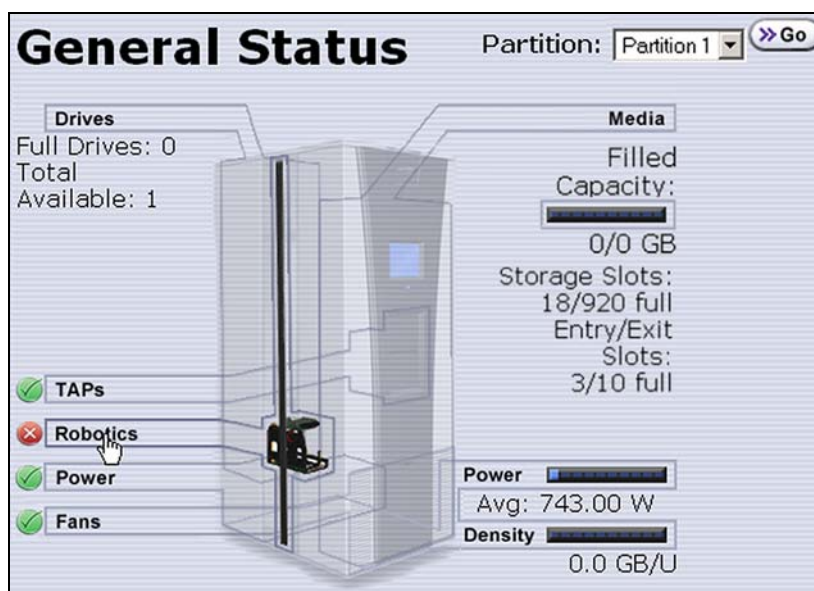


Figure 1 The General Status screen indicating a TeraPorter problem.

4. On the Robotics Status screen, click **Begin Service** next to the robot you need to move into its service bay in preparation for the service operation. A status message displays when the TeraPorter move to the service bay completes.



Figure 2 The Robotics Status screen.

5. Look through the window on the end of the service frame to confirm that the TeraPorter is in the service bay.

Note: If the TeraPorter is not in the service bay, contact Spectra Logic Technical Support for assistance (see [Contacting Spectra Logic on page 2](#)).

6. Click **OK** on the confirmation screen. The library disengages the solenoid lock on the service bay safety door so that it can be closed. Directions to close and lock the service bay safety door display.

**Important**

Close the service bay safety door, as described in [Close the Service Bay Safety Door](#), prior to clicking **OK**.

Close the Service Bay Safety Door

The manually operated service bay safety door slides closed to isolate a TeraPorter in the service bay, making it possible to continue library operations while you service the TeraPorter.

**WARNING**

Risk of electrical shock. Do not remove the service frame access panel until you have closed the service frame safety door.

**Important**

There are three doors on the back of the service frame. Only open the full-length door. Do not open the service access door, shown in [Figure 3](#), until after the service bay safety door is closed. A safety interlock on this door immediately turns off the 24 VAC power to the TeraPorters, which will prevent the other TeraPorter from performing backup operations

Use the following steps to physically close and lock the service bay safety door.

1. Lift and rotate the latch on the full-length access door on the service frame where the TeraPorter is parked, then pull the door open.

Note: You may need to unlock the latch before you can open it.

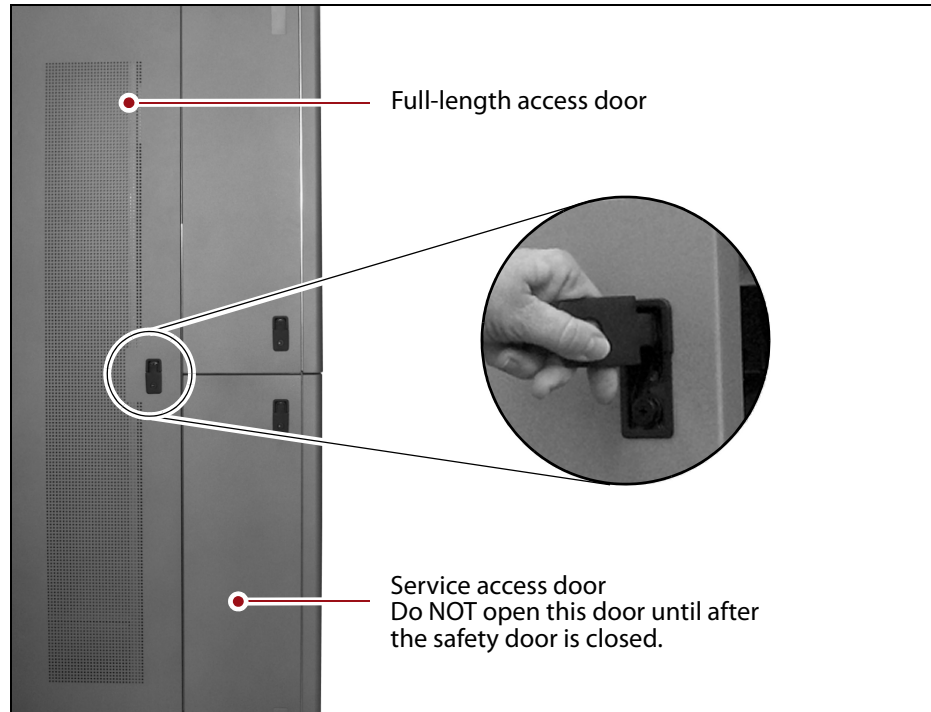


Figure 3 Open the full-length service frame access door (service frame for TeraPorter 1 shown).

2. Locate the handle on the service bay safety door. Loosen the knurled screw at the top of the handle and rotate the handle downward to a horizontal position.

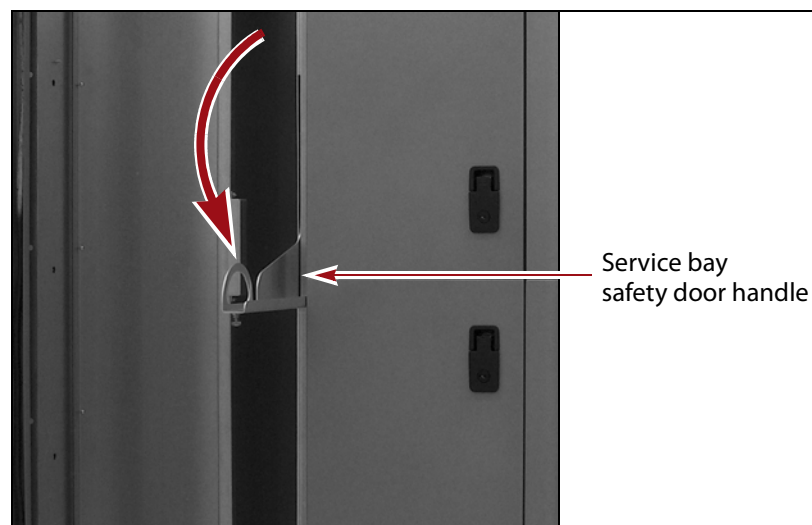


Figure 4 Rotate the handle on the service bay safety door down to horizontal.

3. Using the handle, slide the service bay safety door into the interior of the library as far as it will go.

Note: Closing the service bay safety door removes power to the TeraPorter while it is in the service bay.

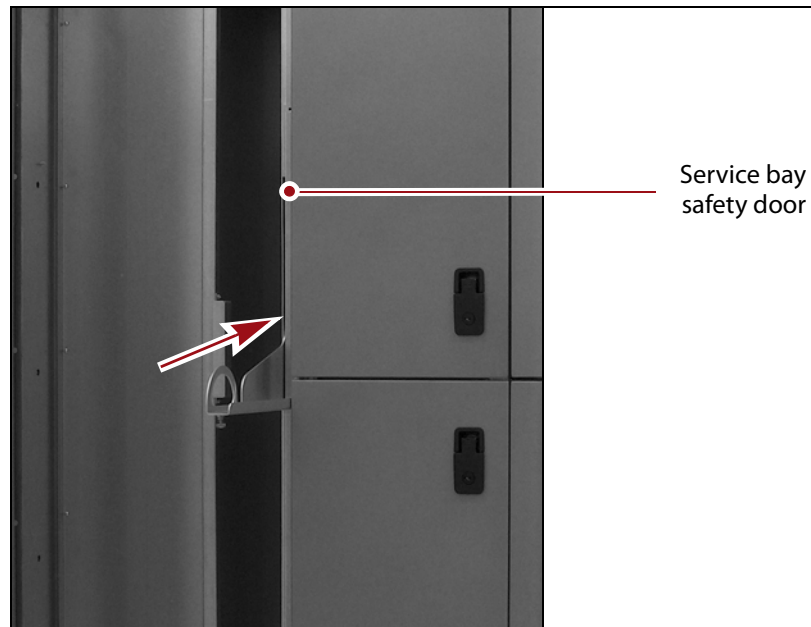


Figure 5 Slide the service bay safety door inward to its closed position.

4. Raise the handle to the vertical position and tighten the knurled screw to secure the handle in its upright position.
5. Return to the front of the library and click **OK** in response to the “Door closed” confirmation message.

Remove the Service Frame Access Panel



WARNING

Risk of electrical shock, and hazardous moving parts. Unless a procedure specifies otherwise, turn off power to the library and disconnect power cords before removing library panels or accessing the inside of the library.

1. Use the following steps to remove the access panel on the service frame where the TeraPorter is parked, providing access to the interior of the service frame.
 - a. Use a 1/8-inch Allen wrench or hex screwdriver, or a #2 Phillips screwdriver, to remove the screw at the bottom of the window panel (Figure 6).
 - b. While holding the panel steady, slide it up to disengage the panel from the hangers on each side of the chassis (three per side) (Figure 7).
 - c. Lift the panel off of the hangers, out and away from the frame (Figure 8).
2. Set the panel aside.

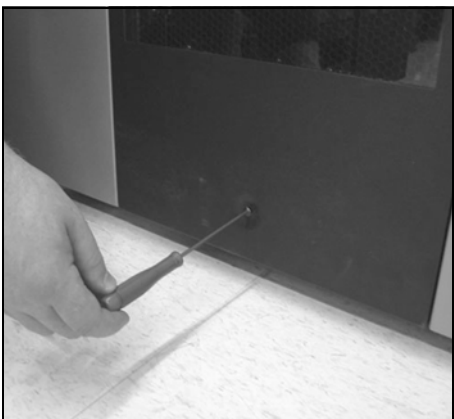


Figure 6 Remove the screw at the bottom of the window panel.



Figure 7 Slide the panel up to disengage the hangers.



Figure 8 Lift the panel out and away from the frame.

REMOVE THE TRANSPORTER

The transporter is mounted on the front of the TeraPorter VAX column. It must be removed before removing the VAX column. See “Remove the Transporter” in the *Spectra TFinity Library Transporter Replacement* guide for instructions.

**Important**

If you installed a binder clip on the VAX belt while removing the transporter, remove it now.

REMOVE THE VAX COLUMN

The procedure for removing the VAX column is the same for both TeraPorters.

Install the VAX Column Stand

Note: The VAX column stand consists of the following components:

- A base with adjustable-height feet
 - A threaded extension rod
 - movable locking collars
1. Assemble the VAX column stand.
 - a. Slide the base onto the extension rod so that there is approximately 4-inches between the base and one end of the rod.
 - b. Using a 5/32-inch Allen wrench, loosen the captive screws in two hinged locking collars and then open the collars.
 - c. Place a hinged locking collar on each side of the base to keep it from sliding off the rod.

- d. Using a 5/32-inch Allen wrench, tighten the captive screws in the locking collars to secure them.

Once the base is installed, the threaded extension rod is now split into short and long sections, which are referenced in the following instructions.

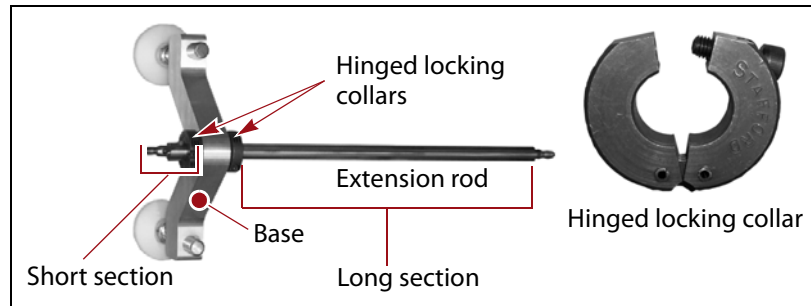


Figure 9 The assembled VAX column stand.

2. Position the assembled VAX column stand so that the short end of the extension rod is toward the inside of the library. Using the adjustment screws on each leg of the base, adjust the height of the base so that the threaded end of the extension rod is even with the threaded opening in the end of the Thomson rod. Final adjustments to the height are made in [Step 5 on page 14](#).



Important

The extension rod must be exactly aligned with the Thomson rod mounted on the floor of the library or you are not able to move the VAX column onto the stand.

Note: Do not screw the extension rod into the Thomson rod at this time.

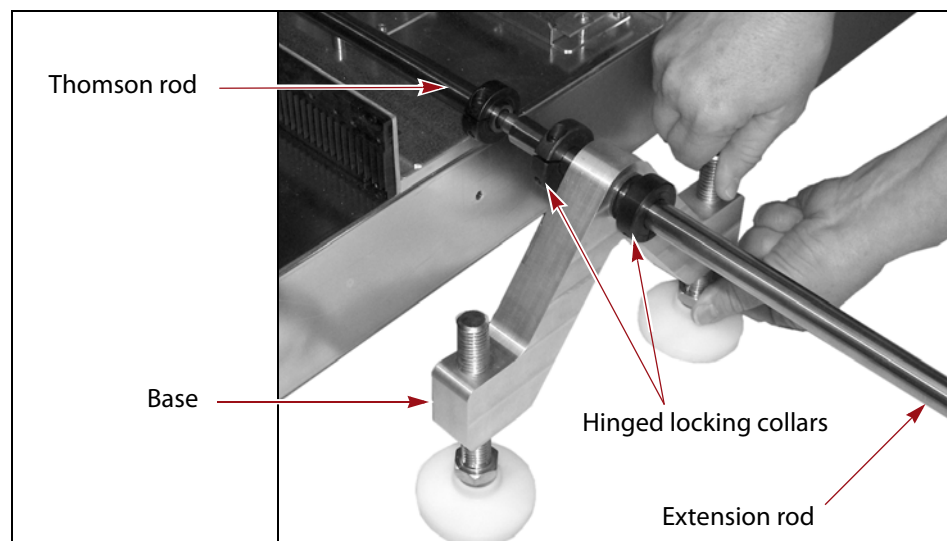


Figure 10 Adjust the height of the base to align the extension rod with the library's Thomson rod.

3. Using the 5/32-inch Allen wrench, loosen the screw securing the locking collar to the end of the Thomson rod and slide the collar off the rod. Set the collar aside to be reinstalled later.

Note: The locking collar on the end of the Thomson rod is not hinged. Loosen the screw just enough so that you can slide the collar off the end of the Thomson rod.

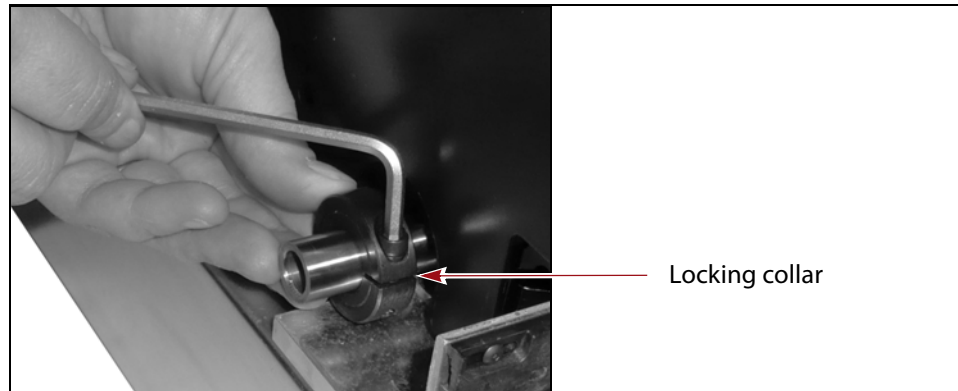


Figure 11 Remove the locking collar from the Thomson rod.

4. Reposition the VAX column stand so that the threading on the long end of the extension rod aligns with the threaded opening in the end of the Thomson rod.
5. Insert a T-handle hex wrench or a screwdriver through the hole in the free end of the extension rod and use it to tighten the rod until it fits flush against the Thomson rod. A very slight gap, up to the thickness of a business card, is acceptable. If necessary, make fine adjustments to the height of the base so that the threads mesh without binding.



Caution

Make sure that the extension rod on the VAX column support stand is exactly aligned with the Thomson rod or you run the risk of bending the Thomson rod.

