Kodak

Automatic Pallet Loader

Picker Gripper Assembly Upgrade

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Revision History

Revision	Date	Author	Comments
1	16 Jan 2008	A.Blignaut	Draft release
2	22 Jan 2008	A.Blignaut	Edits from Steve Damiano
3	12 Mar 2008	A.Blignaut	Added removal and installation of the shoe in/out bracket
4	02 May 2008	A.Blignaut	Added table upgrade to handle small plates
5	06 May 2008	S.Damiano	Some procedure edits

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1. OVERVIEW

The picker gripper assembly upgrade is intended for customers that are using small plates. The grippers will prevent the small plates from sliding off during the picking process.

The upgrade involves adding a solenoid and regulator to the picker manifold, replacing the P-cup assembly, replacing the sensor bracket on earlier APLs, upgrading the table, and the necessary wiring and plumbing for the upgrades. The procedure for the left and right side picker towers is the same.

2. PARTS/TOOLS

Beta upgrade kit – 518-03178A

EP upgrade kit – 518-03176A

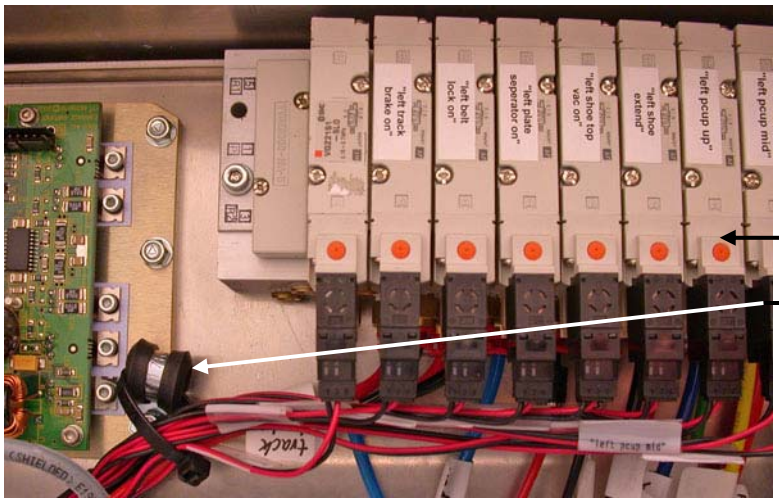
3. UPGRADING THE GRIPPERS

1. Move the picker to the front of the APL. Type `>>apl init .`
2. Move the picker shoes down. Type `>>apl picker z move +200.`
3. Idle the picker towers in the X direction. Type `>>apl picker X idle .`
4. Disconnect the picker from the Y-belt. Type `>>apl picker belt off .`
5. Idle the pusher so that it can be moved out of the way by hand. Type `>>apl pusher Y idle .`
6. Unlock the APL doors. Type `>>apl unlock .`
7. Open the front doors to gain access to the picker towers.
8. Move the pusher by hand towards the rear of the APL to give yourself more working space.
9. Turn off the compressed air at the APL regulator.
10. Turn off the power to the APL.

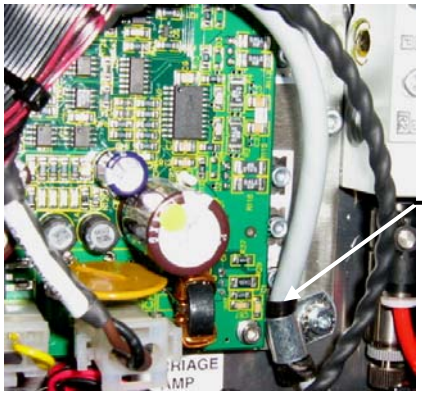
3.1 Upgrading the Picker Manifold

Some early production APLs will have the manifold cable and additional tubing for the gripper already installed. On all beta APLs and the first few early production APLs, all the necessary hardware must be installed.

1. Without disconnecting any cables or tubes from the picker manifold, remove the mounting screws so that it is easier to install the new gripper solenoid and regulator.



2. On the carriage amplifier board next to the manifold, rotate the cable clamp so that it points inwards.
   This will make space for the new regulator and solenoid.



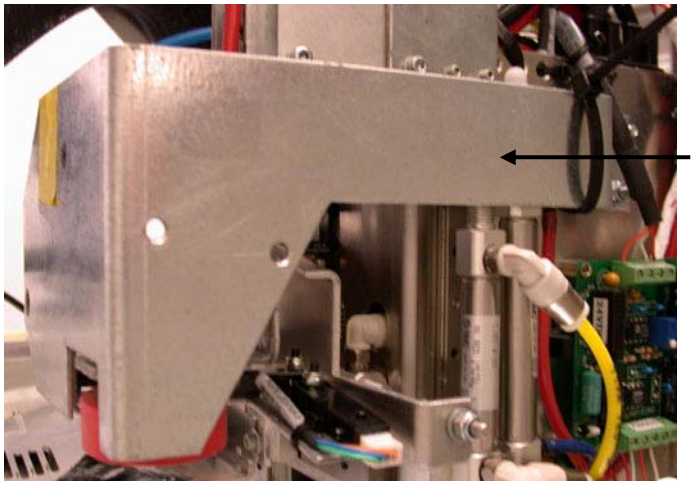
3. In the blank spot on the end of the picker manifold, install the gripper regulator at the back, the new fitting [55-0084] at the front, and the solenoid.
   The regulator should be preset to 45 psi, but they will need to be adjusted once installed. This will happen later in the procedure.



