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HARDWARE SYMBOLS

SYMBOLS FOR HARDWARE USED

The following is a set of symbols used for the hardware, along with their corresponding names:

EXAMPLE: BNK 3 X 8

Type Dia, NOM(mm) Length

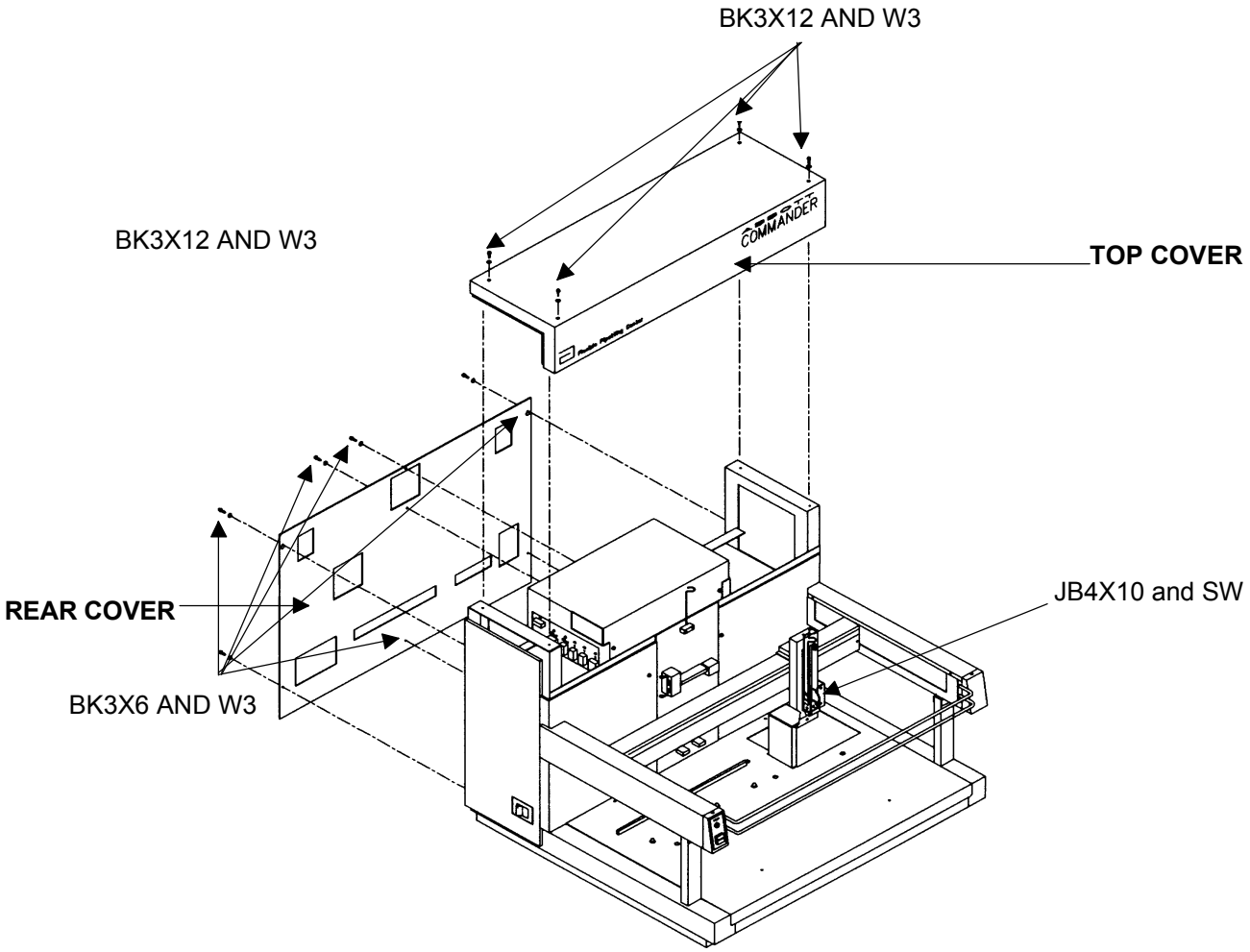
WHERE: Screw, Machine, Phillips Pan Head

NK	Assy., Screw/Washer, Machine, Phillips Pan Head
BNK	Assy., Screw/Washer, Machine, Phillips Pan Head
CNK	Screw, Hex Head Socket
HB	Set Screw, Hex Head Socket
3T	Set Screw, Hex Head Socket
BK	Screw, Machine, Phillips Pan Head
S	Screw, Machine, Phillips Flat Head
MS	Screw, Machine, Phillips Oval Head, CSK
PW	Washer, Flat
W	Washer, Flat
SW	Washer, Split Lock
N	Nut, Full Bearing Hex
ER	Retaining Ring, E-Type
JB	Screw, SHCS

REAR AND TOP COVER REMOVAL

REAR AND TOP COVER REMOVAL

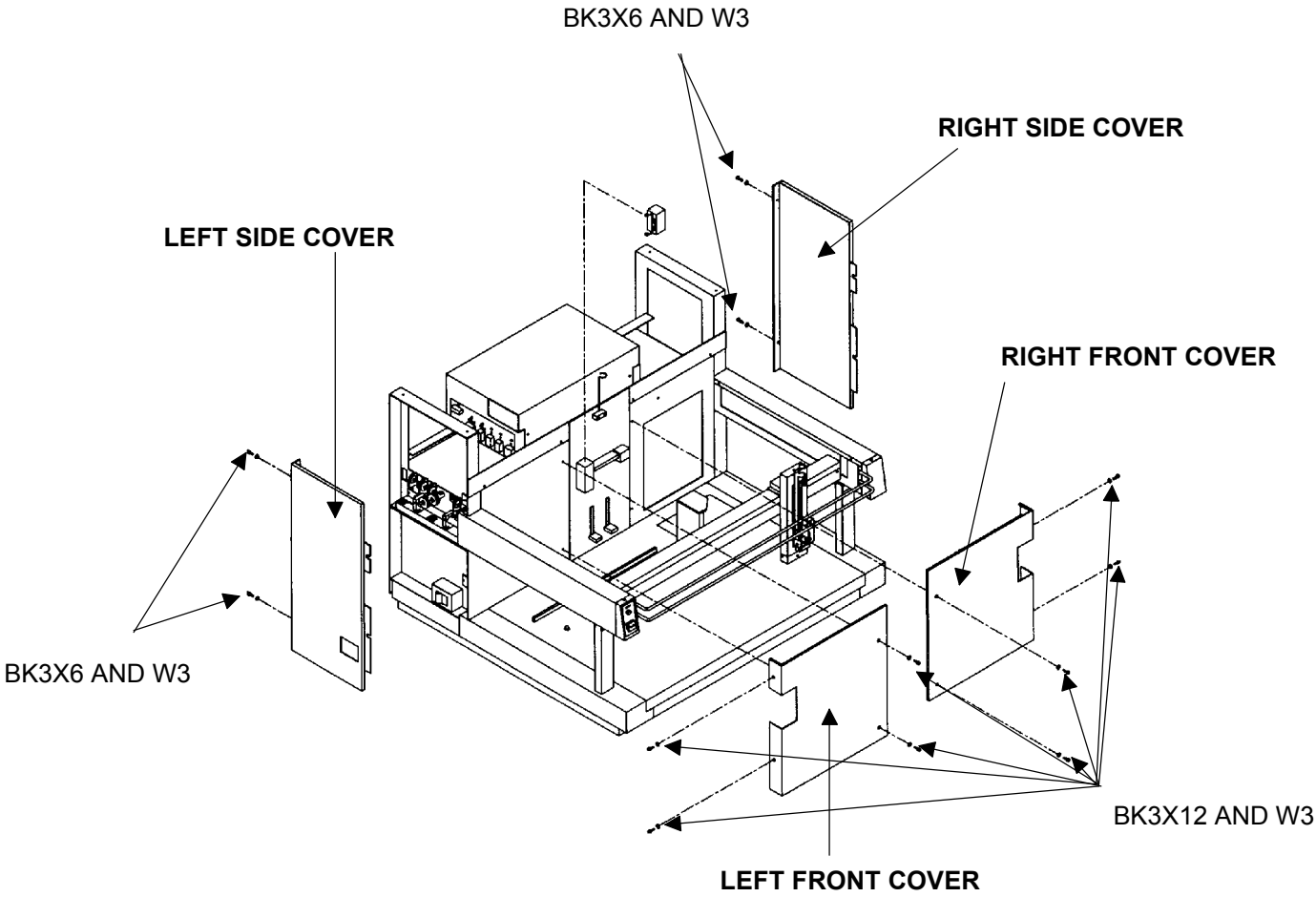
1. Remove Nozzle by removing 1 screw (JB4X10 and SW).
2. Remove the Top Cover by removing 4 screws (BK3X12 and W3) as shown.
3. Remove the Rear Cover by loosening 2 screws (BK3X12 and W3) on the top corners and removing the remaining 5 screws (BK3X6 and W3) on the Rear Cover, as shown.



SIDE AND FRONT COVER REMOVAL

SIDE AND FRONT COVER REMOVAL

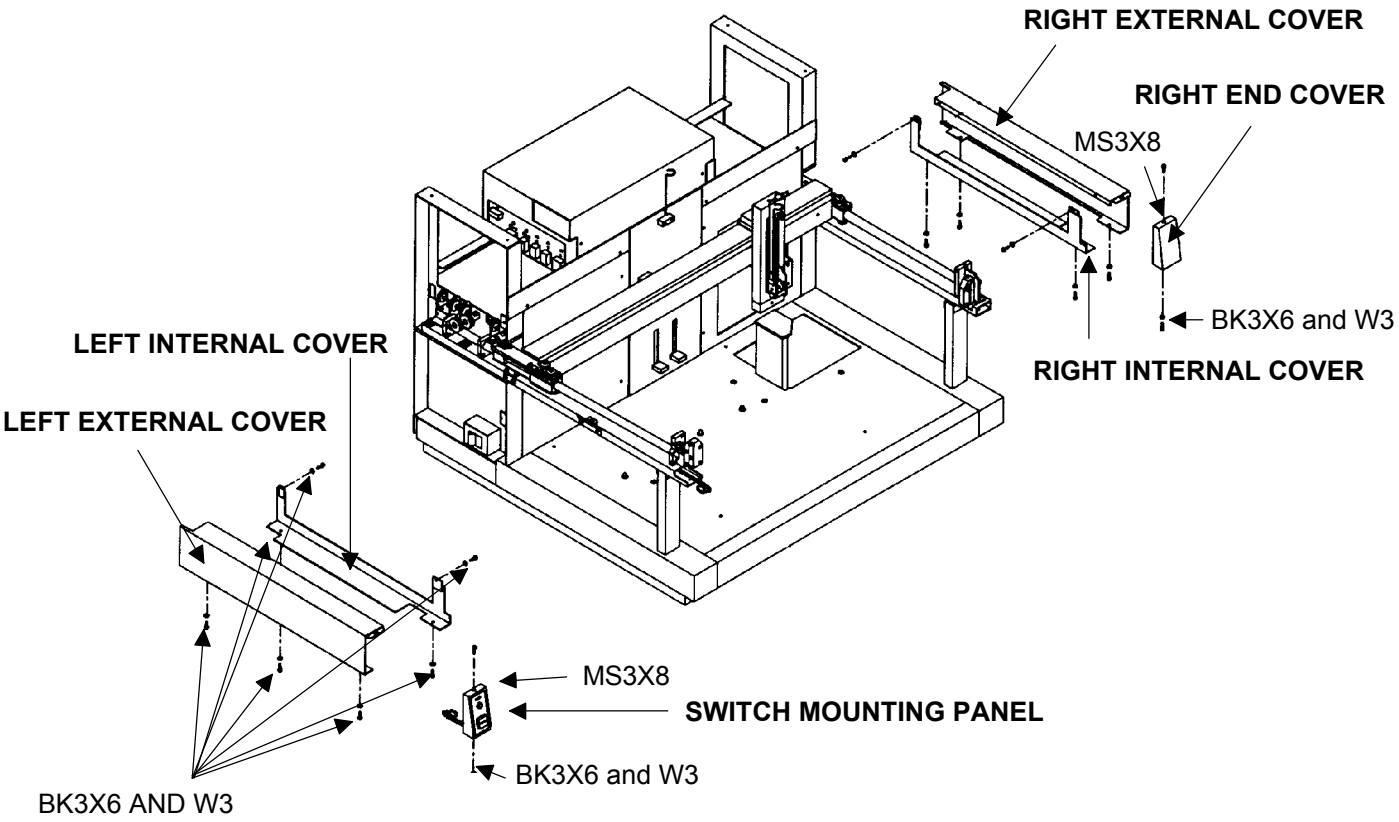
1. Remove the Right and Left Side Covers by removing 4 screws (BK3X6 and W3) and loosening the Left and Right Front side screws (4 screws) (BK3X12 and W3). Remove the Left and Right Front Covers by removing 8 screws (BK3X12 and W3).



INTERNAL AND EXTERNAL COVER REMOVAL

INTERNAL AND EXTERNAL COVER REMOVAL

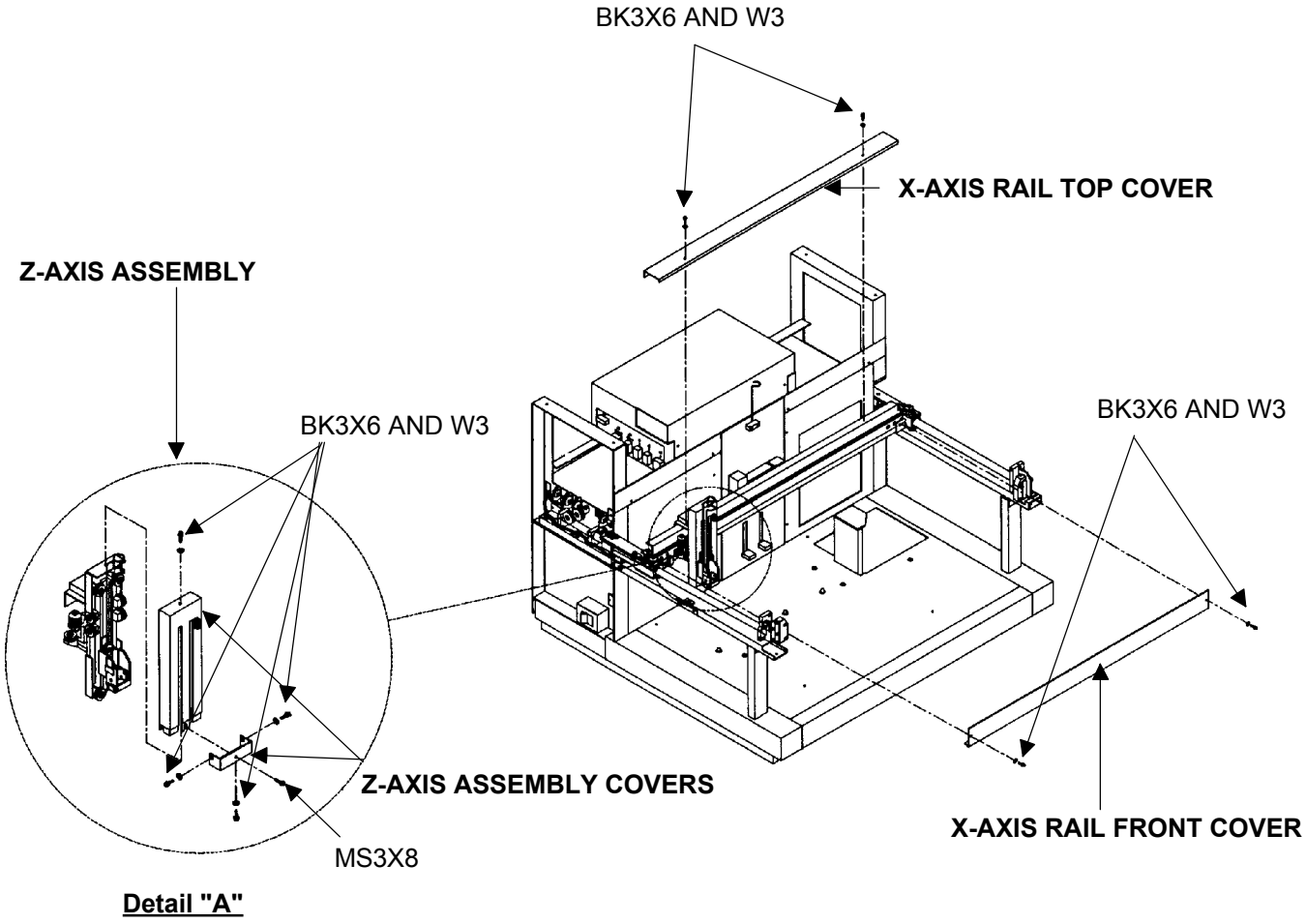
1. Disassemble the Internal and External Right Arm Covers and Right Arm End Cover by removing 7 screws (BK3X6, W3, and MS3X8), as shown.
2. Disassemble the Internal and External Left Arm Covers and Switch Mounting Panel by removing the screws (BK3X6, W3, and MS3X8), as shown.
3. Disconnect the connector from the Switch Mounting Panel.



X-AXIS RAIL COVER REMOVAL

X-AXIS RAIL COVER REMOVAL

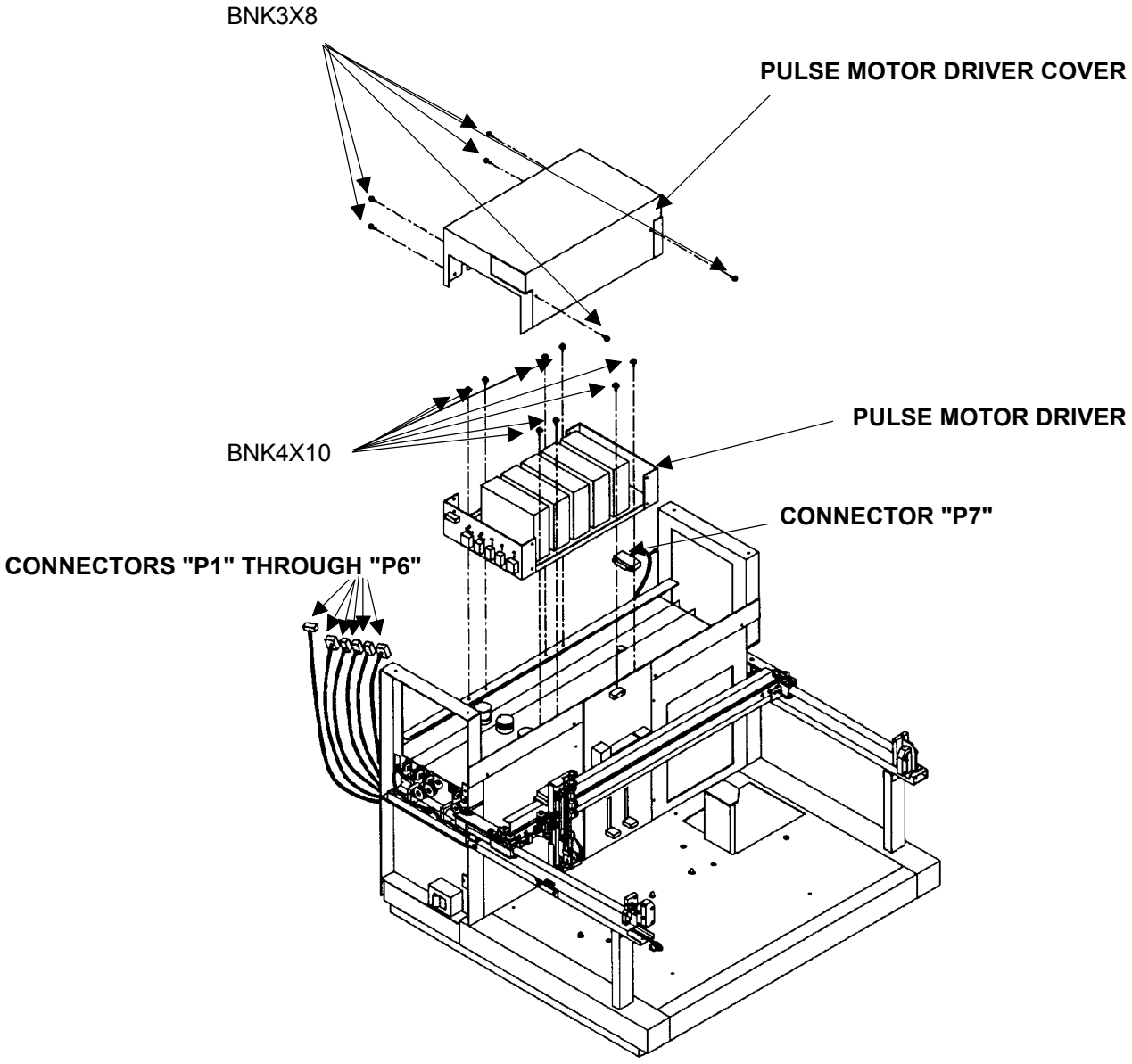
1. Before removing the X-Axis Top and Front Rail Covers, slide the Z-Axis Assembly all the way to the left, as shown.
2. Remove the X-Axis Rail Assembly Top and Front Rail Covers by removing 4 screws (BK3X6 and W3), as shown. Remove the Front Cover by moving the cover upward and pull it to the right side.
3. Remove the Z-Axis Assembly Covers, as shown in Detail "A", by removing 4 screws (BK3X6 and W3), and loosening the screw (MS3X8) on the Z-Axis Bottom Cover.



