Kodak

Automatic Pallet Loader

Table Series 4 Upgrade Procedure

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18 Apr 2008

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Revision History

Revision	Date	Author	Comments
1	20 Feb 2008	A.Blignaut	Initial draft release
2	13 Mar 2008	A.Blignaut	Added sensor cable install procedure.
3	18 Apr 2008	A.Blignaut	Added tube installation and table height adjustment.

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1. OVERVIEW

The purpose of the plate transfer table upgrade is to increase the plate throughput of the Automatic Pallet Loader (APL). The upgrade includes the installation of a shorter leadscrew and the addition of a transfer height sensor.

2. PARTS/TOOLS NEEDED

Table upgrade kit – 518-03106A

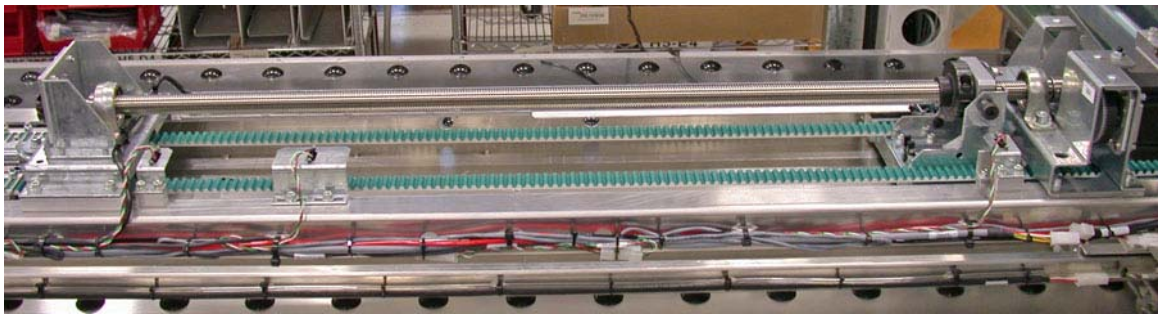
Table upgrade tool kit – 690-01654A

Portable Drill

Vacuum

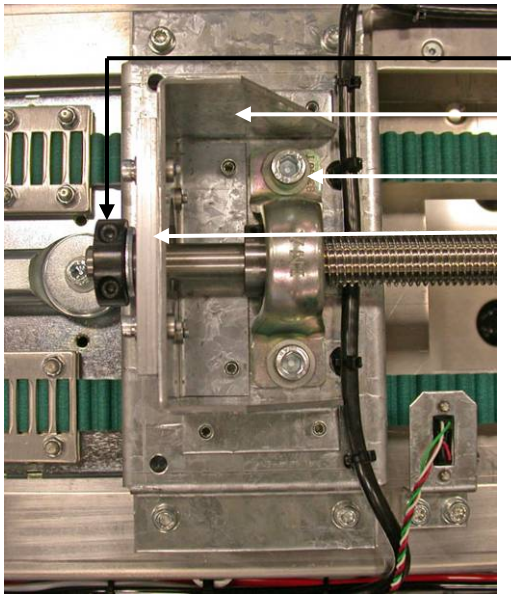
3. REMOVING THE LEADSCREW ASSEMBLY

1. Initialize the APL and ensure that the table is in the up position.
2. Move the table towards the front of the APL. Type `>>apl table y 200` .
3. Open the APL doors and roof panels. Type `>>apl unlock` . Open the roof panels above the table cross beam to provide some head room and extra light while working on the table.



On the home side of the leadscrew (furthest from the motor):

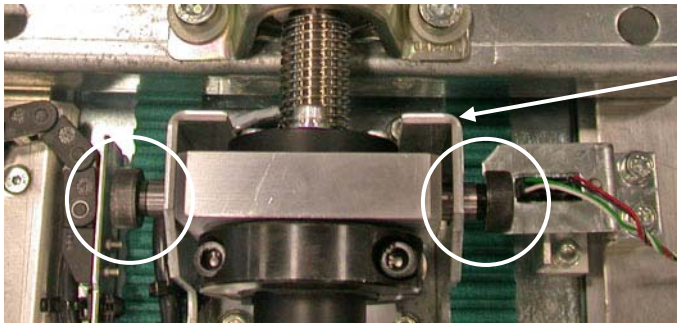
4. Remove the leadscrew collar—loosen the two setscrews.



5. Take note of the order and remove the washers from the leadscrew shaft. The washers must be reinstalled in the same order later in the procedure.
6. Cut the cable ties that secure the sensor cable to the leadscrew bracket.
7. Remove the leadscrew bracket—four screws.
8. Remove the bearing thrust plate from the leadscrew bracket.
   The thrust plate will be installed on the new leadscrew bracket.
9. Remove the leadscrew bearing bracket—two screws.

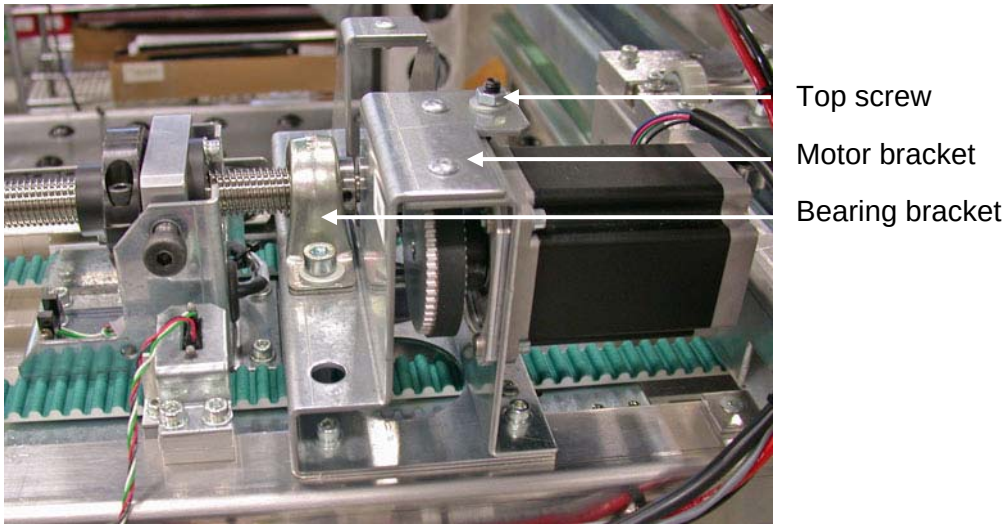
On the away side of the leadscrew (motor side):

10. Remove the two traveler nut shoulder bolts (circled).



11. On the leadscrew nut bracket, disconnect the table down sensor connector and pull the cable out through the grommet hole in the bracket.
12. Remove the leadscrew nut bracket—four screws.

13. Remove the leadscrew bearing bracket—two screws.



14. On the motor bracket, loosen the top screw and rotate the motor to relieve the motor belt tension.

15. Remove the motor bracket—four screws.

16. Remove the shaft collar from the motor and remove the motor from the bracket. The same motor will be reused on the new motor bracket later on in this procedure.

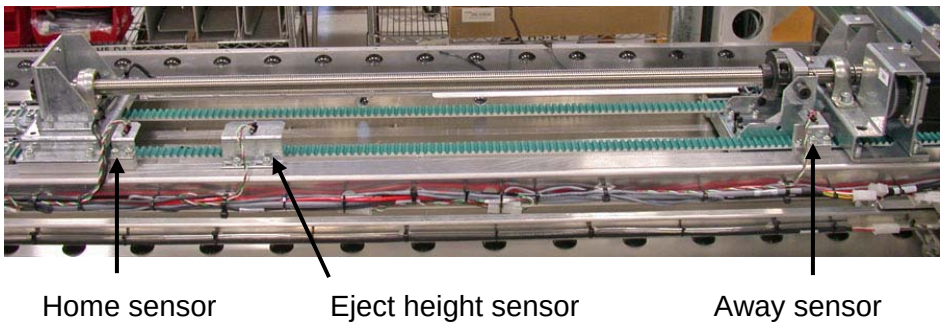
17. Remove the leadscrew assembly.