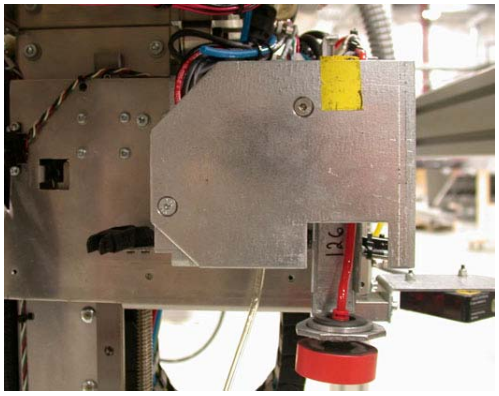
4. If there is no connector for the gripper solenoid installed, then remove the manifold cable between the picker GENINE J18 [located on opposite side of picker] and the manifold and install the new cable from the kit. Connect all solenoids including the new gripper solenoid.
5. Reinstall the manifold back onto the picker tower using the two mounting screws.
6. Install the red and black tubes for the gripper solenoid if they are not already installed. Route the tubes down to the top of the P-cup assembly. At the solenoid, connect the red tube to the regulator.

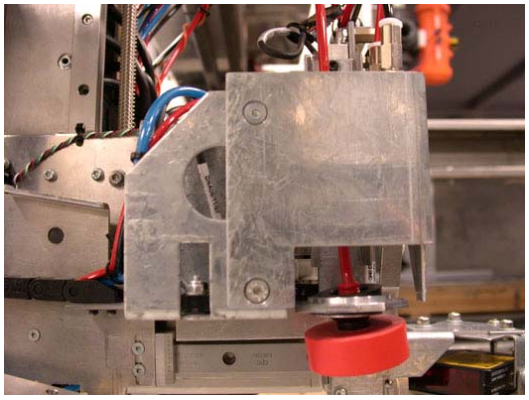
3.2 Installing the New P-cup Assembly

1. Remove the P-cup assembly guard bracket—two screws and two nuts.



2. The sensor bracket must be replaced on beta APLs and some early EP APLs. Shown below is the old style on the left and the new style on the right that does not need replacing.





To replace the old style bracket:

a) Remove the bracket—two screws.

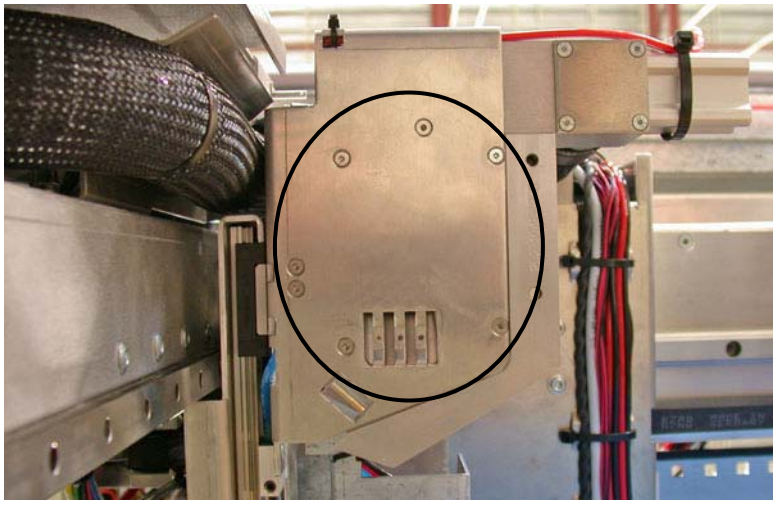
b) Remove the three sensors from the bracket without disconnecting them.

c) Install the sensors on the new bracket from the kit.

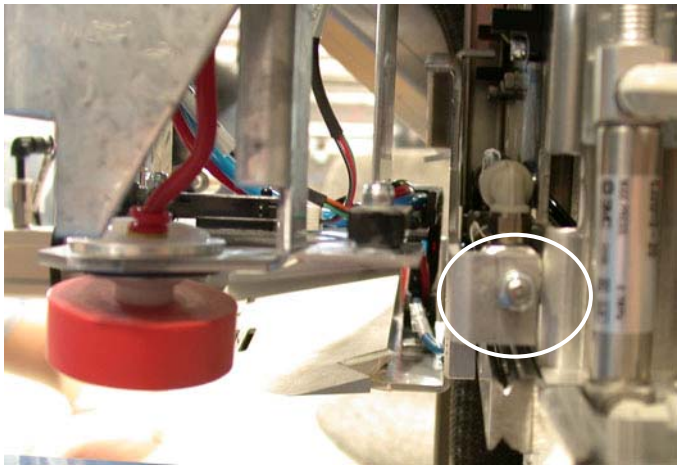
d) Install the new bracket—two screws.