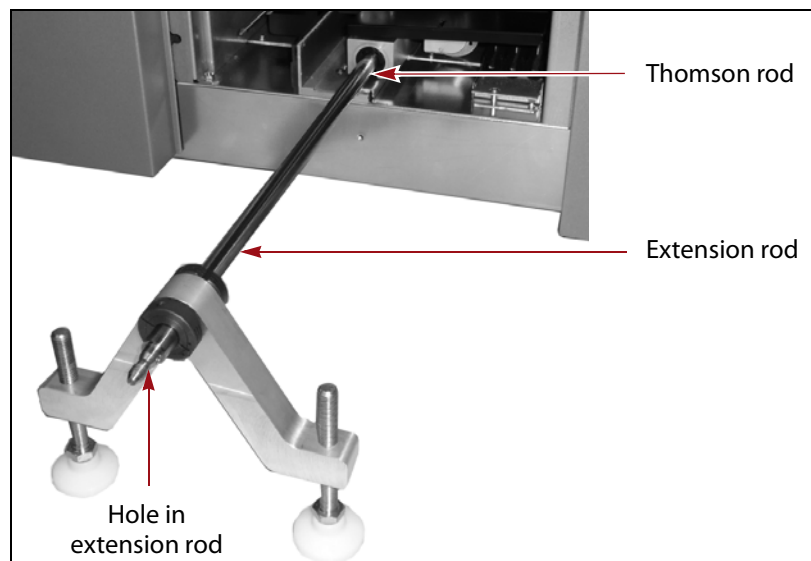


Figure 12 Attach the extension rod to the library's Thomson rod.

Remove the VAX Column

**WARNING**

Some library components are heavy and could be awkward to handle. Use caution and proper equipment or two people to move these.

**WARNING**

Use caution when handling the VAX column. When the VAX column is removed from the library, protruding metal rods on the top and bottom are exposed.

1. Lift the three power rail brush contacts, attached to the base plate on the bottom of the VAX column, up and out of the power rails, and then slide the VAX column out of the service bay and onto the VAX column stand extension rod.

**Caution**

Make sure that the brush contacts do not get pinched when you slide the VAX column out of the service bay. Failure to do so can potentially damage the brush contacts or the rails.

**Important**

If you are performing this procedure without assistance, you can rotate the VAX column so that the top is resting on the floor while you install the locking collar and disconnect the VAX column support from the library.

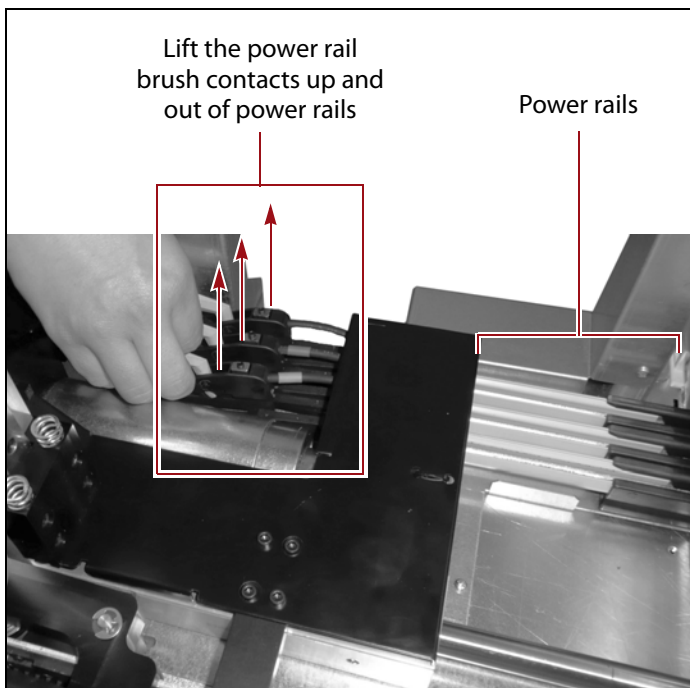


Figure 13 Lift the power rail brush contacts up and away from the power rail.

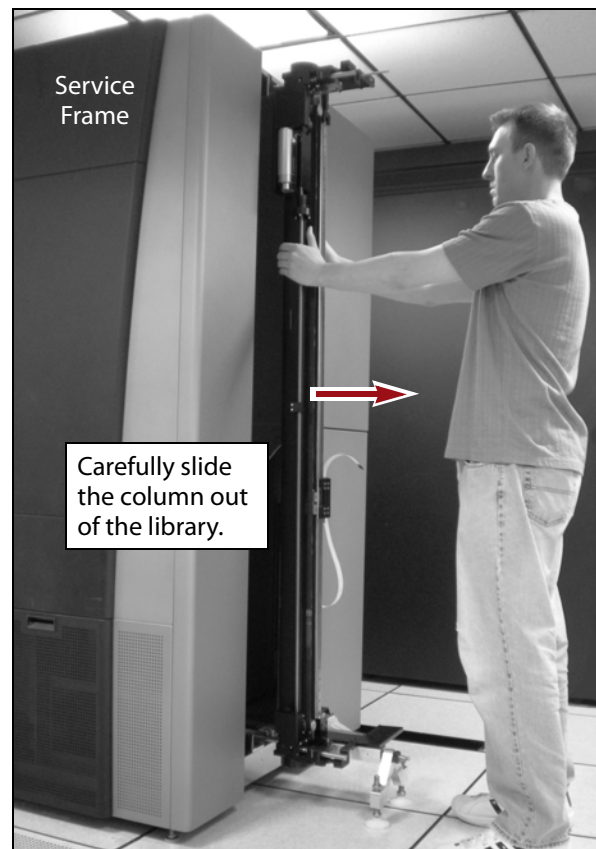


Figure 14 Slide the VAX column out of the library, onto the extension rod.

2. Use a 5/32-inch Allen wrench to loosen the captive screw in a hinged locking collar and open the collar.
3. With another person supporting the VAX column in a vertical position, place the locking collar over the extension rod attached to the Thomson rod.

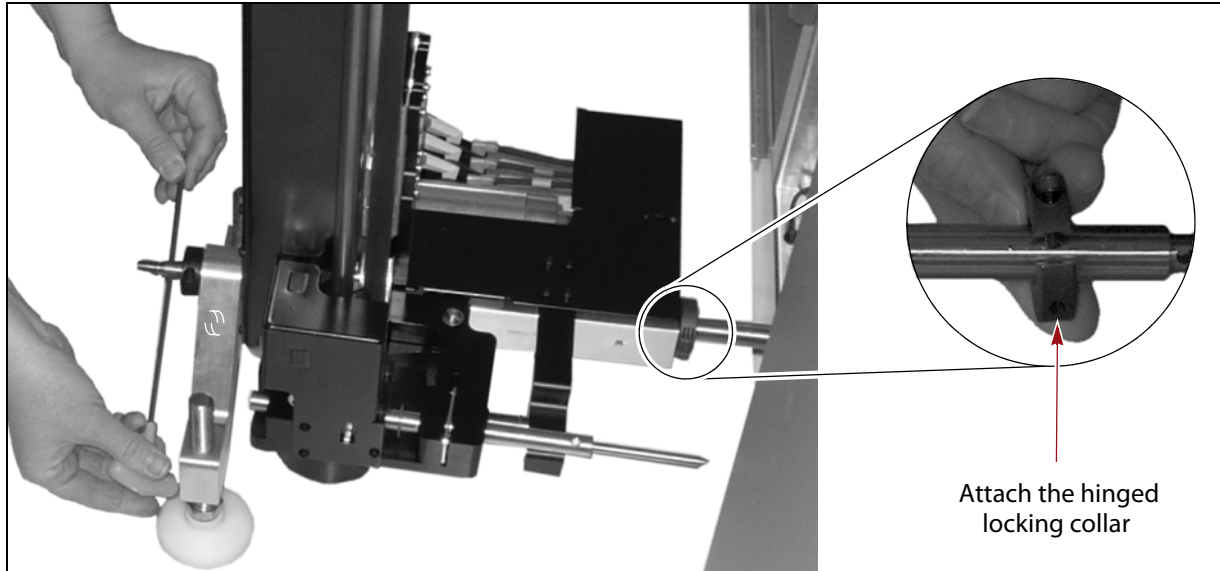


Figure 15 Install the hinged locking collar and disconnect the VAX column stand extension rod from the Thomson rod.

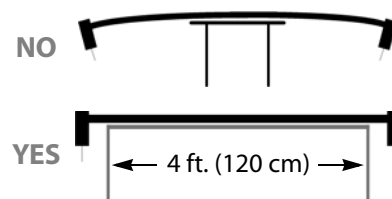
4. Use the 5/32-inch Allen wrench to tighten the screw securing the locking collar to the extension rod.
5. While continuing to support the VAX column in a vertical position, insert the T-handle hex wrench or a screwdriver through the hole in the free end of the extension rod and unscrew the extension rod from the Thomson rod.
6. Carefully lift the VAX column away from the library and place it horizontally on a sturdy, flat working surface with the flat side of the VAX column down.



Caution

Do not let the VAX column bend by allowing it to hang over a short work surface during this procedure.

The work surface must be approximately 4 feet long x 2 feet wide (120 cm x 60 cm) to adequately support the VAX column.



7. Slide the transporter mounting bracket down to the bottom of the VAX column.

REPLACE THE COUPLERS

After removing the VAX column from the library, use the following instructions to replace the couplers.

Component locations

Use [Figure 16](#) to help locate the components you will interact with during this procedure.

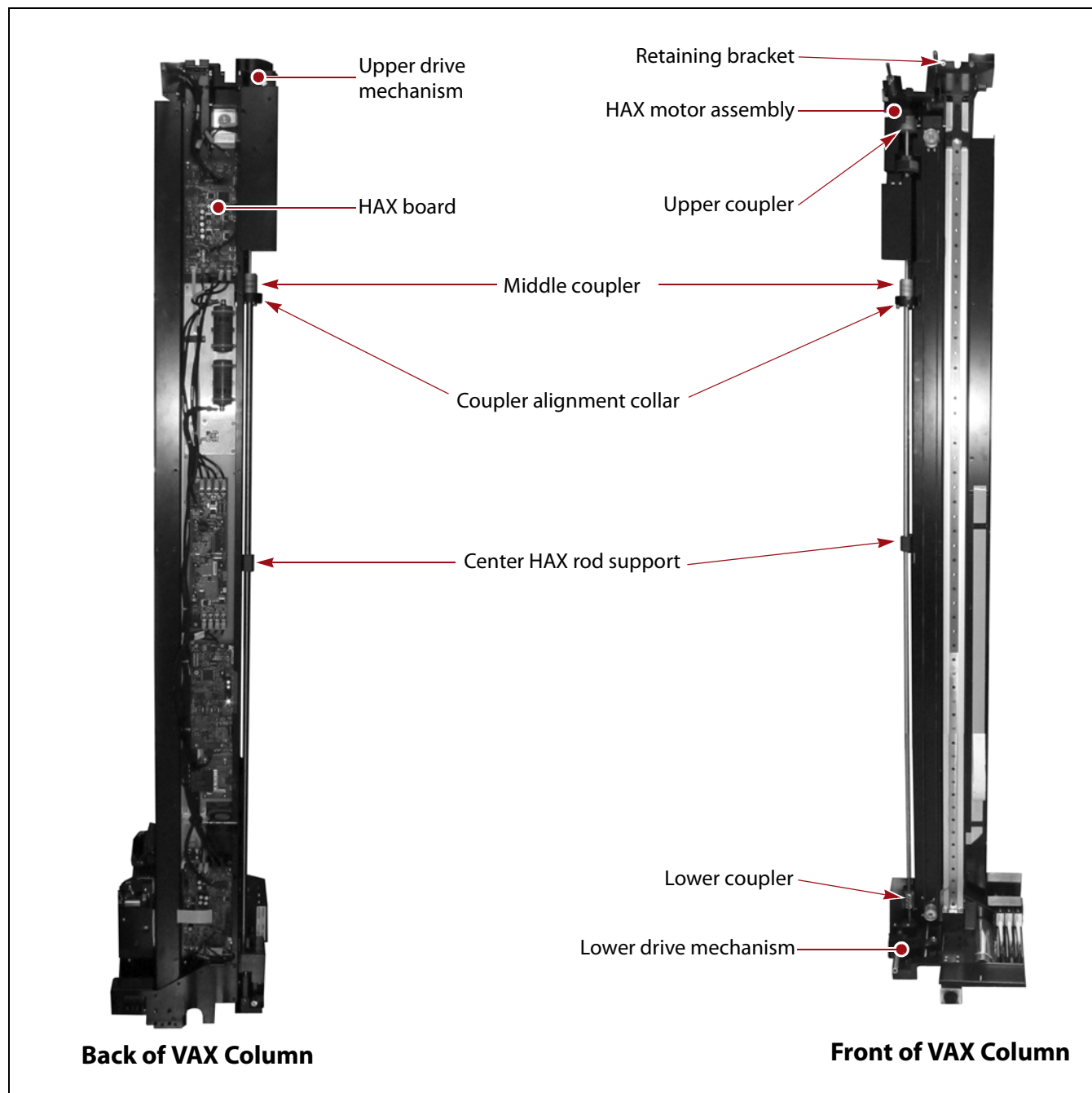


Figure 16 Components used in coupler replacement

Identifying the Couplers

There are three replacement couplers. Two couplers, used to replace the upper and lower coupler, are identical and can be used in either position. The replacement middle coupler is unique with an alignment gear attached.

Note: The plastic gear does not attach securely to the coupler.

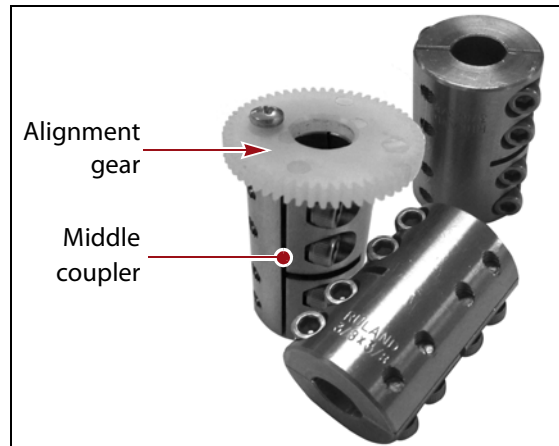


Figure 17 The replacement couplers.

Prepare the VAX Column

1. Orient the VAX Column so the back of the column is facing upward and the VAX column cover is visible.
2. Using a #2 Phillips screwdriver, remove the 12 screws that secure the cover to the VAX Column. Set the cover aside.

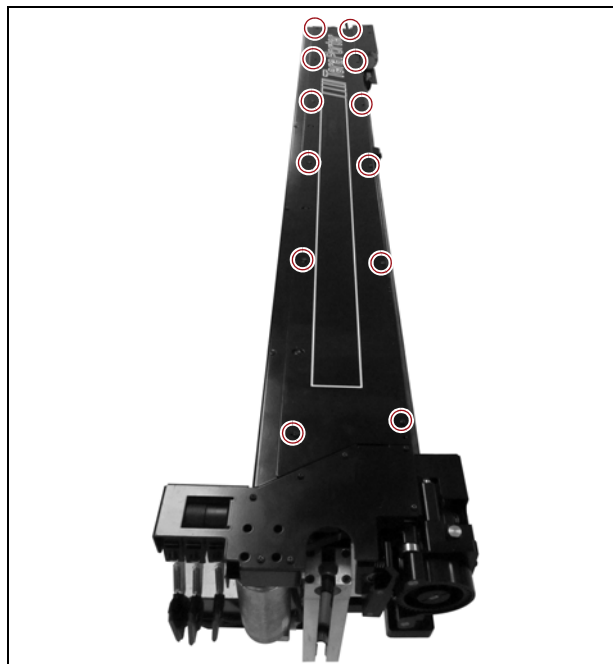


Figure 18 Remove the VAX column cover.

3. Using a #2 Phillips screwdriver, disconnect the motor control cables from the HAX board.
4. Disconnect the motor encoder cable from the CON6 terminal on the HAX board.

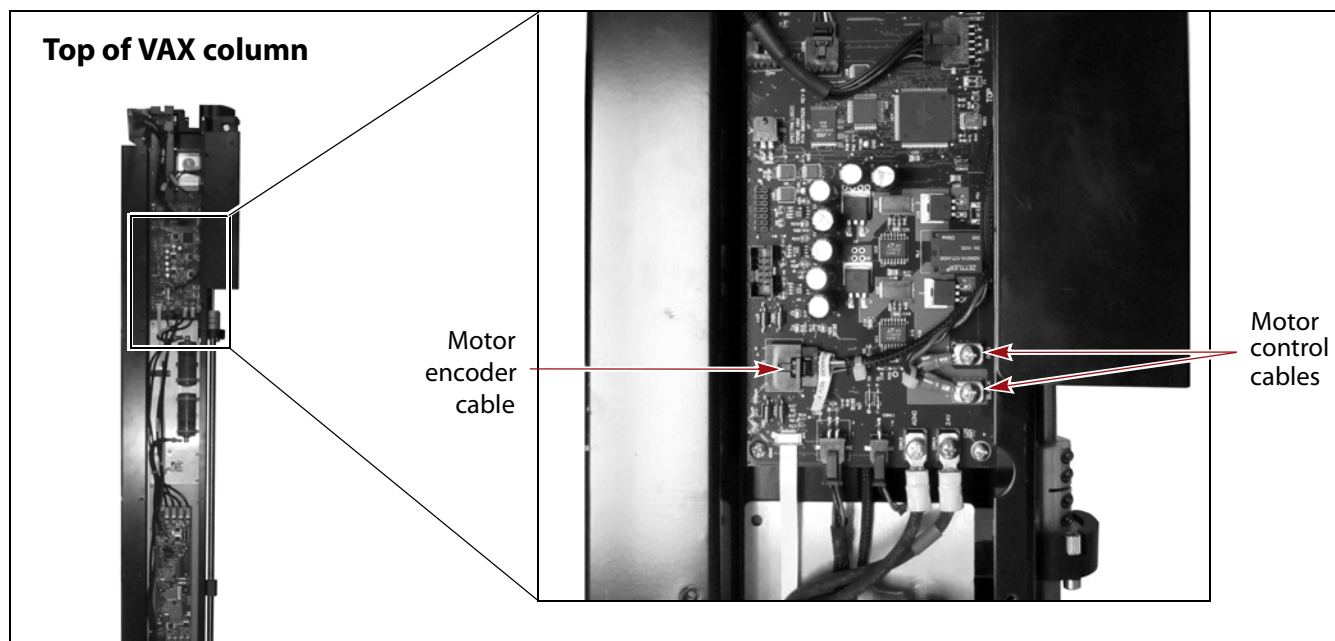


Figure 19 Disconnect the motor control and motor encoder cables.