Removing cables and sensors:

18. Remove the cable track guide bracket—four screws.

19. Remove the cable track front bracket.

20. Remove the home sensor and the eject height sensor—two screws each. These sensors will be relocated later in the procedure.

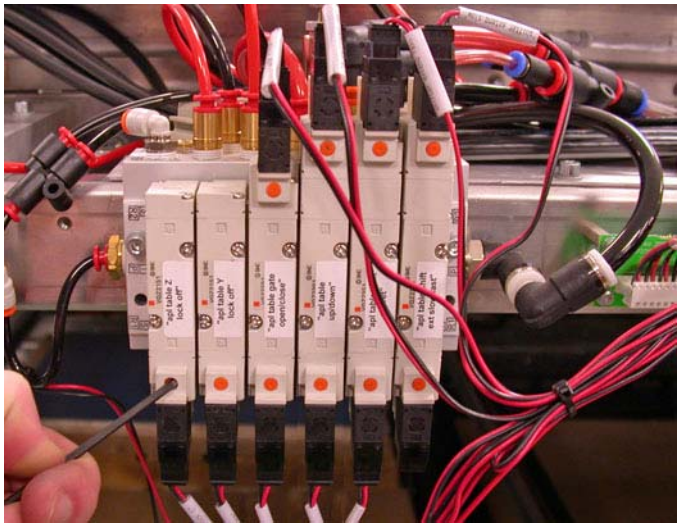


4. INSTALLING THE NEW EJECT STOP ASSEMBLY

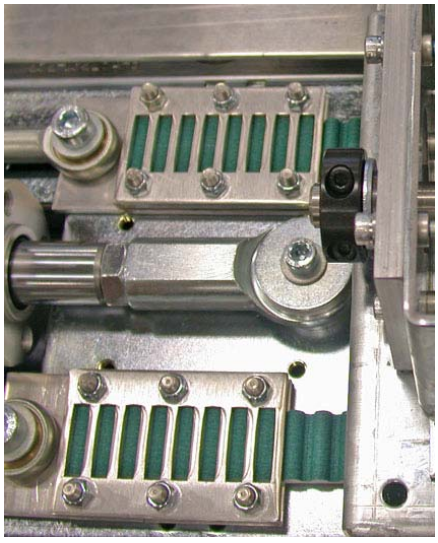
To install the new eject stop assembly, a large square hole must be cut in the table cross beam. There are also a number of mounting holes that must be drilled and tapped.

1. Disconnect the two ends of the table belt at the table lift cylinder:

   a) To release the tension in the belts, disconnect the two ¼ in. tubes from the table lift cylinder. On the table gantry manifold, press the **table z lock off** solenoid button and extend the cylinder by hand.
   When the belt tension is released, the table will go down until it rests on the table locks.



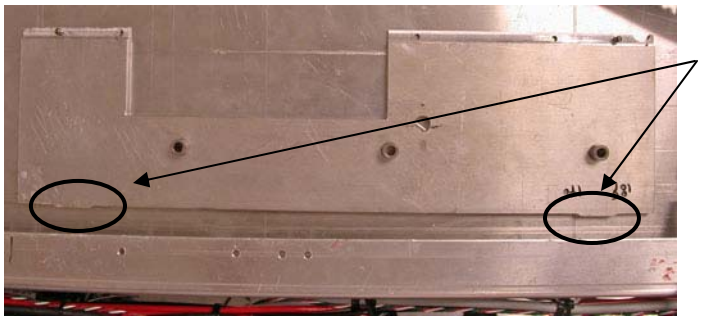
   b) Disconnect the belt ends at the belt clamps by the cylinder—do not loose the washers between the two clamp halves. Move the loose belts out off to the sides of the table beam so that they do not get damaged while cutting the large hole.



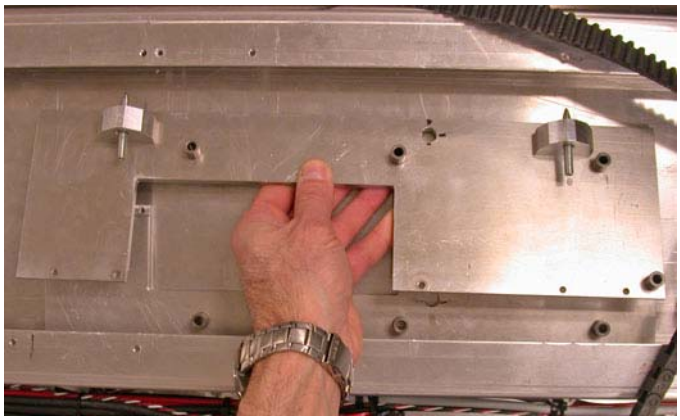
2. Retract the table lift cylinder by hand to make place for the drill jig.

3. Install the drill jig into the table beam channel:

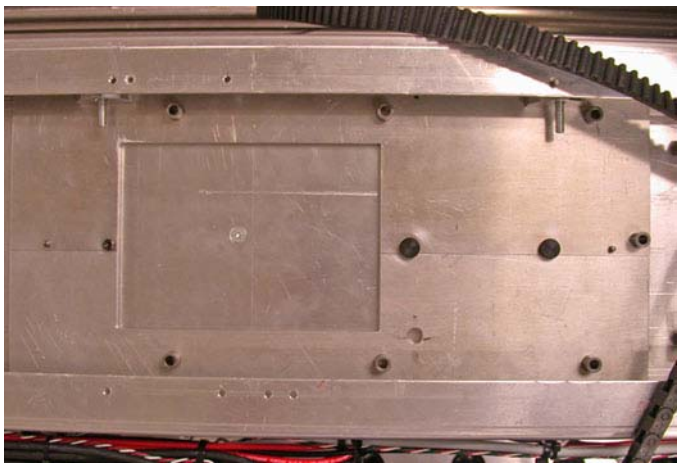
   a) Lay the front half of the jig (the one with the locating flats) on the table beam.



   b) Lay the back half of the jig onto the front half using the locating pins and corresponding holes to align them. The setscrews must be facing toward the rear of the APL.

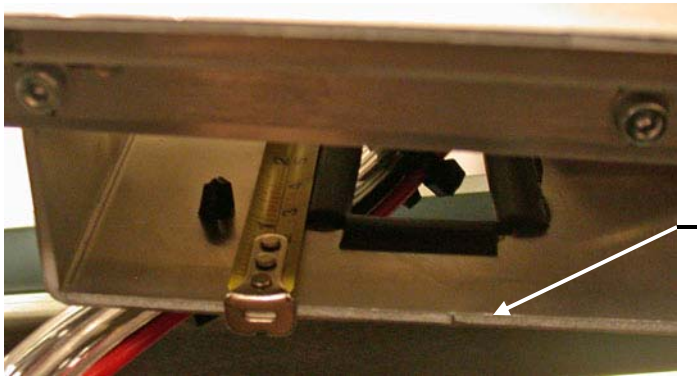


   c) Attach the two jig halves together with two thumb screws on the right of the hole and a soc-cap screw on the left. The jig should still be able to move within the table beam channel.