3. Replace the picker shoe in/out bracket:

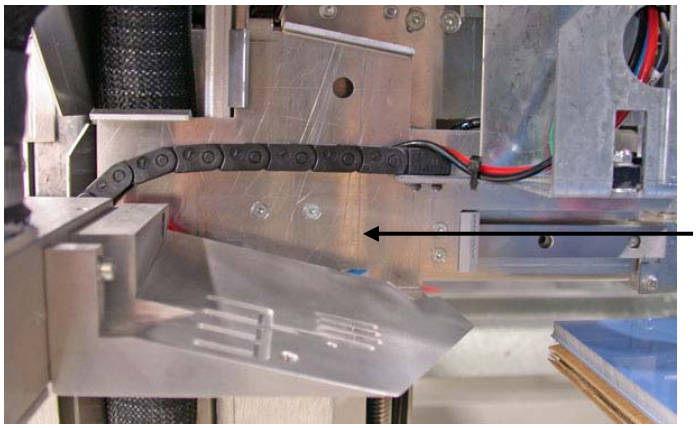
a) Remove the picker shoe—seven screws on the underside of the shoe (two of those screws secure the flex track to the shoe).



b) Remove the nylock nut at the end of the cylinder.



c) Cut any cable ties that secure the cylinder tubes to the bracket and remove the picker shoe in/out bracket—four screws.

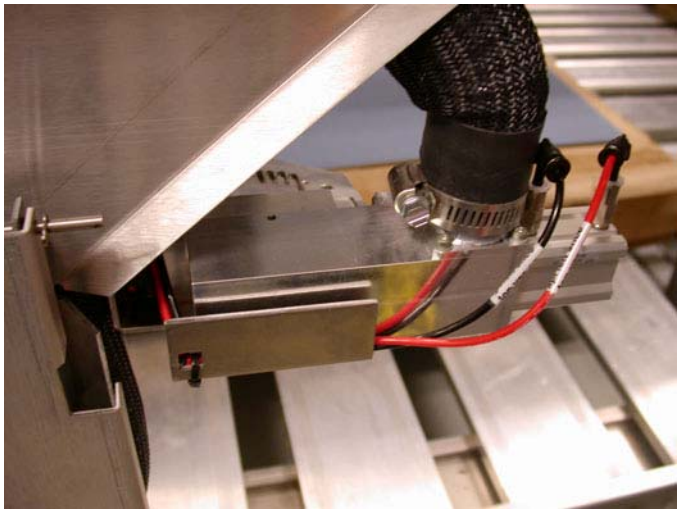


d) Remove the plate separator from the end of the in/out bracket. You may need to disconnect the tube from the plate separator to remove it from the bracket.

Note: Now is a convenient time to do the picker shoe orifice upgrade (see 719-00977A) if it has not already been done.

e) Install the plate separator on the new in/out bracket and reconnect the tube if it was removed.

f) Install the new in/out bracket—four screws. Route the tubes between the cylinder and the bracket and secure them with cable ties.

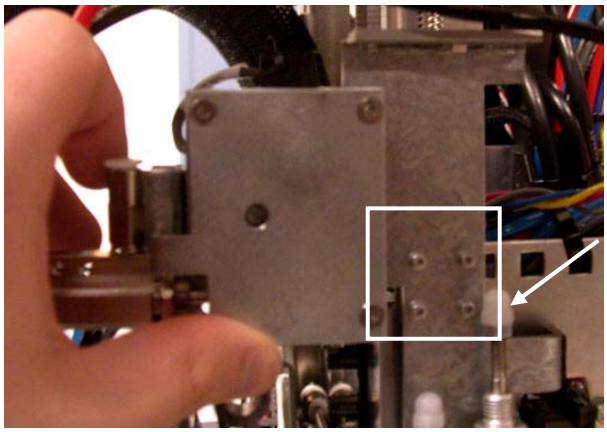


g) Install the cylinder end nylock nut. Do not tighten the nylock all the way, there should be ~1 mm gap between the nylock and sheet metal. Otherwise the cylinder will be over constrained.

h) Install the picker shoe and secure the flex track to the shoe.

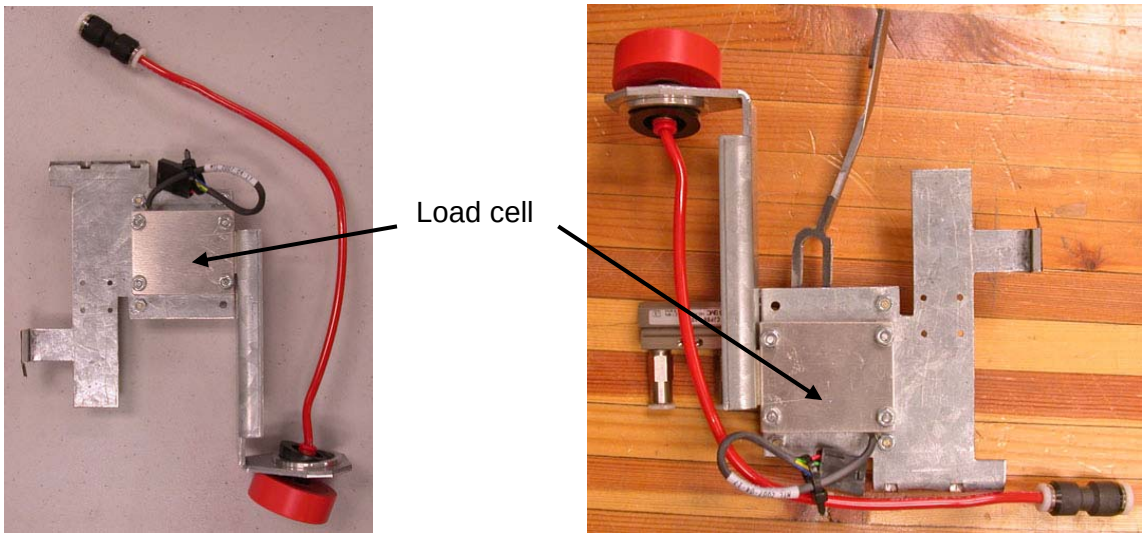
4. Disconnect the P-cup tube and the load cell cable on the P-cup assembly.