PULSE MOTOR DRIVER REMOVAL

PULSE MOTOR DRIVER REMOVAL

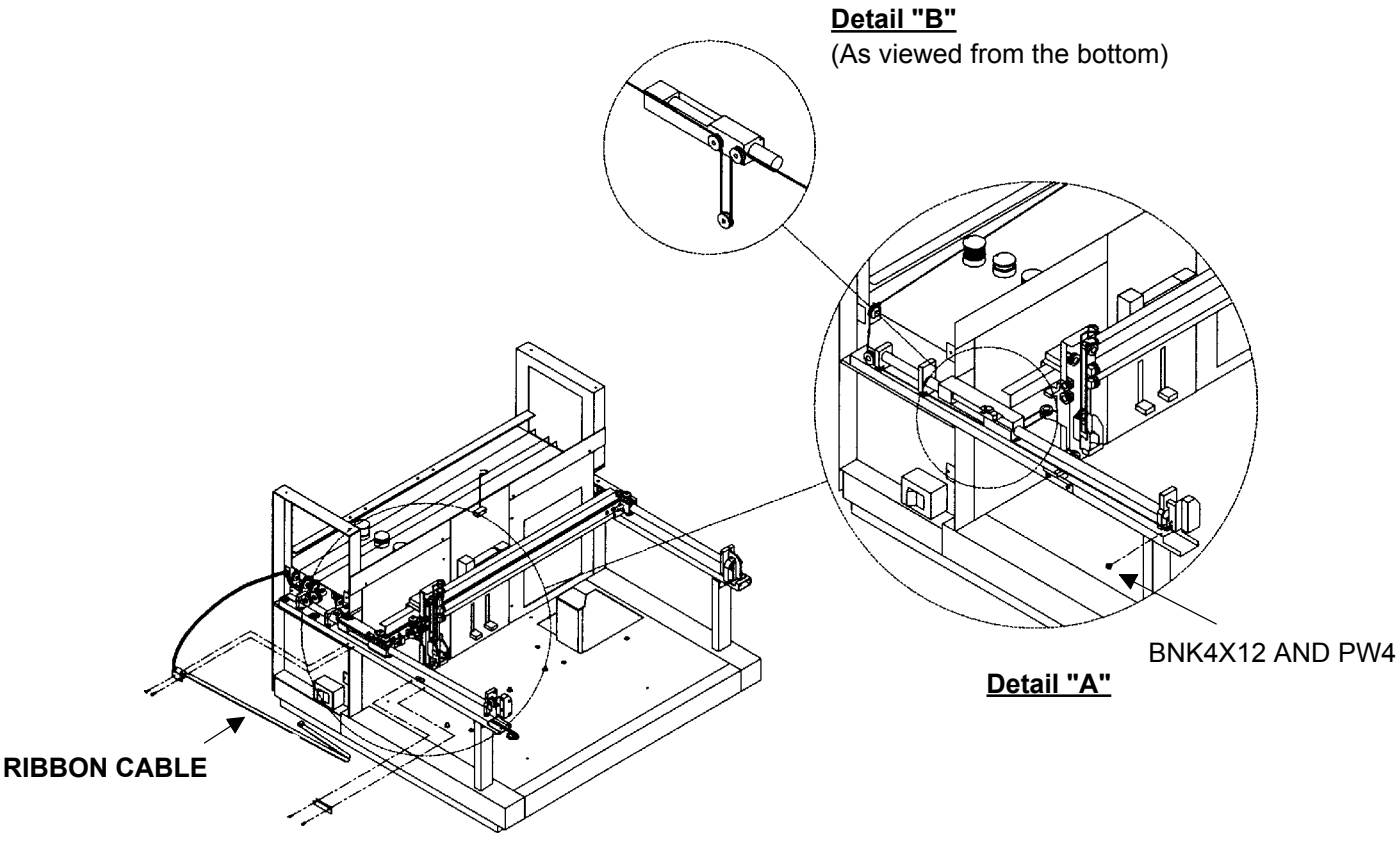
1. Disconnect the Pulse Motor Driver Fan (not shown).
2. Remove the Pulse Motor Driver Cover by removing 6 screws (BNK3X8), as shown.
3. Disconnect Connectors "P1" through "P6".
4. Disconnect Connector "P7", using a #1 Phillips Screwdriver.
5. Remove the Pulse Motor Driver Unit from the FPC frame by removing 6 screws (BNK4X10), as shown.



X-AXIS DRIVE CABLE REMOVAL

X-AXIS DRIVE CABLE REMOVAL

1. Disconnect the ribbon cable from the connector on the Y-Axis Idle Pulley Assembly. Protect the connector pins by placing a piece of styrofoam on the pins.
2. Remove screw (BNK4X12 AND PW4) holding the X-Axis Drive Cable to the Cable Retaining Bracket, as shown in Detail "A".
3. Remove the X-Axis Cable (1-42665-01) from around pulleys and wire drum, as shown in Details "A" and "B".
4. Refer to the next page for continuing X-Axis Drive Cable removal instructions.



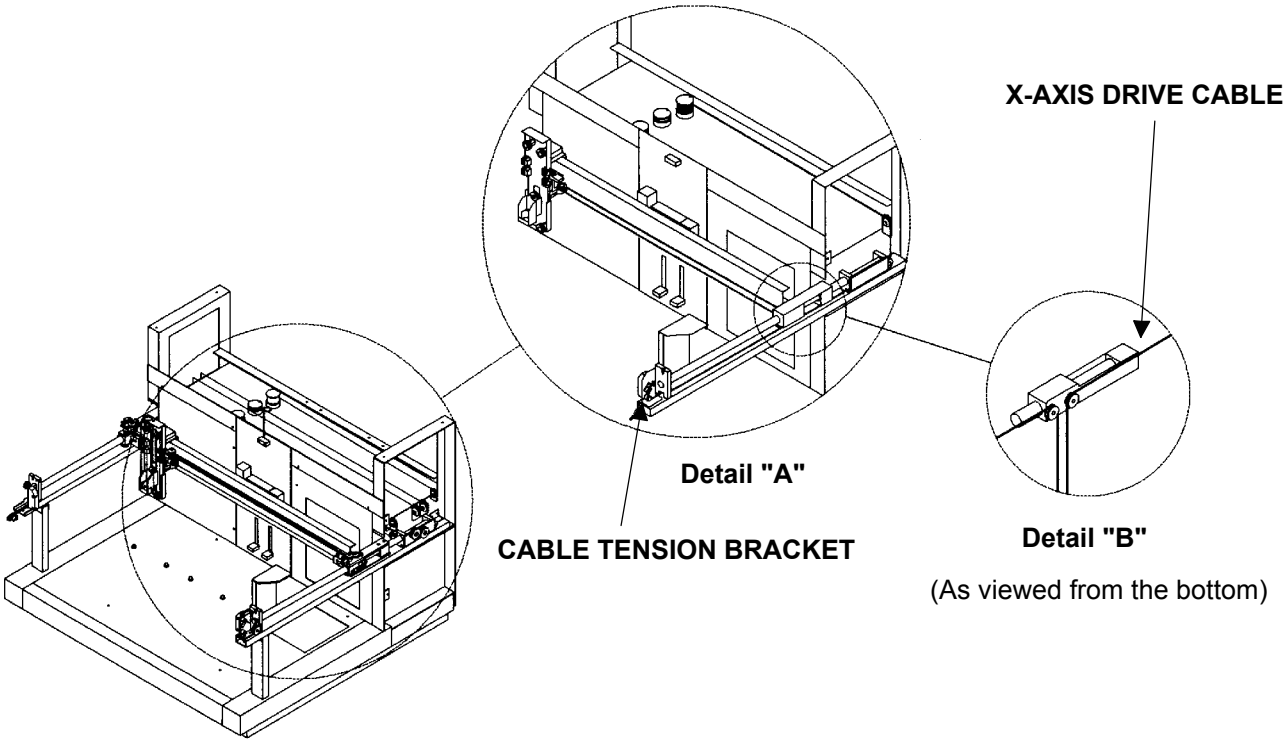
X-AXIS DRIVE CABLE REMOVAL

X-AXIS DRIVE CABLE REMOVAL

5. For clarity purposes, the Y and Z-Axis Drive Cables and pulleys are not shown in Detail "A".

6. Disconnect the terminal on the X-Axis Drive Cable by removing the Cable Tensioning Screw, as shown in Detail "A", using a 3mm Allen wrench.

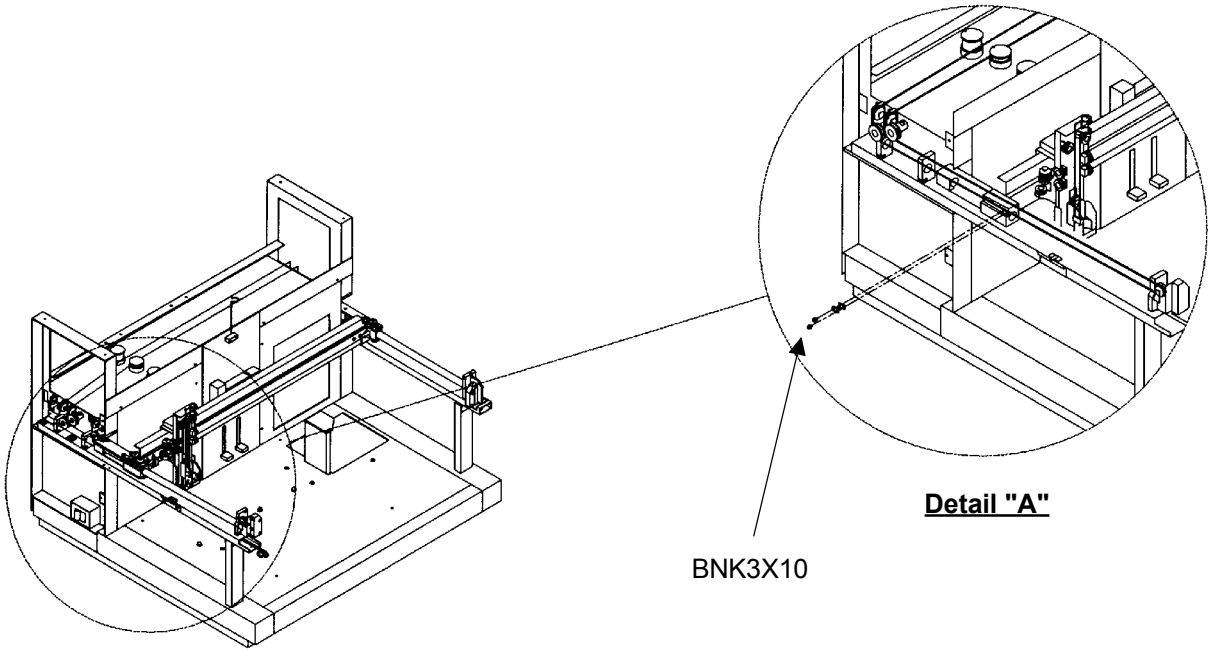
7. Remove the X-Axis Drive Cable (1-42665-01) from around the pulleys and wire drum, as shown in details "A" and "B".



Y-AXIS DRIVE CABLE REMOVAL

Y-AXIS DRIVE CABLE REMOVAL

1. For clarity purposes, X and Z-Axis Drive Cables and pulleys are not shown in Detail "A".
2. Before removing the Y-Axis Drive Cable (1-42666-01), remove the screws (BNK3X10) and cable clamps to release the cable from the Left Idle Pulley Assembly, as shown in Detail "A".
3. The mounting hardware for the Y-Axis Drive Cable is located on the Right Wire Idle Pulley Assembly (see Detail "A" on the next page).
4. Refer to the next page for continuing Y-Axis Drive Cable removal instructions.



Y-AXIS DRIVE CABLE REMOVAL

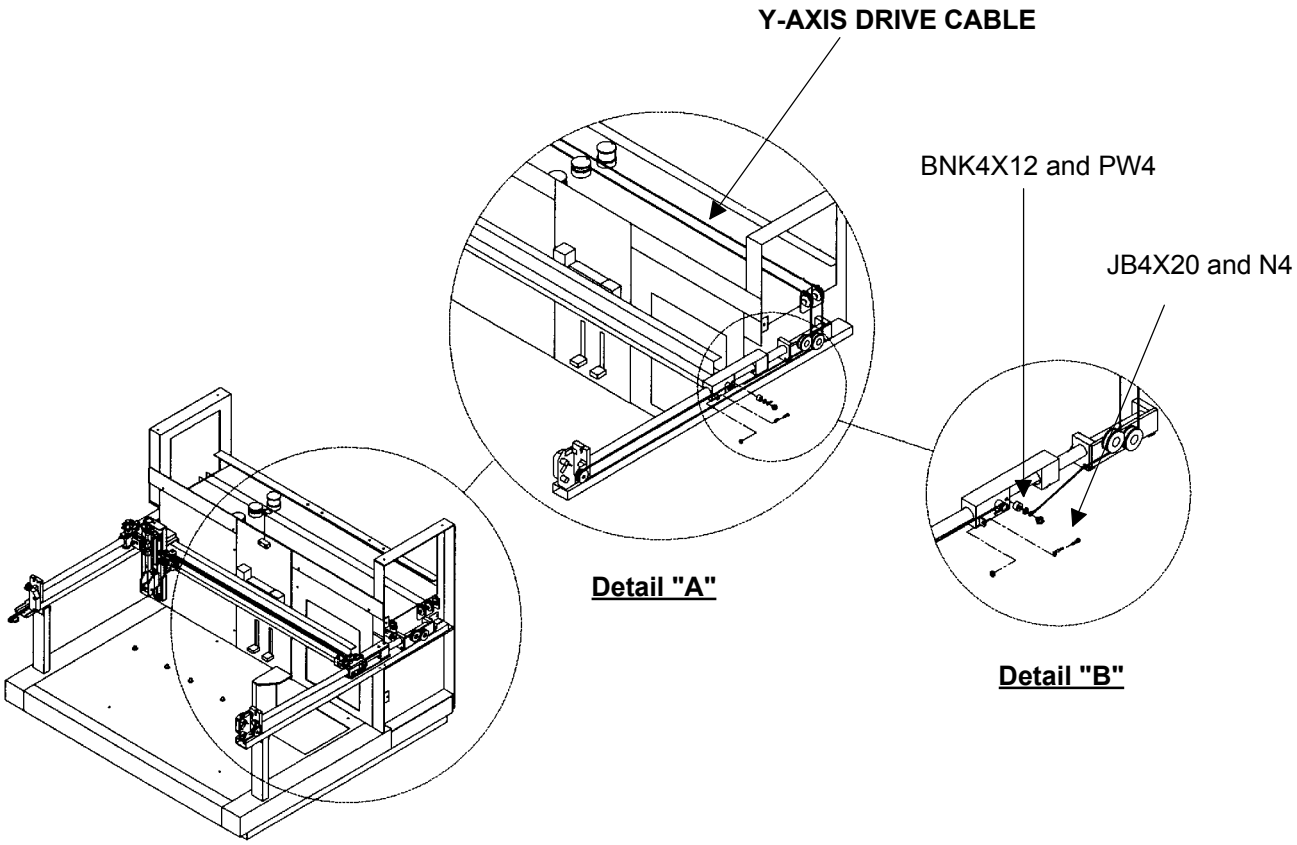
Y-AXIS DRIVE CABLE REMOVAL

5. Remove the socket head screw and jam nut (JB4X20 and N4) from the Idle Pulley Assembly, as shown in Detail "B", using a 3mm Allen wrench.

6. Finish removing the Y-Axis Cable (1-42666-01) from the pulleys and wire drum, as shown in Details "A" and "B".

7. Remove screw (BNK4X12 and PW4) and spacer, as shown in Detail "B".

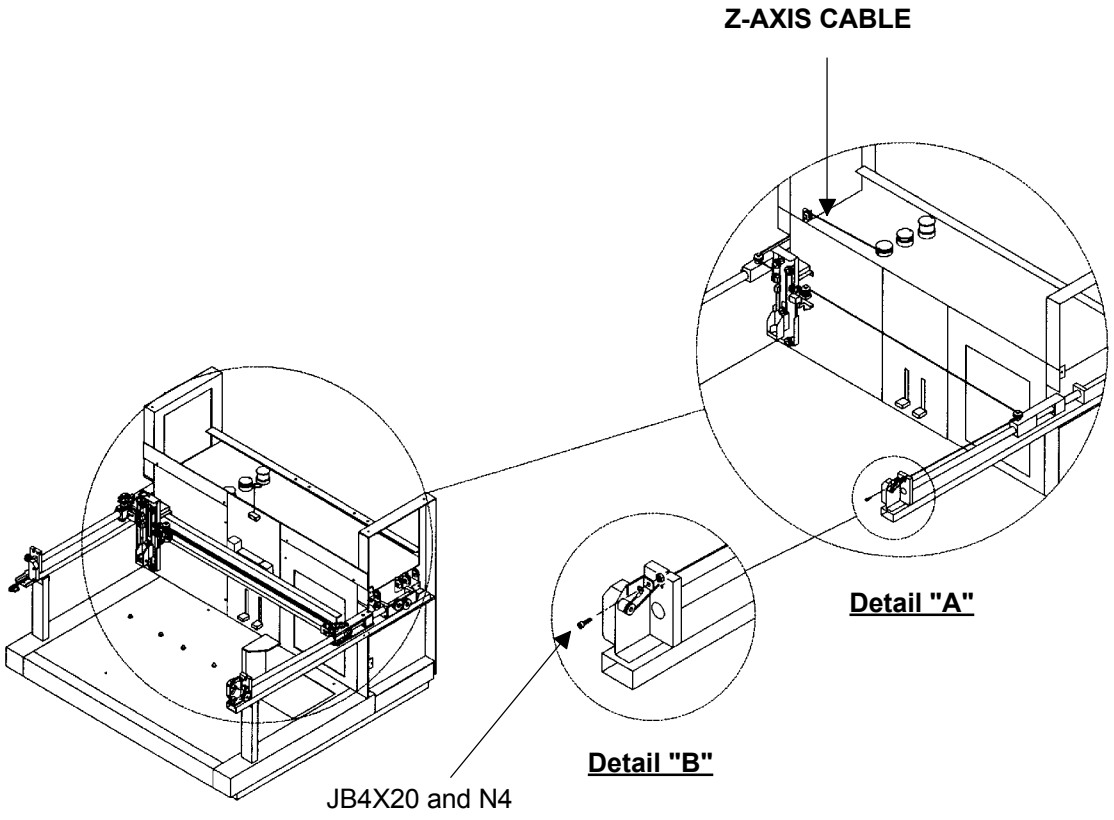
8. Remove the Y-Axis Drive Cable (1-42666-01) from the pulleys and wire drum, as shown.



Z-AXIS DRIVE CABLE REMOVAL

Z-AXIS DRIVE CABLE REMOVAL

1. For clarity purposes, X and Y-Axis Drive Cables and pulleys are not shown in Detail "A".
2. Remove the hex socket head screw and jam nut (JB4X20 and N4) from the Cable Tension Bracket, as shown in Details "A" and "B", using a 3mm Allen wrench.
3. Remove the Z-Axis Drive Cable (1-42667-01) from around the pulleys and wire drum, as shown in Details "A" and "B".
4. Refer to the next page for continuing Z-Axis Drive Cable removal instructions.

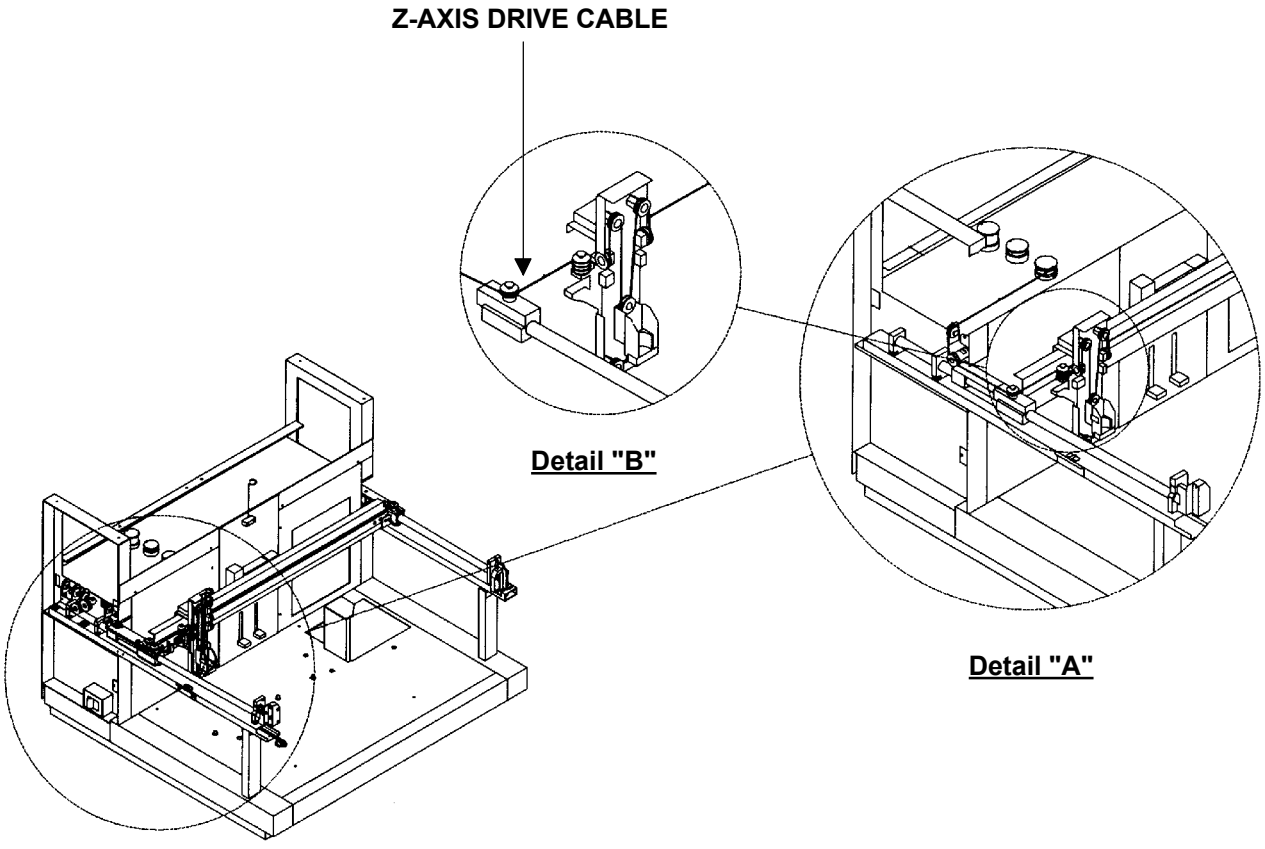


Z-AXIS DRIVE CABLE REMOVAL

Z-AXIS DRIVE CABLE REMOVAL

5. Complete Z-Axis Drive Cable (1-42667-01) removal from around the pulleys and wire drum, as shown in Details "A" and "B".