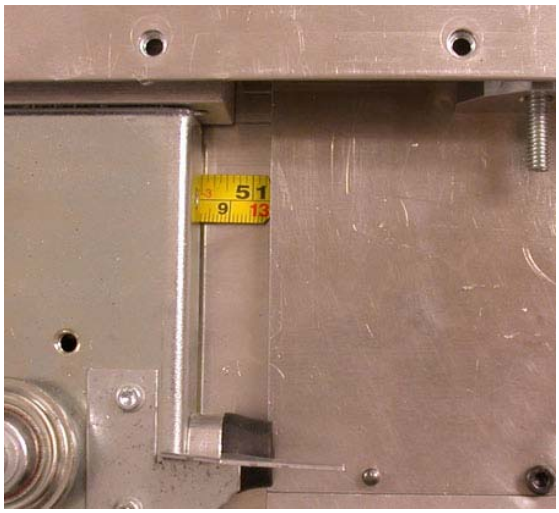


4. Position and secure the drill jig:

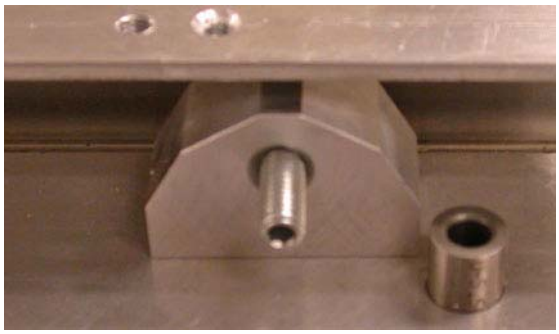
   a) Lay the 1300 mm section of measuring tape (from the tool kit) from the home end of the table beam through under any brackets to where the drill jig is located.



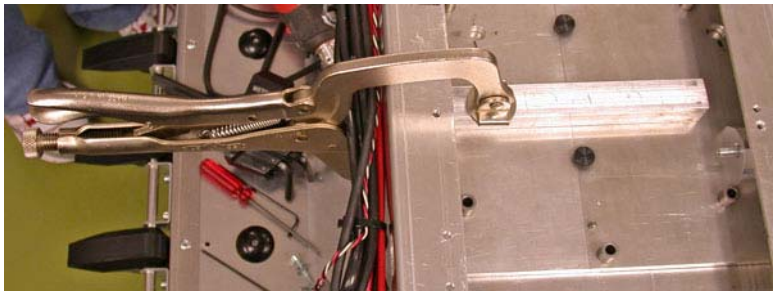
   b) Move the drill jig until the edge of the jig is against the end of the tape.



   c) Secure the jig in place by tightening the two pointed setscrews on the jig's rear half.

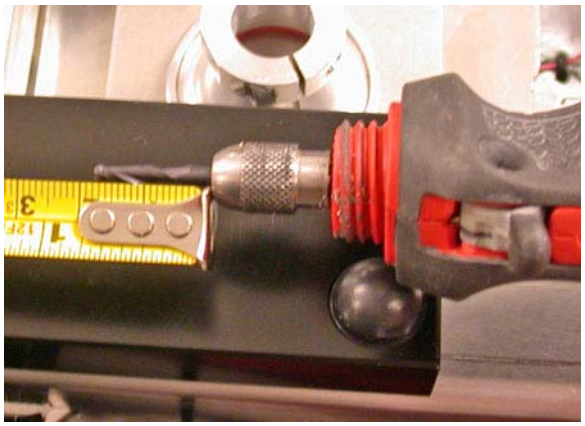


d) To ensure that the jig does not move while drilling or cutting, also use the clamp and metal bar from the tool kit to clamp the jig to the table beam.



5. Place a slip sheet or something similar under the table beam on the table to catch any metal debris from the drilling and cutting process.
6. Using a 5.5 mm drill bit, drill the seven holes through the hole bushings in the drill jig.
7. Cut the large square hole in the table beam for the eject stop assembly:

a) Insert the cutting bit in the cutting tool and tighten it in place so that only 18 mm of the bit is protruding.



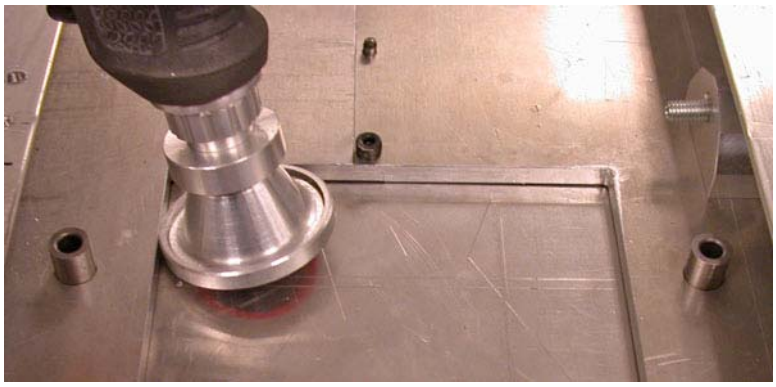
b) Screw the fist collar onto the cutting tool.



c) Slide the height collar onto the cutting tool and use the black depth block to adjust the cutting depth to the first level. Tighten the setscrew to lock the height collar in place.



d) Cut the first level groove by easing the cutting tool onto the table beam inside the drill jig guide hole. With the height jig flat on the surface, run the cutting tool all the way around the guide hole two times. Use cutting fluid while cutting the groove.



e) Adjust the height collar to the next deepest level on the black depth block and repeat the cutting process. Repeat this procedure until you have cut at all five depth levels.

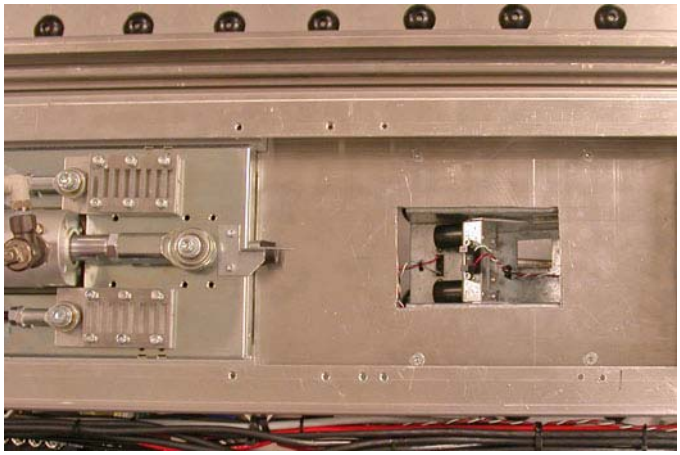
f) If the last groove cut is not all the way through, you can either adjust the cutting depth slightly deeper for one more cut, or use a utility knife or blade to cut the square free.

8. Remove the cutting jig from the table beam.

9. Use the tool (from the toolkit) to remove the burr both the top and bottom edges of the hole you just cut.

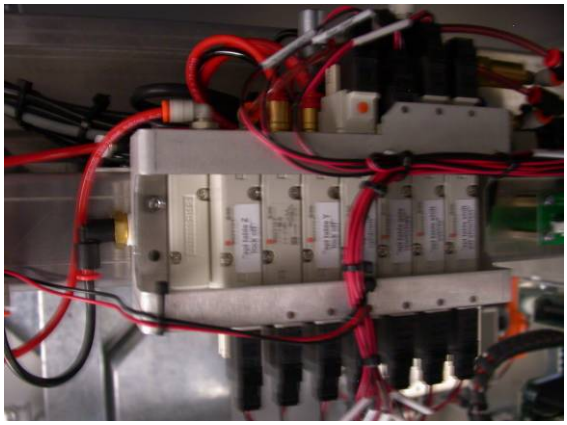
10. Countersink the seven holes that you drilled only enough to accommodate the screw heads that will be used to install the eject stop assembly.