5. Disconnect the solenoid cable from the CON17 terminal and the sensor cables from both the CON9 and CON10 terminals on the HAX board.

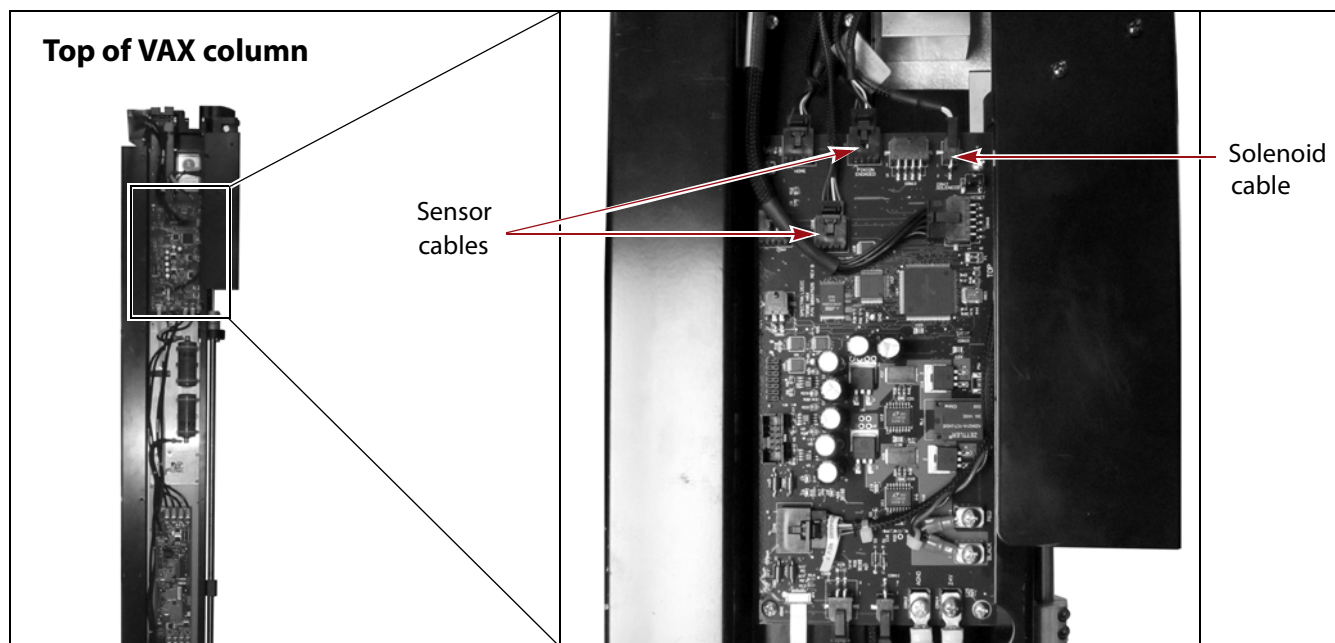


Figure 20 Disconnect the solenoid and sensor cables.

6. (Optional) To help improve access to components on the HAX motor assembly, it may be helpful to remove the HAX motor cover on the back of the VAX column. Use a #2 Phillips screwdriver to remove the three screws that secure the cover to the VAX column

Note: The images in this document show the cover installed.



Figure 21 Optionally, remove the HAX motor cover on the rear of the VAX column.

7. Rotate the VAX column on the work surface so that the VAX motor on the bottom of the VAX column is facing upward.
8. Remove the center section of the HAX rod.
 - a. Using a 7/64-inch hex wrench, loosen the lower coupler and slide it toward the base of the VAX column.
 - b. Using a 7/64-inch hex wrench, loosen the middle coupler. Slide the coupler off of the center section of the rod.
 - c. Using a 7/64-inch hex wrench, remove the two screws that secure the center rod support to the VAX column.



Figure 22 Remove the center rod support.

- d. Remove the center section of the HAX rod. Set the rod section aside.

9. Slide the lower and middle couplers off of the HAX rod sections.

Note: You may need to unlatch the lower drive mechanism to remove the lower coupler. Unlatch the mechanism by pushing in on the tension release rod (see [Figure 56 on page 37](#)).

Replace the Upper Coupler

1. Using a #2 Phillips screwdriver, remove the three screws that secure the HAX motor assembly cover to the VAX column. Set the cover aside.

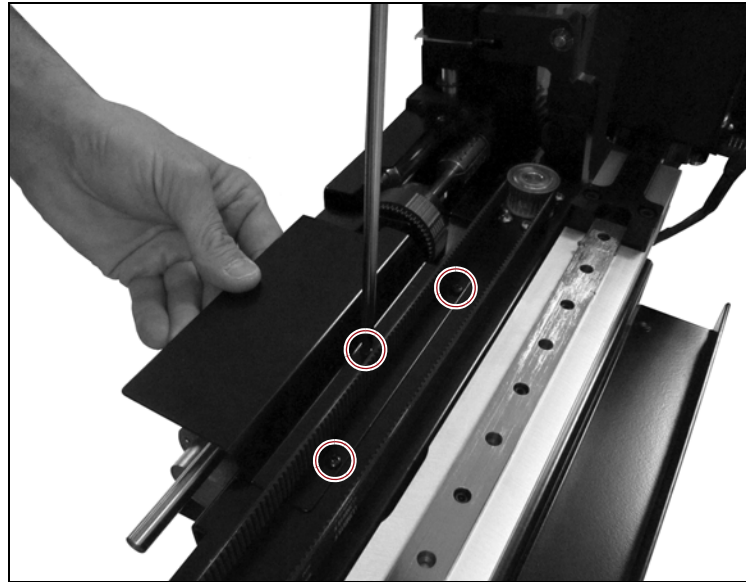


Figure 23 Remove the HAX motor assembly cover.

2. Using needle nose pliers or a small flathead screwdriver, remove the retaining ring.

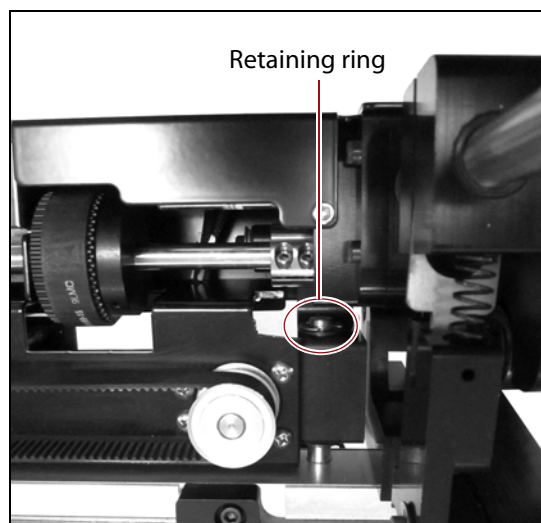


Figure 24 Remove the retaining ring.

3. Using a 1/8-inch hex wrench, loosen the screws on the retaining bracket at the top of the VAX column. With one hand supporting the HAX motor assembly, remove the retaining bracket.

**Caution**

Be careful not to let the HAX motor assembly drop. Cables attached to the assembly may become damaged.

Note: Bushings may fall off the VAX column as you remove the retaining bracket. Set them aside. You will install them later in the procedure.

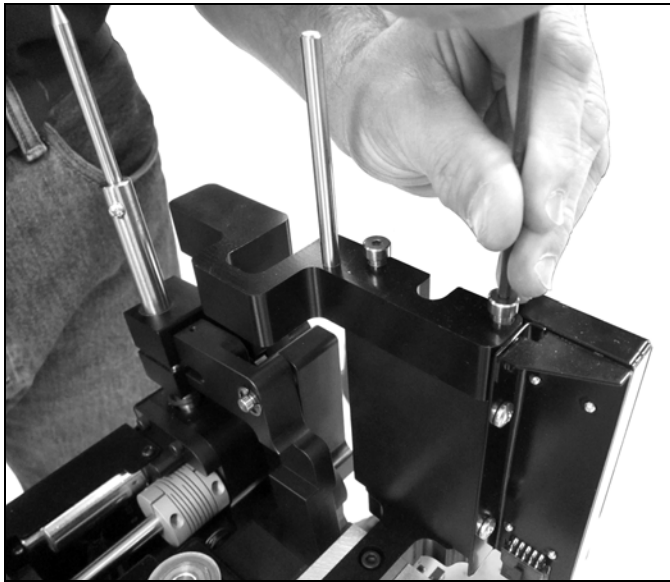


Figure 25 Loosen the screws.

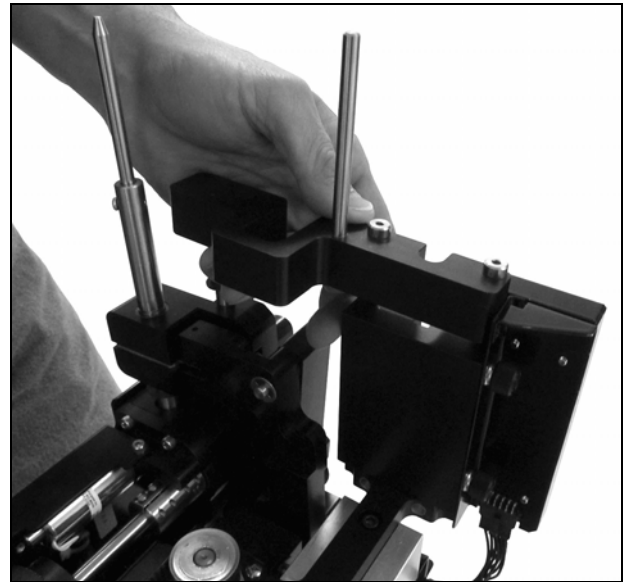


Figure 26 Remove the retaining bracket.

4. While supporting the weight of the HAX motor assembly, slide the assembly off of the guide pin on the VAX column.

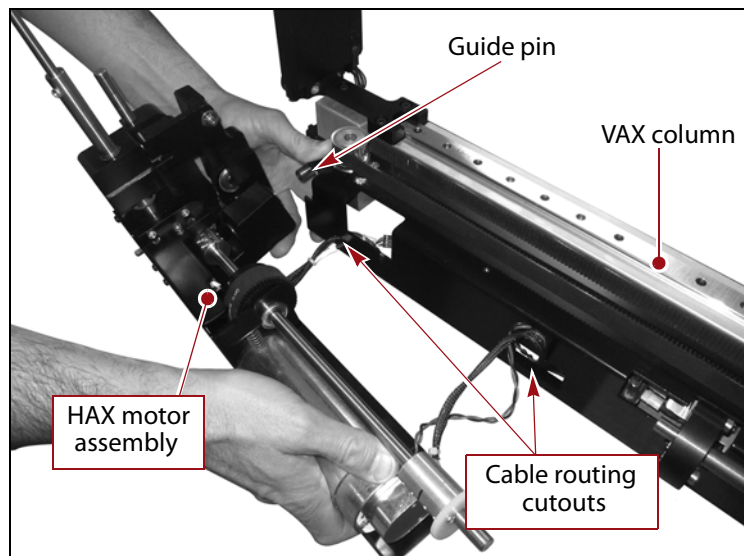


Figure 27 Guide the cables through the cutouts in the VAX column.

5. Guide the attached cables through the cutouts in the VAX column. Set the HAX motor assembly on a flat work surface.
6. Using a #2 Phillips screwdriver, loosen, but do not remove, the three screws that secure the HAX motor to the motor assembly housing. Use the cutout in the plastic to reach the upper screw.

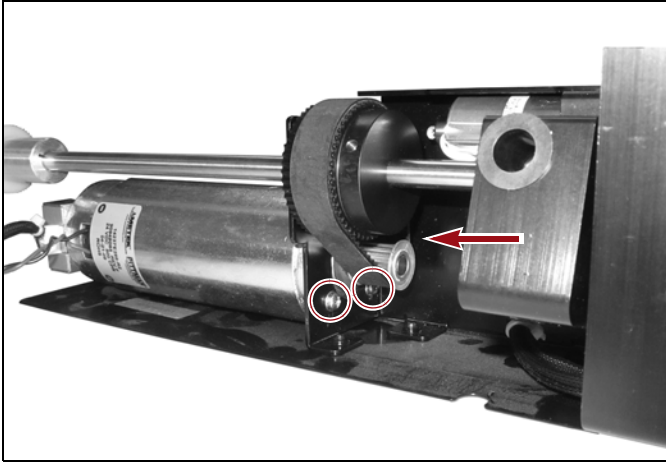


Figure 28 The HAX motor screws. A third screw, behind the motor shaft, is not visible.

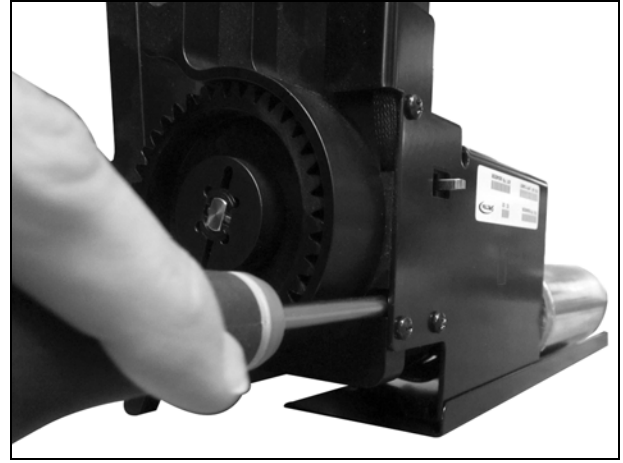


Figure 29 Access the upper screw through the cutout in the motor assembly.

7. Using a 7/64-inch hex wrench, loosen the upper coupler. Slide the coupler towards the HAX motor pulley.
8. While lifting the HAX motor assembly away from the motor housing, push the bearing through the bracket.

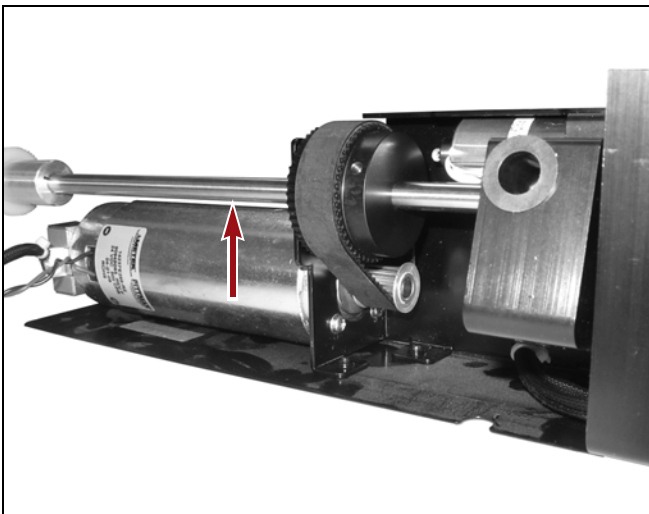


Figure 30 Lift the HAX motor away from the housing.

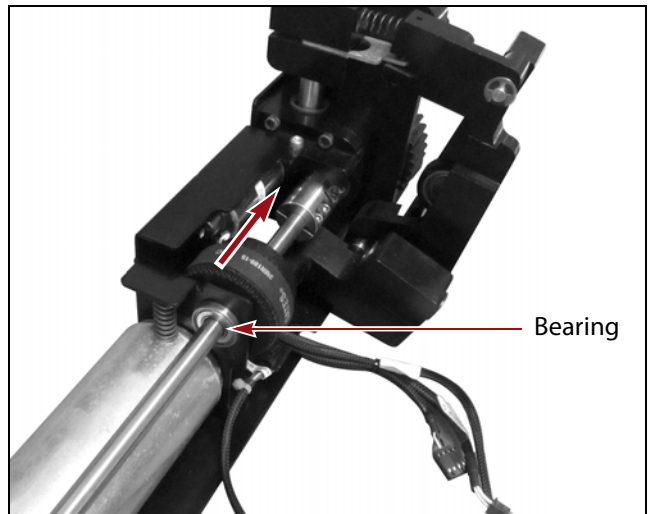


Figure 31 Push the bearing through the bracket.

9. Angle the coupler end of the shaft away from the HAX motor assembly.

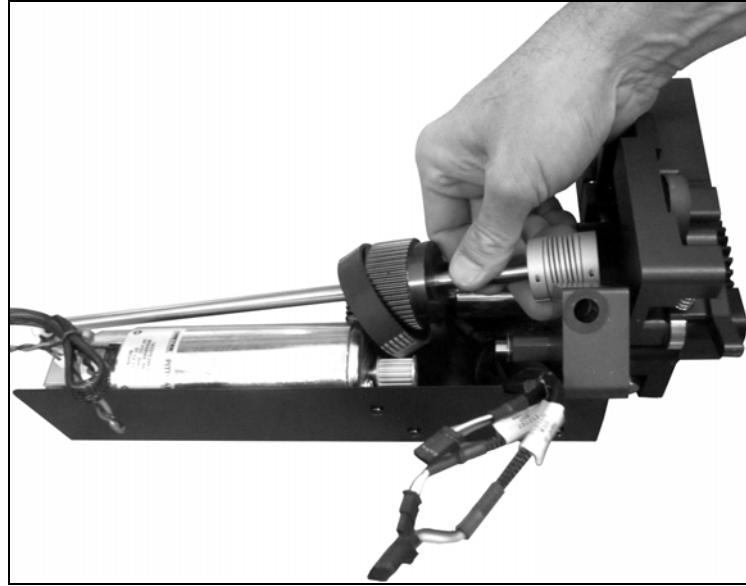


Figure 32 Angle the shaft and remove the coupler.