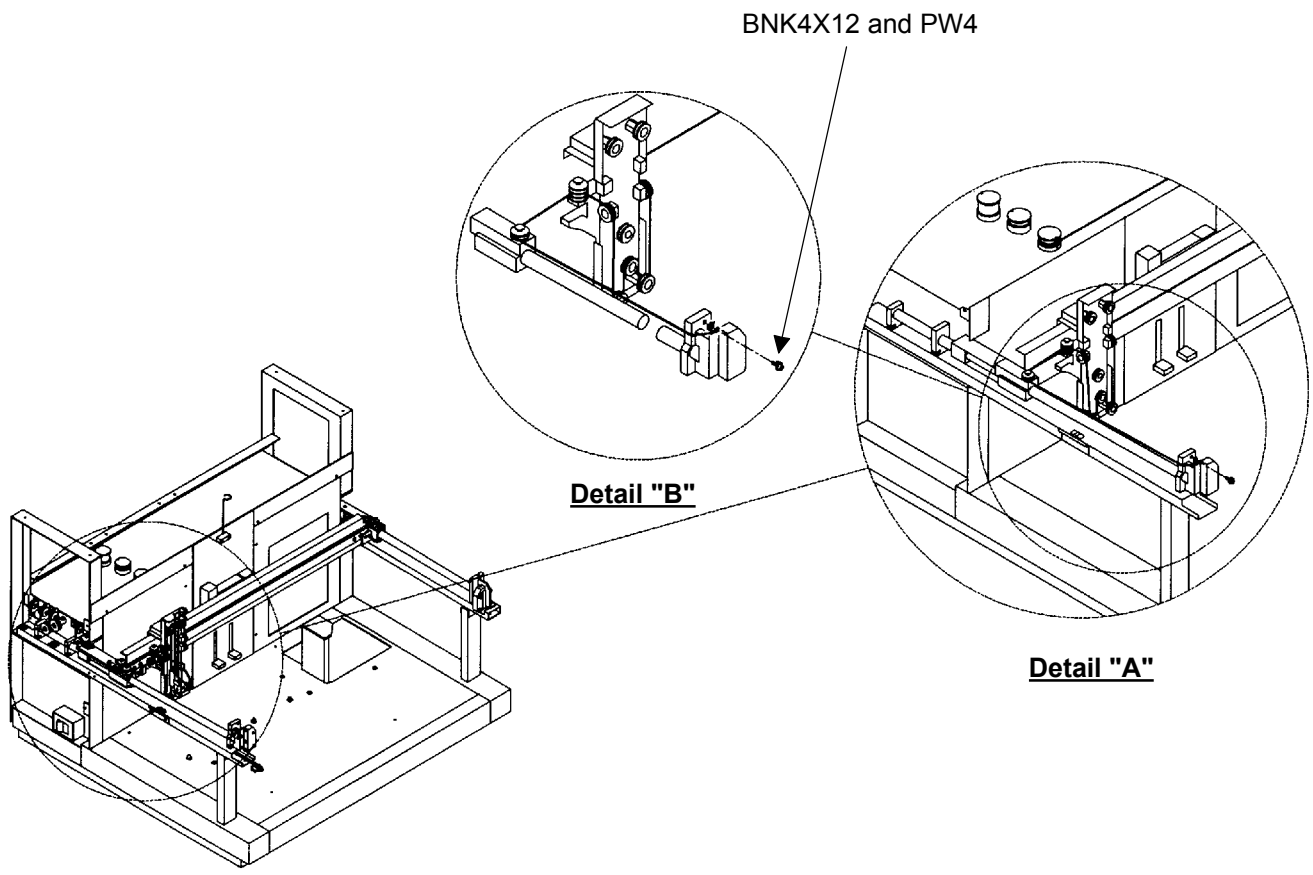
6. Refer to the next page for continuing Z-Axis Drive Cable removal instructions.



Z-AXIS DRIVE CABLE REMOVAL

Z-AXIS DRIVE CABLE REMOVAL

7. Remove screw assembly (BNK4X12 and W4) from the Front Y-Shaft Support Bracket, as shown in Detail "B".
8. Remove the Z-Axis Drive Cable (1-42667-01) from around the pulleys and wire drum, as shown in Details "A" and "B".
9. Refer to the next page for continuing Z-Axis Drive Cable removal instructions.

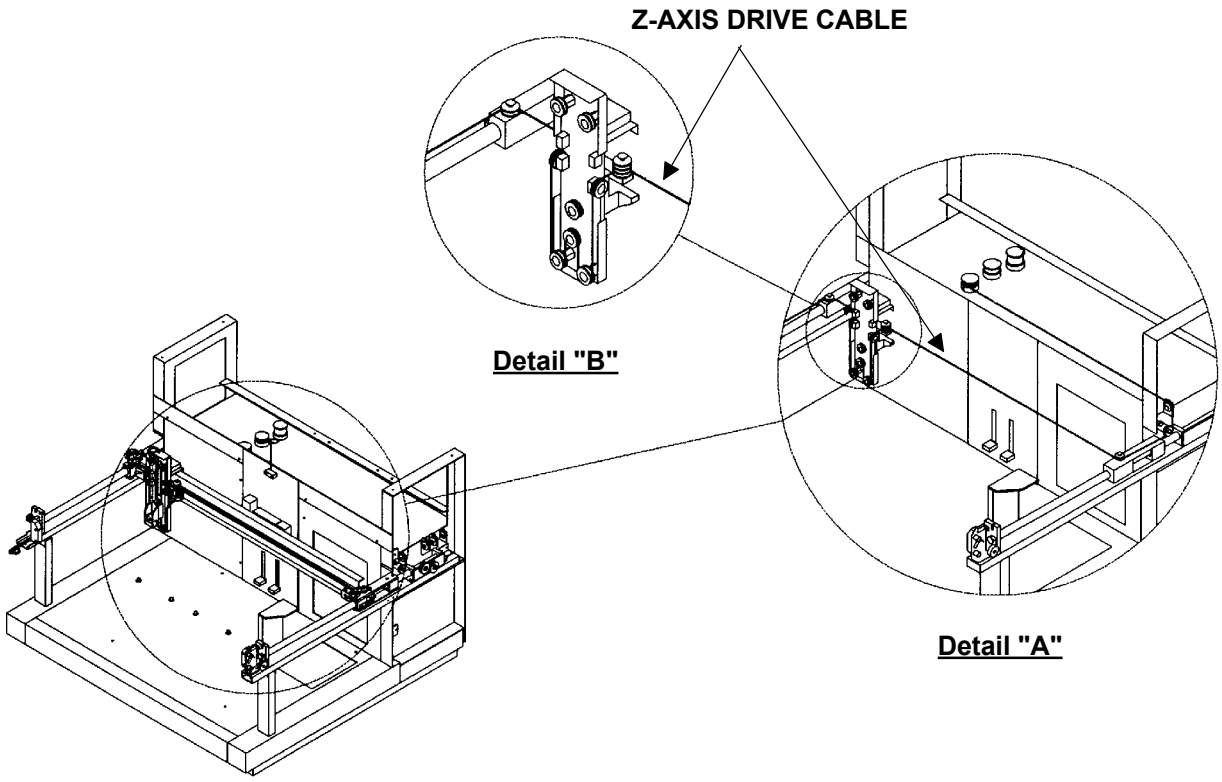


Z-AXIS DRIVE CABLE REMOVAL

Z-AXIS DRIVE CABLE REMOVAL

10. Complete Z-Axis Drive Cable removal, from around the pulleys and wire drum, as shown in Details "A" and "B".

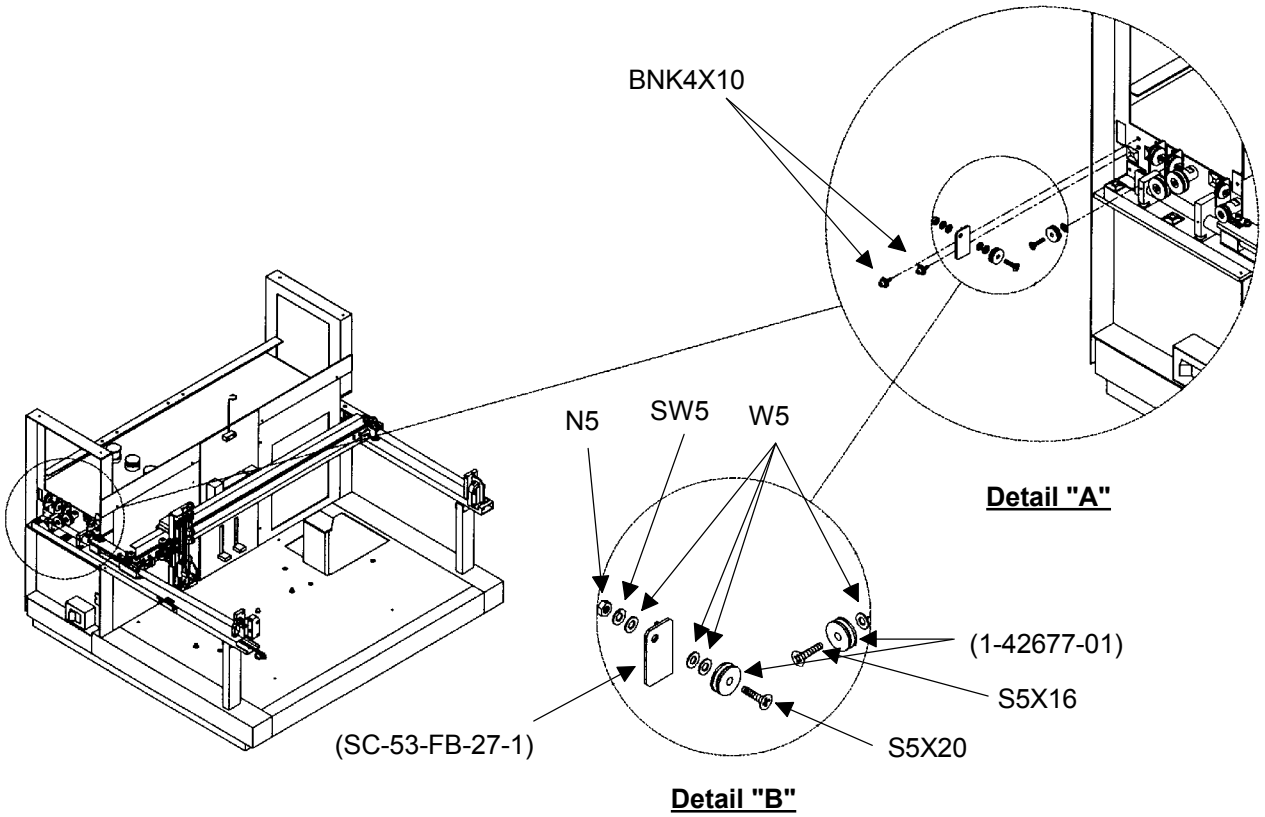
11. After removing the sheet metal panels and the X, Y, and Z-Axis Drive Cables, wipe down the unit with alcohol and a clean, lint-free cloth.



PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Pulleys should be removed and replaced at the same time.
2. Remove the screws (BNK4X10) holding the bracket (SC-53-FB-27-1) and pulley (1-42677-01) from the FPC frame, as shown in Detail "A". Replace the pulley using an 8mm Hex wrench, as shown in Detail "B".
3. Remove only the pulley (1-42677-01) from the pipettor frame, as shown in Detail "A", then replace the pulley as shown in Detail "B".
4. Install new pulleys with the lettered side facing out.
5. Refer to the next page for continuing Pulley Removal and Replacement instructions.



PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

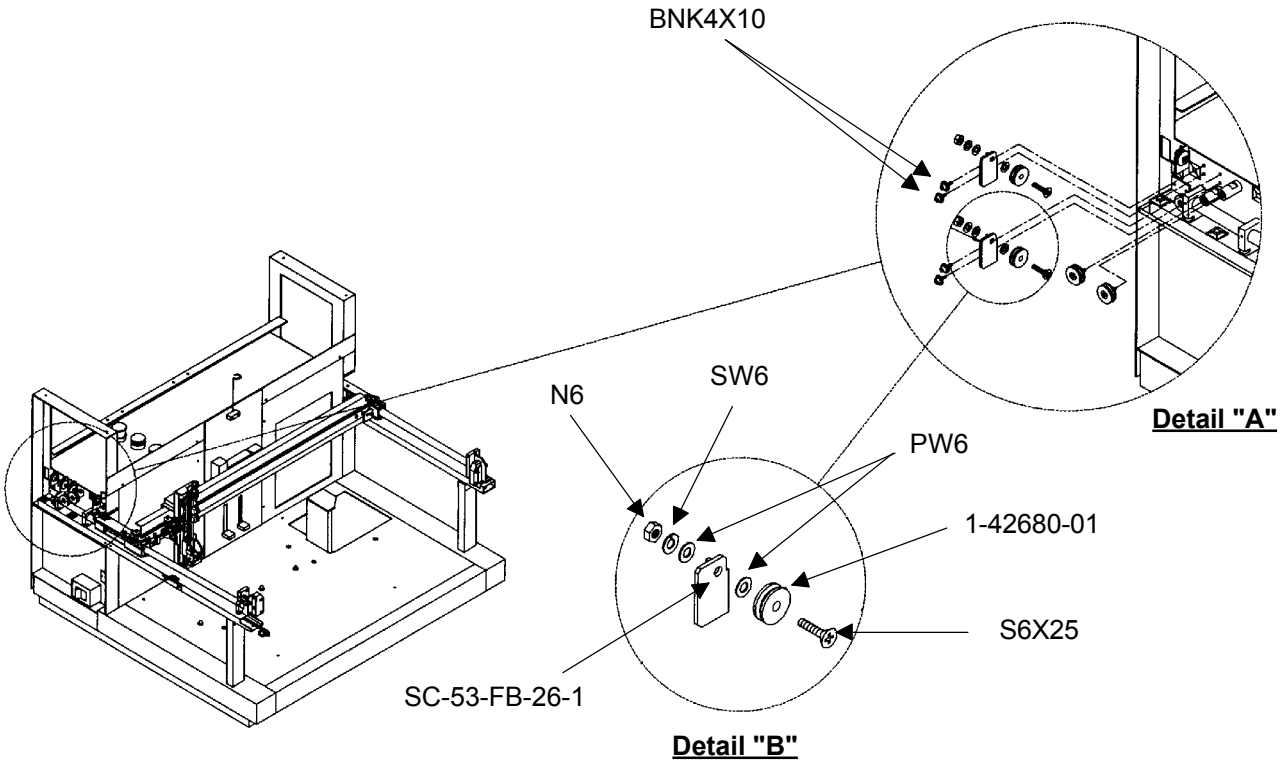
6. Remove the screws (BNK4X10) that hold the bracket (SC-53-FB-27-1) and pulley (1-42677-01) from the FPC frame, as shown in Detail "A". Replace the pulley using a 10mm wrench, as shown in Detail "B".

7. Remove and replace only the pulley (1-42680-01), from the FPC frame, as shown in Detail "A".

8. When mounting the bracket, it should be tightened while holding it towards the back of the FPC and should be in a 90° angle with the FPC frame.

9. Install the new pulleys with the lettered side facing out.

10. Refer to the next page for continuing Pulley Removal and Replacement instructions.



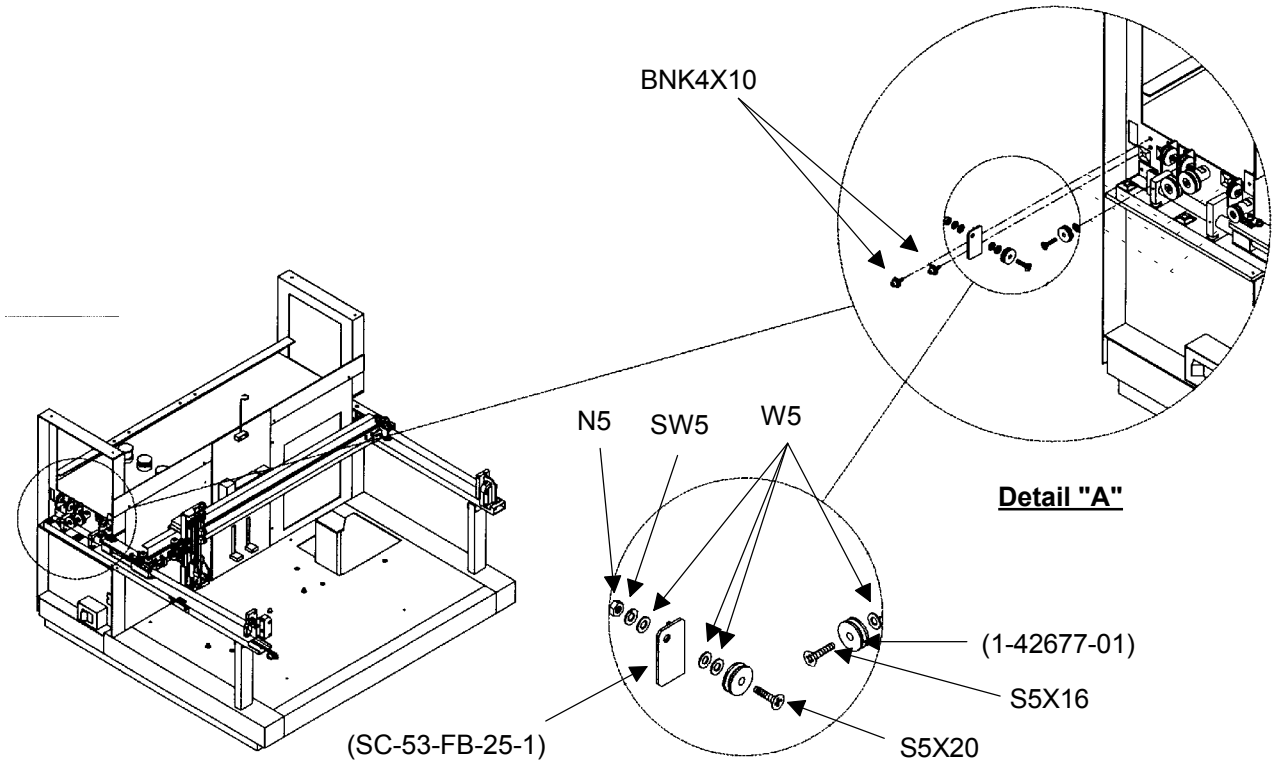
PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

11. Remove the screws (BNK4X10) that hold the bracket (SC-53-FB-25-1) and pulley (1-42677-01) from the FPC frame, as shown in Detail "A". Replace the pulley using an 8mm wrench, as shown in Detail "B".

12. Remove only the pulley (1-42677-01), from the FPC frame, then replace the pulley, as shown in Detail "A".

13. Install the new pulleys with the lettered side facing out.



Detail "A"

Detail "B"

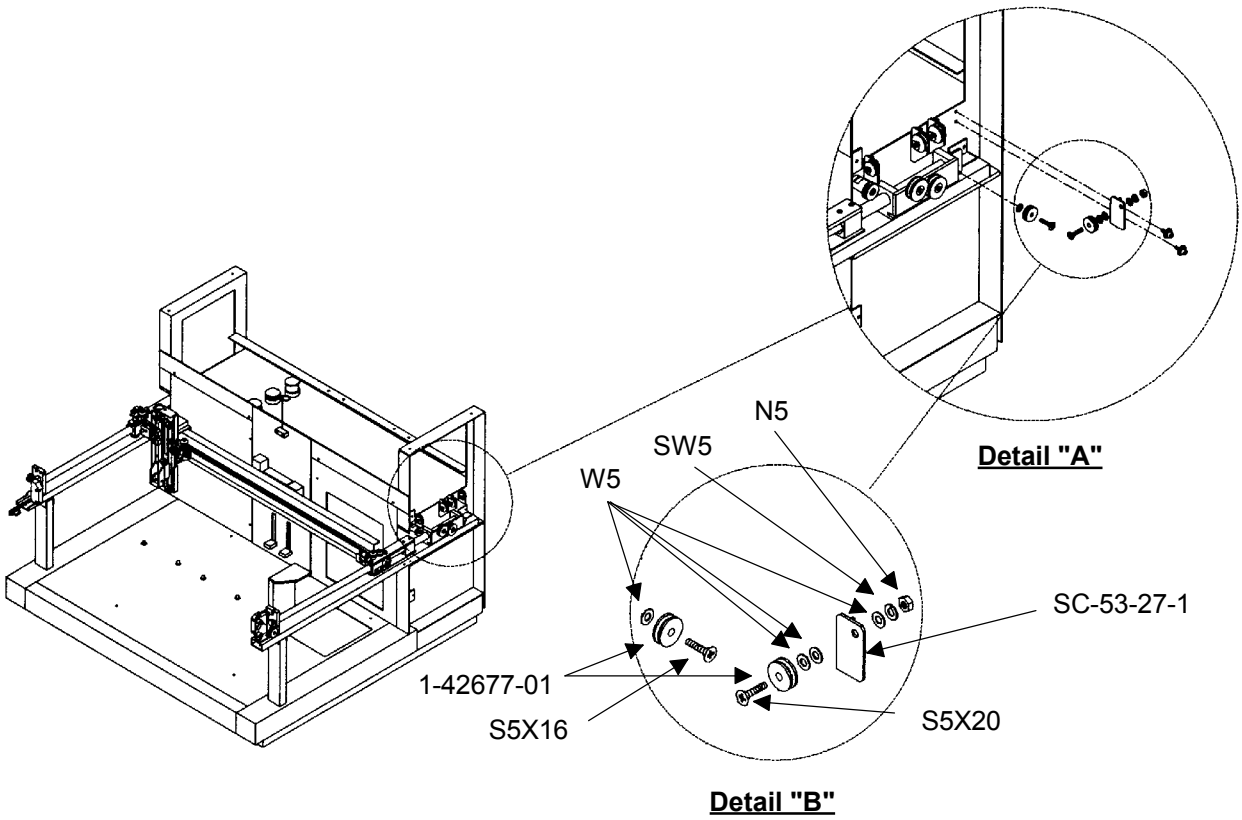
PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Remove the screws (BNK4X10) holding the bracket (SC-53-27-1) and pulley (1-42677-01) from the FPC frame, as shown in Detail "A". Replace the pulley using an 8mm wrench, as shown in Detail "B".

2. Remove only the pulley (1-42677-01) from the pipettor frame, as shown in Detail "A", then replace the pulley, as shown in Detail "B".