5. Remove the P-cup assembly from the picker tower—four screws.
Note: Ensure that the rail slider bearing does not fall off the rail. Use a wrench or something similar to prevent the bearing from falling off.

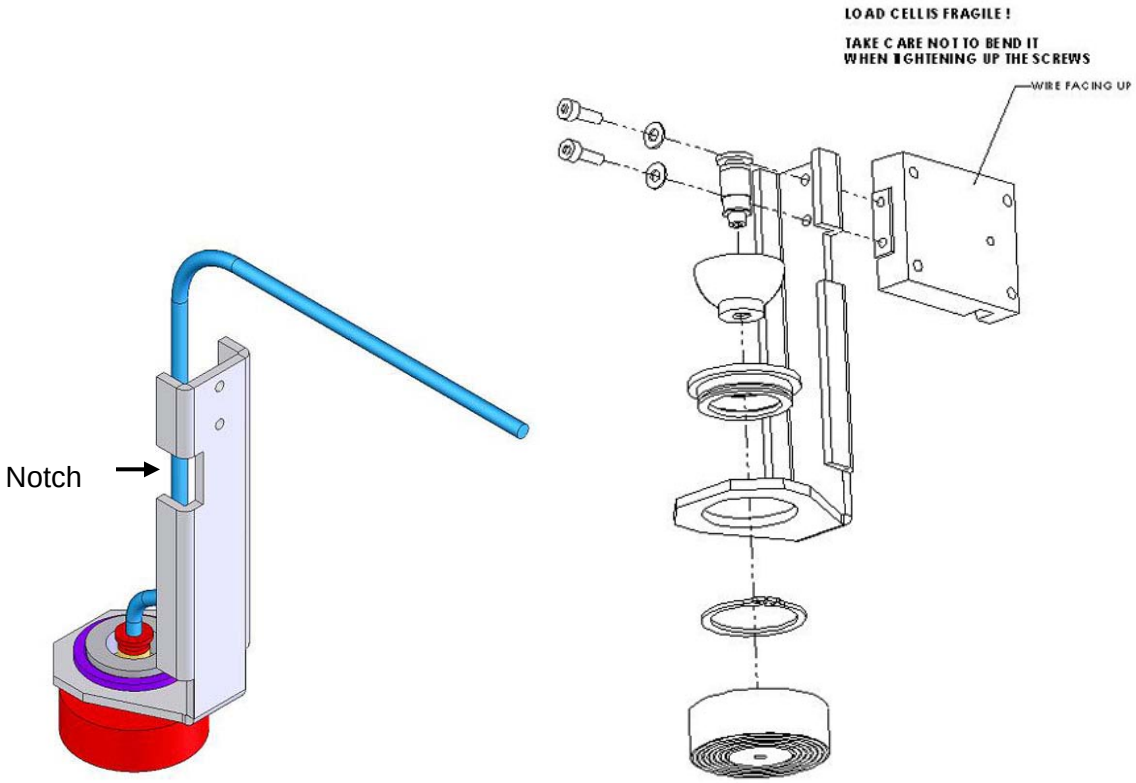


6. Remove the load cell with the P-cup still attached from the P-cup assembly—four nuts.

Note: Take extreme care with the load cell cable. The wires are delicate and may break easily. Ensure the washer spacers are located between the load cell housing and cover are not lost.



7. If the P-cup bracket does not have a notch in it, then it must be replaced with a new bracket from the kit.



To replace the P-cup bracket:

a) Use snap ring pliers to remove the P-cup retaining circlip.

b) Unscrew the P-cup from the bracket.

c) Remove the load cell from the bracket—two screws.

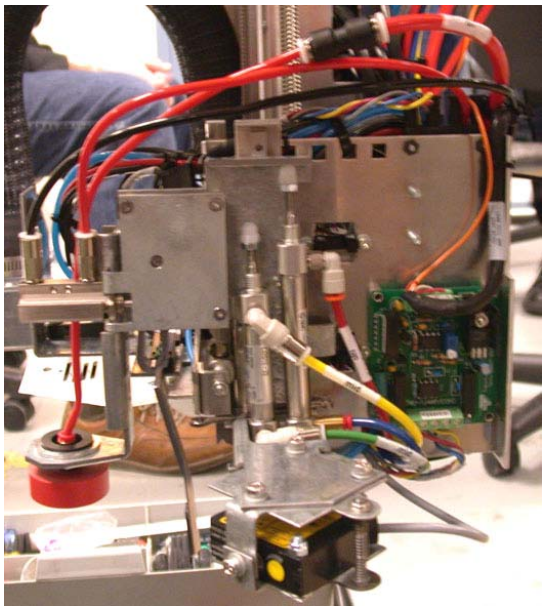
d) Install the load cell onto the new bracket (notched).

e) Install the P-cup onto the new bracket and secure it with the circlip.

8. Install the P-cup bracket/load cell onto the new P-cup assembly. Ensure the washer spacers are in place between the load cell housing and cover plate.
   The P-cup assembly should be preassembled from the factory with the gripper arm and cylinder installed.

9. Install the new P-cup assembly—four screws.

10. Connect the red P-cup tube and the load cell cable. Also connect the red and black tubes from the gripper solenoid—the black tube connects to the gripper cylinder fitting closest to the plate stack.