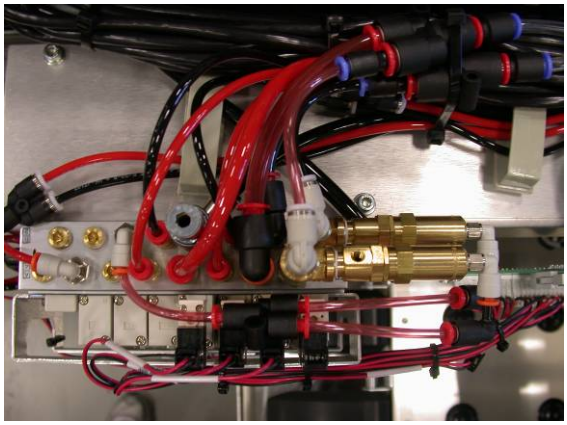
11. Install the eject stop assembly on the bottom of the table beam—seven screws.



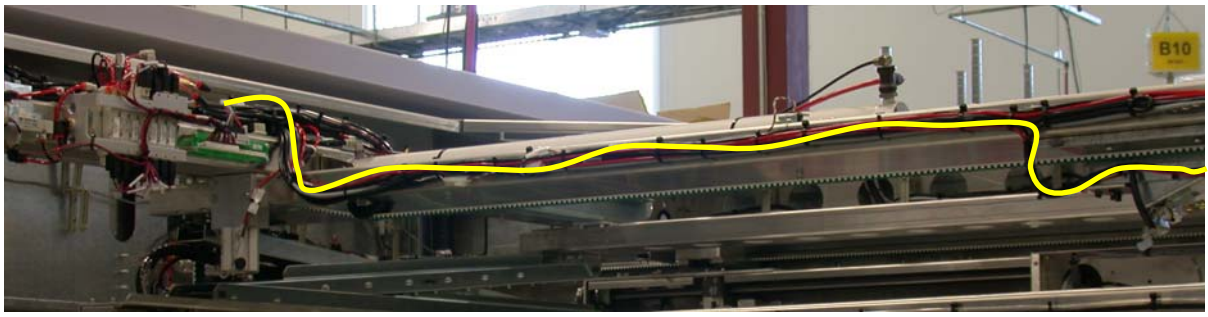
4.1 Installing the Eject Stop Assembly Tubes

1. Tee off the table gate Open/Close tubes using two Y-joint air fittings from the kit.

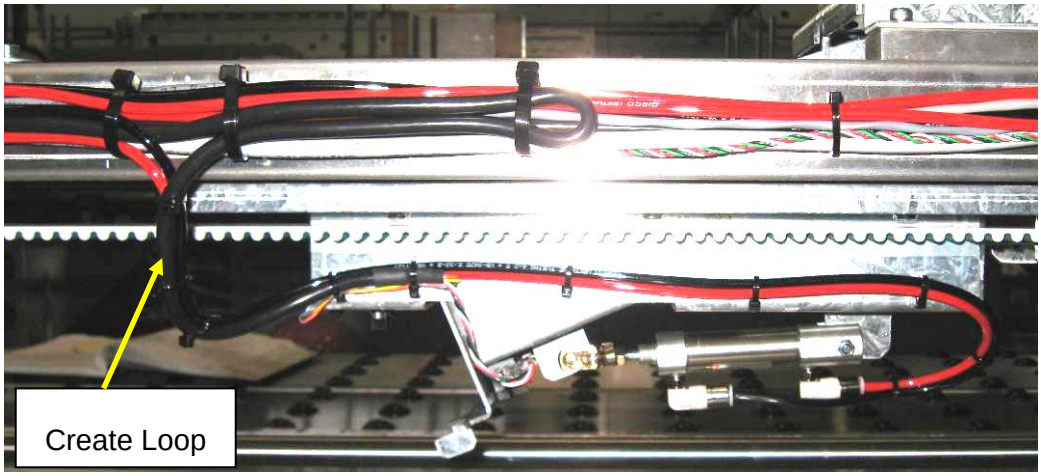




2. Run the tubes down along the upper table crossbar towards the table stop.



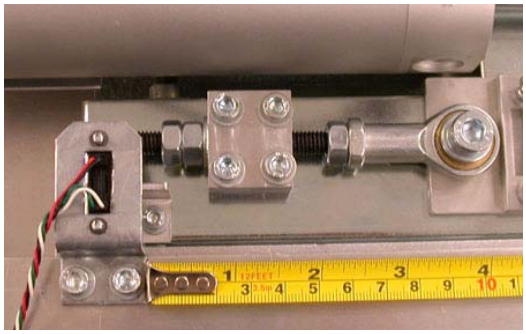
3. Create a loop around the belt so that the tubes do not contact the belt and route them to the cylinder.

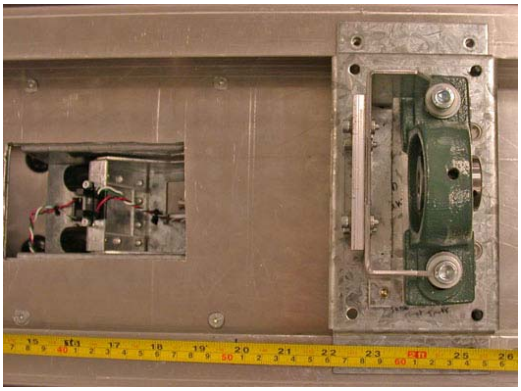


5. INSTALLING THE NEW LEADSCREW ASSEMBLY

On the home side:

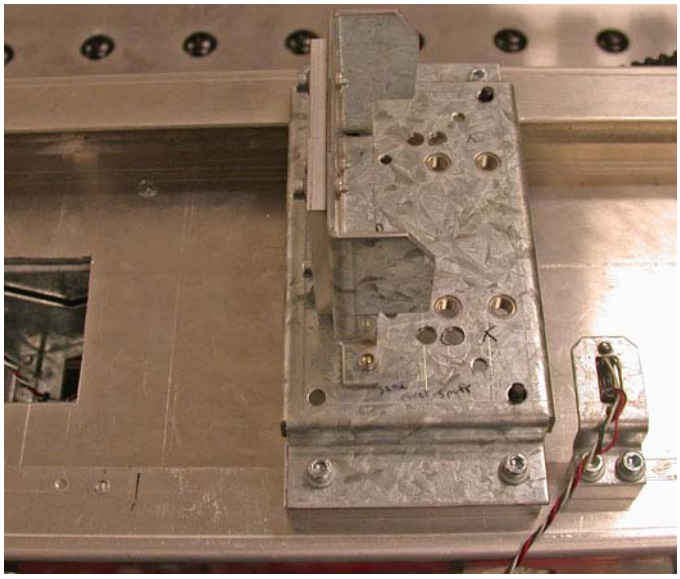
1. Place the home side leadscrew bracket (252-18139A) on the table beam to the right of the new eject stop assembly.
2. Measure 559.5 mm from the table up sensor bracket to the edge of the leadscrew bracket.



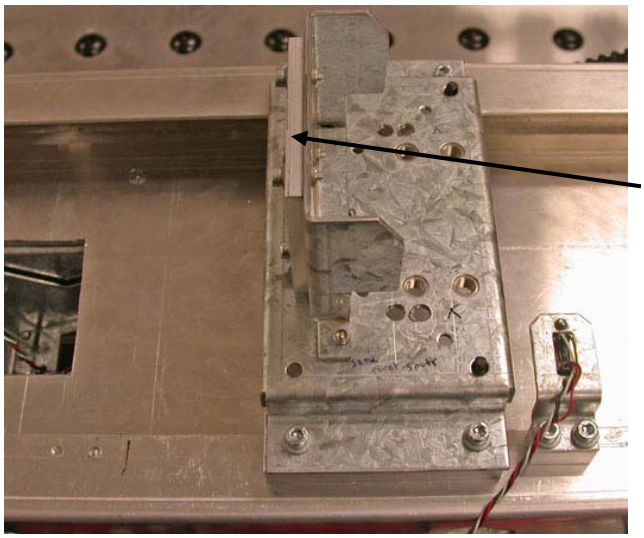


3. Square the leadscrew bracket to the edge of the table beam at this distance and center the bracket on the table beam. Mark the location of the four mounting holes.
4. Drill 4.2 mm holes and use a M5 tap to thread the holes.