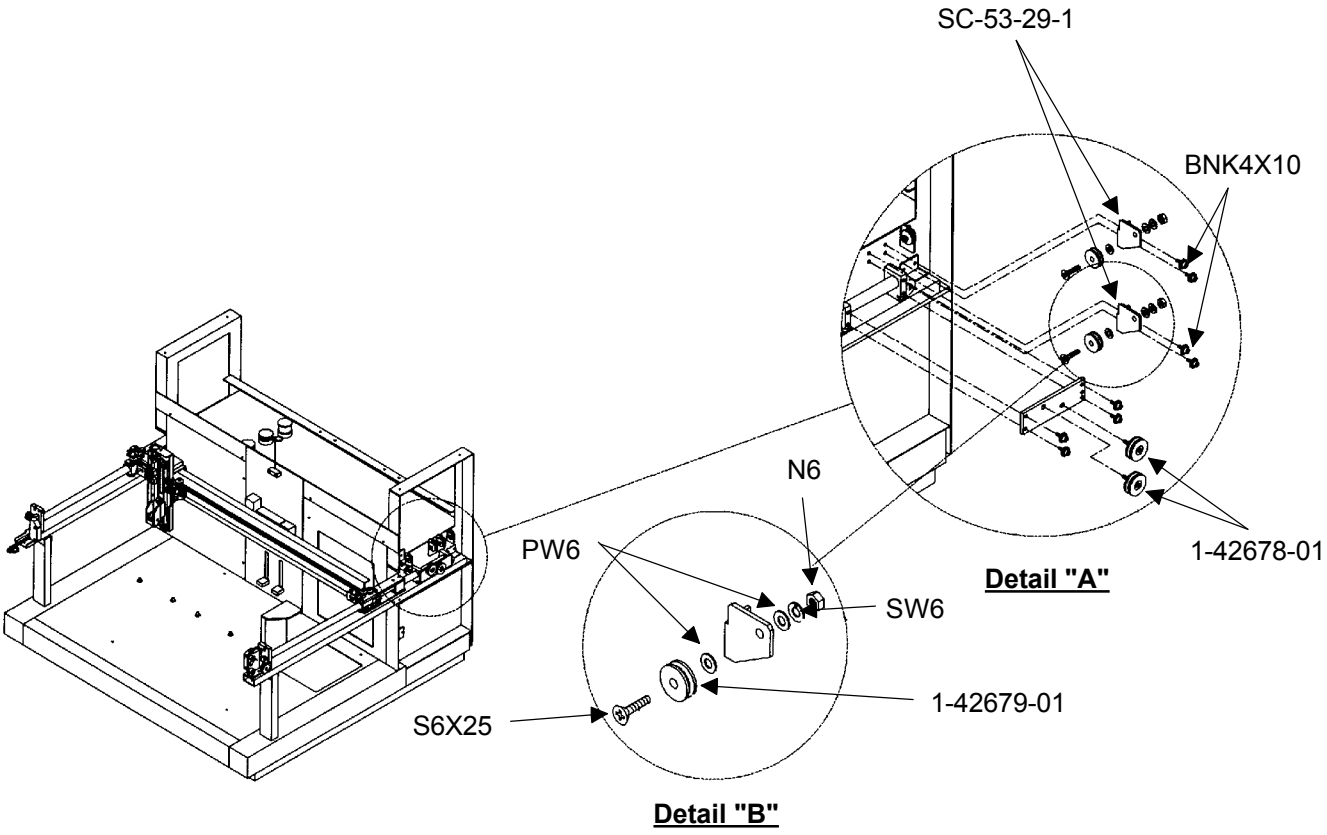
3. Install the new pulleys with the lettered side facing out.



PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Remove and replace pulleys (1-42678-01) on the existing plate, as shown in Detail "A".
2. Remove the screws (BNK4X10) holding the brackets (SC-53-29-1) and pulleys from the FPC frame, as shown in Detail "A". Replace the pulleys (1-42679-01) using a 10mm wrench as shown in Detail "B".
3. When mounting the bracket, it should be tightened while holding it towards the back of the FPC and should be in a 90° angle with the FPC frame.
4. Install the new pulleys with the lettered side facing out.



PULLEY REMOVAL AND REPLACEMENT

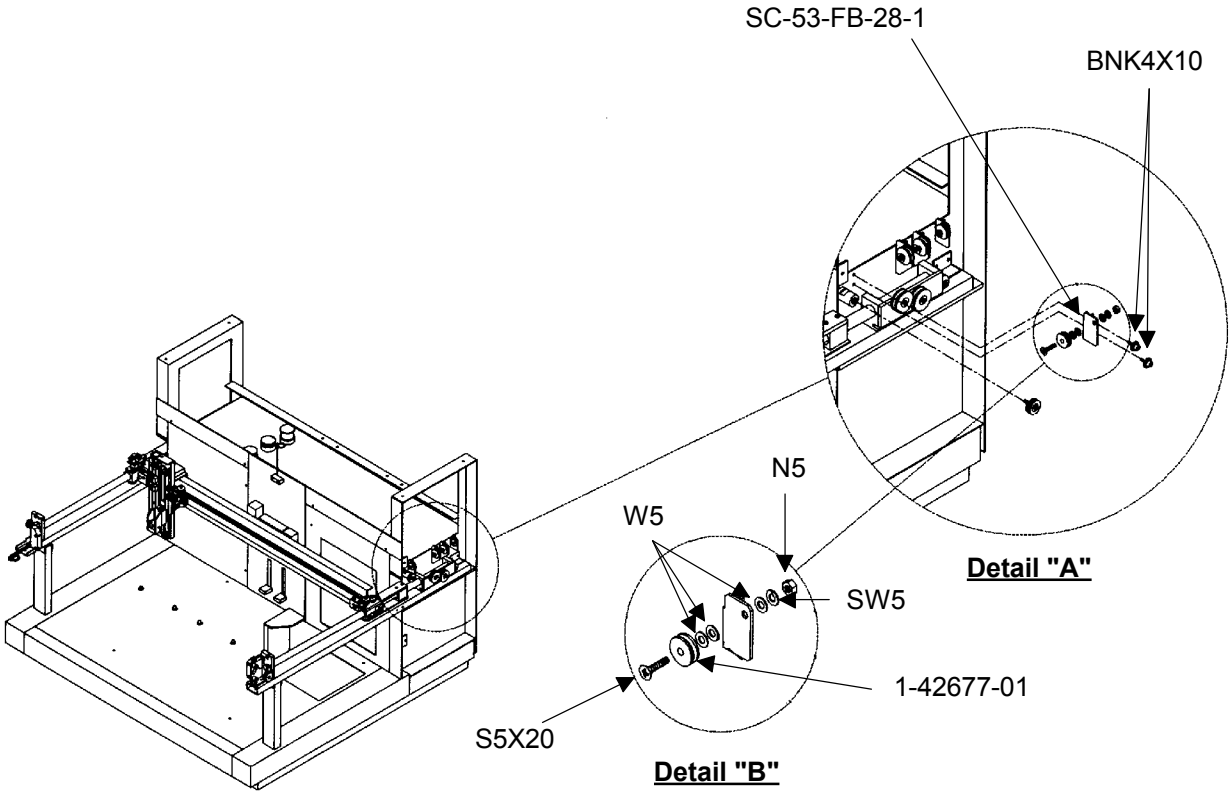
PULLEY REMOVAL AND REPLACEMENT

1. Remove the screws (BNK4X10) holding the bracket (SC-53-FB-28-1) and pulley (1-42677-01) from the FPC frame, as shown in Detail "A". Replace the pulley using an 8mm wrench, as shown in Detail "B".

2. Remove and replace only the pulley (1-42678-01) from the FPC frame, as shown in Detail "A".

3. When mounting the bracket, it should be tightened while holding it towards the back of the FPC and should be in a 90° angle with the FPC frame.

4. Install the new pulleys with the lettered side facing out.



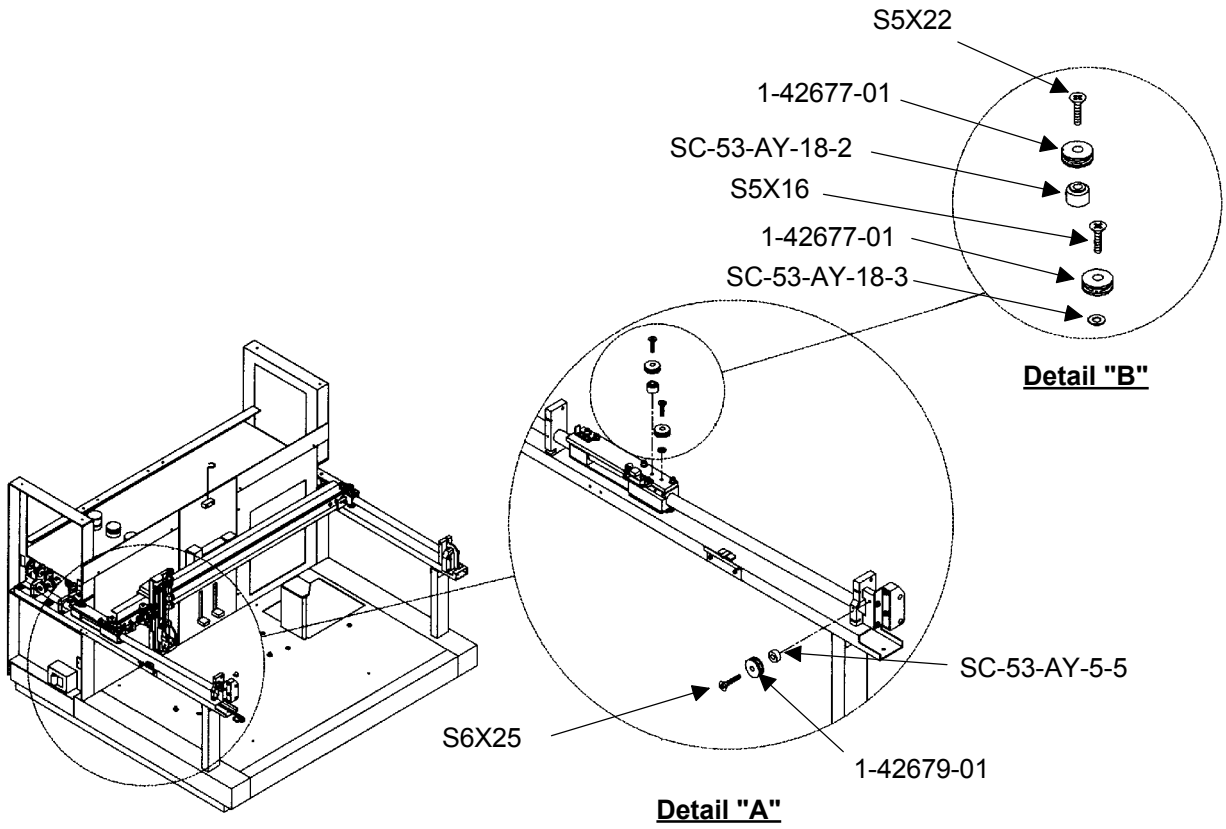
PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Remove and replace the pulley (1-42679-01) from the Front Left Y-Axis Bracket, as shown in Detail "A".

2. Remove the pulleys (1-42677-01) from the Left Wire Idle Pulley Assembly, as shown in Detail "A". Replace the pulleys, as shown in Detail "B".

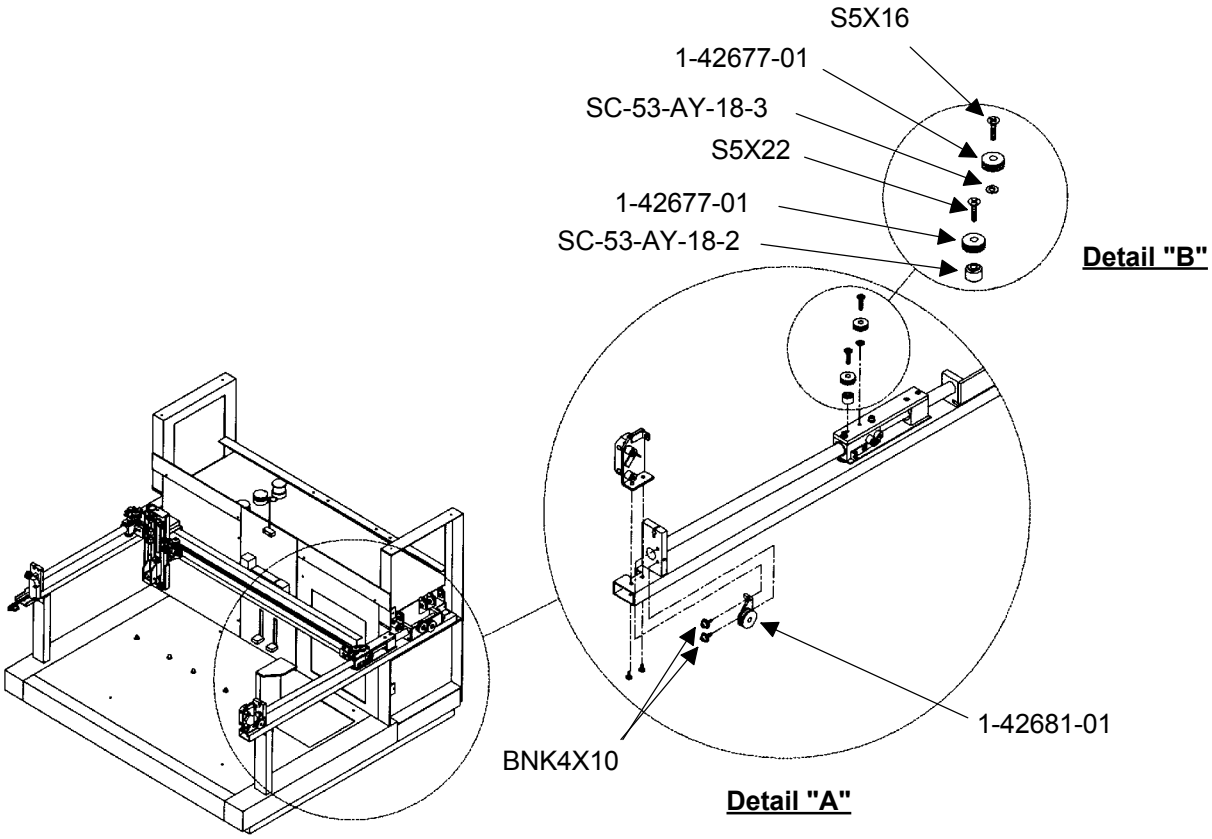
3. Install the new pulleys with the lettered side facing out.



PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Remove the screws (BNK4X10) holding the riveted pulley (1-42681-01). Replace the riveted pulley, as shown in Detail "A".
2. Remove the pulleys (1-42677-01) from the Right Side Wire Pulley Assembly, as shown in Detail "A". Replace the pulleys, as shown in Detail "B".
3. Install the new pulleys with the lettered side facing out.



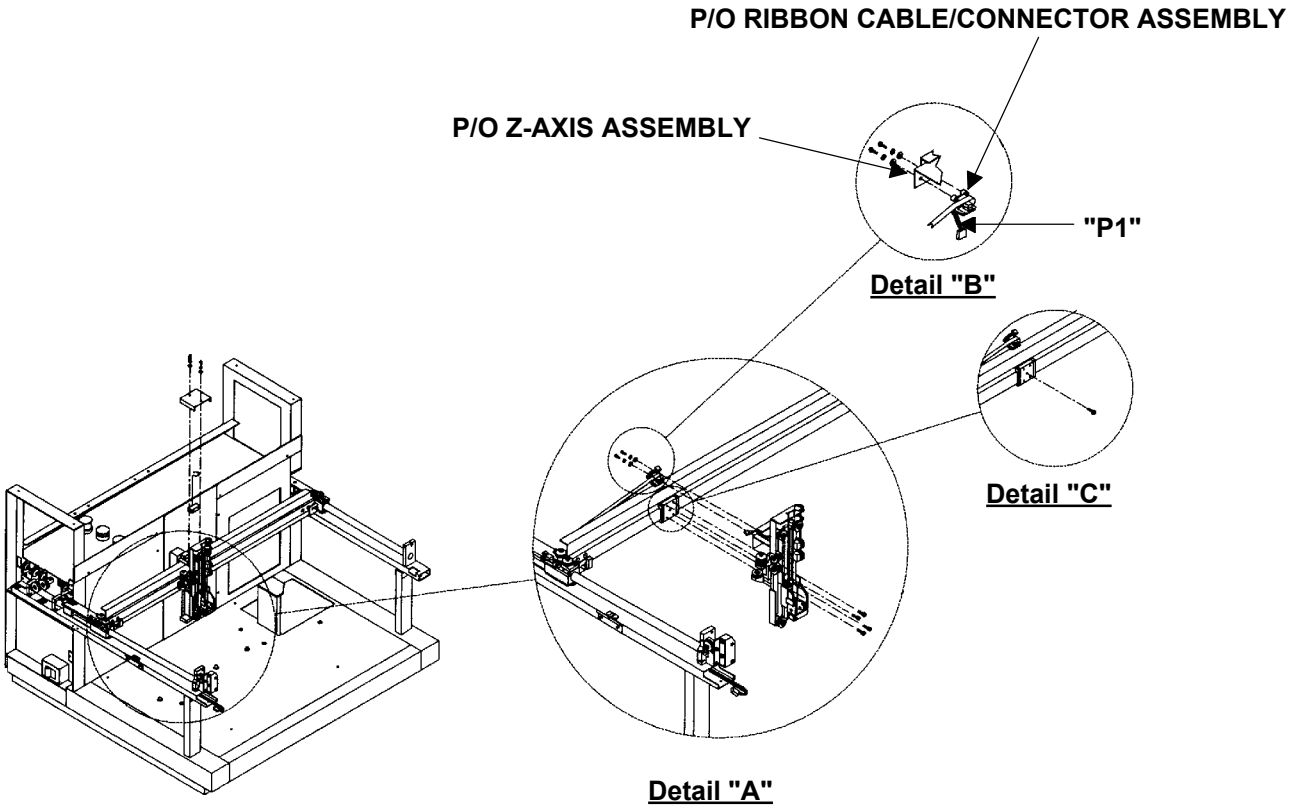
PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Remove the Top Cover Plate on the Z-Axis Assembly, to expose the P/O Ribbon Cable/Connector Assembly by removing 2 screws (BK3X6 and W3).

2. Cut the ty-wrap nearest Connector "P1" and then unplug "P1" from "J1". Remove the screws (NK2.6X6, SW2.6, and W2.6) from the back plate using a # 1 Phillips screwdriver. Then withdraw the connector assembly from inside the Z-Axis Assembly, as shown.

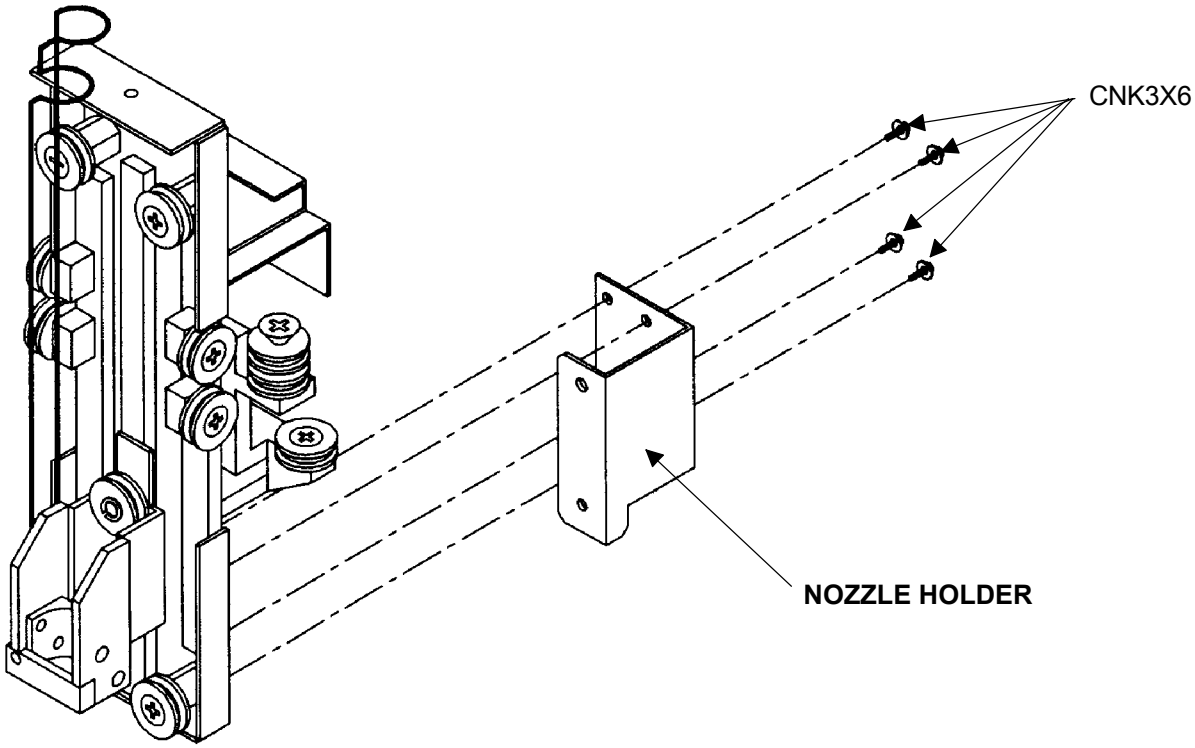
3. Remove the Z-Axis Assembly from the X-Axis Rail by removing the socket head screws (HB3X6), as shown in Detail "A".



PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. In order to access the pulleys near the Nozzle Head (SC-53-AY-5-4), remove the screws (CNK3X6) and the Nozzle Holder, as shown.



PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Clean the lubricant off of the Z-Axis Assembly with alcohol and a clean, lint-free cloth.

2. Disassemble the Nozzle Holder by removing the socket head screws (HB3X6, HB4X10, and SW4), using both a 2.5mm and a 3mm Allen wrench, as shown.

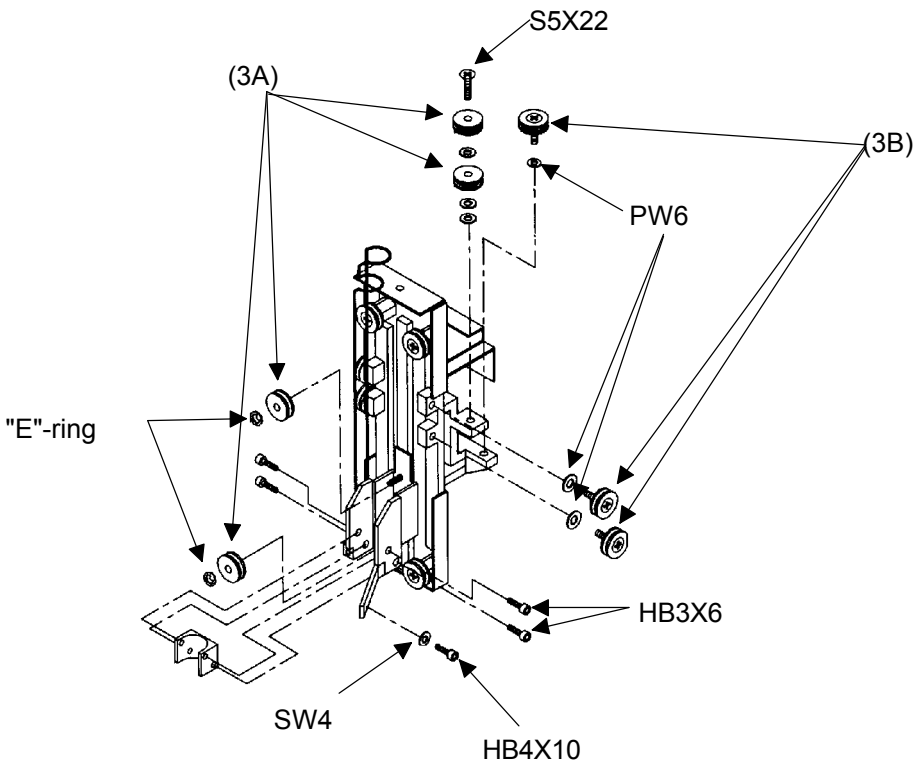
3. Remove and replace the following pulleys as shown:
   (A). 1-42677-01 - Quantity of 4
   (B). 1-42678-01 - Quantity of 3

4. In order to remove and replace the pulleys inside the Nozzle Holder, remove the "E"-ring clips, using needle nose pliers.