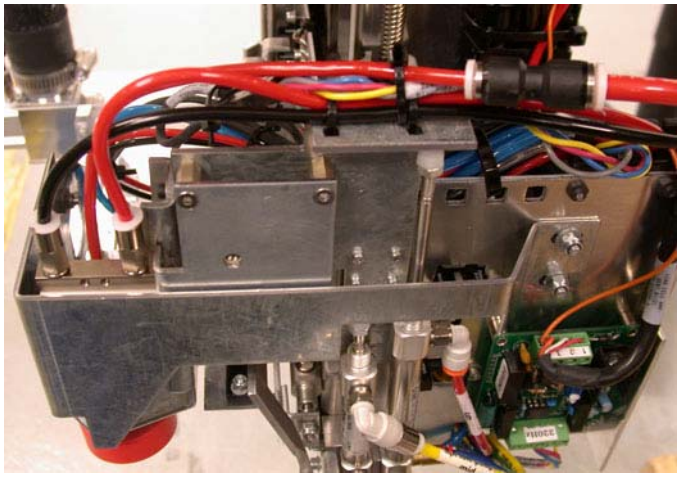


11. Install the P-cup assembly guard bracket—two screws and two nuts.

12. Secure the P-cup tube loosely to the top of the P-cup assembly with a cable tie.

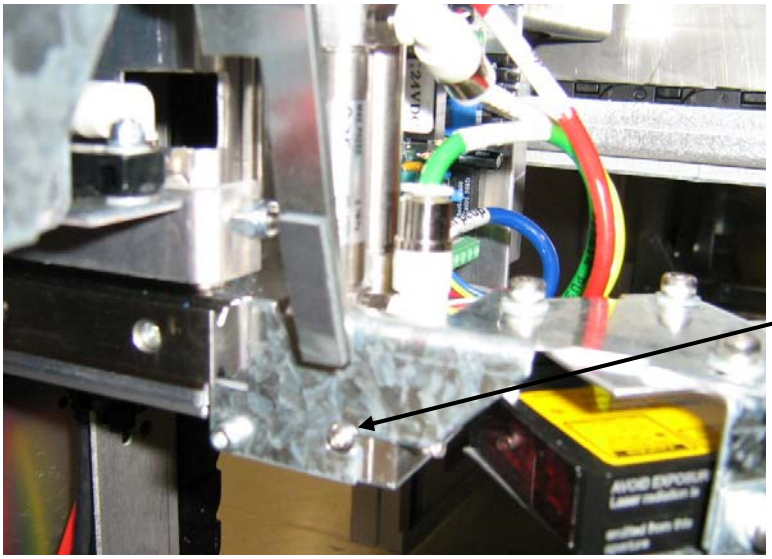
13. Secure the two gripper tubes to the top of the P-cup assembly with a cable tie.

14. Secure the load cell cable with cable ties.



15. Check that the P-cup assembly can move up and down freely.

16. Replace the screw directly in line with the gripper finger with a button head screw.



17. Check the load cell calibration according to the procedure posted on TechPlanet. The calibration may be out after transferring the load cell from one assembly to another.

18. Install the new gripper assembly on the other picker tower.

19. Turn on the compressed air at the APL regulator.

20. Check that the gripper finger is free to move up/down in its slot without binding on anything.

21. Check the air pressure at the plate gripper regulator and make certain that they both are set to 45 psi. Use your pressure regulator 93-0005B and the fittings included in the kit to adjust the pressure.

3.3 Testing the Plate Grippers

1. Close the APL doors.
2. Turn on the power to the APL and allow it to initialize.
3. Check that the grippers are functional. Type `>>apl plate gripper on/off` .

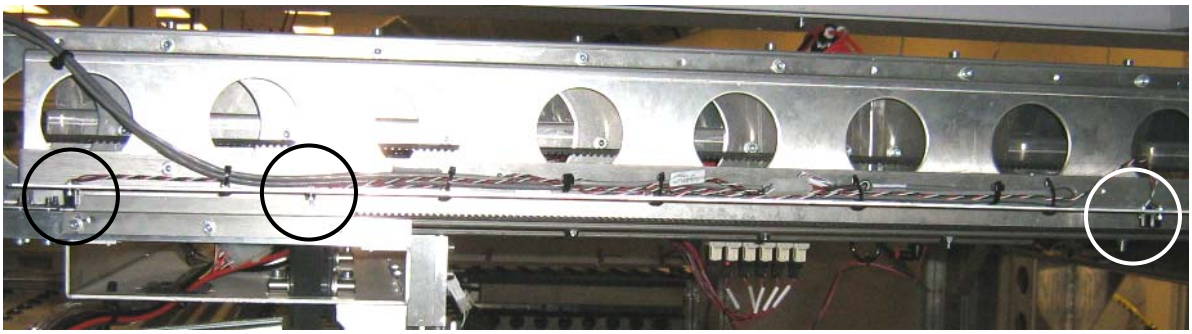
4. UPGRADING THE TABLE

The table upgrade is to enable the table to handle small plates. Because the position of the plates on the table in the Y-direction will change, we must compensate for the following:

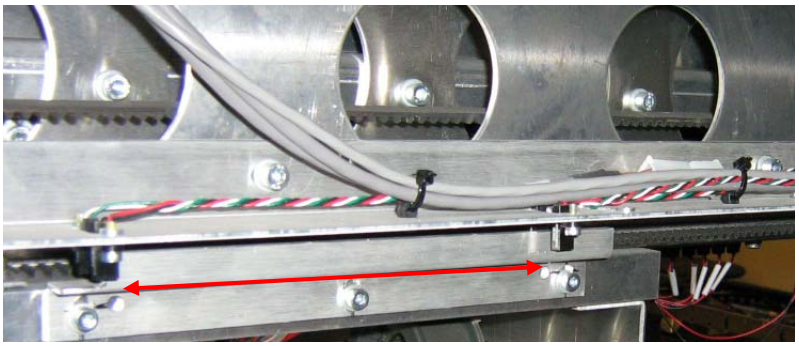
- The Y-movement of the table.
- The position of the safe sensor.
- The proximity of the table to the rear of the APL—the table will be closer to the back of the APL when transferring a plate to the fetcher.