5. For the new location of the home sensor, measure 661.5 mm from the table up sensor bracket to the closest edge of the home sensor bracket. The hole centers on the sensor bracket must be 8 mm in from the edge of the table beam.
   You may need to cut some cable ties to allow the sensor to reach its new position.



6. Mark the location of the two holes through the sensor bracket and drill 4.2 mm holes. Tap the holes with the M5 tap.
7. Install the home sensor bracket—two screws.
8. Install the home side leadscrew bracket—four screws.
9. Attach the bearing thrust plate to the home side leadscrew bracket.

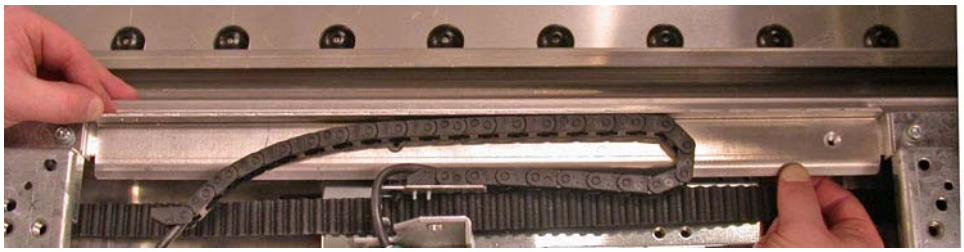


On the away side:

10. Install the motor onto the new motor bracket (252-18139A) with the connector facing upwards—four screws.
11. Install the new shaft coupler hub onto the motor shaft so that it is flush with the end of the shaft.
12. Place the motor bracket on the table beam. Measure 1101 mm from the table up sensor bracket to the closest edge of the motor bracket. Square and center the bracket and mark the location of the mounting holes. Remove the bracket.
13. Drill the holes using a 4.2 mm drill bit and tap them with a M5 tap.
14. Install the motor bracket—four screws.

Between the home and away sides:

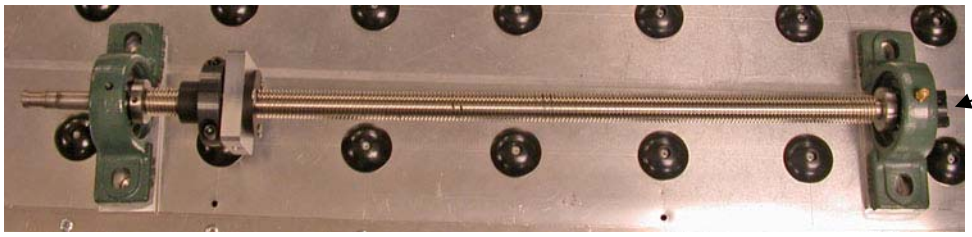
15. Center the new shorter cable track bracket (252-18142A) between the leadscrew bracket and the motor bracket on the rear of the table beam. Mark the location of the mounting holes and remove the bracket.



16. Drill the holes using a 3.3 mm drill bit and tap them with a M4 tap.
17. Install the cable track bracket.
18. Install the new leadscrew nut bracket (252-18140A)—four screws.
19. Run the table down sensor cable through the nut bracket grommet hole and connect the sensor cable to the sensor. Fasten the cable with cable ties.
20. Attach the cable track to the cable track bracket—two screws.
21. Secure the sensor cable to the cable tie mounts on top of the home side leadscrew bracket. Note: The leadscrew and bearing would not be installed yet.

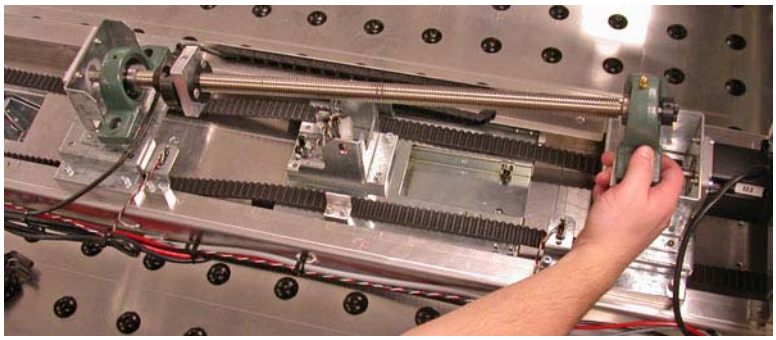


22. Assemble the leadscrew assembly before installing it onto the table. The coupler hub on the away side (right) must be flush with the end of the leadscrew shaft. Also note the orientation of the leadscrew nut.

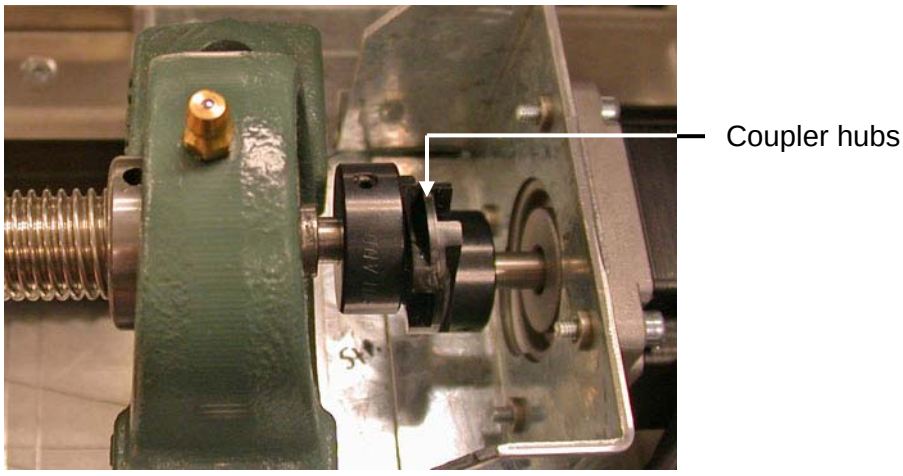


23. Install the leadscrew assembly:

    a) First put the home side of the shaft through the bearing thrust plate and then lower the away side in place.



    b) Where the leadscrew coupler hub and motor coupler hub mate, slide the mating piece in place to lock the two collars together.

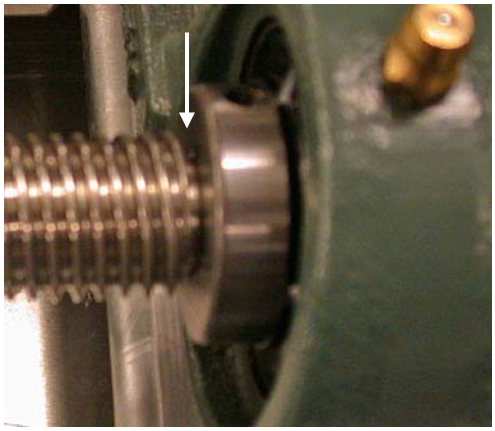


    c) On the home side of the leadscrew shaft, add the washers in the same order that they were removed from the original assembly.