5. Install the new pulleys with the lettered side facing out.

6. Reassemble the Nozzle Holder by inserting and tightening the screws.

7. Refer to the next page for continuing Z-Axis Pulley replacement instructions.

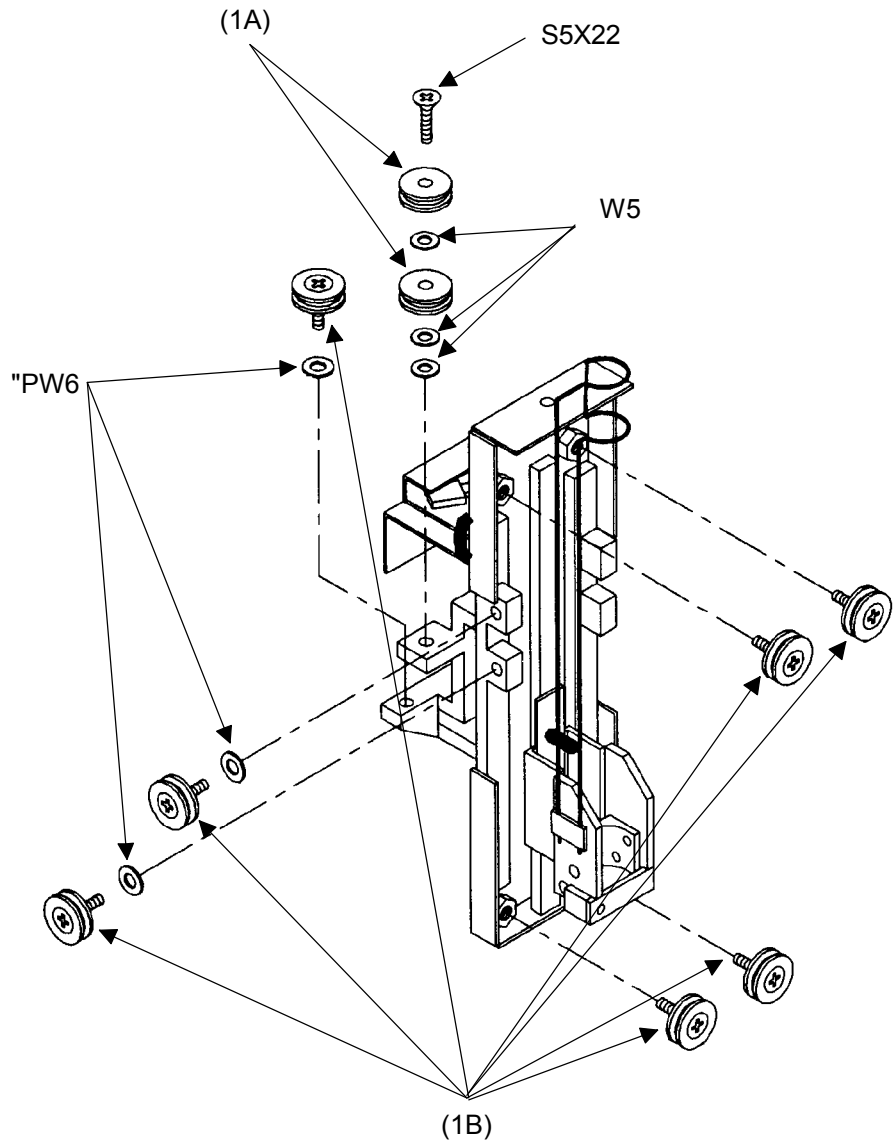


PULLEY REMOVAL AND REPLACEMENT

PULLEY REMOVAL AND REPLACEMENT

1. Remove and replace the following pulleys as shown:
   (A). 1-42677-01 Quantity of 2
   (B). 1-42678-01 Quantity of 7

2. Install the new pulleys with the lettered side facing out.



PULLEY REMOVAL AND REPLACEMENT

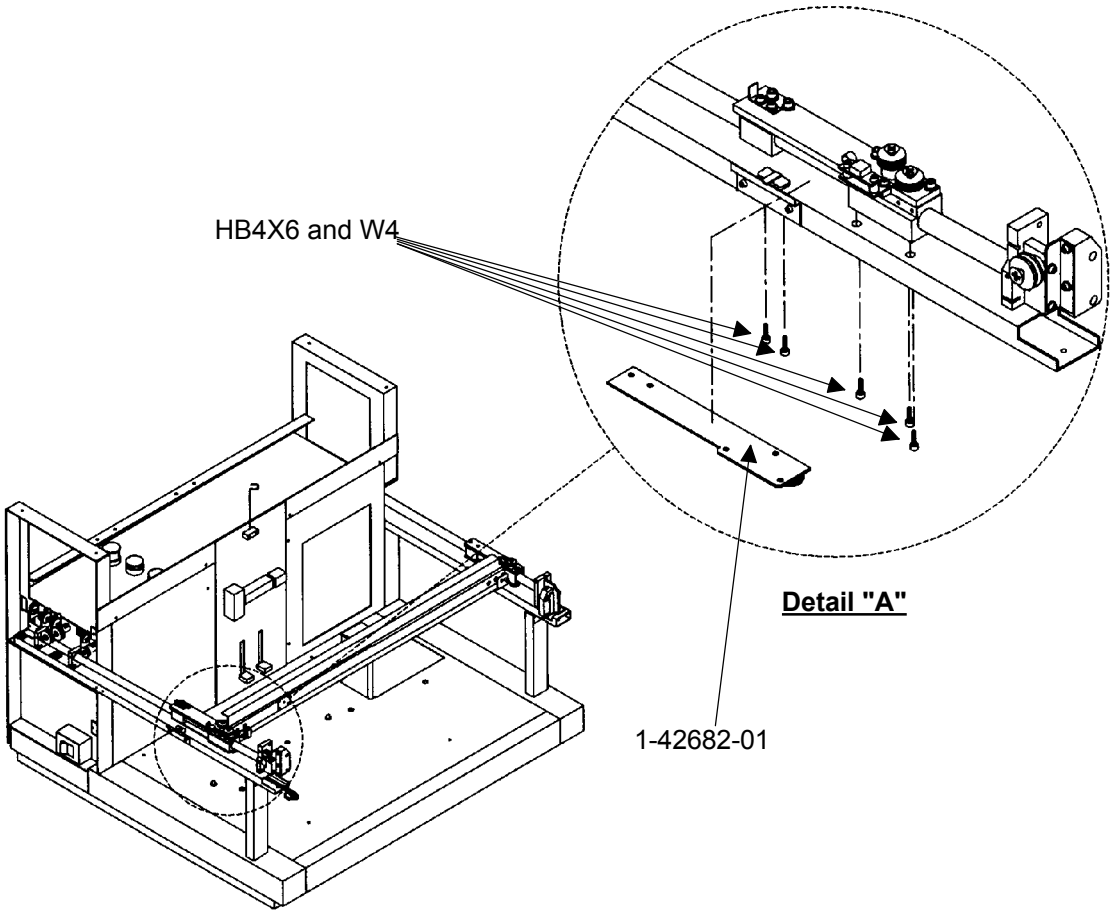
PULLEY REMOVAL AND REPLACEMENT

1. The Y-Axis Shafts are NOT to be replaced and a complete breakdown of the unit is NOT necessary.

2. Remove the socket head screws (HB4X6 and W4), using a 3mm Allen wrench from the Wire Idle Pulley Assembly by aligning the access holes in the angular pipe with the screw heads on the Wire Idle Pulley Assembly from the bottom of the angular pipe, as shown in Detail "A". Take care not to drop the screws into the angular pipe while removing them.

3. Remove and replace the bracket (1-42682-01) with the riveted pulleys on it.

4. Install and tighten the socket head screws (HB4X6), using a 3mm Allen wrench.



WIRE IDLE PULLEY ASSEMBLY REMOVAL AND REPLACEMENT

WIRE IDLE PULLEY ASSEMBLY REMOVAL AND REPLACEMENT

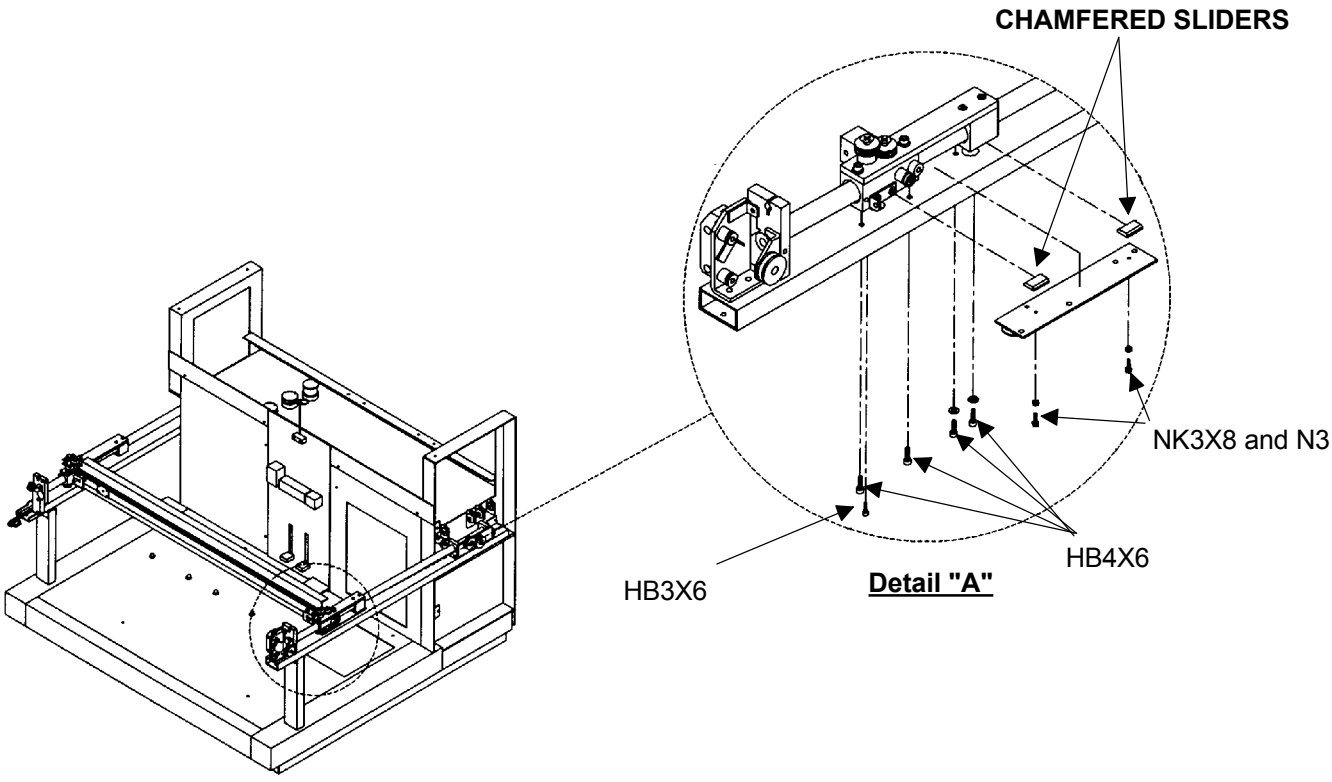
1. Remove the socket head screws (HB3X6, HB4X6, and W4), using a 2.5mm and a 3mm Allen wrench from the Wire Idle Pulley Assembly by aligning the access holes in the angular pipe with the screw heads on the Wire Idle Pulley Assembly from the bottom of the angular pipe, as shown in Detail "A".

2. Remove the riveted pulley bracket (1-42683-01). This side of the assembly has 2 chamfered sliders, which should NOT be discarded. In addition, remove the slider adjustment screws (NK3X8) and jam nuts (N3), using a 5.5mm wrench, as shown in Detail "A".

3. Partially start the slider adjustment screws (NK3X8) and jam nuts (N3) into the new bracket (1-42683-01); then attach the sliders with the chamfered side facing up onto the bracket, using grease (1-42727-01), and install the bracket assembly onto the Wire Idle Pulley Assembly using a 2.5mm and a 3mm Allen wrench.

4. After replacing the bracket and sliders, properly adjust the gap with the slider adjustment screws (NK3X8) and jam nuts (N3).

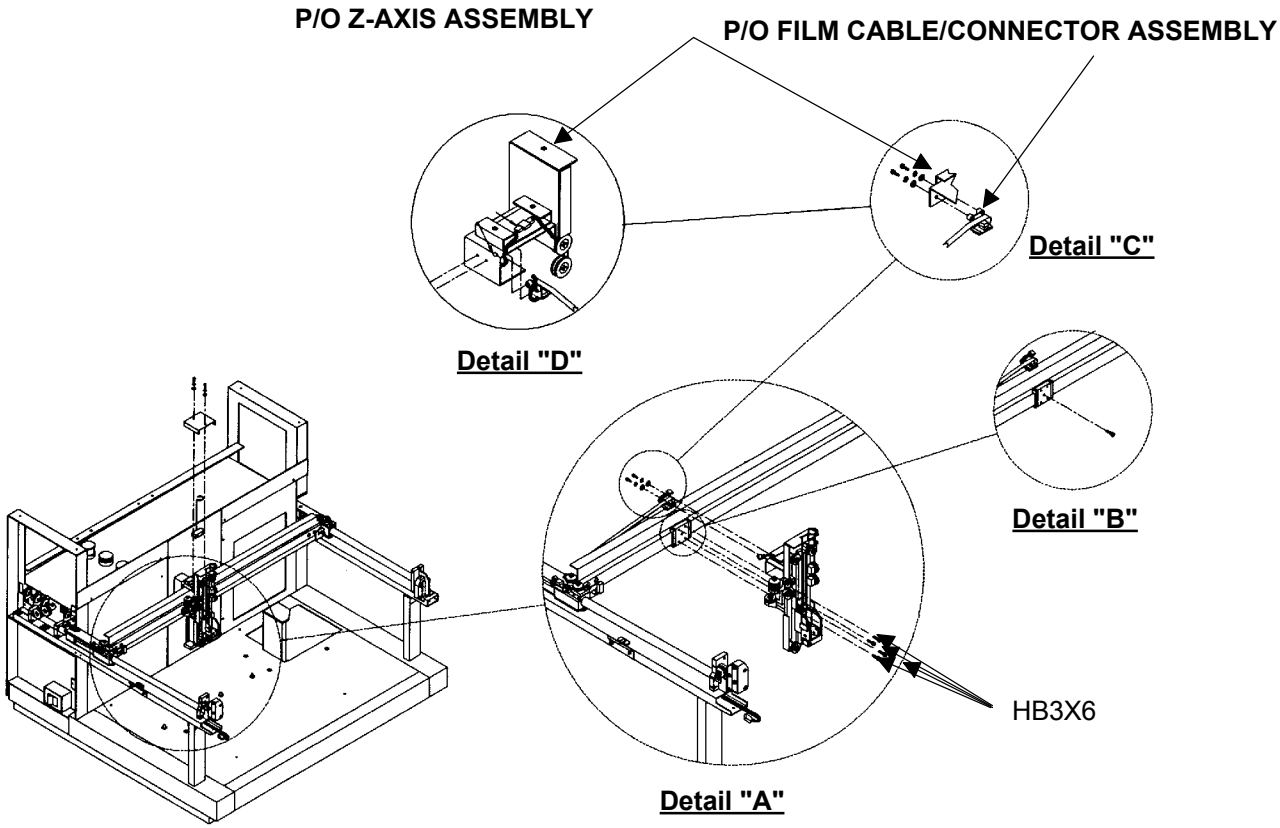
5. To adjust the vertical gap between the sliders and the Y-Axis shaft, gradually tighten the 2 slider adjustment screws; when the tips of the screws touch the sliders, loosen the screws approximately half a turn and secure each jam nut, using a 5.5mm wrench.



Z-AXIS ASSEMBLY INSTALLATION

Z-AXIS ASSEMBLY INSTALLATION

1. Instructions for the installation of the Z-Axis Assembly are continued on the following page.



Z-AXIS ASSEMBLY INSTALLATION AND LUBRICATION

Z-AXIS ASSEMBLY INSTALLATION AND LUBRICATION

1. Install the Z-Axis Assembly with socket head screws (HB3X6), using a 2.5mm Allen wrench, as shown in Detail "A". Tighten these screws.

2. Apply a light film of grease (1-42727-01) to the X-Axis Rail on both the top and bottom travel groove in 5 places (approximately 30mm long), equally spaced. Move the Z-Axis Assembly back and forth at least 10 full strokes. Wipe off the excess grease with a clean, lint-free cloth.

3. Apply a light film of grease (1-42727-01) to the Z-Axis Rail on both the left and right travel groove in 3 places (approximately 30mm long), equally spaced. Move the nozzle head up and down at least 10 full strokes. Wipe off the excess grease with a clean, lint-free cloth.

4. Apply a light film of grease (1-42727-01) to both Y-Axis shafts. Move the X-Axis Rail Assembly back and forth several times; then wipe off the excess grease with a clean, lint-free cloth.

5. Connect the Ribbon Cable to the PCB. Install the cable assembly on the inside of the Z-Axis Assembly, shown in Details "C" and "D", and install the cable between the cable assembly bracket and the guide plate on the Z-Axis Assembly, using screws (NK2.6X6, SW2.6, and W2.6), as shown in Detail "D". Tighten the screws using a #1 Phillips screwdriver.

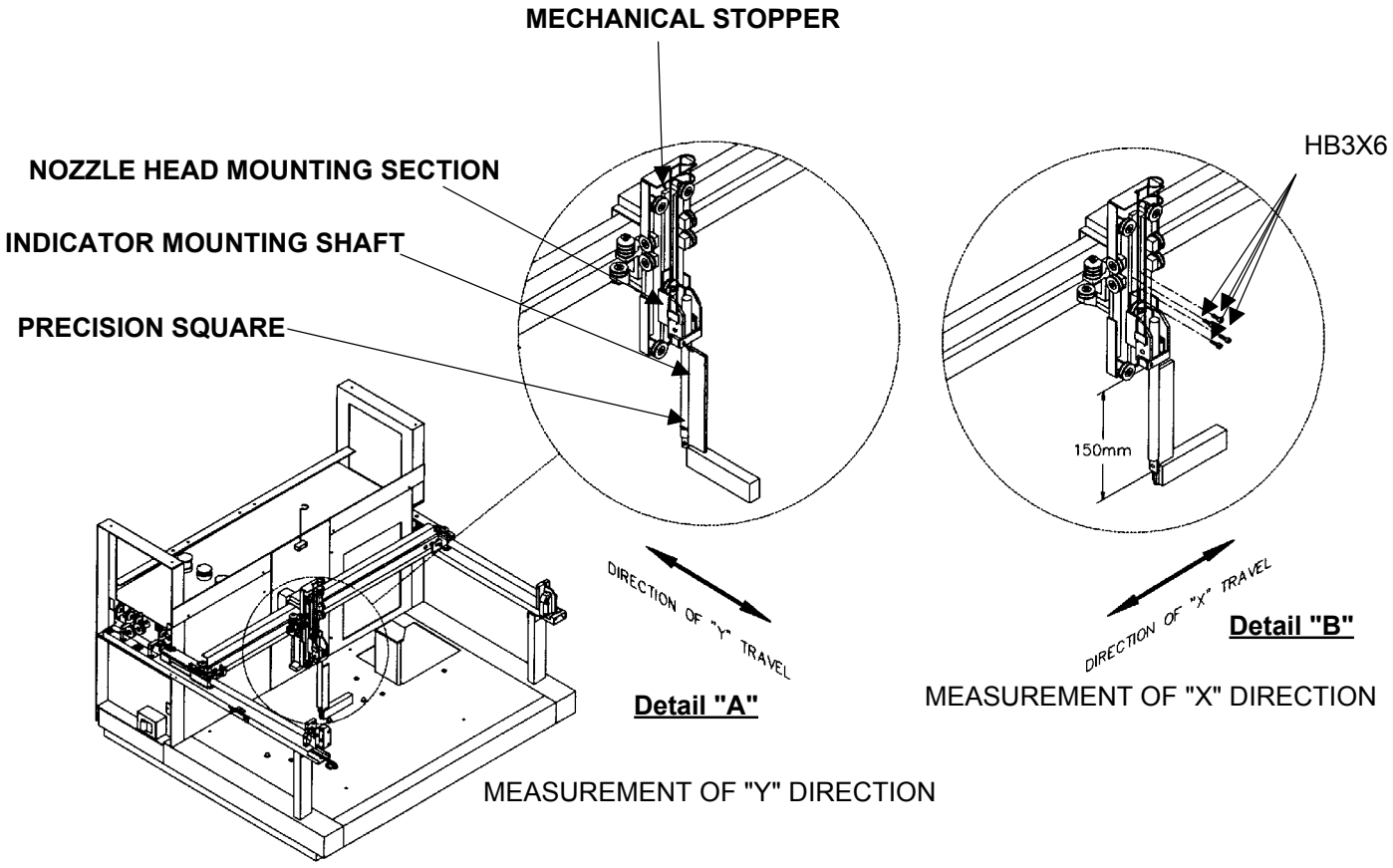
6. Plug Connector "P1" into "J1". Secure the cable to the Z-Axis Assembly using a ty-wrap, as shown in Detail "D".

7. Install the top mounting cover on the Z-Axis Assembly and tighten the screws (BK3X6 and W3), as shown.

Z-AXIS ASSEMBLY ALIGNMENT

Z-AXIS ASSEMBLY ALIGNMENT

1. Instructions for the perpendicularity measurement are continued on the next page.
2. Remove mirror finish Base Plate by removing 2 screws (S3X6) and 2 screws (BK3X6).



Z-AXIS ASSEMBLY ALIGNMENT

Z-AXIS ASSEMBLY ALIGNMENT

1. Tools required:
   a). Indicator Mounting Shaft (APS-930-T400)
   b). Precision Square (APS-930-T600)
   c). Feeler Gauge

2. Specification Limits:

   X-Axis direction: 0.3mm or less (Detail "B")
   Y-Axis direction: 1.0mm or less (Detail "A")

3. Disassemble the Indicator Mounting Clamp from the mounting shaft by removing the socket head screw (HB5X10) using a 4mm Allen wrench. Loosen the socket head screw (HB4X10) using a 3mm Allen wrench, and mount the Indicator Mounting Shaft into the nozzle head mounting section, as shown in Detail "A".

4. After mounting the Indicator Mounting Shaft, measure the distance from the base plate to the bottom of the nozzle head. This measurement should be **150mm**, as shown in Detail "B".

5. **Inspection Point**: Using the feeler gauge, make sure the gap between the overall edge of the indicator shaft is in contact with the edge of the precision square and is within specification limits.

6. Adjust for optimal X-Axis squareness by loosening the 4 Z-Axis socket head mounting screws (HB3X6) using a 2.5mm Allen wrench, and set the precision square on the stainless steel base plate to the right or left side of the mounting shaft vertically so that it contacts the indicator mounting shaft, as shown in Detail "B". While holding the mounting shaft and the precision square, tighten the 4 mounting screws and recheck the alignment.