4.1 Replacing the Table Y-axis Sensor Bracket

1. Note the position of the home (left), safe (middle), and away (right) sensors. Cut the cable ties securing the sensor cables and remove all three sensors from the existing table Y-axis bracket.

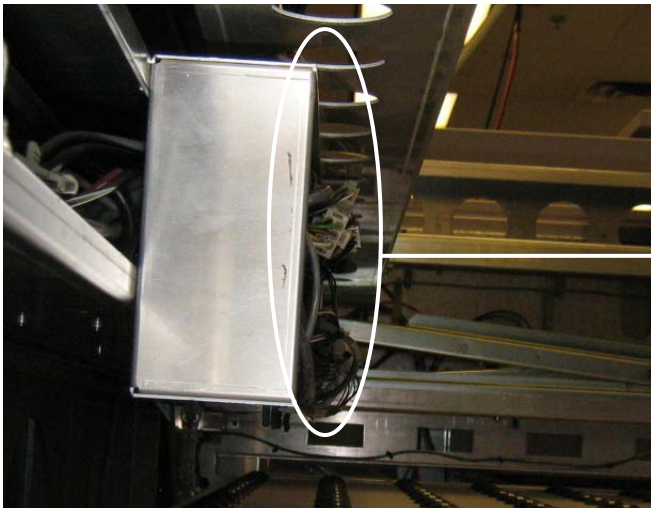


2. Remove the old bracket and install the new one from the kit with four M5 SHCS. The kit may contain both the 51 in. (252-11027B) bracket and the 63 in. (252-14614B) bracket. Discard the unused one.
3. Install the three sensors into the appropriate slots—the home and away positions have not changed, but the safe sensor will be closer to the home sensor by 30 mm (1.2 in.). The separation distance between the home and safe sensors is 155 mm (6.1 in.).



155 mm between sensors

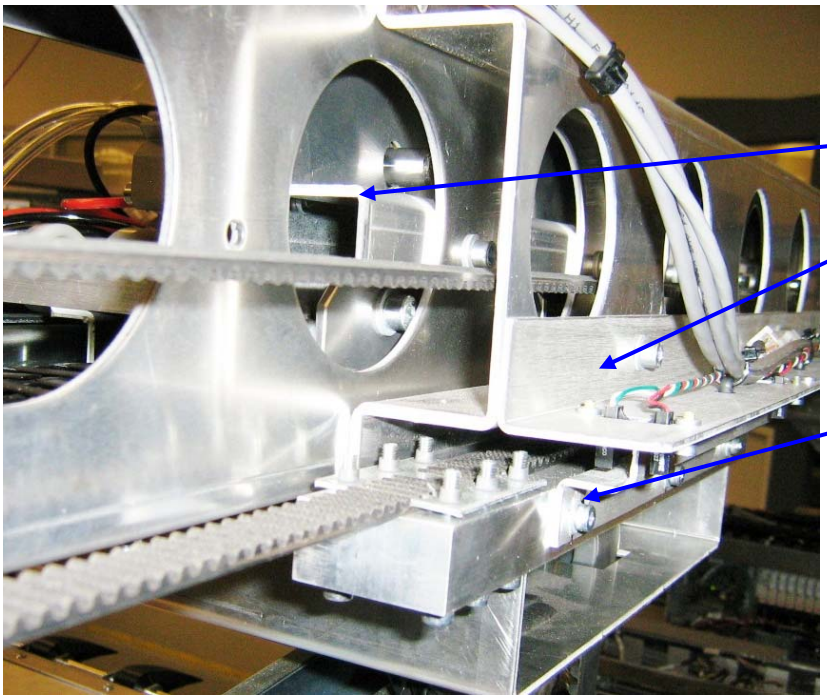
4. To prevent cable interference, check the picker gantry electronics tray cables to ensure that they do not protrude outside of the tray. If they do, secure them inside the tray with cable ties.



Protruding cables

Because the table now travels closer to the electronics tray when transferring a plate to the fetcher, it may snag any protruding cables.

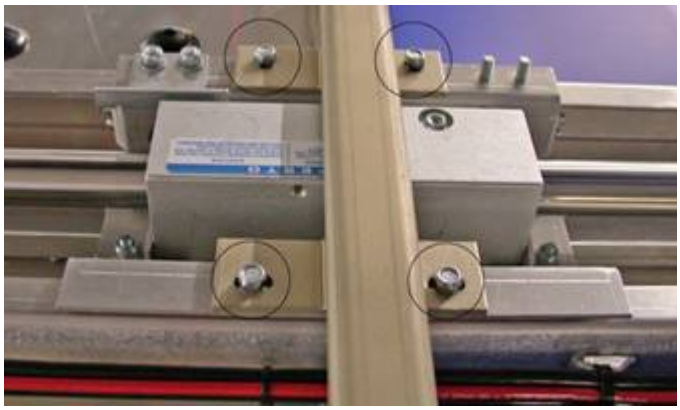
When the Table Y is moved home, a lock engages. This lock pin must be aligned with the hole by adjusting the Table Y home tab.