10. Slide the coupler off of the shaft.
11. Slide the replacement coupler on to the shaft. Orient the coupler so that the coupler screws are toward the HAX motor (see [Figure 34 on page 25](#)).
12. Apply Loctite Threadlocker Blue 242 to the screw securing the HAX motor pulley to the shaft.
 - a. Using a 5/64-inch hex wrench, remove the set screw securing the HAX motor pulley to the shaft (see [Figure 33](#)).
 - b. Apply a small amount of Loctite 242 to the screw.
 - c. Make sure the hole in the shaft is aligned with the hole in the pulley.
 - d. Using a 5/64-inch hex wrench, install and tighten the set screw to secure the HAX motor pulley.
13. If the belt came off the pulley, lift the HAX motor away from the housing and loop the belt around the pulley.

- 14.** While lifting the HAX motor away from the assembly, push the bearing through the bracket.

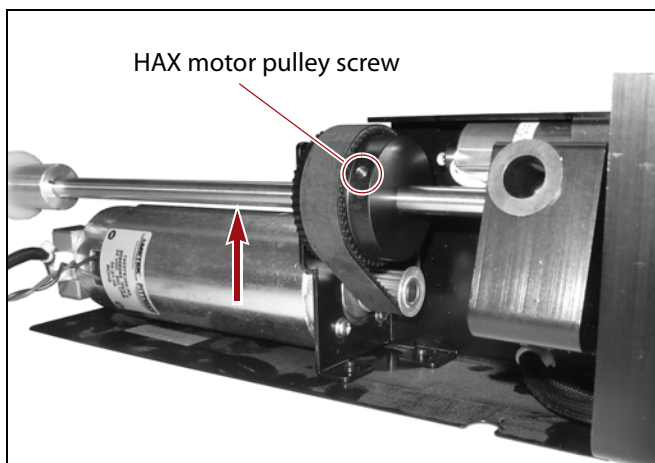


Figure 33 Lift the HAX motor away from the housing.



Figure 34 Push the bearing through the bracket.

- 15.** Make sure the shaft bearing is fully seated in the bracket cutout, and flush against the bracket.

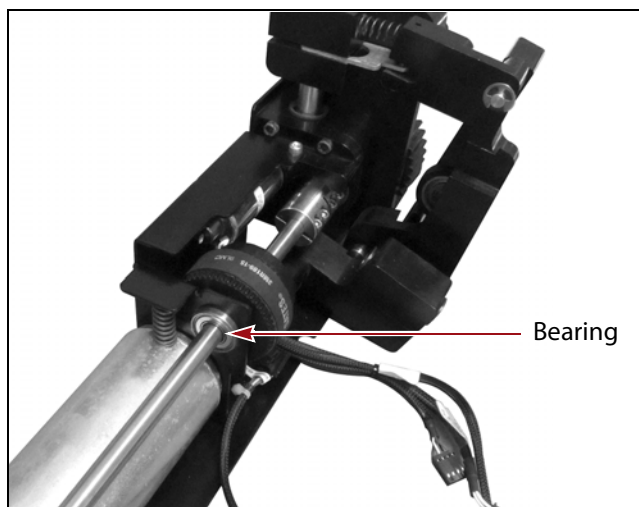


Figure 35 Make sure the shaft bearing is fully seated.

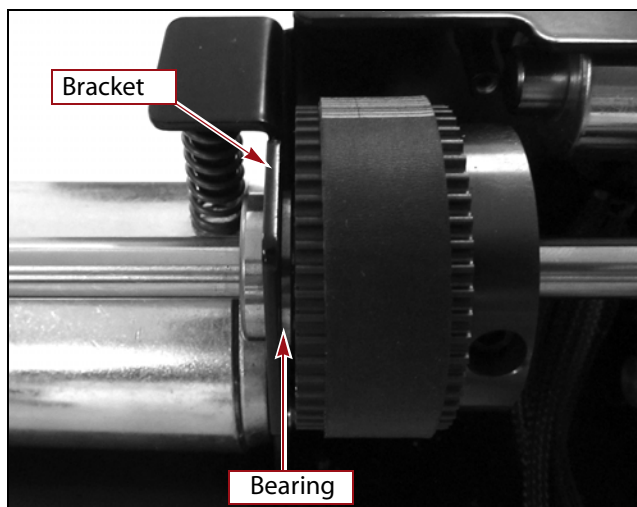


Figure 36 Make sure the bearing is flush against the bracket.

16. Position the coupler so that the cutout gap in the coupler is centered over the gap between the two HAX rod pieces.

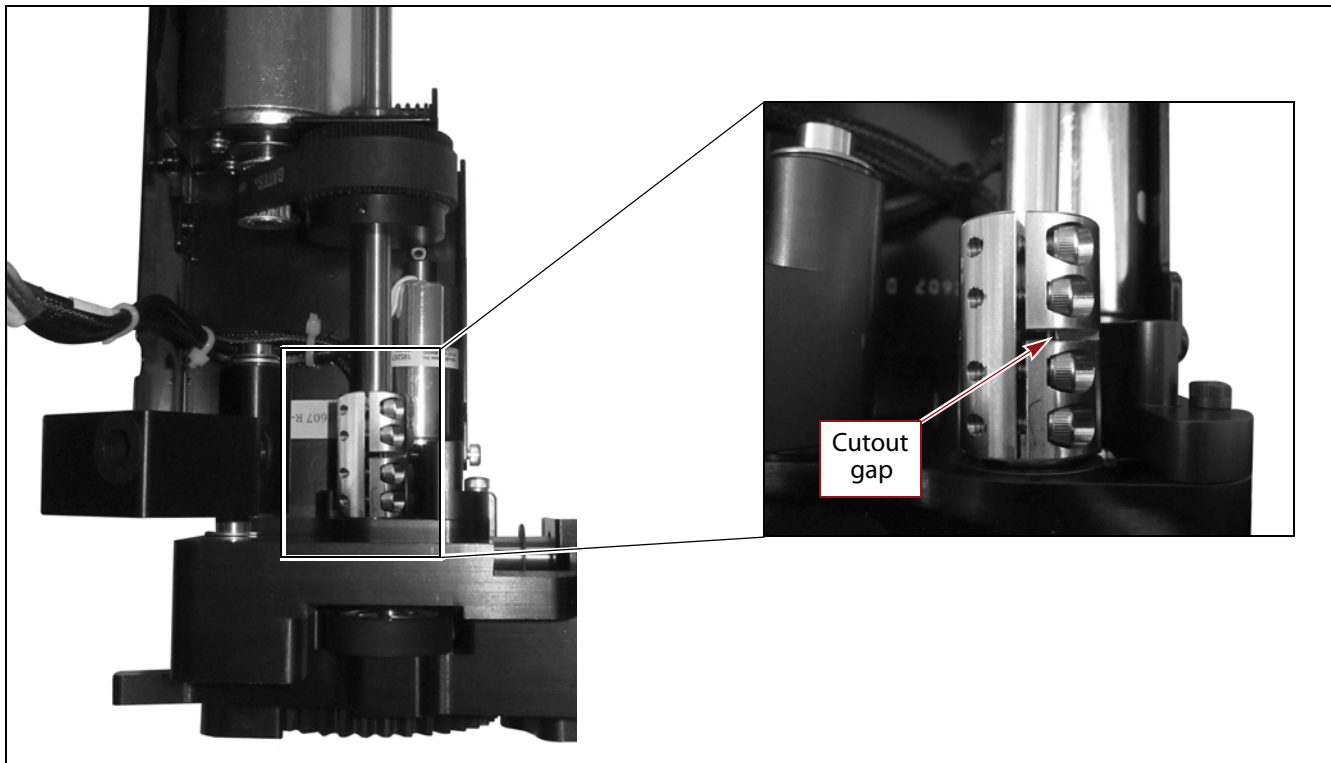


Figure 37 Center the coupler's cutout gap over the gap between the two HAX rod pieces.

17. Using a 7/64-inch hex wrench, loosely tighten the four screws on one side of the coupler, then rotate the coupler 180° and loosely tighten the other four screws. Make the gap between the two halves of the coupler even on both sides.
18. Fully tighten the coupler screws on both sides of the coupler.

19. Install the HAX motor assembly on the VAX column.

- a.** Route the attached cables through the cutouts in the VAX column.

Note: The sensor and solenoid cables, closest to the coupler end of the HAX motor assembly, are routed through a small, circular cutout in the VAX column, not the adjacent large square cutout. [Figure 39](#) shows the position of the circular cutout.

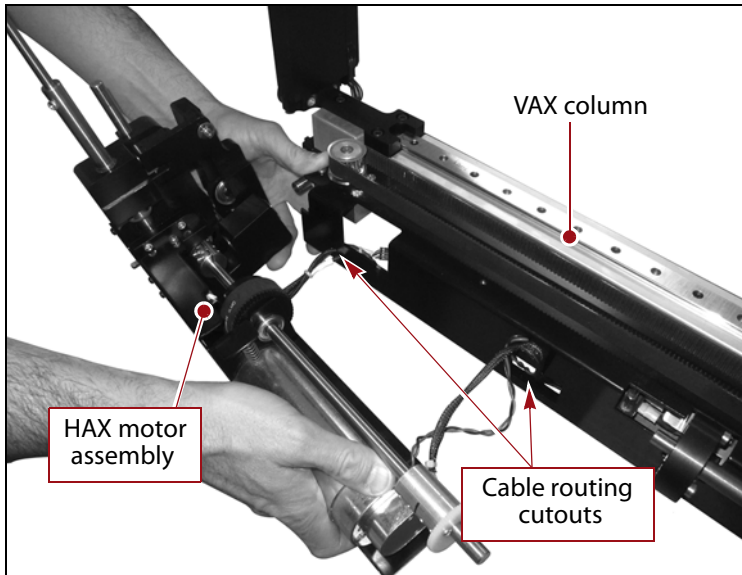


Figure 38 Route the cables through the cutouts in the VAX column.

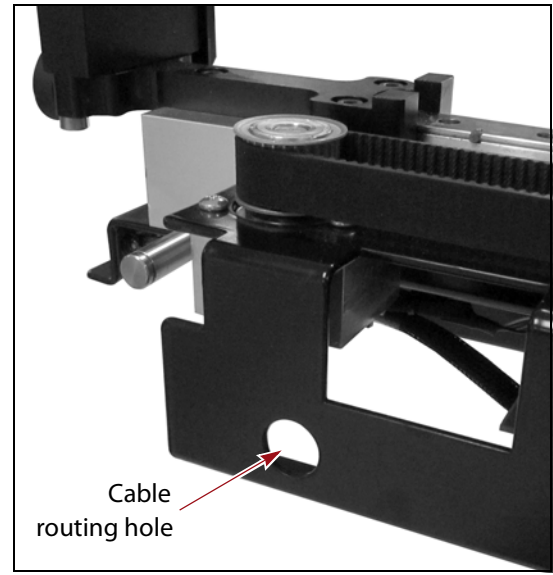


Figure 39 Route the cables through the small hole in the VAX column.

- b.** Mount the HAX motor assembly on the guide pin on the VAX column.

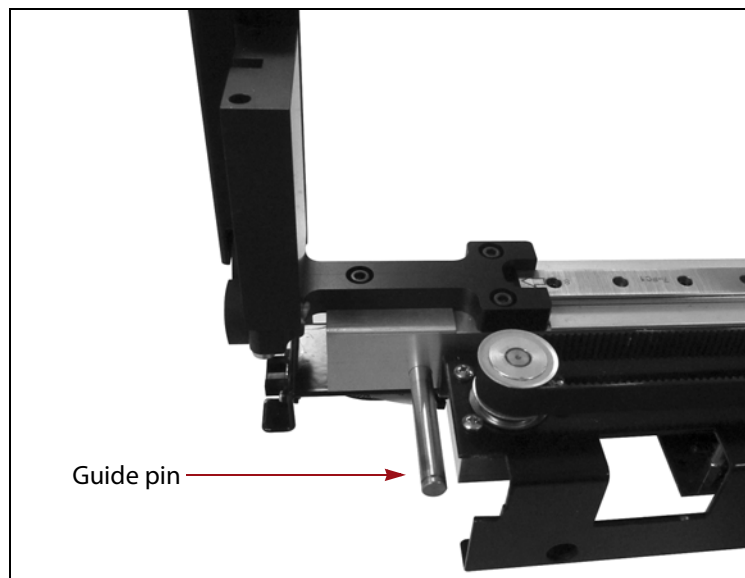


Figure 40 Mount the HAX motor assembly on the guide pin.

- c. Using needle nose pliers or a 3/8-inch external retaining ring installation tool, install the retaining ring to secure the motor assembly to the VAX column.

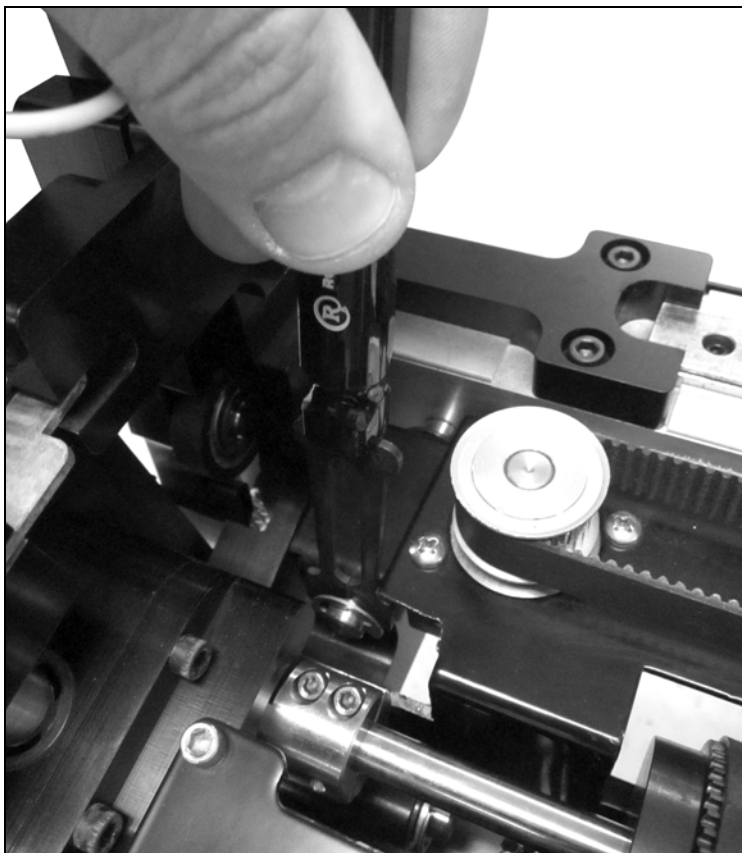


Figure 41 Install the retaining ring (external retaining ring installation tool shown).

- d. Make sure both bushings are on the metal rod of the HAX motor assembly, and that the flanges are oriented down, toward the HAX motor assembly.

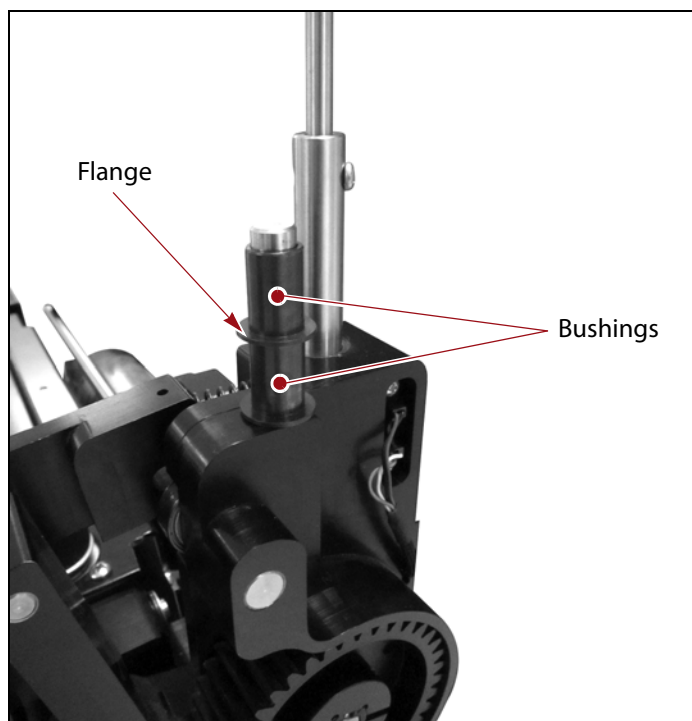


Figure 42 Make sure both bushings are installed.

- e. Install the retaining bracket on to the VAX column. As you install the bracket, ensure the bushings fit inside the pocket in the bracket.
- f. Using a 1/8-inch hex wrench, tighten the two screws to secure the retaining bracket to the VAX column.



Figure 43 Install the retaining bracket.



Figure 44 Tighten the screws.

Replace the Lower and Middle Couplers

1. Orient the replacement middle coupler with the plastic gear facing toward the bottom of the VAX column and slide the coupler on the upper HAX rod section, which protrudes from the HAX motor assembly.