7. Adjust for optimal X-Axis squareness by loosening the 4 nozzle socket head mounting screws (HB3X6), using a 2.5mm Allen wrench, and the single socket head screw (HB4X10) on the front of the nozzle head using a 3mm Allen wrench, with the indicator mounting shaft in place. Set the precision square on the stainless steel base plate to the front or side of the mounting shaft vertically so that it contacts the indicator mounting shaft, as shown in Detail "A". While holding the mounting shaft and the precision square, tighten the 4 screws (two on each side) and then tighten the front screw. Recheck the alignment.

8. After inspection is complete, remove the Indicator Mounting Shaft from the nozzle head section, retighten the screw, and reinstall the mounting clamp onto the mounting shaft.

9. Reinstall the mirror finish Base Plate using 2 screws (S3X6) and 2 screws (BK3X6).

X-AXIS DASH (2) DRIVE CABLE INSTALLATION

X-AXIS DASH (2) DRIVE CABLE INSTALLATION

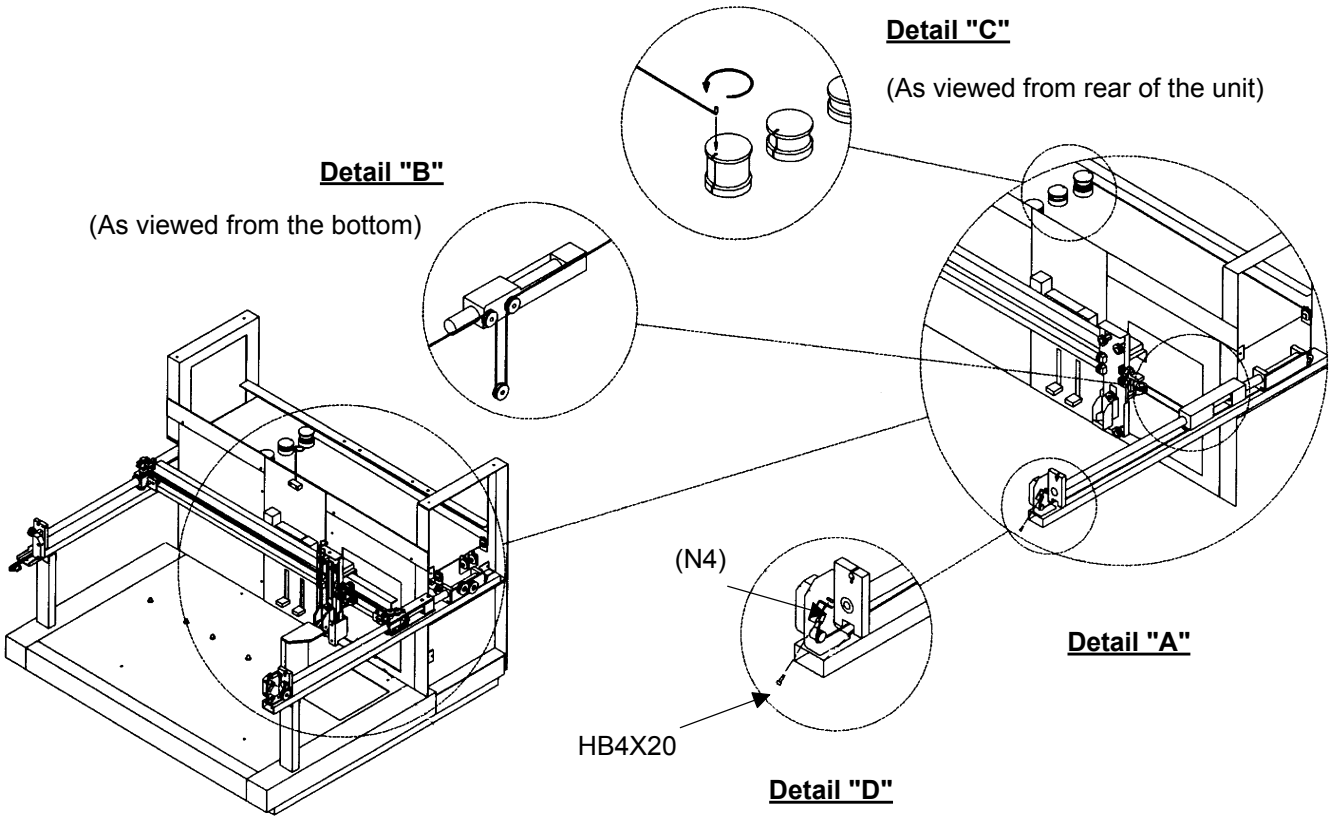
1. Before routing the Dash (2) X-Axis Drive Cables (1-42665-01), make sure that the Z-Axis Assembly is pushed all the way to the right and the Y-Axis Assembly is pushed all the way to the back, as shown.

2. Insert the X-Axis Drive Cable (1-42665-01) onto the bottom of the wire drum, as shown in Detail "C", but do not force the cable below the ridge of the bottom of the drum. Rotate the wire drum counter-clockwise until the cable is taut. Ensure that the cable does not overlap when being installed on the wire drum.

3. Route the cable onto the pulleys as shown in Details "A" and "B".

4. Route the cable through the notched portion of the Y-Shaft mounting bracket as shown in Detail "D". Install the socket head screw (HB4X20) and jam nut (N4) onto the cable and wire tension bracket. Tighten the screw into the bracket only enough to get the jam nut started on the screw.

5. Refer to the next page for instructions on installing the Dash (1) X-Axis Drive Cables.



X-AXIS DASH (1) DRIVE CABLE INSTALLATION

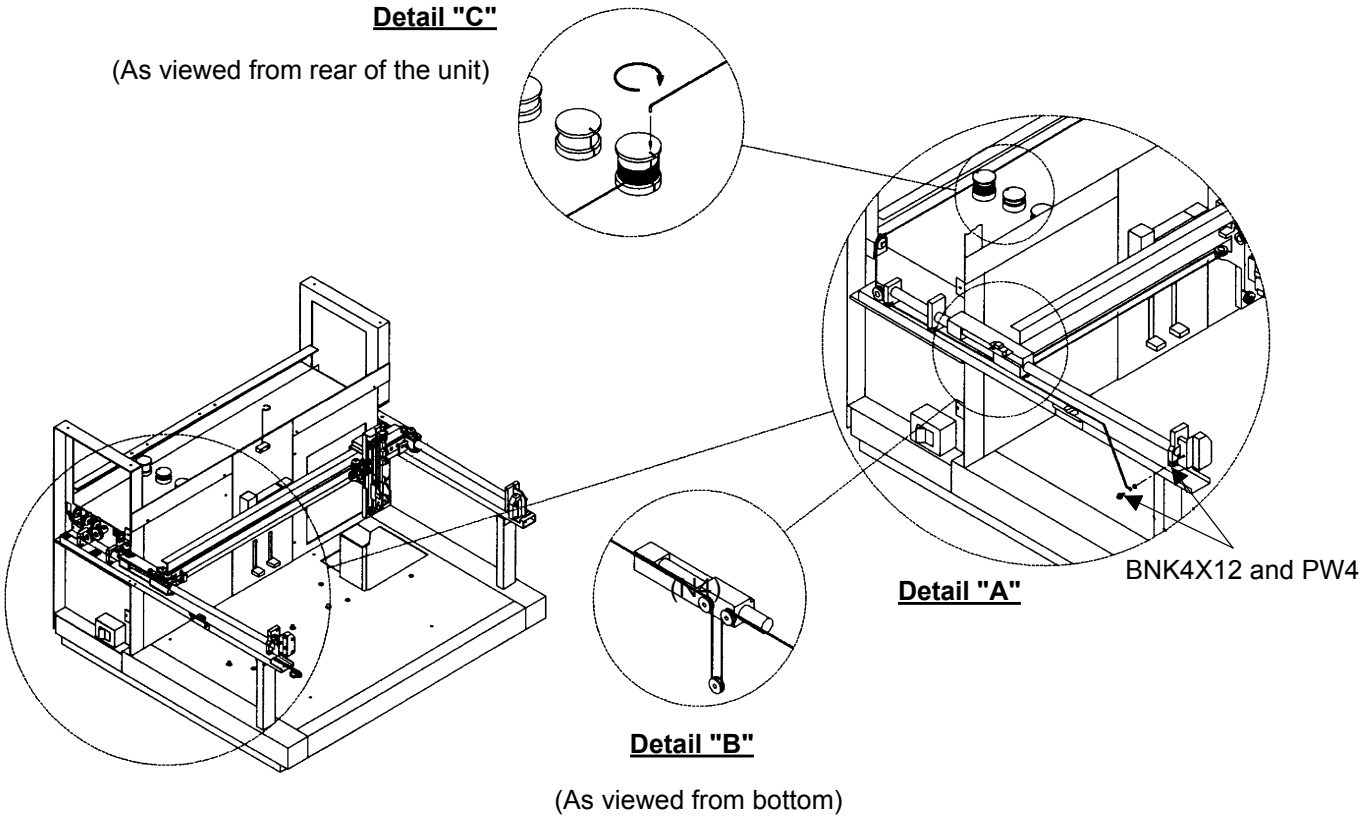
X-AXIS DASH (1) DRIVE CABLE INSTALLATION

1. Before routing of the dash (1) X-Axis Drive Cable (1-42665-01), make sure that the Z-Axis Assembly is pushed all the way to the right and the Y-Axis Assembly is all the way to the back of the unit, as shown.

2. Insert the X-Axis Cable (1-42665-01) onto the top of the wire drum, as shown in Detail "C", but do not let the cable come above the ridge on top of the drum. Loop the cable two (2) turns counter-clockwise around the drum. Ensure that the cable does not overlap when being installed on the wire drum.

3. Route the cable on the pulleys as shown in Details "A" and "B".

4. To prevent the cable from fraying, make sure that the nylon sleeve is covering the cable when it passes through the notched portion of the Y-Shaft mounting bracket, as shown in Detail "A". Sandwich the lug terminal of the X-Axis Cable between the pan head screw/washer assembly (BNK4X12) and the flat washer (PW4), then tighten, as shown in Detail "A".



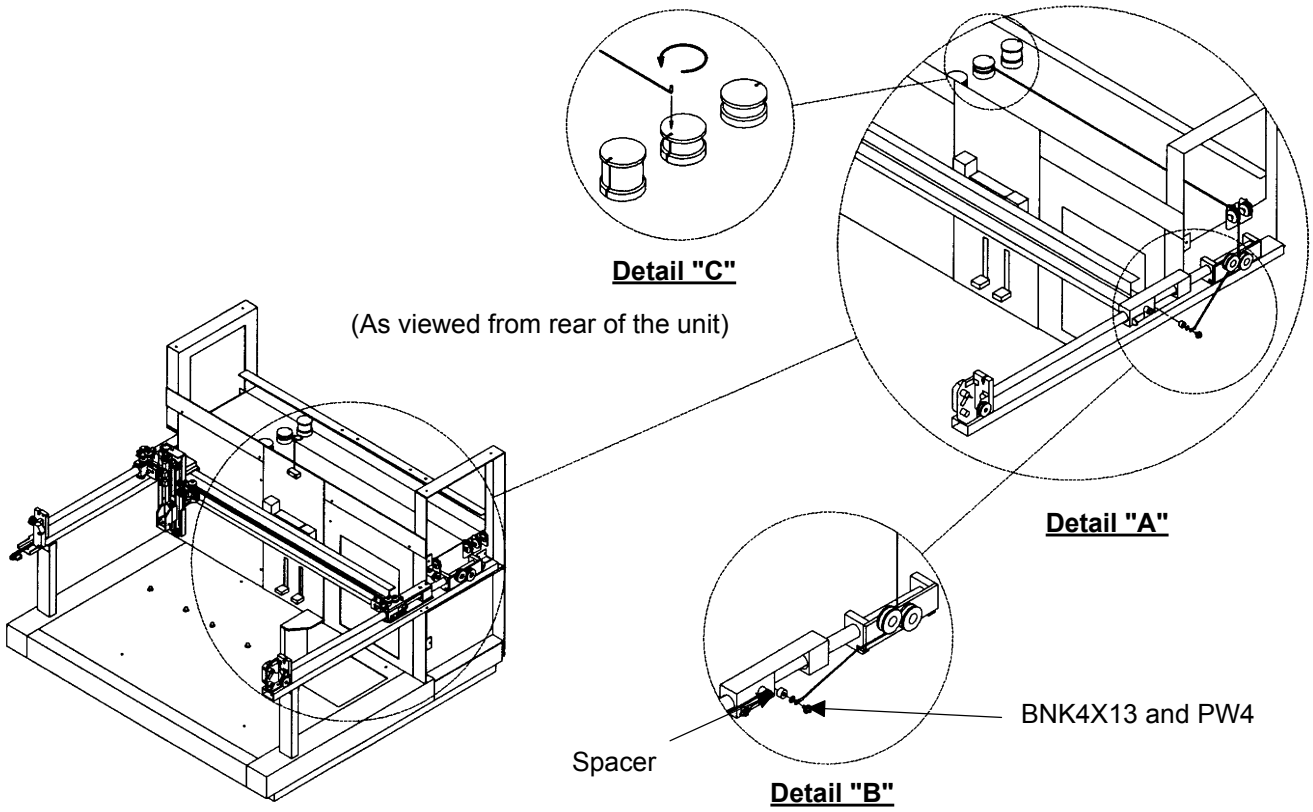
Y-AXIS DRIVE CABLE INSTALLATION

Y-AXIS DRIVE CABLE INSTALLATION

1. Make sure that the Y-Axis is all the way to the back of the unit. Insert the Y-Axis cable (1-42677-01) onto the bottom of the wire drum, as shown in Detail "C". Do **NOT** force the cable below the ridge on the bottom of the drum. Rotate the wire drum approximately 5 turns counter-clockwise. Ensure that the cable does not overlap when being installed on the wire drum.

2. Route the Y-Axis Cable on the pulleys as shown in Detail "A".

3. Sandwich the lug terminal of the Y-Axis Cable between the screw assembly (BNK4X13) and washer (PW4), and then install the spacer as shown in Detail "B".



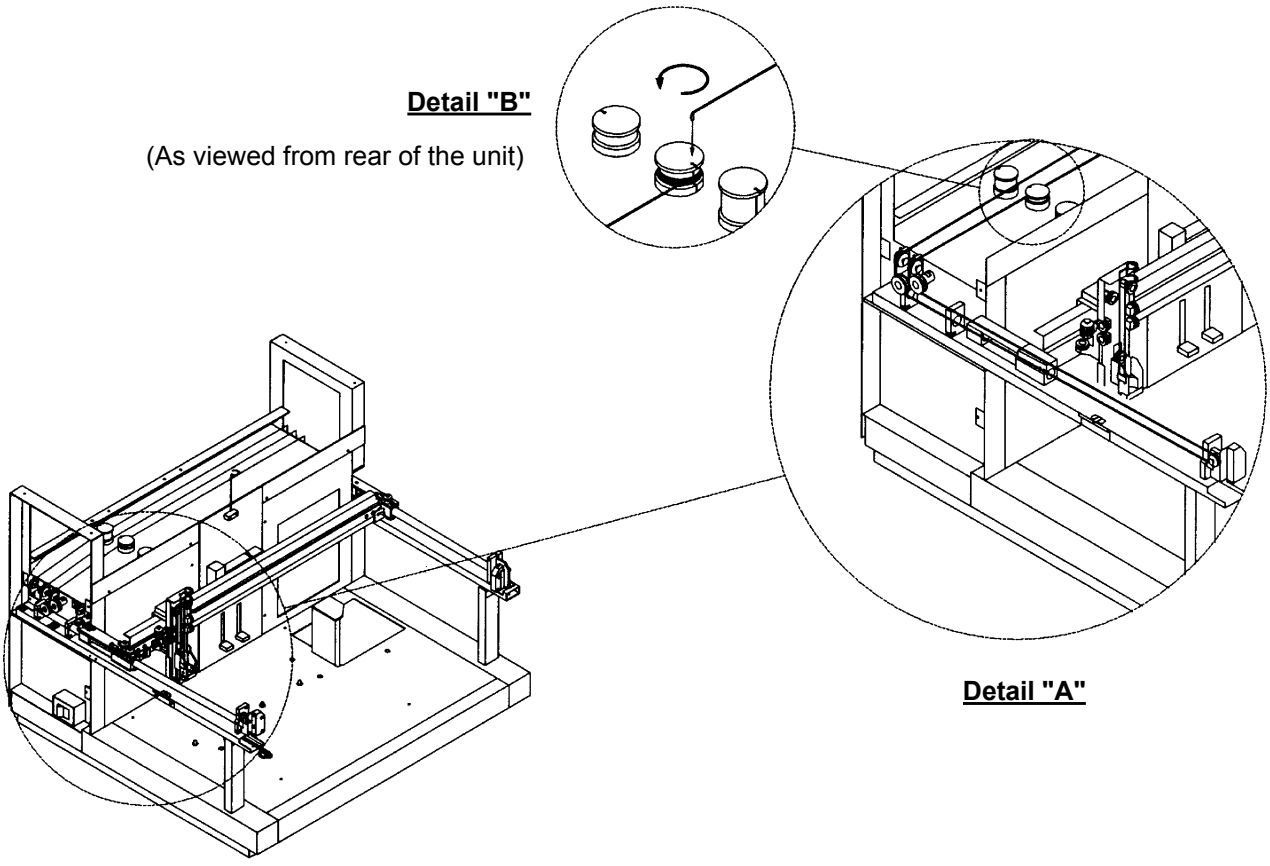
Y-AXIS DRIVE CABLE INSTALLATION

Y-AXIS DRIVE CABLE INSTALLATION

1. Insert the cable onto the top of the wire drum as shown in Detail "B", but do **NOT** let the cable come above the ridge on the top of the drum. Loop the cable approximately 2 turns counter-clockwise while holding the wire drum to keep it from moving. Ensure that the cable does not overlap when being installed on the wire drum.

2. Route the Y-Axis Drive Cable (1-42666-01) around the pulleys, as shown in Detail "A".

3. Refer to the next page for continuing Y-Axis Drive Cable installation instructions.

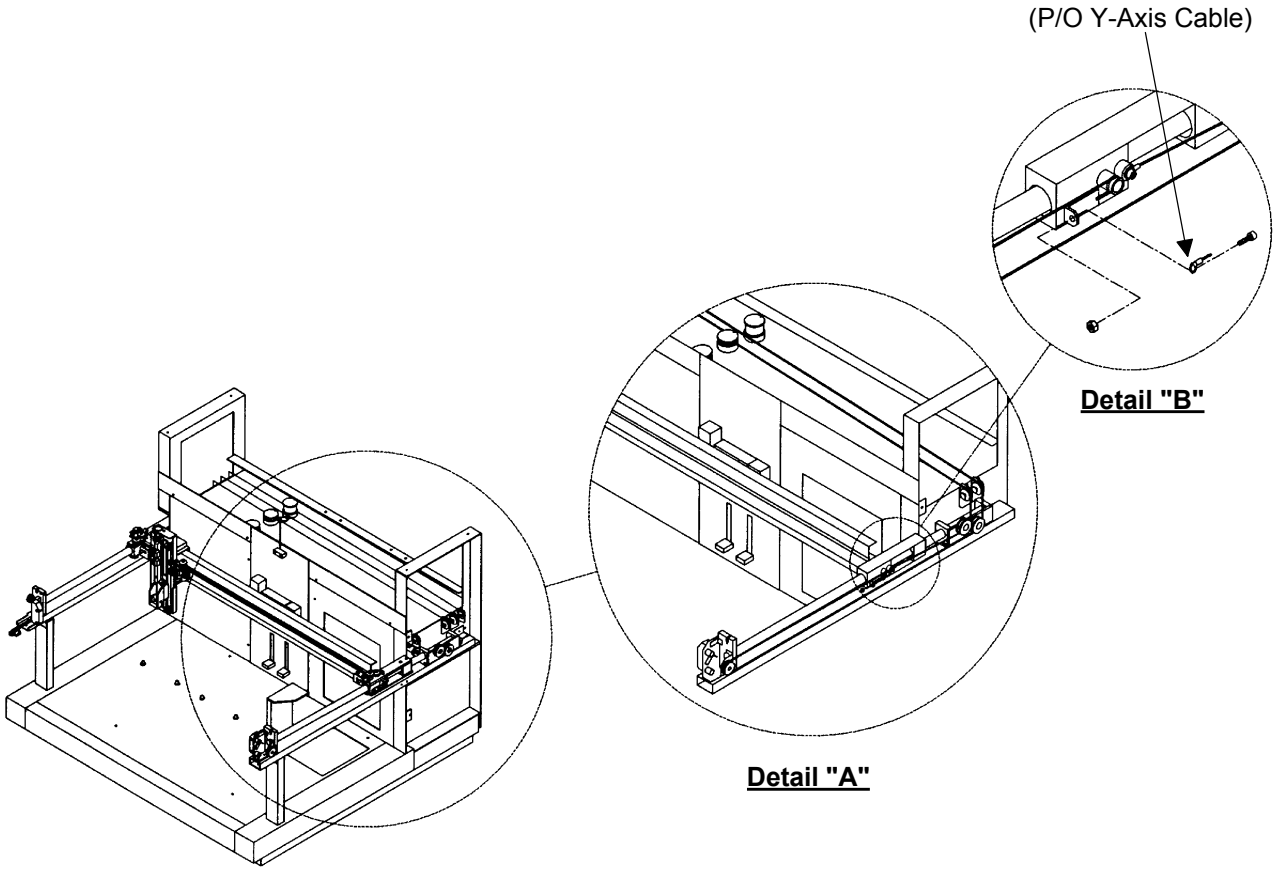


Y-AXIS DRIVE CABLE INSTALLATION

Y-AXIS DRIVE CABLE INSTALLATION

1. Route the Y-Axis Drive Cable (1-42666-01) onto the pulleys as shown in Detail "A".

2. Install the socket head screw (HB4X20) and jam nut (N4) onto the cable and Wire Idle Pulley Assembly as shown in Detail "B". Tighten the screw into the bracket only enough to get the nut started onto the screw.