5. Ensure the table gantry is locked to the picker gantry.
6. Move the Table Y home. Type: `>>apl table y home.` This will engage the lock.
7. Look at the relative position of the pin to the hole from BOTH sides. The clearance to the edges of the hole should be roughly equal on both sides. If not, then an adjustment of the home sensor is required. If the command fails, this indicates that the lock pin is substantially out of alignment.
8. To adjust the home sensor, loosen all M4 bolts holding the angle bracket to the gantry. The bracket has adjustment slot holes.
9. Repeat steps 2-4 until the pin is centrally located in the hole.

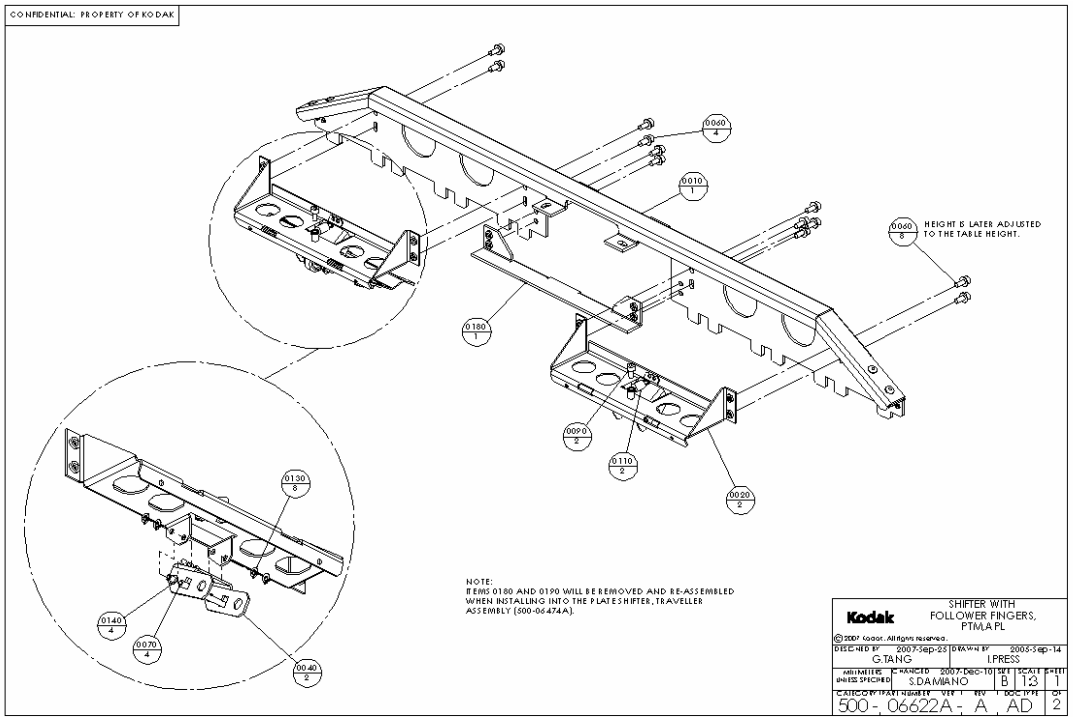
4.2 Rotating the Table Shifter

1. Remove the table shifter—four M5 nylock nuts.



2. Remove the following fingers from the shifter—four M5 SHCS.

3. Install the new following finger components on the shifter as per drawing 500-06622A. Note the orientation of the shifter will be rotated 180 degrees. Do not tighten the four M5 SHCS yet.



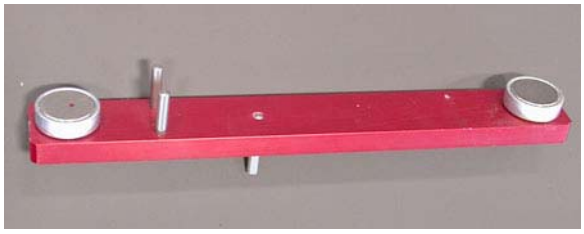
4. Install the table shifter and secure it with the four M5 nylock nuts.

5. Adjust the height of the following fingers by moving the M5 SHCS up/down in their slots. The following fingers should be as close as possible to the table top, but must not contact the top throughout the stroke of the shifter. Tighten the M5 SHCS.

6. Install the new UHMW table shifter tab (252-13354A) with two M3 SHCS.

4.3 Aligning the Table Shifter

In this procedure you will adjust the table shifter so that it is parallel to the Magnus VLF's MABs. You will need the two special magnetic alignment tools (690-01081A) found in the APL installation kit and/or a large plate with parallel mainscan edges.