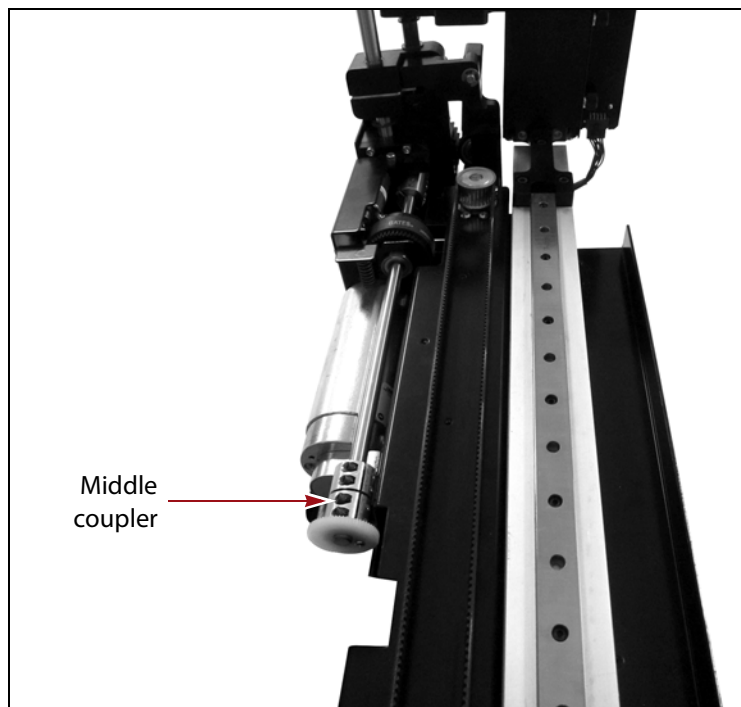


Figure 45 Slide the middle coupler on the upper HAX rod section.

2. Slide the replacement lower coupler on the lower HAX rod section at the base of the VAX column.

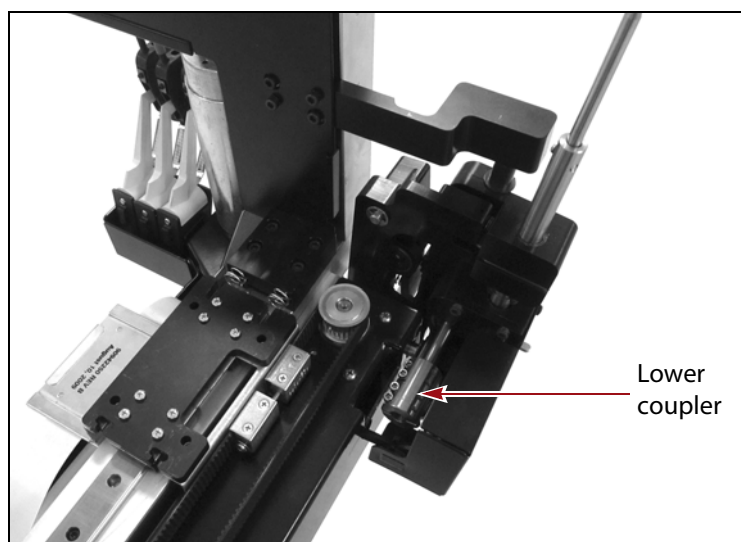


Figure 46 Slide the lower coupler on the HAX rod section at the base of the VAX column.

3. Install the center section of the HAX rod.
 - a. Slide the thinner diameter end of the rod section into the lower coupler.

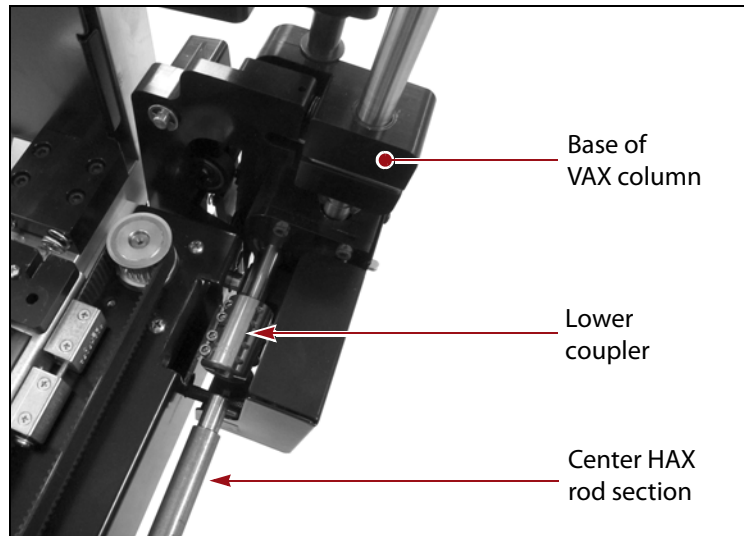


Figure 47 Slide the center rod section into the lower coupler.

- b. Using a 7/64-inch hex wrench, install the two screws that secure the center rod support to the VAX column.



Figure 48 Install the center rod support.

- c. Ensure the upper drive mechanism is latched. See [Latch the Drive Mechanisms on page 37](#) if you need to latch the mechanism.
- d. Mate the teeth of the plastic gear to the three pinions in the coupler adjustment ring.

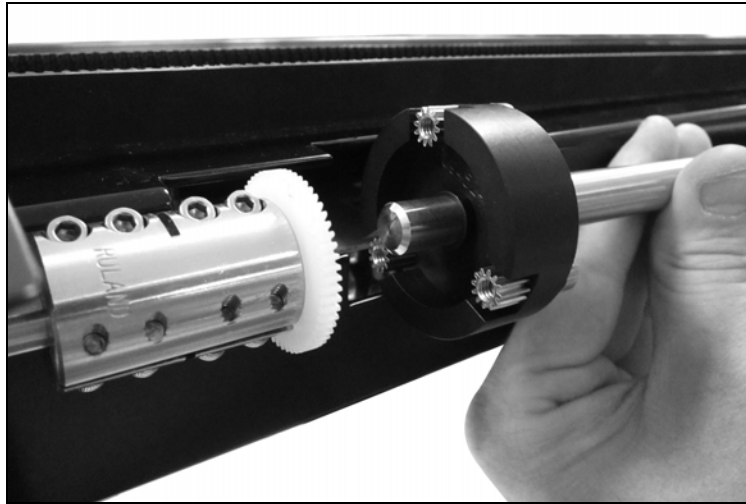


Figure 49 Mate the teeth of the plastic gear to the coupler adjustment ring.

- 4. Adjust the position of the center HAX rod. Make the gap between the lower and middle sections, and middle and upper sections of the HAX rod about the same.
- 5. Ensure the coupler adjustment ring can rotate without hitting the VAX column. If the adjustment ring will come in contact with the VAX column, bias the center section of the HAX rod towards the middle coupler until the adjustment ring can rotate freely.



Caution

Make sure the coupler adjustment ring will not come into contact with the VAX column during normal operation.

6. Orient the middle coupler so the cutout gap in the coupler is centered over the gap between the two sections of the HAX rod. The plastic gear attached to the middle coupler does not have to be fully inserted into the coupler adjustment ring.

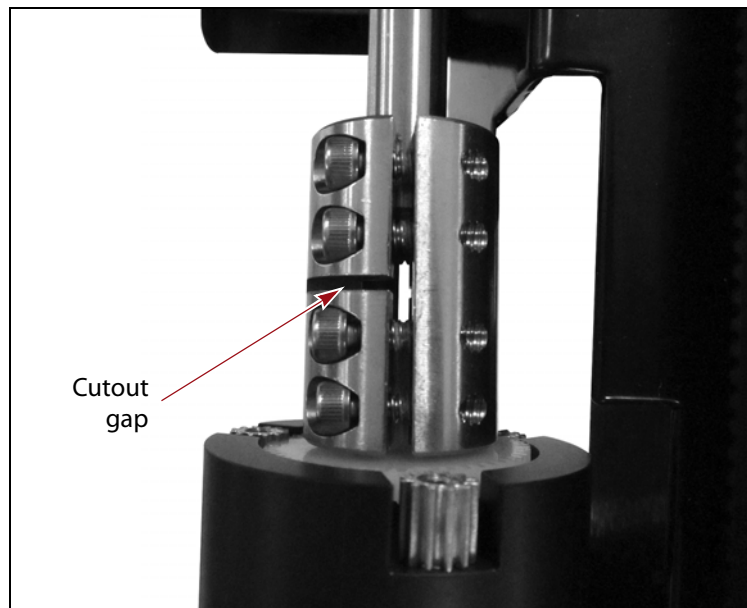


Figure 50 The cutout gap in the coupler should be centered on the gap between the two sections of the HAX rod.

7. Position the lower coupler so that the cutout gap in the coupler is centered over the gap between the two HAX rod pieces.
 - a. Using a 7/64-inch hex wrench, loosely tighten the four screws on one side of the lower coupler, then rotate the coupler 180° and loosely tighten the other four screws. Make the vertical gap between the two halves of the coupler even on both sides.
 - b. Fully tighten the coupler screws on both sides of the lower coupler.
8. Using a 7/64-inch hex wrench, loosely tighten the four screws on one side of the middle coupler, then rotate the coupler 180° and loosely tighten the other four screws. Make the vertical gap between the two halves of the coupler even on both sides.

Note: You will fully tighten this coupler during the VAX column alignment procedure.

9. Using a 5/64-inch hex wrench, make sure the set screw in the alignment collar is tight.

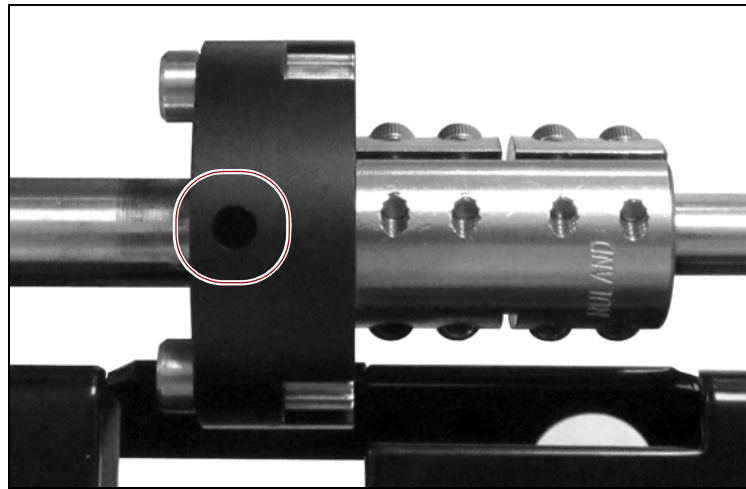


Figure 51 Tighten the set screw in the coupler alignment collar.

10. Press the HAX motor down toward the housing so that the belt is fully tensioned.
11. Using a #2 Phillips screwdriver, tighten the three screws that secure the HAX motor to the motor assembly housing. Use the cutout in the plastic to reach the upper screw (see [Figure 29](#) on page 23).

Note: You will not be able to see the view shown in [Figure 52](#). It is intended to give you a frame of reference.

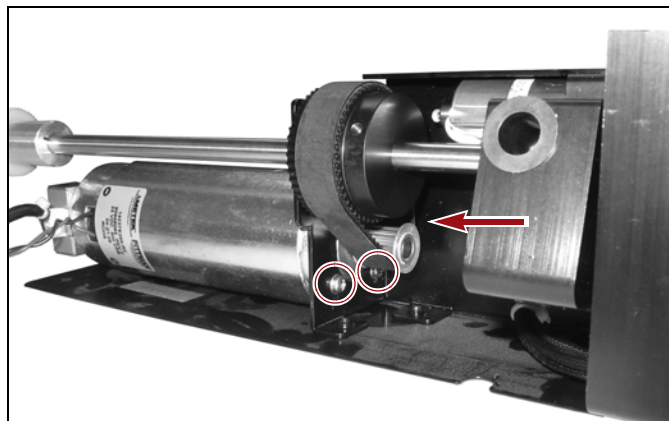


Figure 52 Tighten the HAX motor screws. A third screw, behind the motor shaft, is not visible.

12. Using a #2 Phillips screwdriver, install the three screws to secure the HAX motor assembly cover to the VAX column.

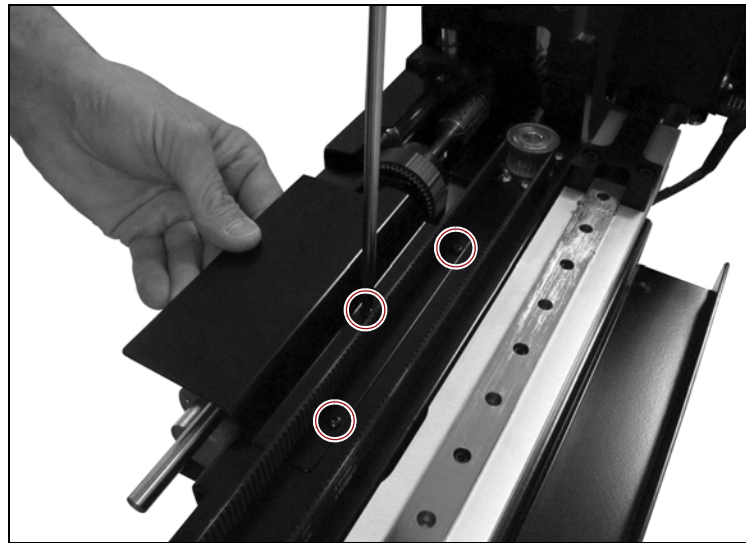


Figure 53 Install the HAX motor assembly cover.

Complete the Replacement

1. Rotate the VAX column so the VAX motor is facing down and the back side of the column is facing upward.
2. Connect the solenoid cable to the CON17 terminal on the HAX board.
3. Connect the solenoid and sensor cables to the HAX board. The sensor cables use the same connector. Connect the longer of the two cables to CON9 and the shorter cable to CON10.

Note: One connector on the HAX motor board should be left empty. Ensure the connector labeled CON4 does not have a cable seated in the connector.

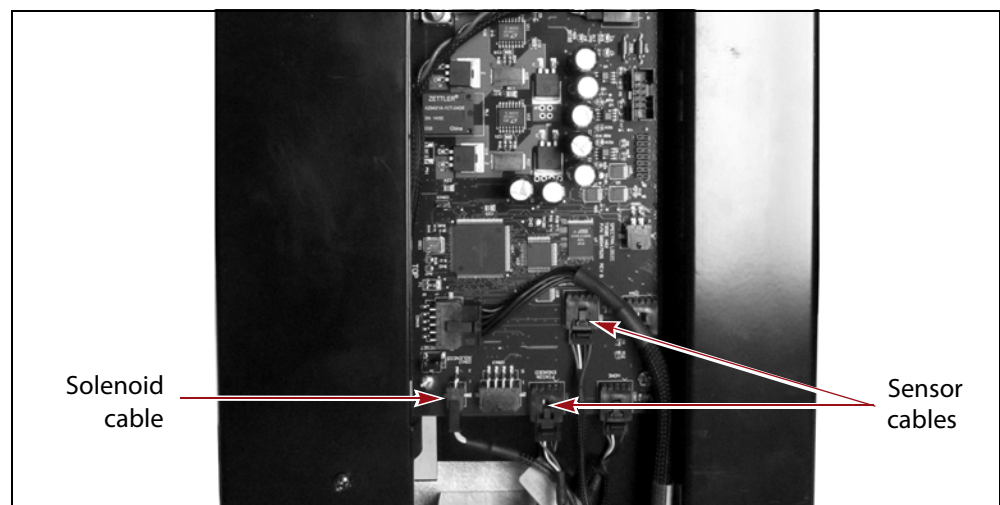


Figure 54 Connect the solenoid and sensor cables.

4. Connect the motor encoder cable to the CON6 terminal on the HAX board.

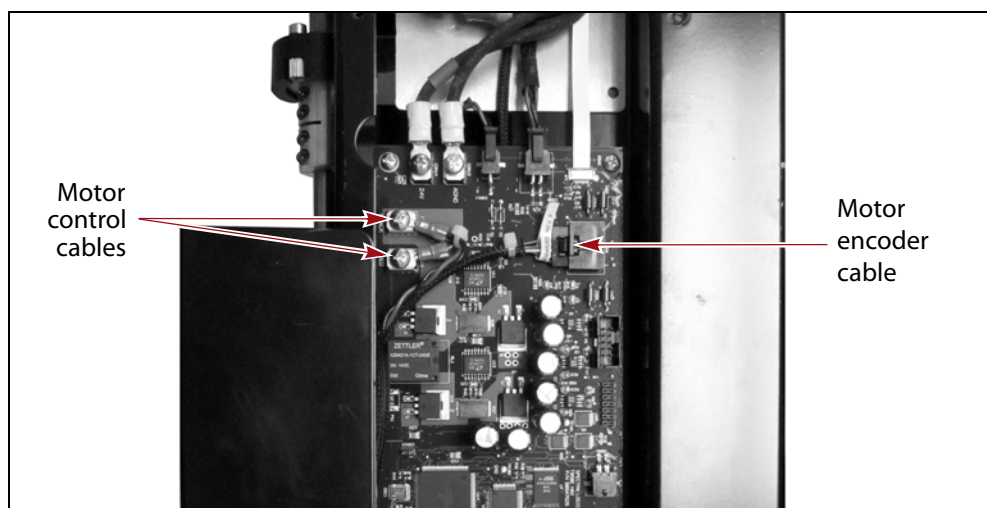


Figure 55 Connect the motor control and motor encoder cables.