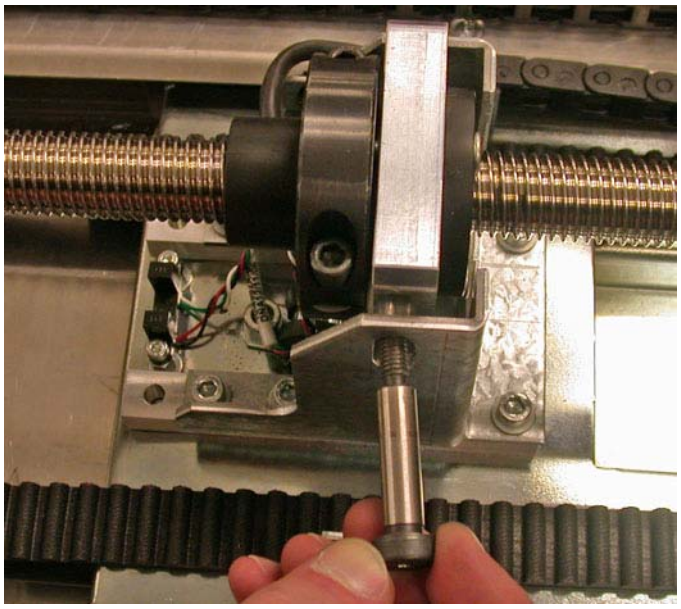
    d) Install the home side collar in the shaft groove and fasten it in place—two setscrews.

    e) Install, but do not tighten, the home side pillow block bearing—two screws. The bearing bracket must be up against the leadscrew shaft shoulder.

f) Install, but do not tighten, the away side pillow block bearing—two screws. There must be a gap of approximately 1 mm between the bearing and the leadscrew shaft shoulder.



g) Move the leadscrew nut to the nut bracket and install the two shoulder bolts to secure the leadscrew nut in place.

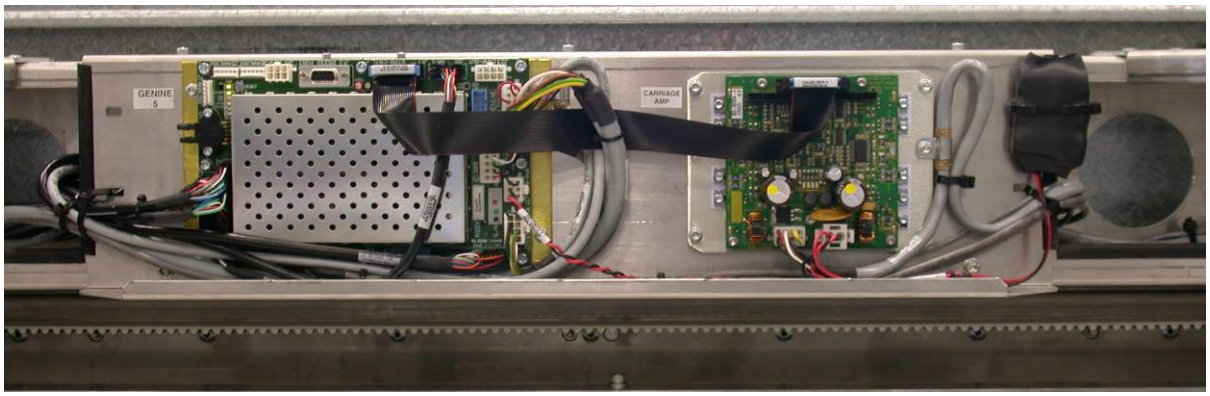


24. Extend the table lift cylinder by hand.

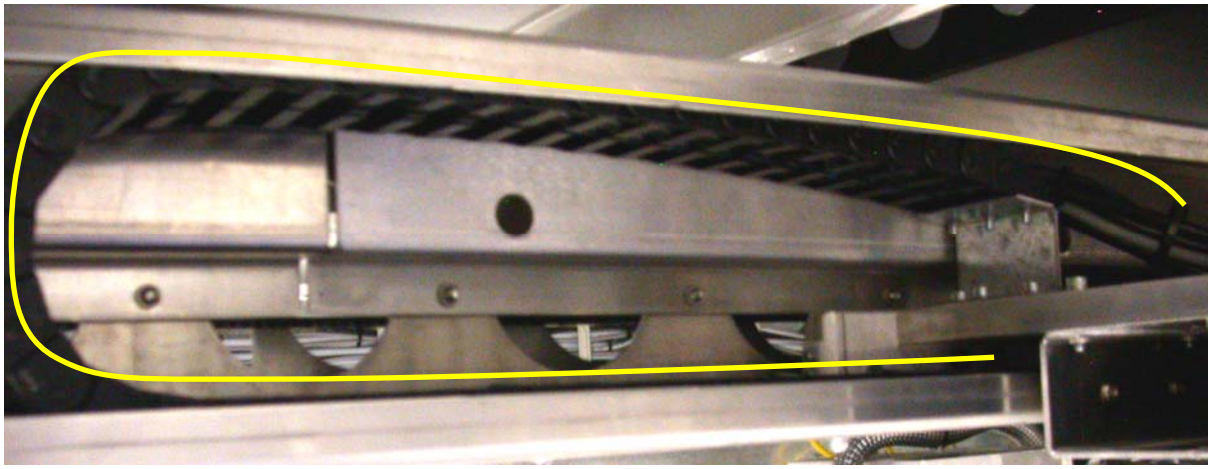
25. Ensure that the belt is not snagged on anything on top of and below the table cross beam and attach the two belt ends to the belt clamps at the cylinder. Don't forget to put the washers between the two clamp halves to prevent the belt from being compressed too much.

6. INSTALLING THE EJECT STOP ASSEMBLY SENSOR AND WIRING

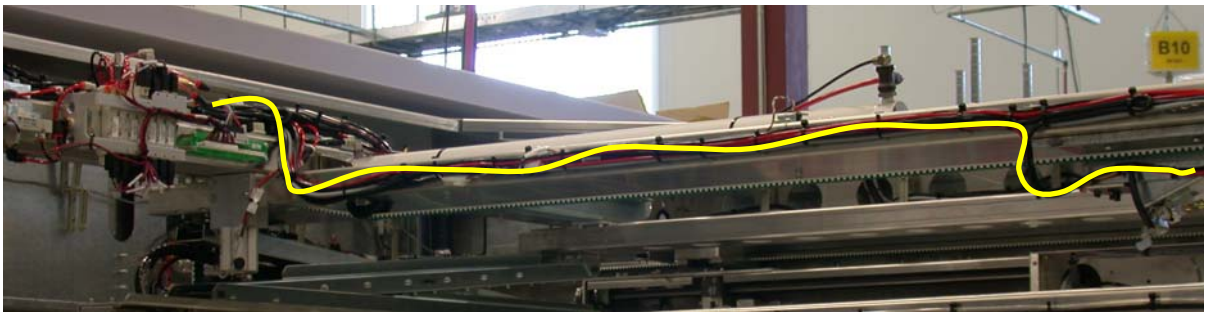
1. Plug the connector from cable ???? into J2 on GENINE 5 and route the cable left into the cable track.