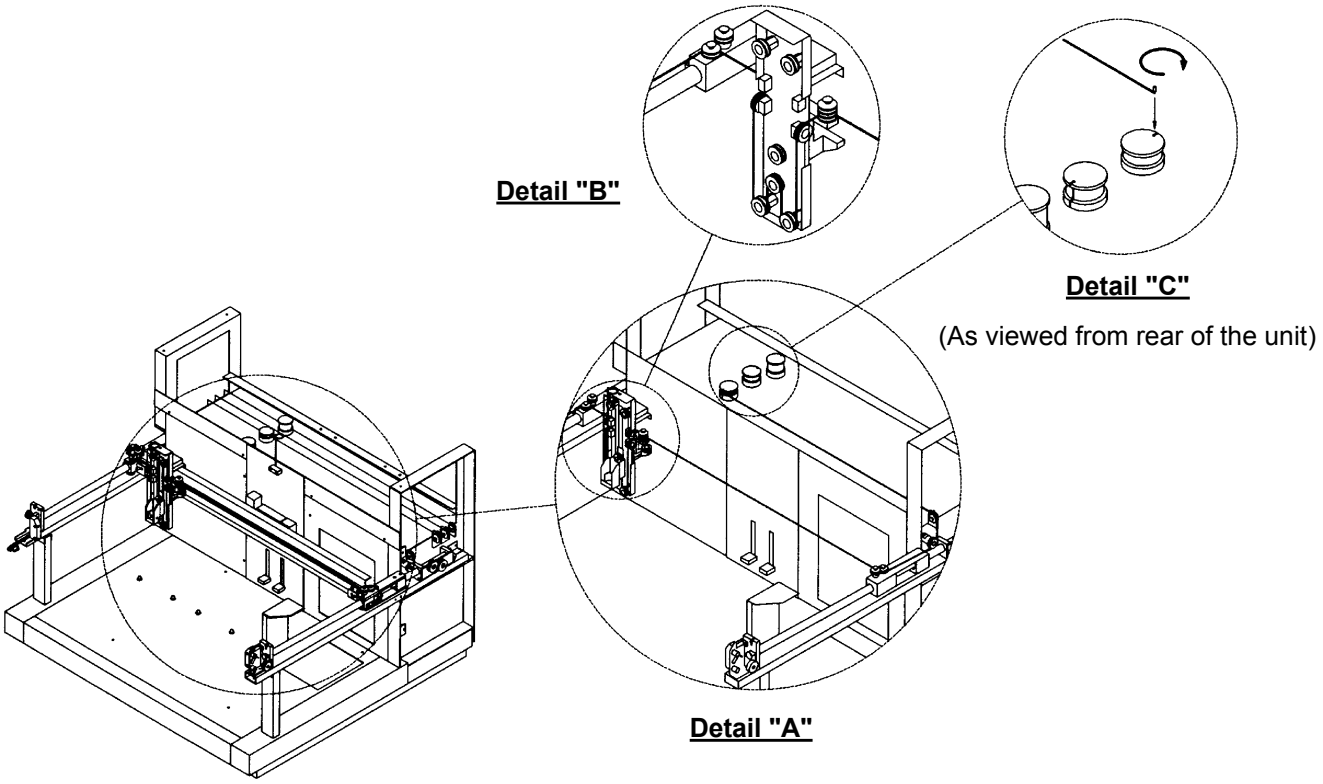


Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

1. Insert the dash (2) Z-Axis Drive Cable (1-42667-01) onto the bottom of the wire drum as shown in Detail "C", but do **NOT** force the cable onto the bottom of the drum. Rotate the wire drum approximately 5 turns clockwise. Make sure that the cable does not overlap when being installed on the wire drum.

2. Route the Z-Axis Drive Cable onto the pulleys as shown in Details "A" and "B".

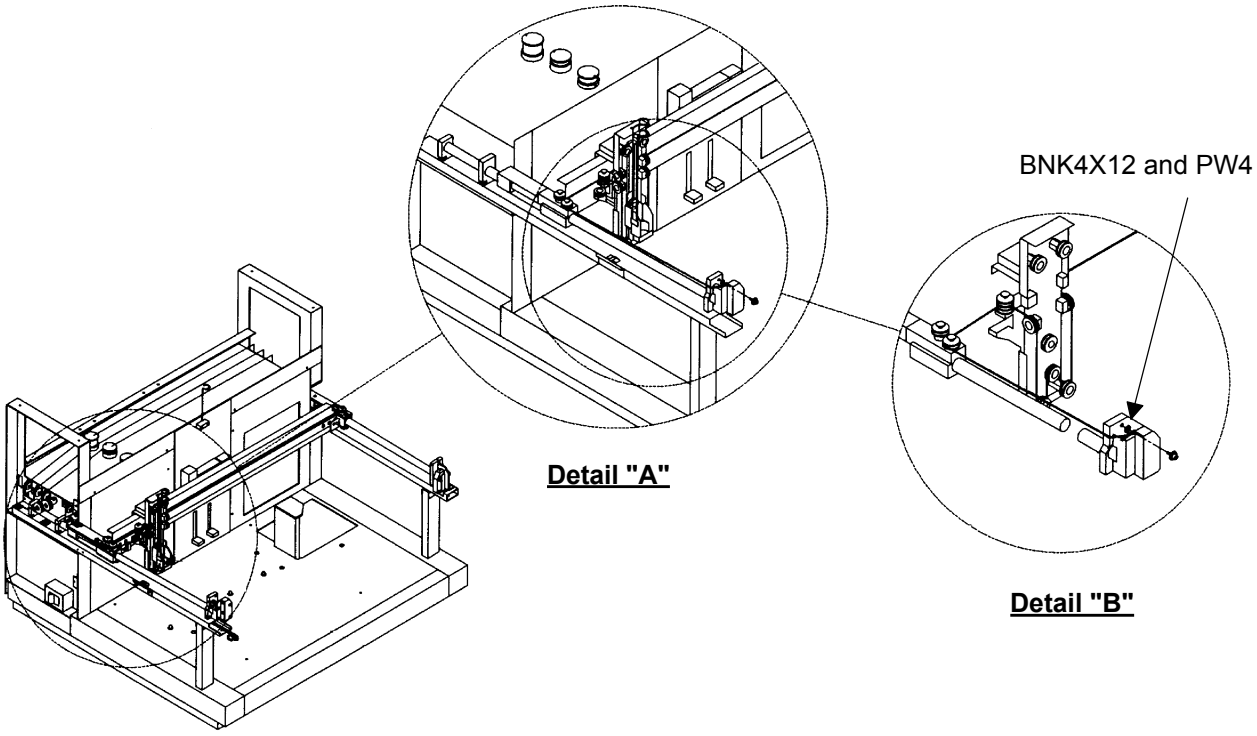


Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

1. To prevent the cable from fraying, make sure that the nylon sleeve is covering the cable when it passes through the notched portion of the Y-Shaft mounting bracket. Sandwich the lug terminal of the Z-Axis Drive Cable between the pan head screw/washer assembly (BNK4X12) and the flat washer (PW4), then tighten, as shown in Detail "A".

2. Route the Z-Axis Drive Cable as shown in Detail "B".



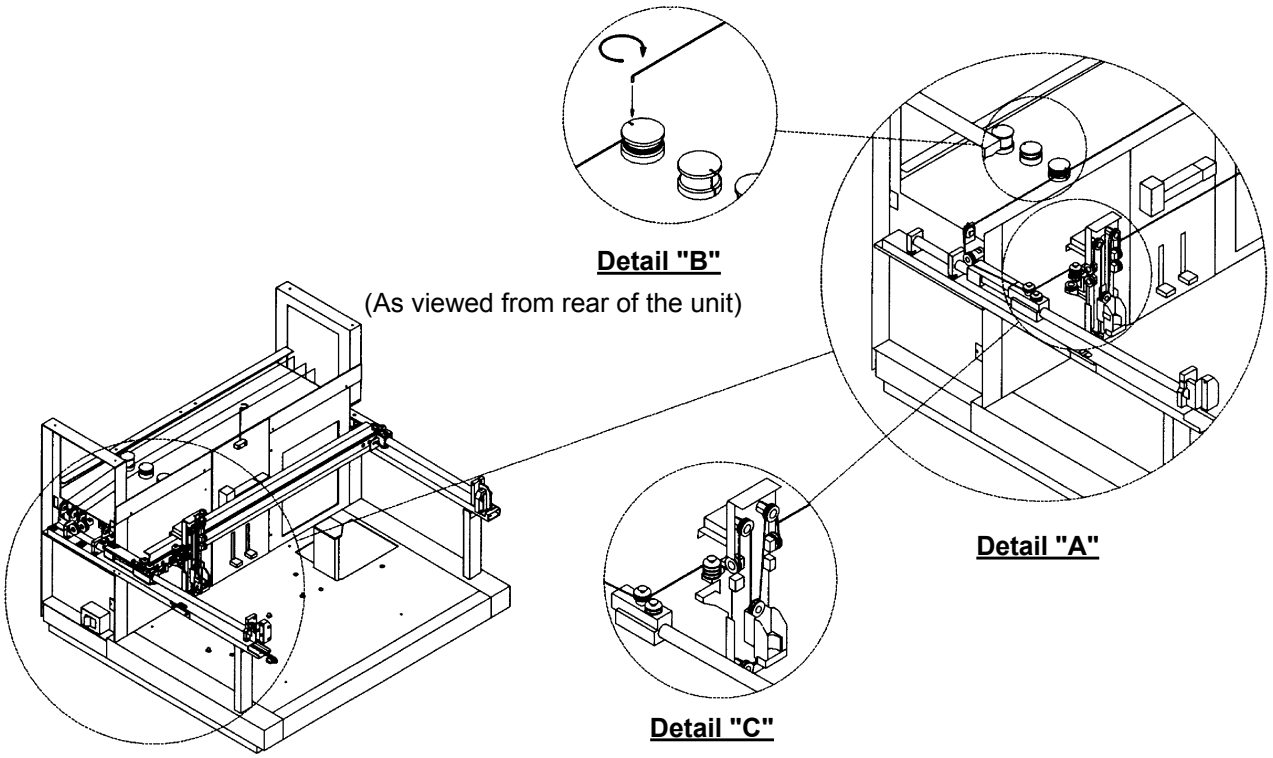
Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

1. Insert the Z-Axis Cable (1-42667-01) onto the top of the wire drum, as shown in detail "B", but do **NOT** let the cable come above the ridge on the top of the drum. Loop the cable around the wire drum 2 turns clockwise while holding the wire drum to keep it from moving. Ensure that the cable does not overlap when being installed on the wire drum.

2. Route the cable on the pulleys, as shown in Details "A" and "C".

3. Refer to the next page for continuing Z-Axis dash (1) Drive Cable installation instructions.

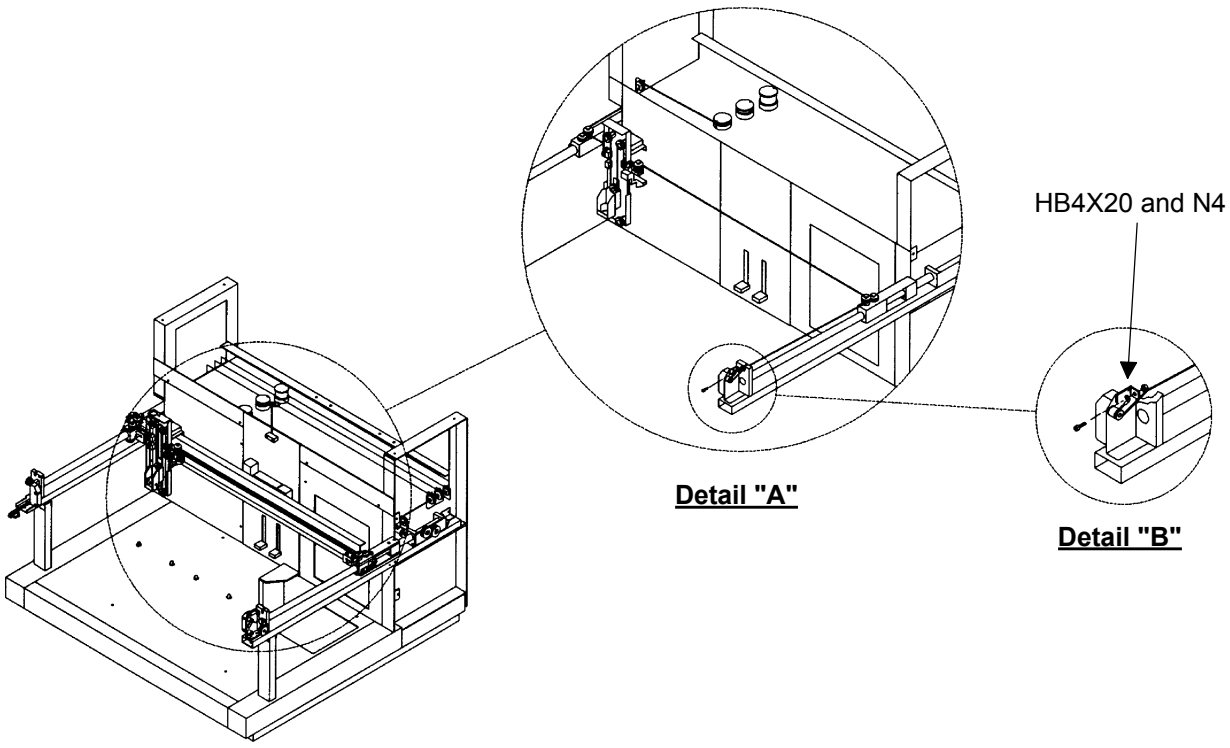


Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

Z-AXIS DASH (2) DRIVE CABLE INSTALLATION

1. Route the Z-Axis Drive Cable onto the pulleys, as shown in Detail "A".

2. To prevent the cable from fraying, make sure that the nylon sleeve is covering the cable when it passes through the notched portion of the Y-Shaft mounting bracket. Install the socket head screw (HB4X20) and jam nut (N4) onto the cable and tension bracket, as shown in Detail "B". Tighten the screw into the bracket only enough to get the nut started on the screw.

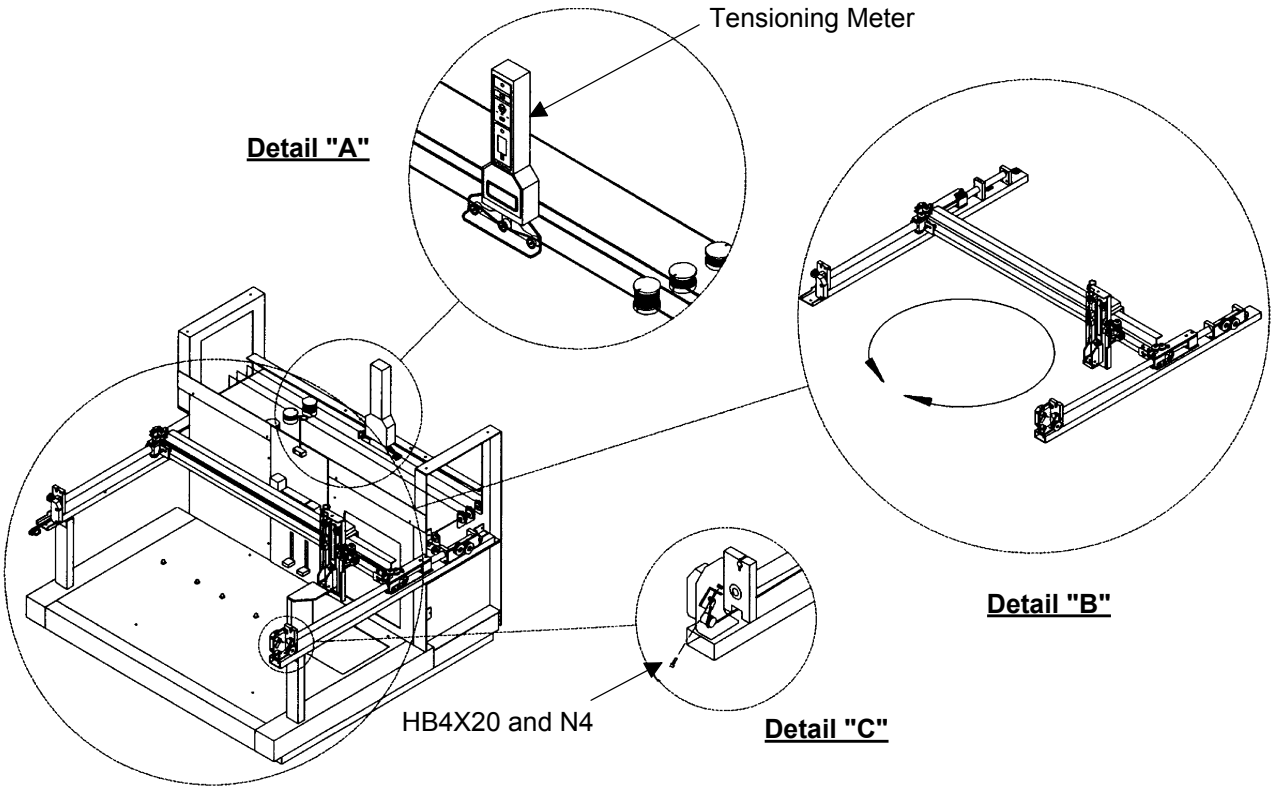


X-AXIS DRIVE CABLE TENSIONING

X-AXIS DRIVE CABLE TENSIONING

IMPORTANT: Before proceeding with the tensioning of the X, Y, and Z-Axis Drive Cables, pull the cables tight around the drive drums to seat the cables properly on the drive drum.

1. Refer to the following page for X-Axis Drive Cable tensioning instructions.



X-AXIS DRIVE CABLE TENSIONING

X-AXIS DRIVE CABLE TENSIONING

NOTE:

Before proceeding with the tensioning of the X, Y, and Z Axis Drive Cables, verify that the cables have been properly installed:

1. Manually turn the X-Axis wire drum clockwise. The X-Axis Assembly should travel towards the home position.

2. Manually turn the Y-Axis wire drum counter-clockwise. The Y-Axis Assembly should travel towards the home position.

3. Manually turn the Z-Axis wire drum counter-clockwise. The Z-Axis Assembly should travel towards the home position.

1. Tools required:
   a). Tension Meter (DTM-T200) or equivalent.

2. Specification Limits: 2,000 - 2,500 gF

3. Set the Tension Meter switches as follows:
   - DTS/SP CAL Switch - STD
   - Damping - NOR
   - Sample - TEX

4. Before taking measurements, set the tension meter to zero (0) by pressing the "measurement" and "memory" buttons simultaneously.

5. Hold the tension meter at the measuring position (centered upright between the side pulley and the wire drum), as shown in Detail "A". Push the guide roller slide knob **down** to lower the side guide rollers; then position the X-Axis cable between the center roller and the two side rollers. Gently release the slide knob to bring tension to the cable.

6. While holding the Z-Axis Assembly, move it and the X-Axis Assembly in the "X" and "Y" directions as if plotting a circle, as shown in Detail "B". Rotate the assemblies 3 times clockwise and counter-clockwise, while trying to avoid hitting the mechanical stoppers. Take the wire tension measurement with the head in the home position by pressing the "measure switch" button and holding the button down for several seconds.

7. Adjust the socket head screw (HB4X20), using a 3 mm Allen wrench, as shown in Detail "C", until the specified value has been reached. Then tighten the jam nut (N4) against the bracket to prevent loosening of the screw, using a 6 mm wrench.

Y-AXIS DRIVE CABLE TENSIONING

Y-AXIS DRIVE CABLE TENSIONING

NOTE:

Before proceeding with the tensioning of the X, Y, and Z Axis Drive Cables, verify that the cables have been properly installed:

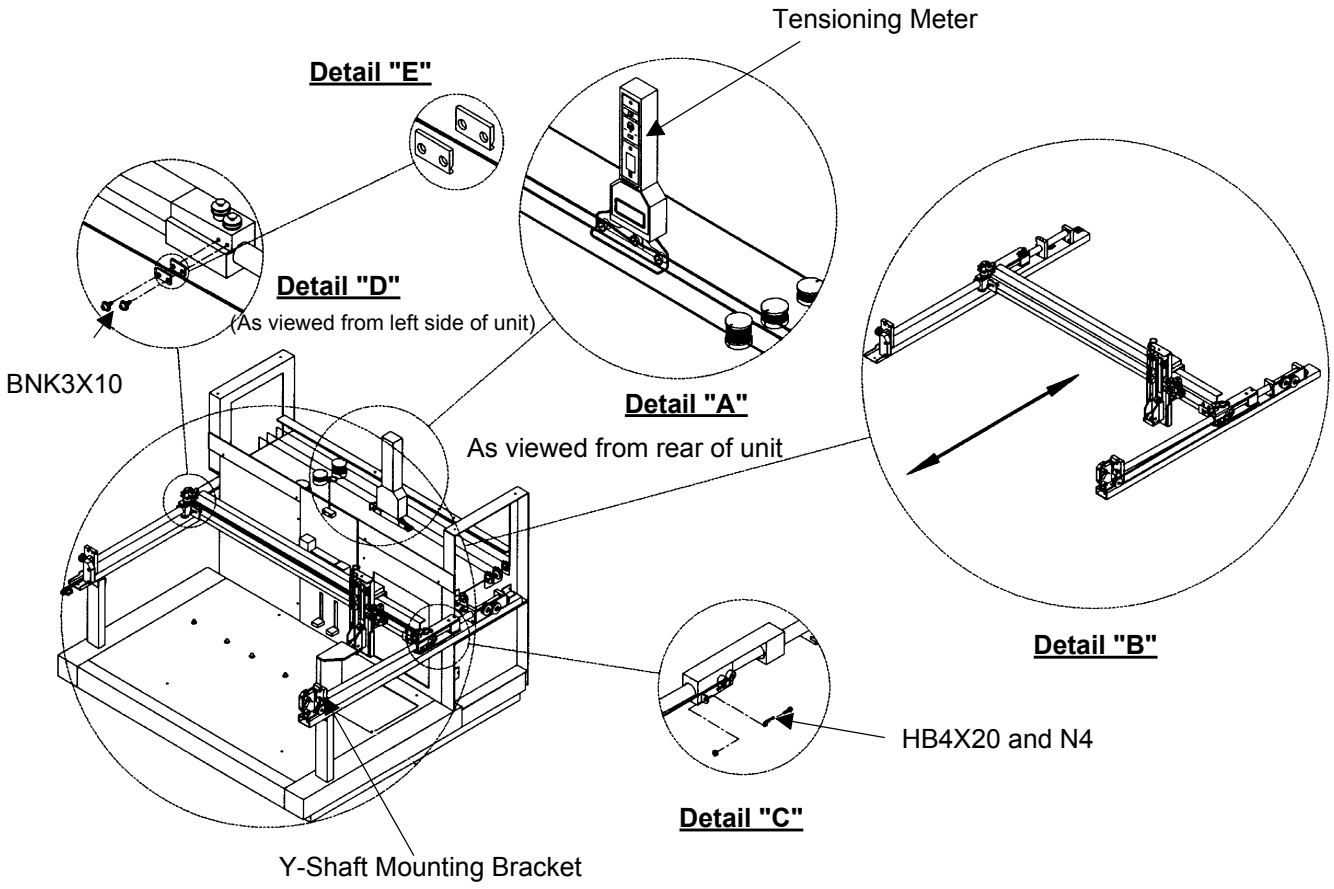
1. Manually turn the X-Axis wire drum clockwise. The X-Axis Assembly should travel toward the Y-Axis wire drum counter-clockwise. The Y-Axis Assembly should travel towardss the home position.