5. Using a #2 Phillips screwdriver, connect the motor control cables to the HAX board.



Caution

Make sure the red and black cable connectors of the twisted-pair motor control cable are connected to the red and black terminals, respectively, on the HAX motor board. The terminals on the HAX motor board are labeled indicating which cable should be connected to each terminal.

6. If you removed the HAX motor cover in [Step 6 on page 20](#), using a #2 Phillips screwdriver install the three screws that secure the cover to the VAX column.
7. Using a #2 Phillips screwdriver, install the 12 screws that secure the VAX column cover to the VAX column (see [Figure 18 on page 18](#)).

INSTALL THE VAX COLUMN

Latch the Drive Mechanisms

Latching the drive mechanism is done by feel. While the VAX column is out of the library, practice the latching procedure described here several times so that you know how it feels.

When VAX column 1 (left side) is installed in the library, the drive mechanism is toward the interior of the library. You cannot see the top drive mechanism while latching it closed and you must reach up and around the left side of the VAX column to access the tension arm and tension release rod. It may be easier to latch the drive mechanism before installing the VAX column in the library; however, this can make the VAX column alignment more difficult.

1. Examine the drive mechanisms at the top and bottom of the VAX column. The following figure shows the latching components of the bottom drive mechanism. The components of the top drive mechanism are similar.

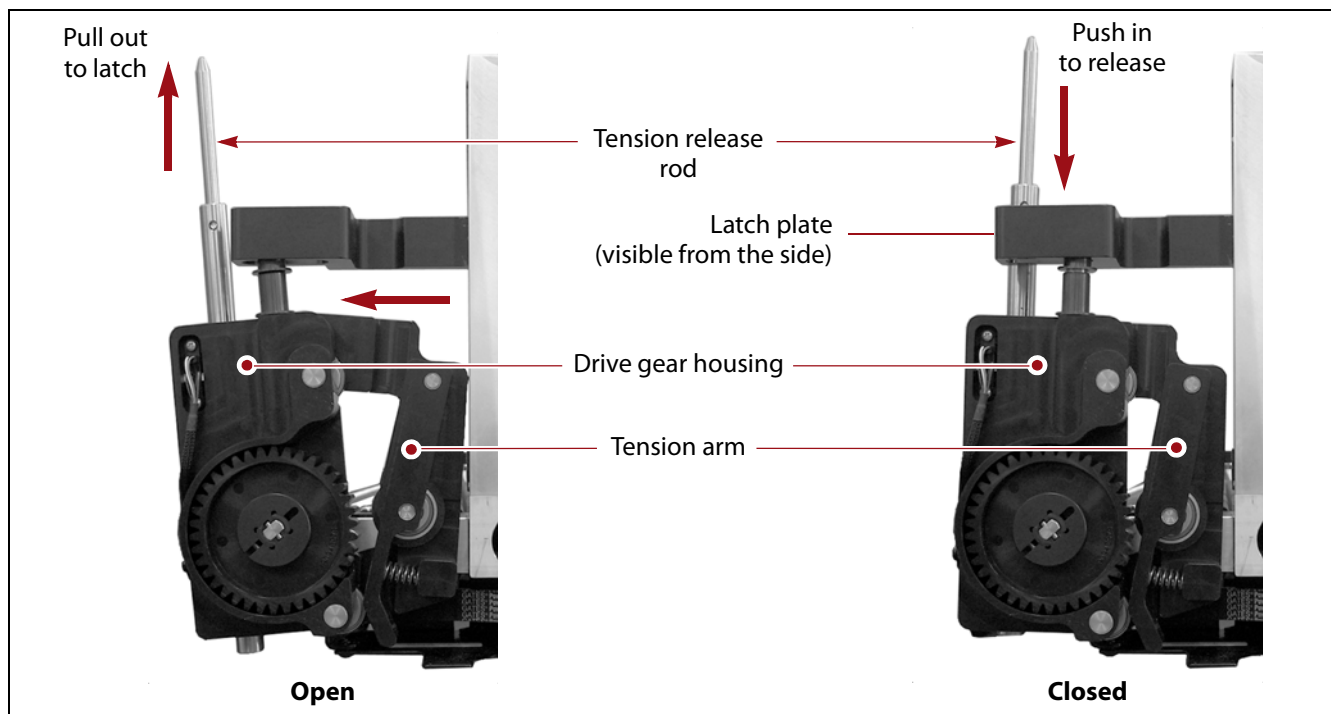


Figure 56 VAX column drive mechanism (bottom mechanism shown).

2. Use the following steps to close the latching mechanism. Otherwise continue to [Install the VAX Column on page 37](#).

- Notes:**
- Latching the drive mechanisms is most easily accomplished with the VAX column out of the library; however, this can make the VAX column alignment more difficult.
 - To unlatch the drive mechanism, push in on the tension release rod.
 - Latching the drive mechanism requires considerable hand strength. In addition, latching the top mechanism can be awkward when the VAX column is installed in the library. The rack and pinion latching tool simplifies the latching process by eliminating the need to compress the tension arm while adjusting the position of the tension release rod.

3. Using one hand, squeeze the tension arm toward the drive gear housing, compressing the spring between the housing and the tension arm.

—OR—

Use the following steps to install the rack and pinion latching tool on the drive mechanism.

Note: The drive mechanisms are latched one at a time. It does not matter whether you latch the top or bottom mechanism first.

- a. Using the knob on the side of the latching tool, open the clamping jaws as far as they go.

Note: Do not turn the knob past the point at which it becomes difficult to turn.

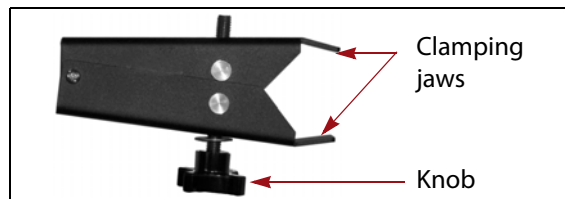


Figure 57 Rack and pinion latching tool.

- b. Orient the latching tool so that the knob is toward the inside of the VAX column and position the jaws so that they grasp the tension rod and the drive gear housing.

**Important**

Make sure that the jaws do not cover the latch plate on the side of the drive mechanism (see [Figure 58](#)).

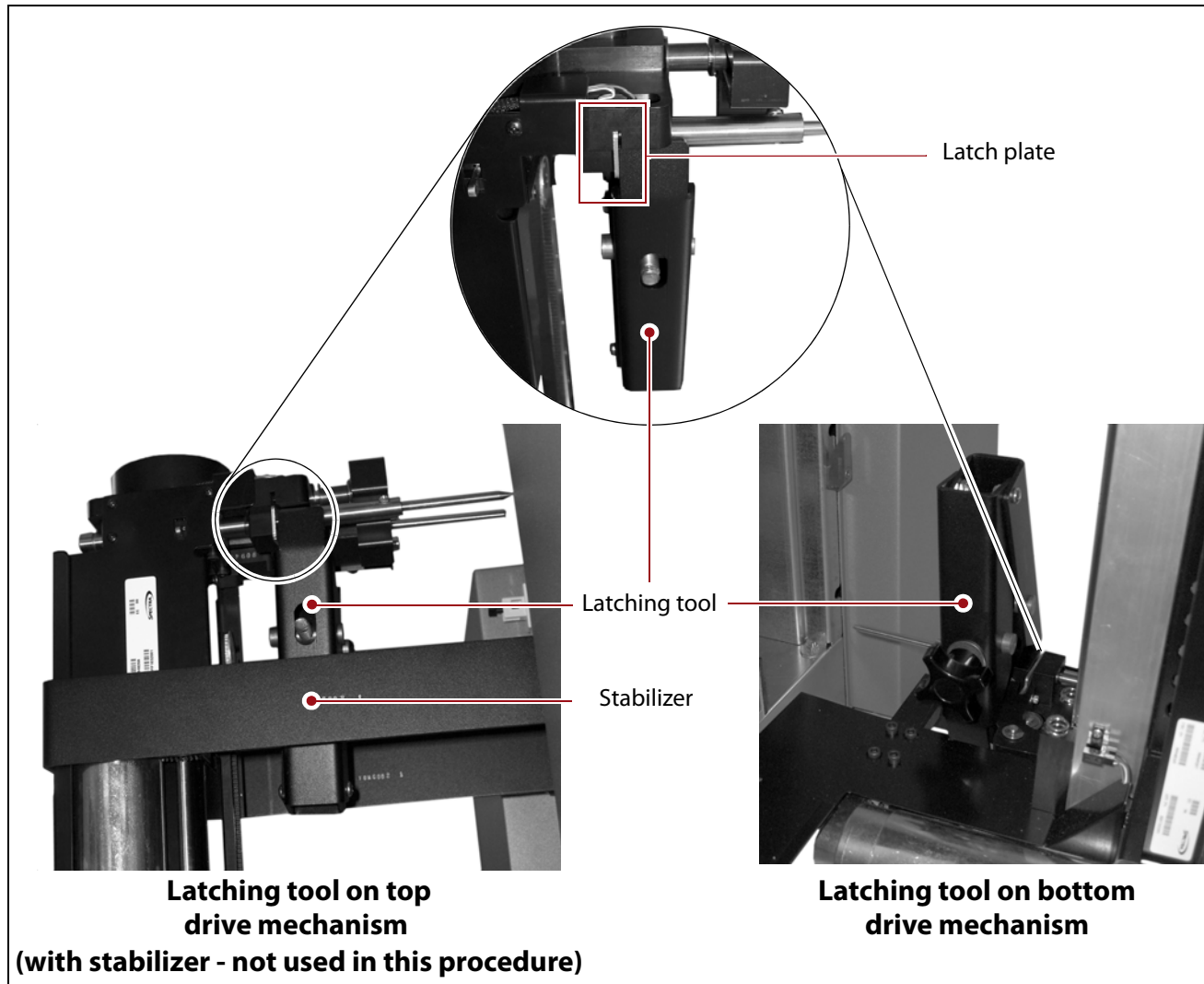


Figure 58 Install the latching tool over the drive mechanism.

- c. Tighten the knob on the latching tool to squeeze the tension arm toward the drive gear housing, compressing the spring between the housing and the tension arm.

Note: You may need to move the tension release rod in or out slightly before you can squeeze the tension arm toward the drive gear.

4. When the tension rod moves freely, position it so that the grooves around it are flush with the surface of the drive gear housing.

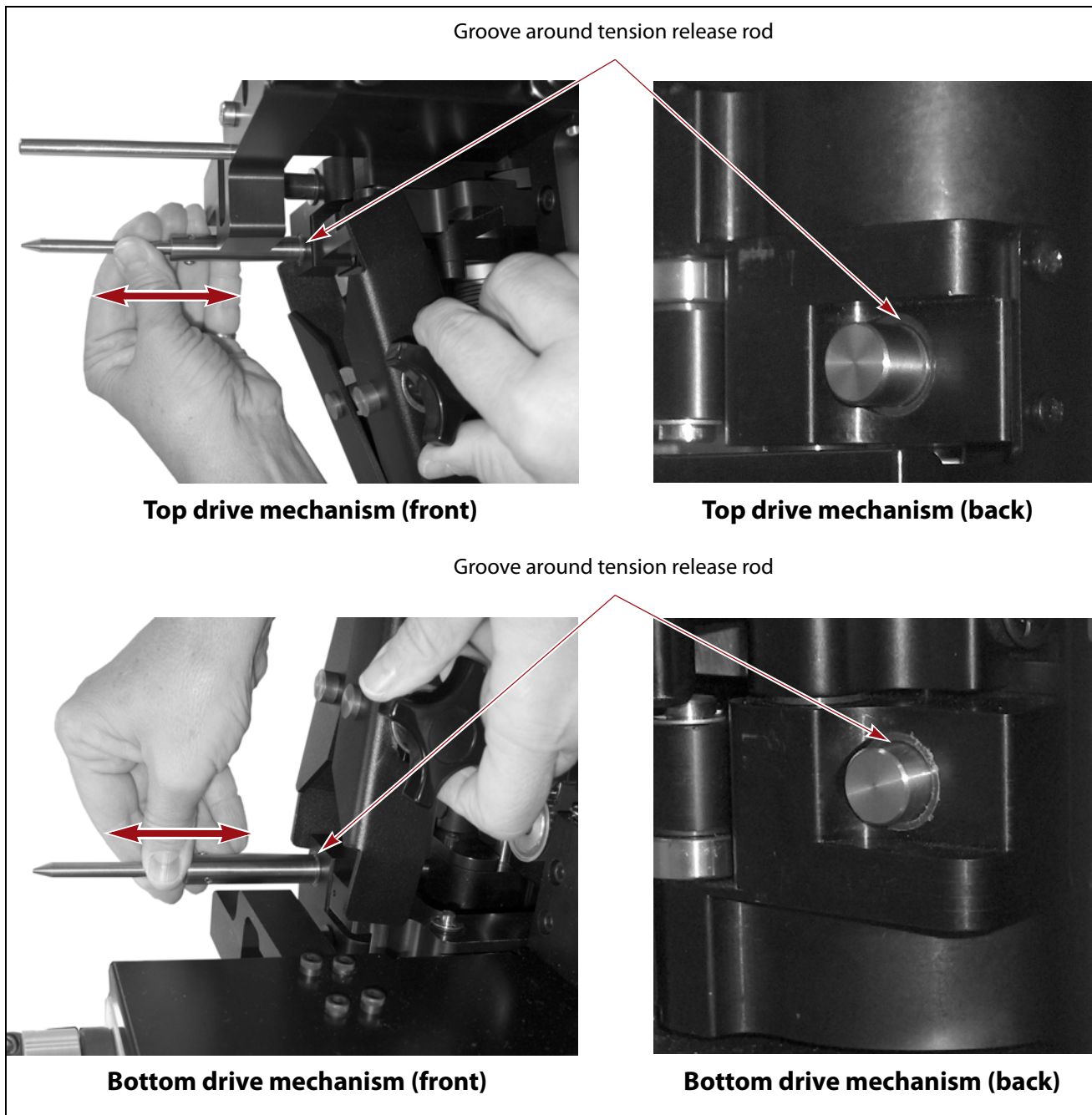


Figure 59 Adjust the position of the tension release rod to latch the drive mechanism closed.

5. Using a small flat-blade screwdriver, confirm that the tab that extends from the side of the drive mechanism moves freely up and down the full length the slot.

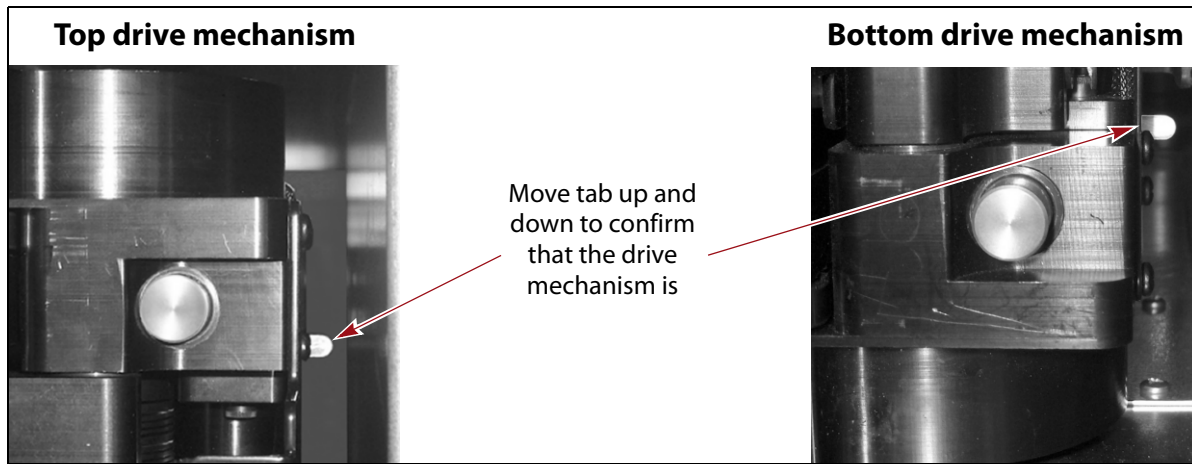


Figure 60 Confirm that the drive mechanisms are latched.

6. Confirm that the latch is correctly engaged using the following criteria:

- The tab extending from the side of the drive mechanism moves freely.
- A groove around the front of the tension rod is just visible above the edge of the latching arm. You may need to use your fingernail to detect the groove.
- The end of tension release rod is flush with the back edge of the drive mechanism (use your finger to confirm).
- A groove around the back of the tension rod is just visible above the edge where the rod extends from the drive mechanism. You may need to use your fingernail to detect the groove.

If the latch is not correctly engaged, release the tension rod (see [Figure 56 on page 37](#)) and repeat [Step 4 on page 40](#) through [Step 6](#).