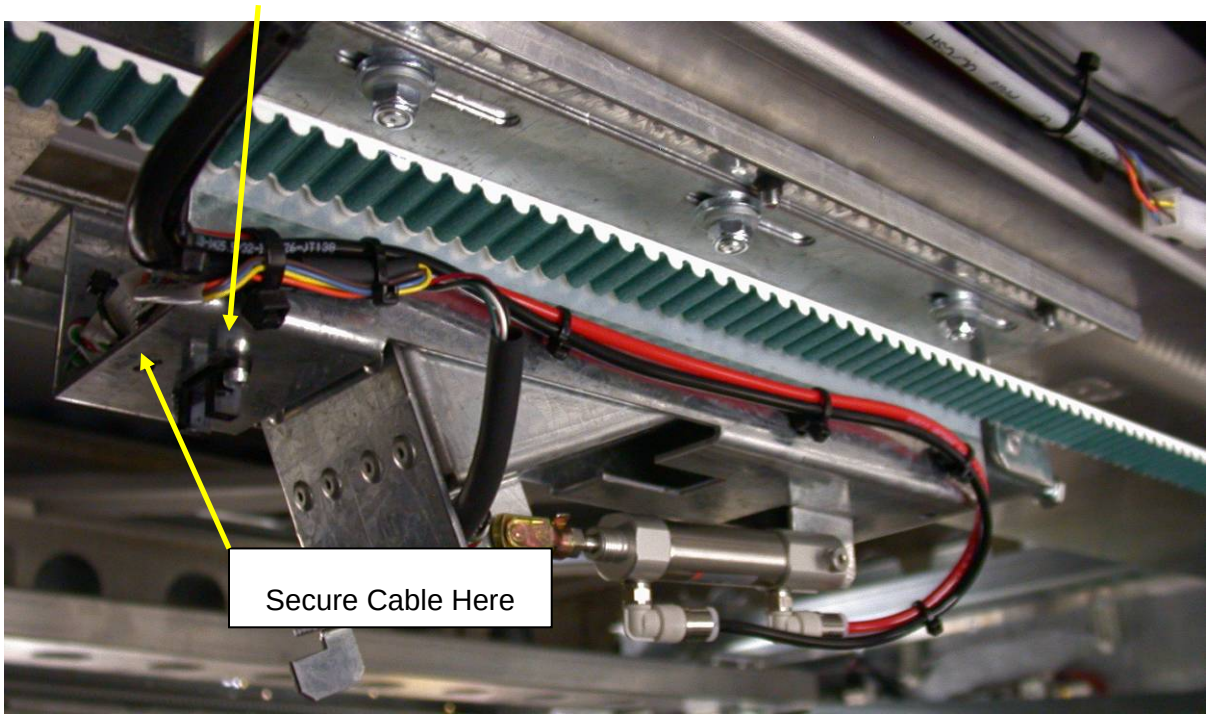
2. Run the cable through the cable track.



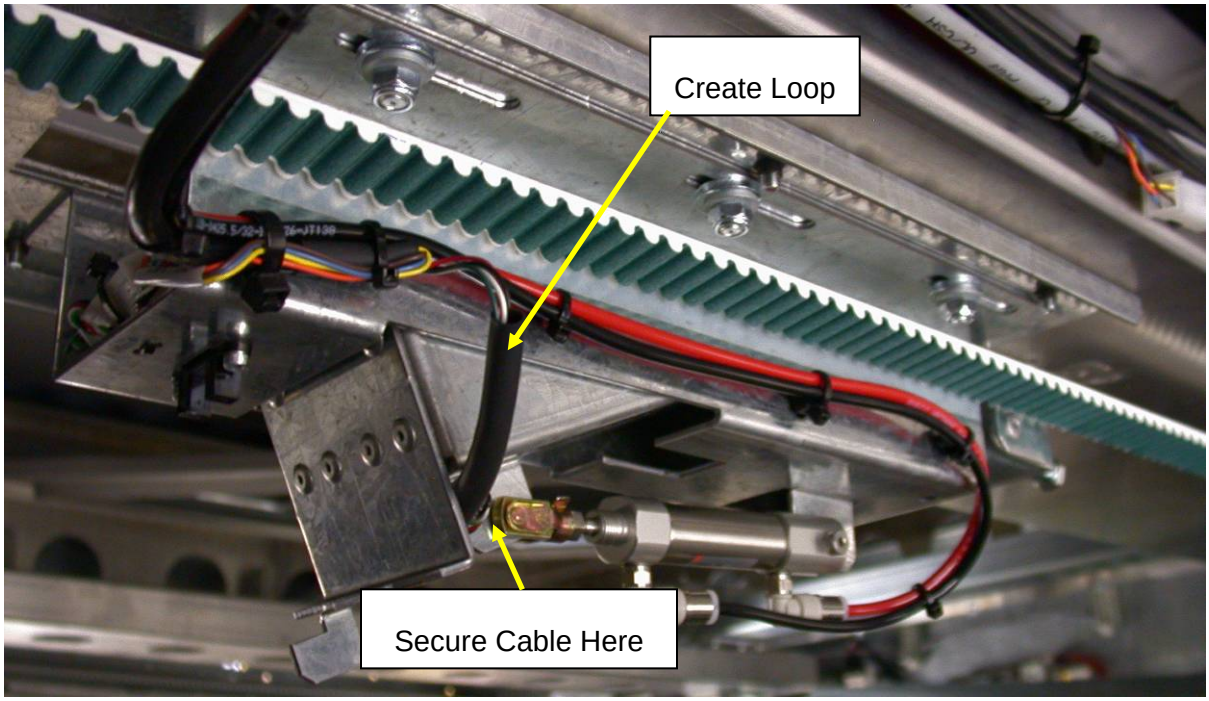
3. Run the cable along the table upper crossbar, following the existing cables.

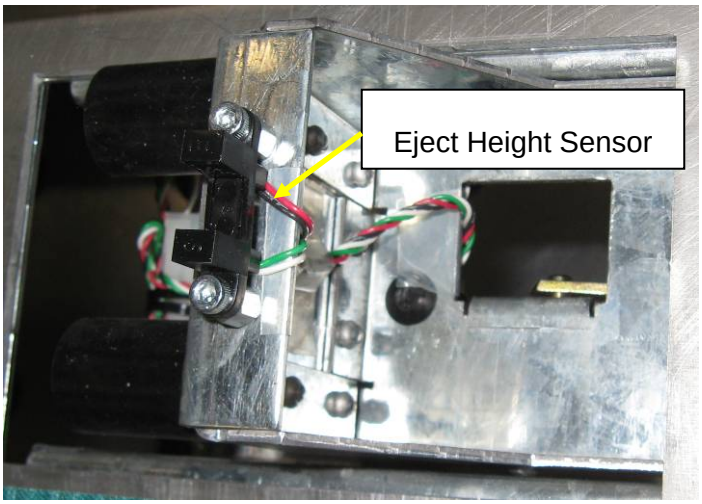


4. Connect the cable to the eject stop sensor and use the cable tie mount to secure the connector.



5. Connect the eject height sensor—create a loop with the highflex cable to prevent it from getting caught when the eject stop cylinder extends/retracts. Secure the cable using the cable tie mount located near the end of the cylinder rod eye.





7. ADJUSTING THE TABLE TRANSFER HEIGHT

When a plate is transferred from the table to the fetcher, the table height must be the same as the APL shutter deck. The height of the table is set by an adjustable hard stop.