1. Raise the Magnus VLF's shoulder panel closest to the APL.

2. Remove the two black MAB panels (P52 and P53).

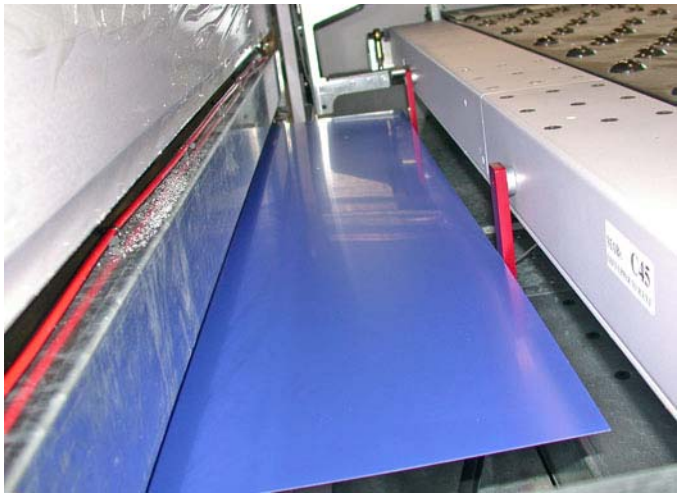


3. Attach the two magnetic alignment tools to the MABs approximately one meter apart and adjacent to the APL shutter opening. The two dowel pins on the tools rest on the bottom MAB with the single dowel pin facing the APL.

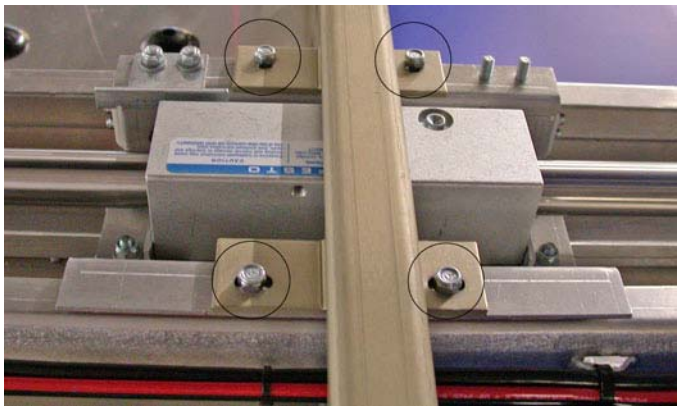


4. Move the APL table to the transfer position.
   Type `>>set apl tabletransferposZ <n>` where n is the value determined in the table transfer height procedure.

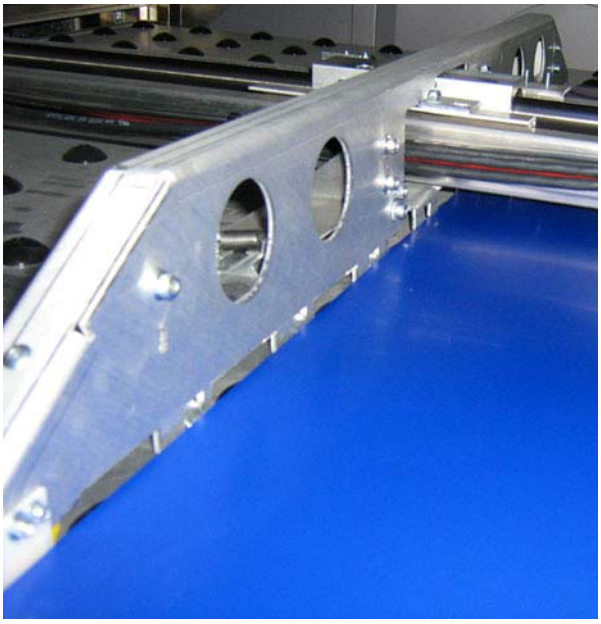
5. Place a large plate on the APL table and slide it through the shutter opening so that it is tightly up against both alignment jigs.

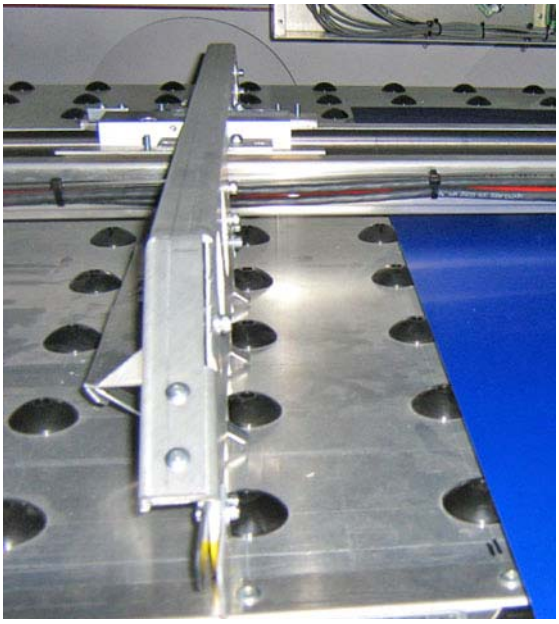


6. Loosen the four M5 nylock nuts that secure the shifter in place.
   Two of the holes have adjustment slots in the X direction and the other two have adjustment holes in the Y direction.



7. Move the table shifter close to the edge of the plate by manually pressing the activate button on the **apl tableshift ext slow/fast** solenoid on the table manifold.





Note: The table shifter will be flipped 180 degrees from that shown in the photos.

8. Move the shifter by hand so that the fingers are tightly up against the edge of the plate.

Note: Do not apply too much pressure that will cause the plate to buckle and no longer be square to the alignment jigs.

9. Tighten the four nylock nuts and check that the shifter is still tightly against the plate and the plate is still tightly against the alignment jigs.

10. Move the table shifter away from the plate and remove the plate from the table.

11. Remove the alignment jigs from the MABs, install the MAB skin panels, and lower the Magnus VLF's shoulder panel.