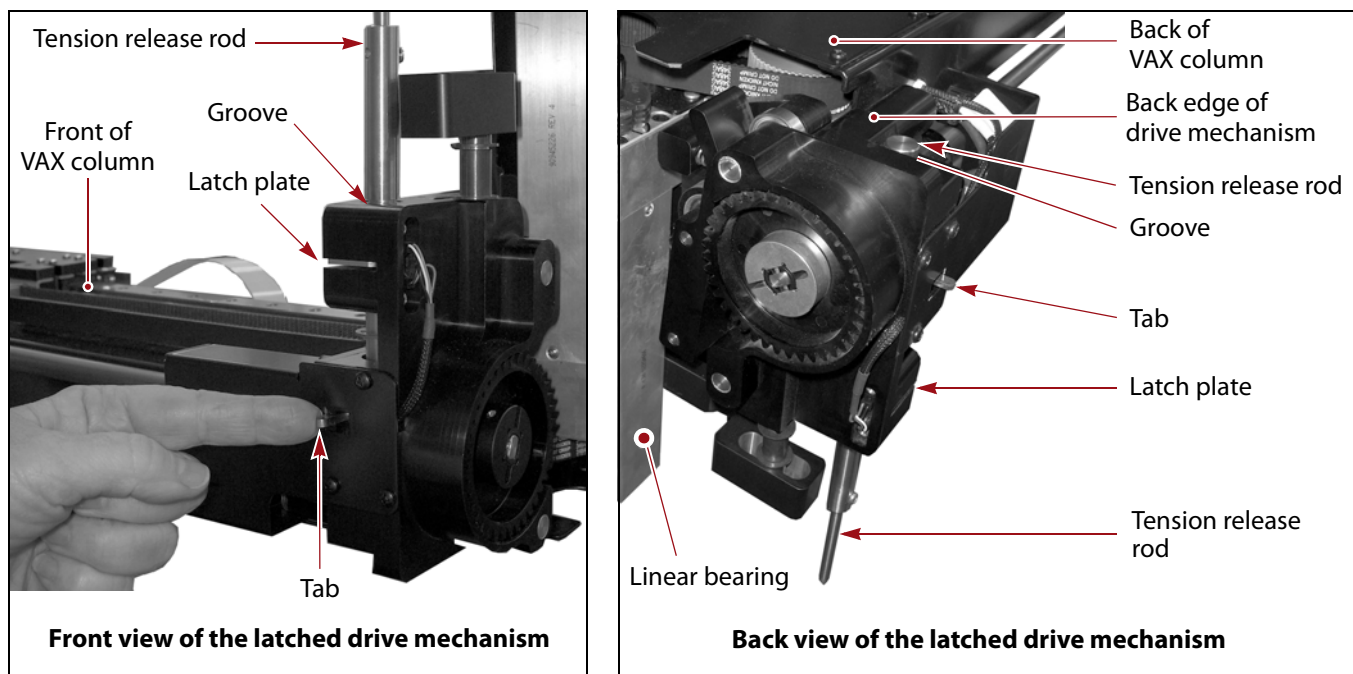


Figure 61 Confirm that the drive mechanism is latched (bottom drive mechanism shown).

- 7.** If you used the latching tool, loosen the knob on the latching tool until you can remove it from the drive mechanism.
- 8.** Repeat [Step 3 on page 38](#) through [Step 7](#) for the other drive mechanism.

Install the VAX Column

1. Move the VAX column to the library.



WARNING

Some library components are heavy and could be awkward to handle. Use caution and proper equipment or two people to move these.



WARNING

Use caution when handling the VAX column. When the VAX column is removed from the library, protruding metal rods on the top and bottom are exposed.



Important

If you are performing this procedure without assistance, you can rotate the VAX column so that the top is resting on the floor while you connect the VAX column support to the library and remove the locking collar.

2. While supporting the VAX Column vertically, position it so that the extension rod in the column support stand aligns with the Thomson rod in the library.
 - **VAX Column 1**—The front of the VAX column (where the transporter will mount) is toward the interior of the library.
 - **VAX column 2**—The front of the VAX column (where the transporter will mount) is toward the outside of the library.
3. Insert a T-handle hex wrench or a screwdriver through the hole in the free end of the extension rod and screw the rod into the Thomson rod to form a gapless extension. A very slight gap is acceptable.



Caution

Make sure that the extension rod on the VAX column support stand is exactly aligned with the Thomson rod or you might bend or damage the Thomson rod.



Important

If the extension rod is not aligned with the Thomson rod you will not be able to move the VAX column off the stand and onto the Thomson rod.

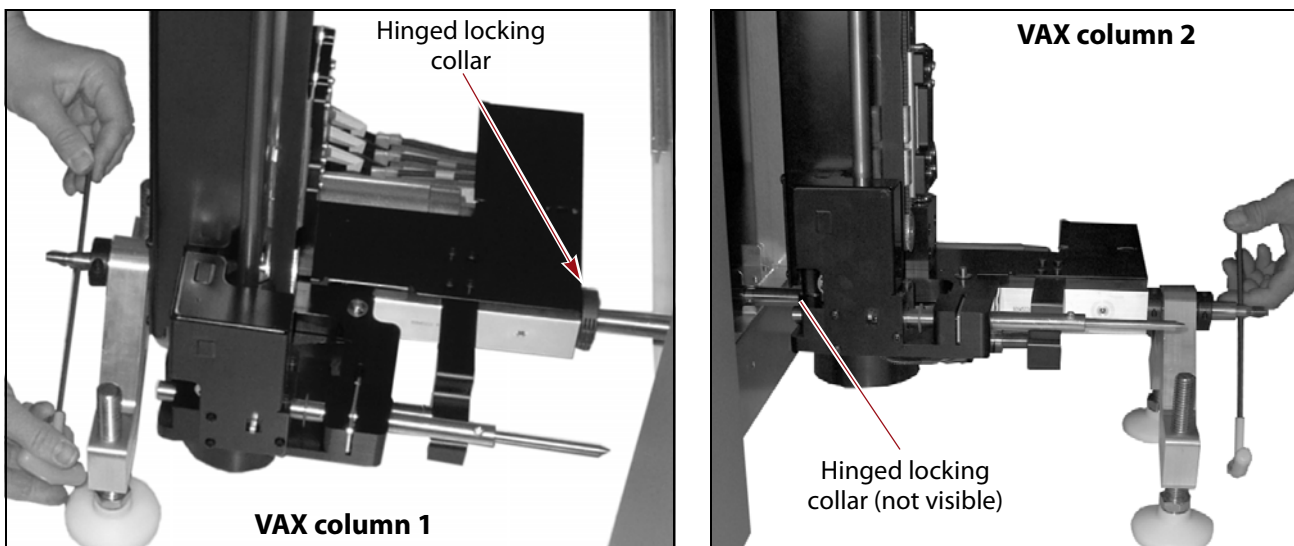


Figure 62 Connect the VAX column stand extension rod to the Thomson rod.

4. Using the 5/32-inch Allen wrench, loosen the screw securing the hinged locking collar on the end of the extension rod connected to the Thomson rod. Open the collar and remove it from the rod.
5. Examine the top and bottom drive mechanisms to confirm that they are latched closed (see [Figure 61 on page 42](#)).

If either mechanism is not latched closed, follow the instructions in [Latch the Drive Mechanisms on page 37](#) to latch it before continuing.

6. Position the top and bottom drive mechanisms on the VAX column so that the guide rollers are aligned with the alignment rail, and the drive rails are aligned between the drive gear and the tension arm.

[Figure 63](#) shows how the top drive mechanism engages on the drive rail and the guide rollers engage the alignment rail. The bottom drive mechanism is similar.

Note: You will not be able to see the view shown in [Figure 63](#). It is intended to give you a frame of reference for determining whether the drive mechanisms are correctly aligned.

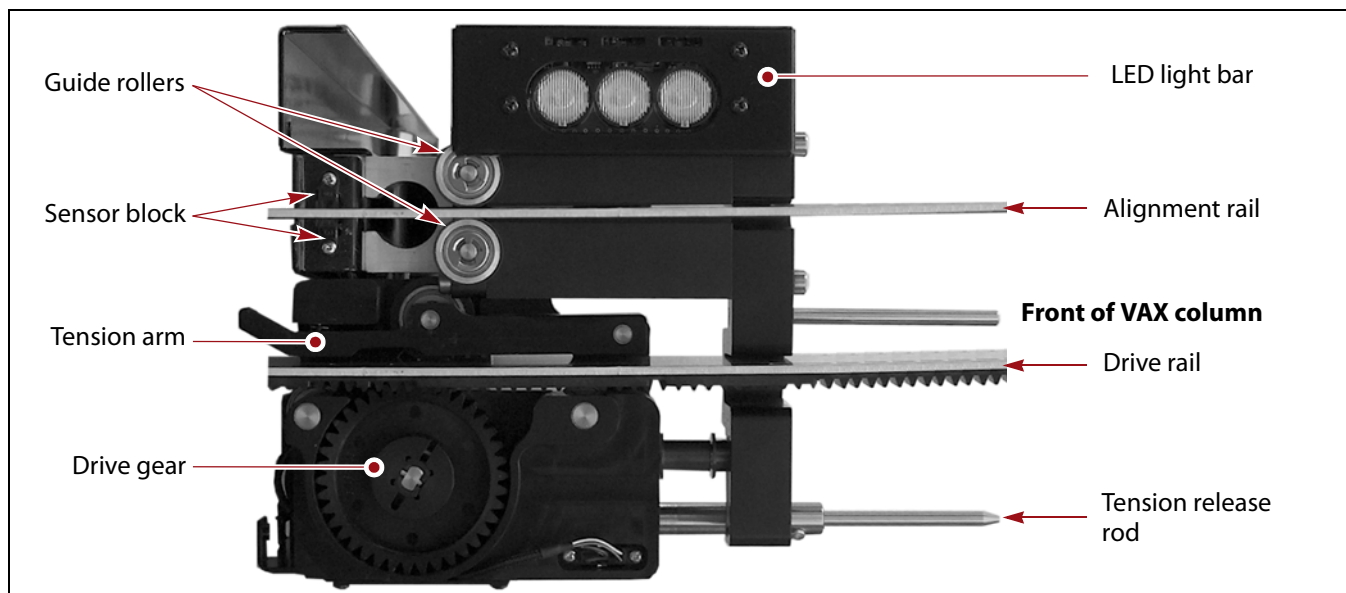


Figure 63 Position the VAX column so that the drive rail is aligned between the drive gear and the tension arm (looking down at the top mechanism from above).

7. Lift the three power rail brush contacts attached to the bottom of the VAX column up and away from the power rails. Grasp both sides of the VAX column at about shoulder height and carefully slide it off the extension rod and onto the Thomson rod in the service bay.

Note: As you slide the VAX column into place, watch the positioning of both the top and bottom drive mechanisms to ensure that the sensor block at the back of the column straddles the alignment rail (refer to [Figure 63 on page 44](#) for the location of the sensor block).

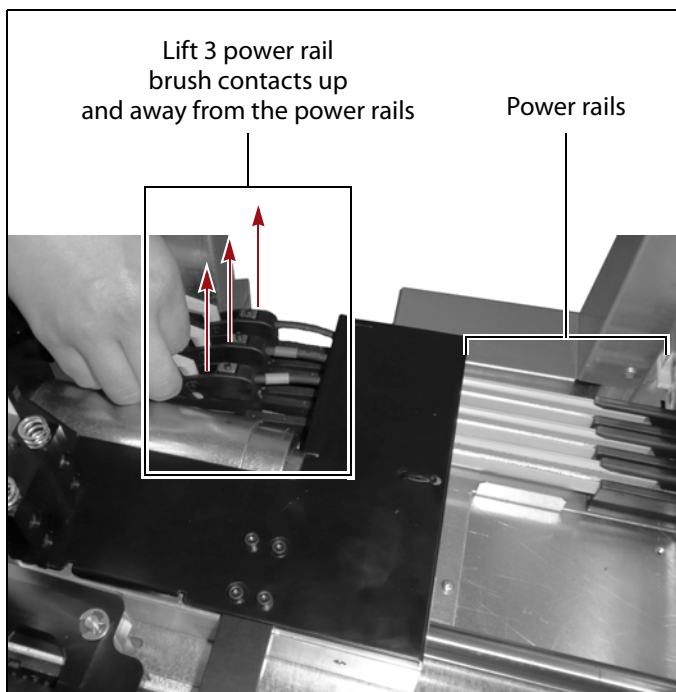


Figure 64 Lift the power rail brush contacts up and away from the power rails.

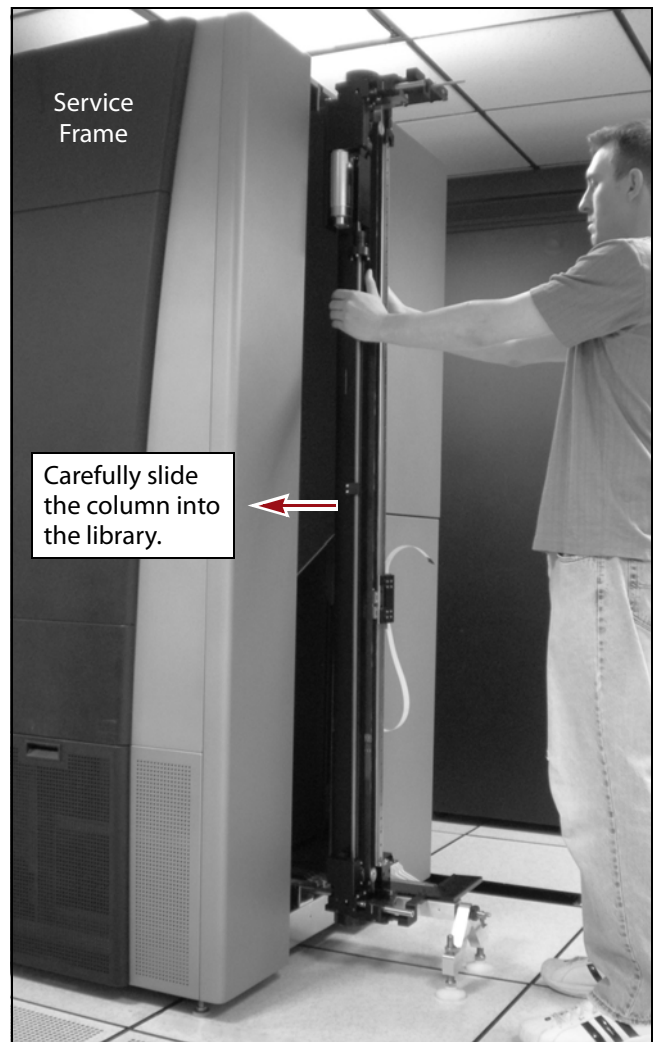


Figure 65 Slide the VAX column onto the Thomson rod in the service bay (VAX column 2 shown).

8. Push the VAX column all the way into the service bay.
 - **VAX column 1**—The back of the column will be approximately even with the edge of the opening in the service bay.
 - **VAX column 2**—The back of the column will be close to the service door.

9. Position the three power rail brush contacts so that they fit inside the power rails attached to the floor of the library.

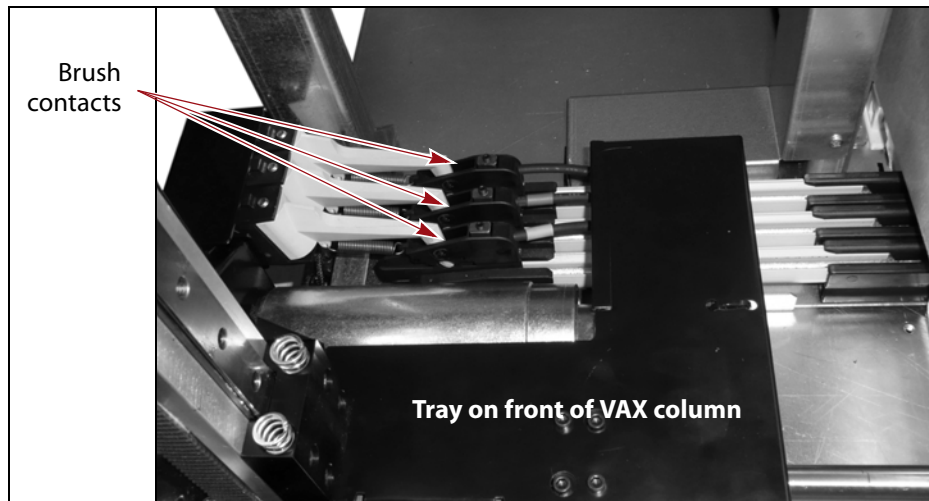


Figure 66 Position the power rail brush contacts in the power rails (VAX column 1 shown).

ALIGN THE VAX COLUMN

Use the following steps to check and adjust the VAX column alignment.

1. Install a VAX alignment block on the top drive rail.
 - **VAX column 1**—Position the block so that the internal prongs fit into the outer set of two holes in the ridged side of the drive rail.
 - **VAX column 2**—Position the block so that the internal prongs fit into the inner set of two holes in the ridged side of the drive rail.

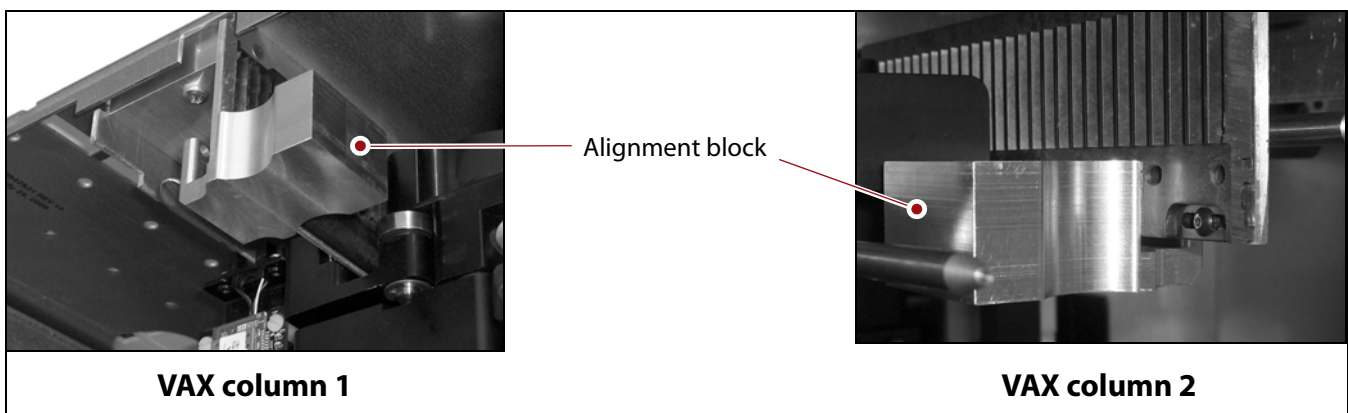


Figure 67 Install the top VAX alignment block (note different positions on the drive rail).