To mechanically align the hard stop:

1. Initialize the APL. Type `>>init .`
2. Close the shutter. Type `>>apl shutter up .`
3. Move the APL table into position for the fetcher transfer. Follow the specific order of commands to avoid the firmware's safety checks at the command line level. Type:

   `>>apl gantry unlock`

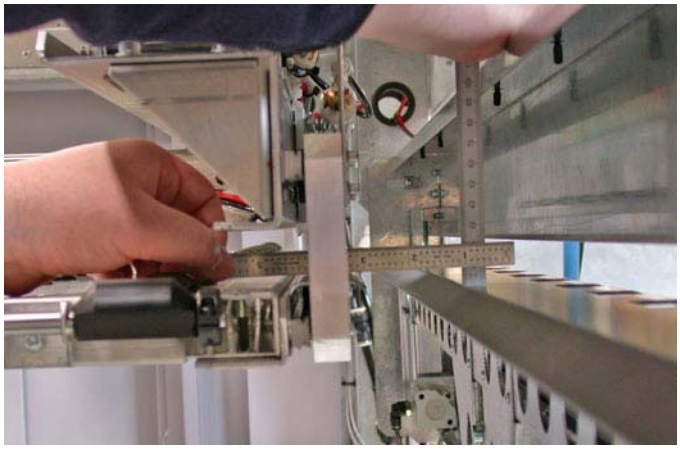
   `>>apl table y move 300`

   `>>apl table x move 0`

   `>>apl table gate open` (note this also raises the table stop)

   `>>apl table dn`

4. Measure the difference in height in mm between the APL table's transfer deck and the shutter's deck.



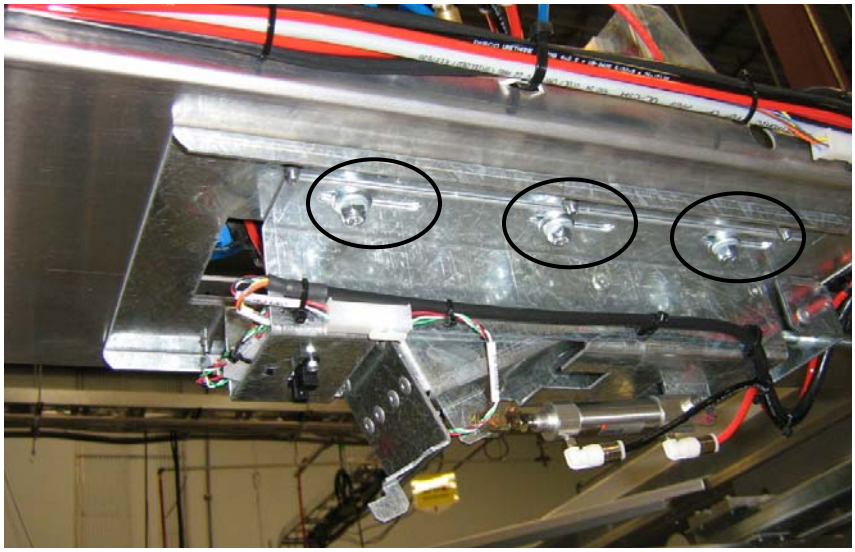
If the table height is the same as the shutter height, then no further actions are required. If they are not, measure the height difference and continue to the next step (the example in the photo shows that the table is 10 mm higher than the shutter).

5. Adjust the table height as follows:

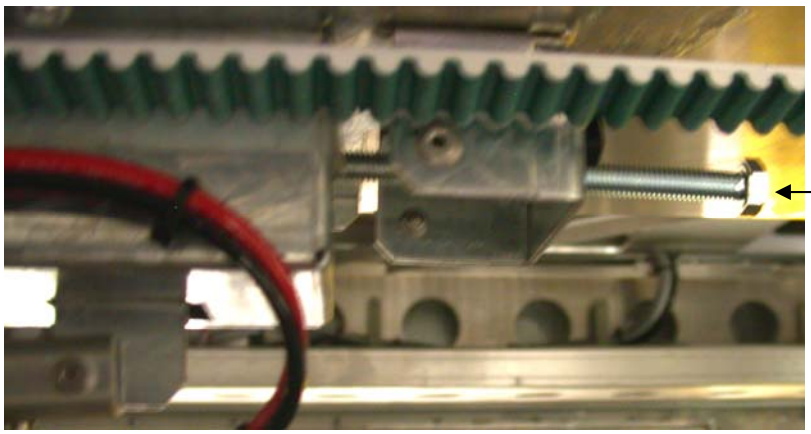
   a) Raise the table. Type `>>apl table gate close` .

   b) Mark the current position of the table Z-stop assembly as a reference.

   c) Loosen the nuts on the six adjustment slots.



   d) Using the fine adjustment bolt located at the back of the stop, move the stop by the amount of misalignment measured in step 5. Move the stop towards the big table Z-cylinder to raise the table transfer position and vice versa. In the example above, the stop should be moved 10 mm away from the table Z-cylinder.



   e) Tighten the nuts on the adjustment slots.

   f) Lower the table to verify the adjustment. Type:

```
>>apl table gate open

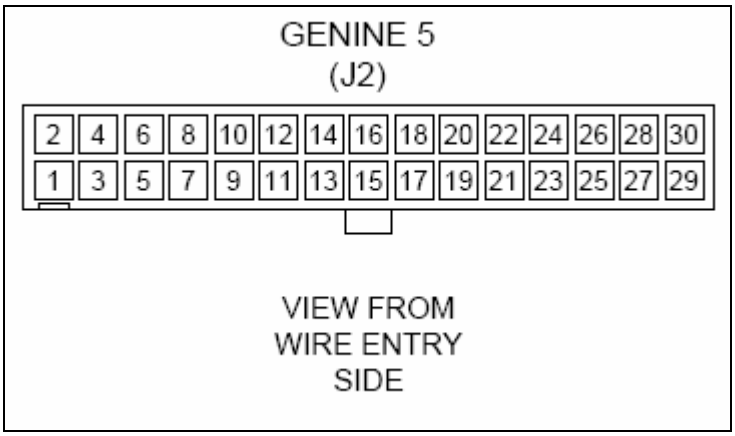
>>apl table dn
```

6. Repeat step 5 as required to fine tune the table height.

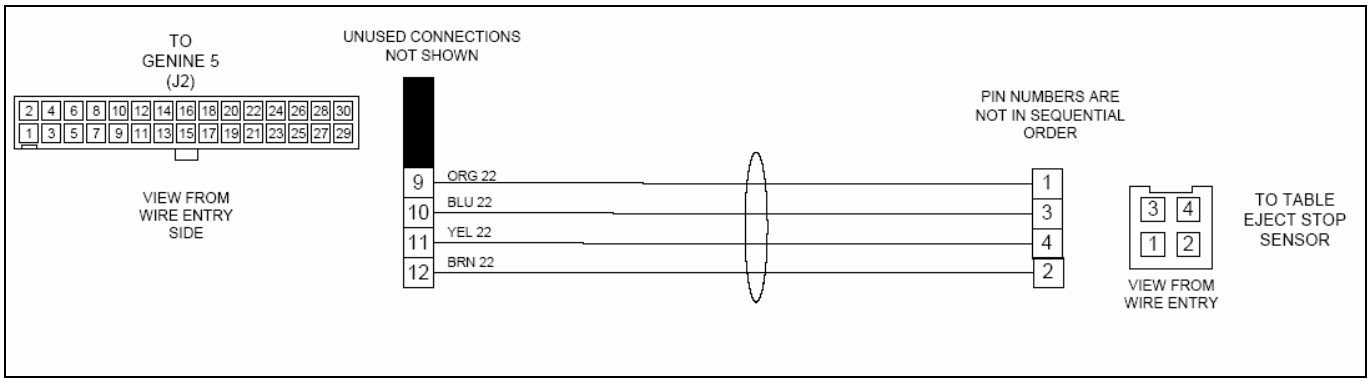
APPENDIX A

Adding pins to connector J2 on GENINE 5 for the table eject stop sensor:

1. Unplug cable 220-01629A from J2 on GENINE 5.
2. Using the pin removal tool (690-0032A), remove the pins from locations 9 to 12 on connector J2.



3. Insert the pins from sensor cable 220-02560A according to the diagram below. Ensure that the pins lock in place in the connector.



Note: If a pin does not lock in place, then the connector tab could have been damaged during the removal of the pins. If this happens, then connector J2 must be replaced with a new connector provided in the upgrade kit.
Using the pin removal tool, remove all 30 wires from the broken plug J2 and install them in the same location on the new plug. Move the wires one by one to avoid installing them in the wrong place.

4. Plug the connector back into J2 on GENINE 5.