2. Use your fingers to tighten the thumb screw against the metal side of the drive rail to secure the block in place.

3. Install a VAX alignment block on the bottom drive rail.
 - **VAX column 1**—Position the block so that the internal prongs fit into the outer set of two holes in the ridged side of the drive rail.
 - **VAX column 2**—Position the block so that the internal prongs fit into the inner set of two holes in the ridged side of the drive rail. The outer holes remain visible.
4. Use your fingers to tighten the thumb screw against the metal side of the drive rail to secure the block in place.

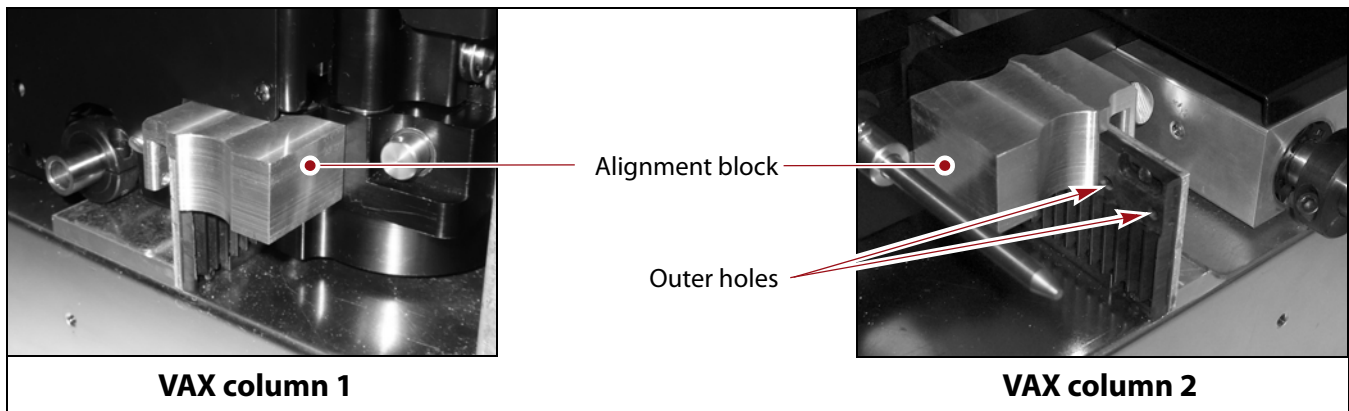


Figure 68 Install the bottom VAX alignment block (note different positions on the drive rail).

5. If necessary, rotate the coupler alignment collar until the two locking screws on the neck of the middle coupler are accessible.
6. Using a 7/64-inch Allen wrench, tighten the top two locking screws on the neck of the middle coupler.

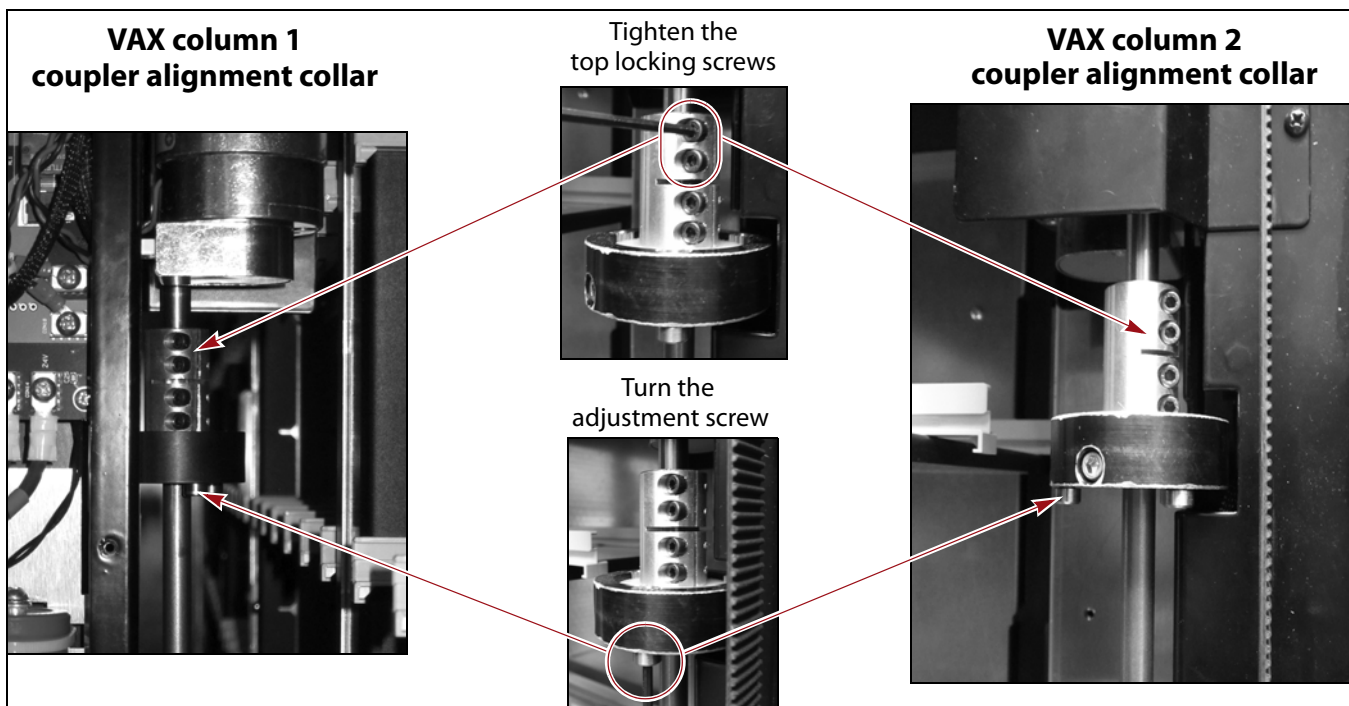


Figure 69 Adjust the VAX column alignment.

7. Check the alignment of the VAX column. Both the top and bottom drive mechanisms must touch the inside face of their respective alignment blocks simultaneously.

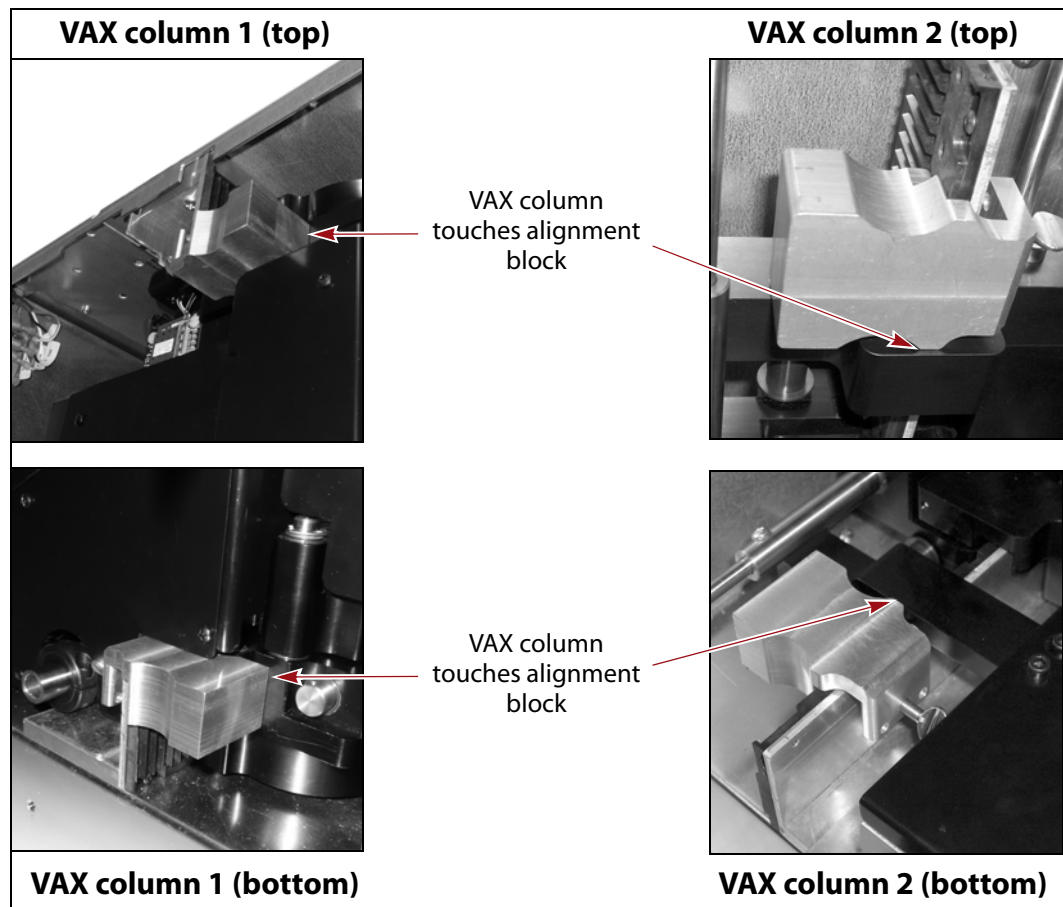


Figure 70 Check the VAX column alignment.

If either the top or bottom drive mechanism does not touch its alignment block, use the following steps to adjust the alignment. If the VAX column touches both alignment blocks, skip to [Step d on page 49](#).

- a. Position the VAX column until either the top or the bottom drive mechanism is touching its alignment block.
- b. Locate the coupler alignment collar (see [Figure 69 on page 47](#)) on the VAX column.

A gear inside the coupler aligns the two shafts that adjust the position of the top and bottom drive mechanisms relative to each other.

- **VAX column 1**— The alignment coupler is on the right-hand side of the VAX column when viewed from the back, about 12 inches (30.5 cm) down from the top.
- **VAX column 2**— The alignment coupler is on the left-hand side of the VAX column when viewed from the front, about 12 inches (30.5 cm) down from the top.

- c. While holding the end of the VAX column that is already touching its alignment block in place, use a 3/32-inch Allen wrench to turn one of the adjustment screws on the bottom of the coupler alignment collar until both drive mechanisms are touching their alignment blocks.

Note: It does not matter which adjustment screw you use.

- d. Using a 7/64-inch hex wrench, tighten the bottom locking screws on the neck of the coupler alignment collar.
- e. Confirm that both drive mechanisms touch their respective alignment blocks. If they do not, loosen the bottom screws on the neck of the coupler alignment collar and repeat [Step c](#) and [Step d](#).



Important

If you can not get both ends of the VAX column to touch the alignment blocks by turning the adjustment screw, disengage one of the tension release rods, pull the VAX column against the alignment blocks, re-latch the drive mechanism, and then turn the adjustment screw (see [Latch the Drive Mechanisms on page 37](#)).

- f. Confirm that all screws in the neck of the alignment coupler are tight so that the coupler does not turn freely and that the vertical gap between the two halves of the coupler is even on both sides.
8. Confirm once again that both drive mechanisms are latched closed (see [Step 6 on page 42](#)).
 9. Loosen the thumb screw securing the top and bottom alignment blocks to the drive rails and remove the alignment blocks from the library.

Remove the VAX Column Support Stand

1. Insert a T-handle hex wrench or a screwdriver through the hole in the free end of the extension rod.
2. Unscrew the extension rod from the Thomson rod.
3. Set the stand aside.

4. Slide the non-hinged locking collar you removed in [Step 3 on page 14](#) over the end of the Thomson rod until it is against the stop tab that extends up from the horizontal axis (HAX) mounting plate.

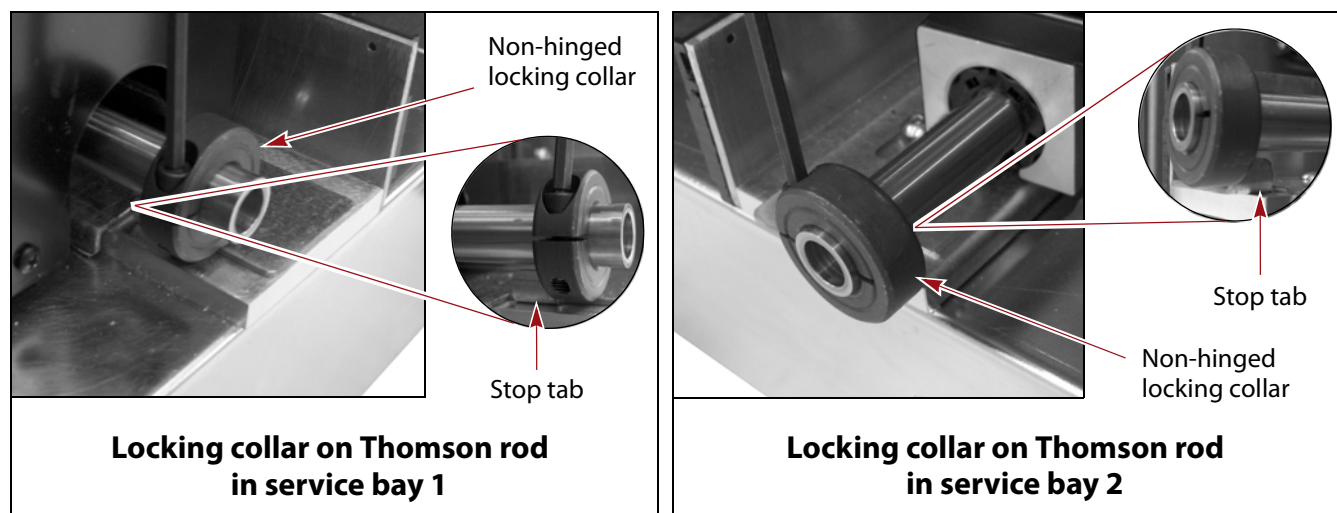


Figure 71 Install the non-hinged locking collar on the Thomson rod.

5. Using a 5/32-inch Allen wrench, tighten the screw on the locking collar to secure it to the end of the Thomson rod.



Caution

Make sure that the screw is tight. This locking collar provides the hard stop for the TeraPorter.

INSTALL THE TRANSPORTER

After you finish installing the VAX column, you must reinstall the transporter. See “Install the Transporter” in the [Spectra TFinity Library Transporter Replacement](#) guide for instructions.



Important

If you installed a binder clip on the VAX belt while installing the transporter, remove it now.

COMPLETE THE REPLACEMENT

After the transporter is installed, pull the TeraPorter all of the way against the hard-stop locking collar.



Important

The TeraPorter **MUST** be pulled to the outside of the library such that it is touching the hard-stop collar or the TeraPorter does not initialize when it is put back into service.

Then, follow the steps in the following sections to complete the replacement process.

Install the Service Frame Access Panel

Use the following steps to install the side access panel on the service frame.

1. Lift the panel onto the hooks at the top of the opening.
2. While supporting the weight of the panel with one hand and support the panel vertically with the other, slide the panel down into place.
3. Use a 1/8-inch Allen wrench or hex screwdriver, or a #2 Phillips screwdriver to install the screw at the bottom of the side panel.



Figure 72 Lift the panel onto the hooks at the top of the opening.



Figure 73 Slide the panel down into place while holding it steady higher up.



Figure 74 Use #2 Phillips screwdriver to install the screw at the bottom of the side panel.

Open the Service Bay Safety Door



WARNING

Risk of electrical shock. Do not open the service frame safety door until you have reinstalled the service frame access panel.

1. If it is not already displayed, click **Robotics** on the General Status screen to display the Robotics Status screen.
2. Select the **Robots** tab of the Robotics Status screen and then click **Complete Service**. Directions to unlock and open the service bay safety door display.



Important

Open the service bay safety door, as described in the following steps, prior to clicking **OK**.

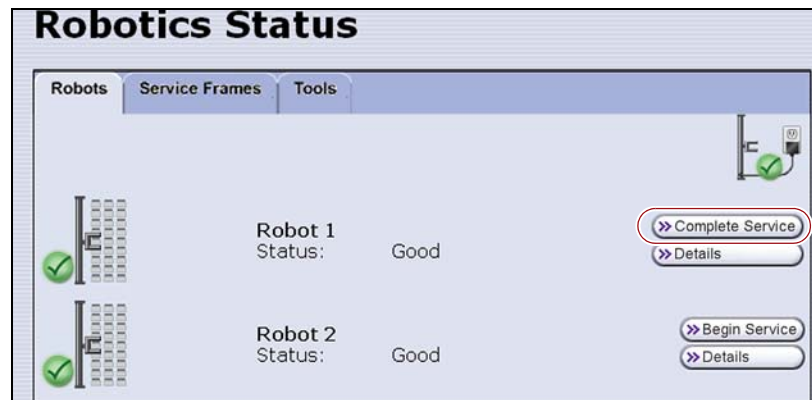


Figure 75 The Robotics Status screen.

3. If necessary, open the full-length access door on the service bay where the TeraPorter is parked (see [Figure 3 on page 9](#)).
4. Open the service bay safety door.
 - a. Loosen the captive screw securing the service bay safety door handle in its upright position, then rotate the handle downward to a horizontal position.