2. Manually turn the home position.

3. Manually turn the Z-Axis wire drum counter-clockwise. The Z-Axis Assembly should travel towards the home position.

If any of the axis assemblies do not respond to these movements, the operator must return to the appropriate section and reinstall that cable.

1. Refer to the following page for continuing Y-Axis Drive cable tensioning instructions.



Y-AXIS DRIVE CABLE TENSIONING

Y-AXIS DRIVE CABLE TENSIONING

2. Tools required:
   a). Tension Meter (DTM-T200)

3. Specification Limits: 2,500 - 3,000 gF

4. Set the Tension Meter switches as follows:
   - DTS/SP CAL Switch - STD
   - Damping - NOR
   - Sample - STE

5. Before taking measurements, set the tension meter to zero (0) by pressing the "measurement" and "memory" buttons simultaneously.

6. Hold the tension meter at the measuring position (centered upright between the side pulley and the wire drum), as shown in Detail "A". Push the guide roller slide knob **down** to lower the side guide rollers; then position the Y-Axis cable between the center roller and the two side rollers. Gently release the slide knob to bring tension to the cable.

7. While holding the Z-Axis Assembly, move it and the X-Axis Assembly in the "X" and "Y" directions as if plotting a circle, as shown in Detail "B". Rotate the assemblies 3 times clockwise and counter-clockwise, while trying to avoid hitting the mechanical stoppers. Take the wire tension measurement with the head in the home position by pressing the "measure switch" button and holding the button down for several seconds.

8. Adjust the socket head screw (HB4X20), using a 3 mm Allen wrench, as shown in Detail "C", until the specified value has been reached. Then tighten the jam nut (N4) against the bracket to prevent loosening of the screw, using a 6 mm wrench.

9. After completing measurements and adjustments to the Y-Axis Cable, pull the X-Axis Rail Assembly against the two (2) Y-Shaft Mounting Brackets and sandwich the Y-Axis cable between the clamps with screws (BNK3X10), as shown in Detail "D".

NOTE:

Make sure that the "V" notch in both brackets is facing towards the pulley assembly and the cable is installed inside the noted groove of the outside bracket, as shown in Detail "E".

Z-AXIS DRIVE CABLE TENSIONING

Z-AXIS DRIVE CABLE TENSIONING

NOTE:

Before proceeding with the tensioning of the X, Y, and Z Axis Drive Cables, verify that the cables have been properly installed:

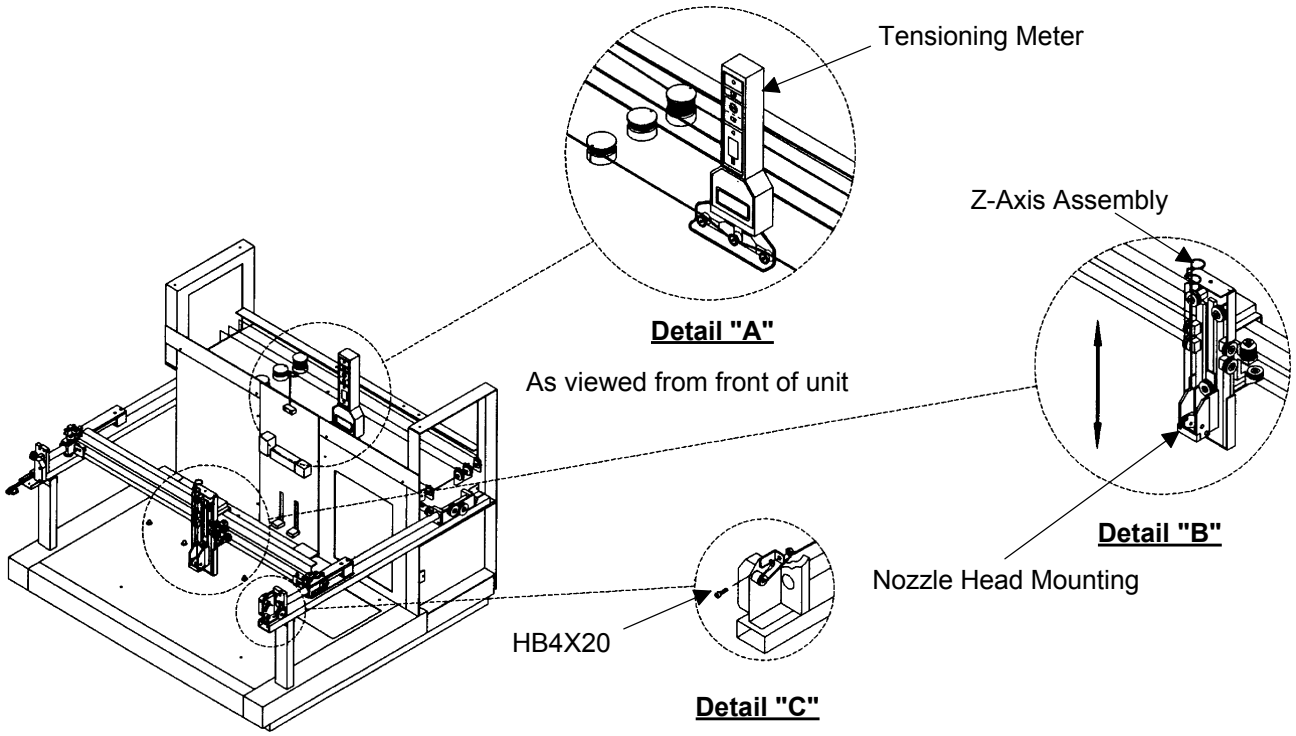
1. Manually turn the X-Axis wire drum clockwise. The X-Axis Assembly should travel towards the home position.

2. Manually turn the Y-Axis wire drum counter-clockwise. The Y-Axis Assembly should travel towards the home position.

3. Manually turn the Z-Axis wire drum counter-clockwise. The Z-Axis Assembly should travel towards the home position.

If any of the axis assemblies do not respond to these movements, the operator must return to the appropriate section and reinstall that cable.

1. Refer to the following page for Z-Axis Drive Cable tensioning instructions.



Z-AXIS DRIVE CABLE TENSIONING

Z-AXIS DRIVE CABLE TENSIONING

2. Tools required:
   a). Tension Meter (DTM-T200) or equivalent.

3. Specification Limits: 2,000 - 2,500 gF

4. Set the Tension Meter switches as follows:
   - DTS/SP CAL Switch - STD
   - Damping - NOR
   - Sample - TEX

5. Before taking measurements, set the tension meter to zero (0) by pressing the "measurement" and "memory" buttons simultaneously.

6. Hold the tension meter at the measuring position (centered upright between the side pulley and the wire drum), as shown in Detail "A". Push the guide roller slide knob **down** to lower the side guide rollers; then position the Z-Axis cable between the center roller and the two side rollers. Gently release the slide knob to bring tension to the cable.

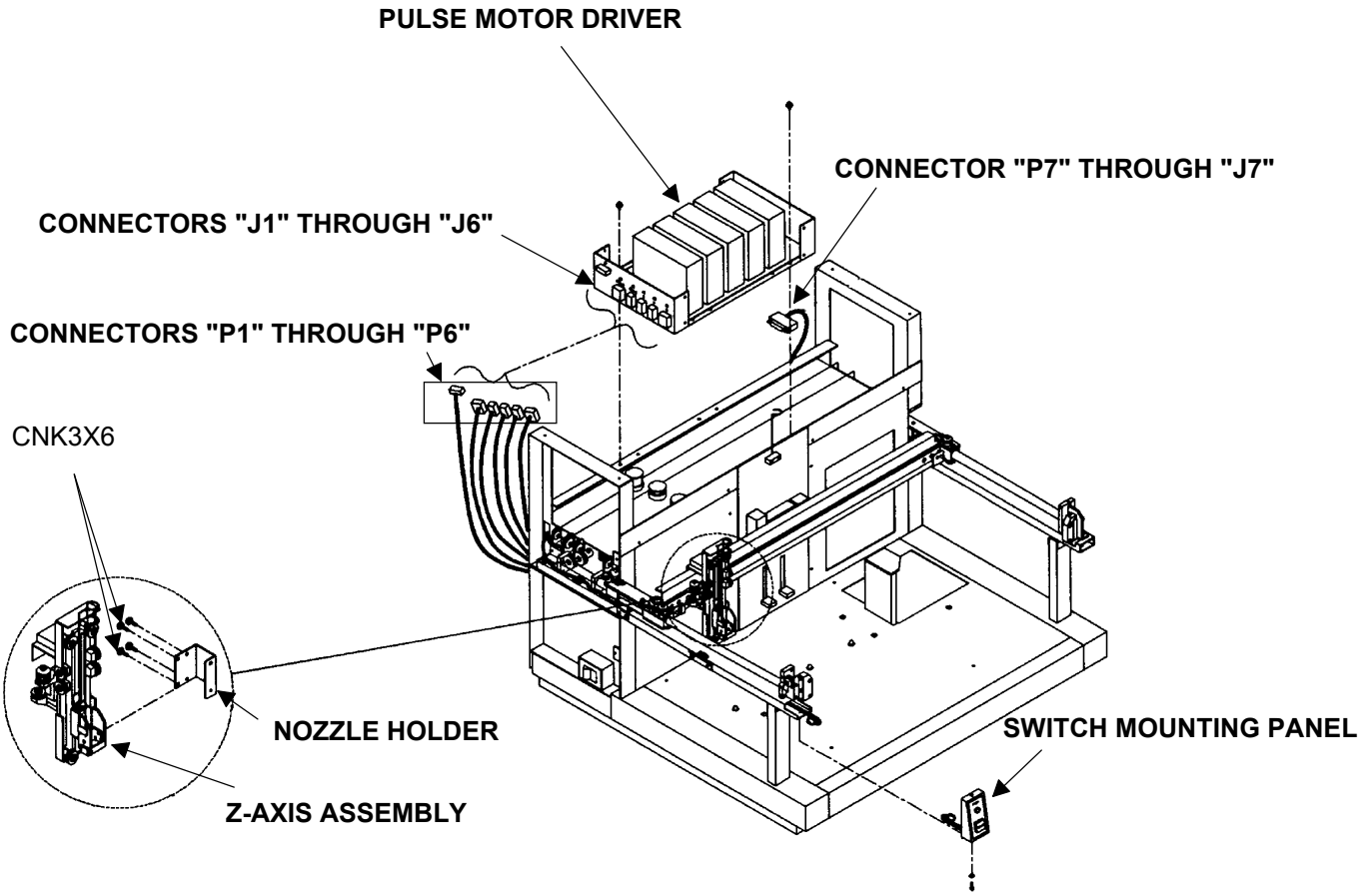
7. While holding the Z-Axis Assembly, manually move the Nozzle Head Mount vertically up and down 3 full times while holding the Z-Axis Assembly steady, as shown in detail "B", trying to avoid hitting the mechanical stopper. Take the wire tension measurement with the head in the home position by pressing the "measure switch" button and holding the button down for several seconds. This will change the display reading from "0000" to the actual measured tension.

8. Adjust the socket head screw (HB4X20), using a 3 mm Allen wrench, as shown in Detail "C", until the specified value has been reached. Then tighten the jam nut (N4) against the bracket to prevent loosening of the screw, using a 6 mm wrench.

PULSE MOTOR DRIVER INSTALLATION

PULSE MOTOR DRIVER INSTALLATION

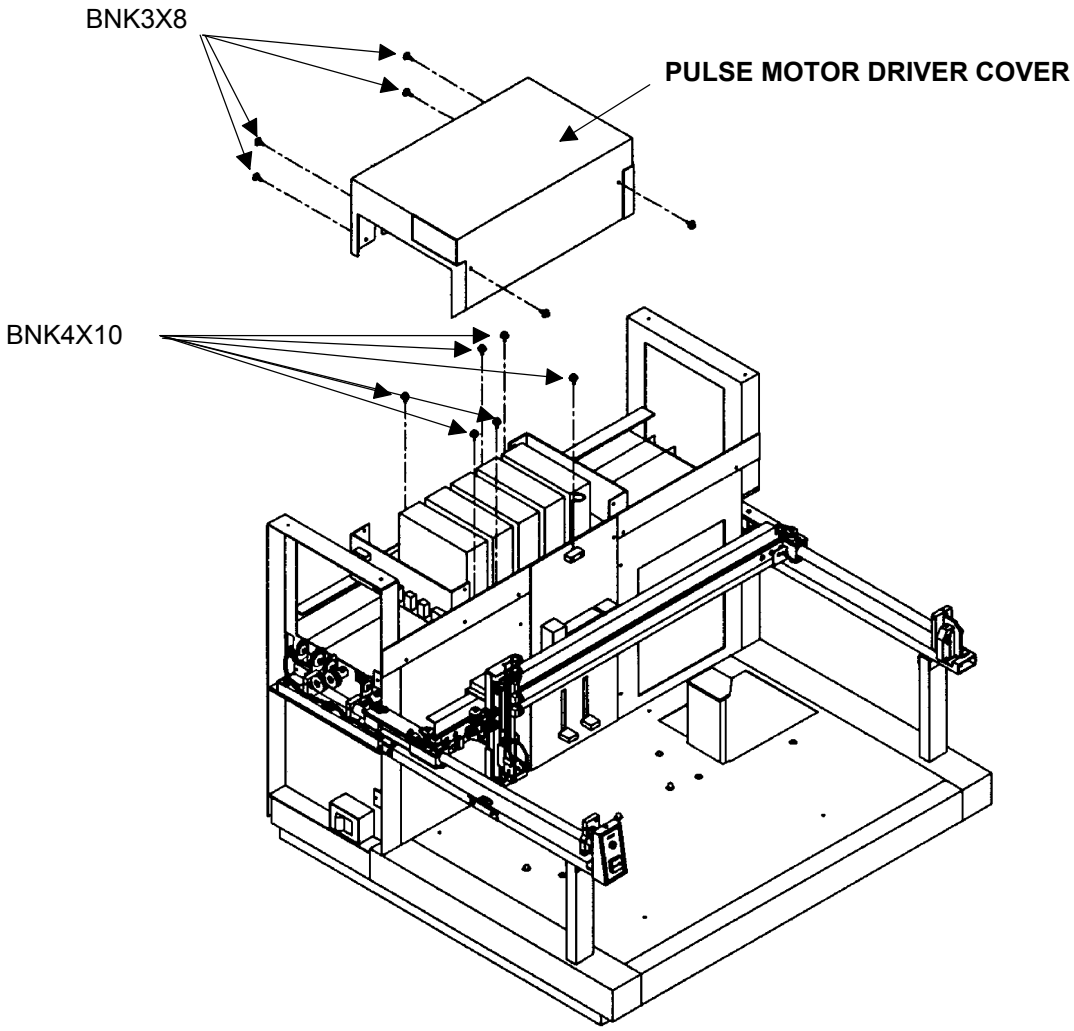
1. Connect the Ribbon Cable to the connector on the Y-Axis Idle Pulley Assembly.
2. Install the Pulse Motor Driver by installing and tightening only 2 screws (BNK4X10), as shown.
3. Plug in Connectors "P1" through "P6" of the Pulse Motor Driver, as shown.
4. Connect Connector "J1" through "J6" of the Pulse Motor Driver, using a #1 Phillips screwdriver, as shown.
5. Plug in the connector to the switch mounting panel; then mount the panel using screw (BK3X6 and W3), as shown.
6. Install screws (CNK3X6) and nozzle holder (SC-53-AY-5-4), into the Z-Axis Assembly, as shown in Detail "A".
7. For the testing of the unit, refer to FTP43855.



PULSE MOTOR DRIVER COVER INSTALLATION

PULSE MOTOR DRIVER COVER INSTALLATION

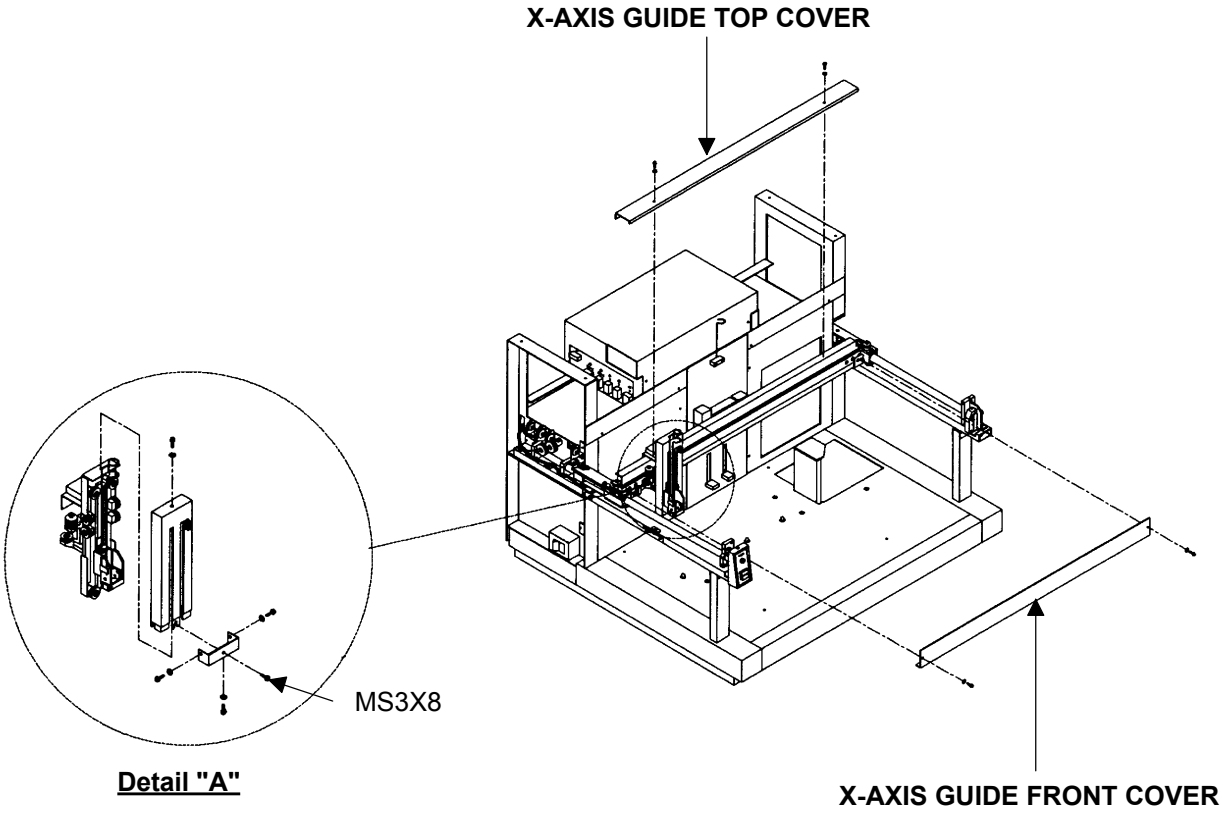
1. Install the remainder of the screws (BNK4X10) that hold the Pulse Motor Driver to the frame, as shown.
2. Assemble the Pulse Motor Driver's Cover by installing and tightening the screw (BNK3X8), as shown.
3. Connect the Pulse Motor Driver Fan (not shown).



X-AXIS RAIL COVER INSTALLATION

X-AXIS RAIL COVER INSTALLATION

1. Before assembling the X-Axis Rail Covers, slide the Z-Axis all the way to the left, as shown.
2. Assemble the X-Axis Top and Front Guide Covers by installing screw (BK3X6 and W3), as shown.
3. Assemble the covers to the Z-Axis Assembly, by installing screws (BK3X6, W3, and MS3X8) as shown in Detail "A".

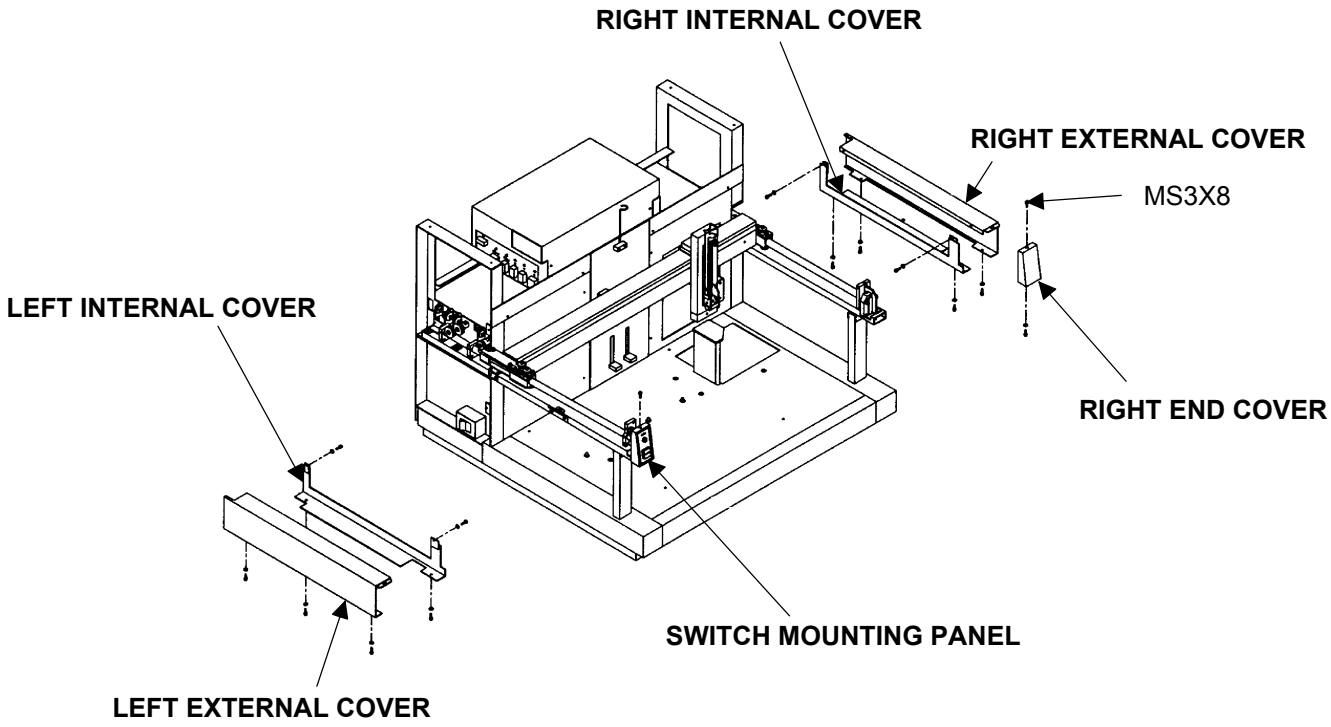


INTERNAL AND EXTERNAL COVER INSTALLATION

INTERNAL AND EXTERNAL COVER INSTALLATION

1. Assemble the Right Arm Covers and End Cover by installing and tightening the screws (BK3X6, W3, and MS3X8), as shown.

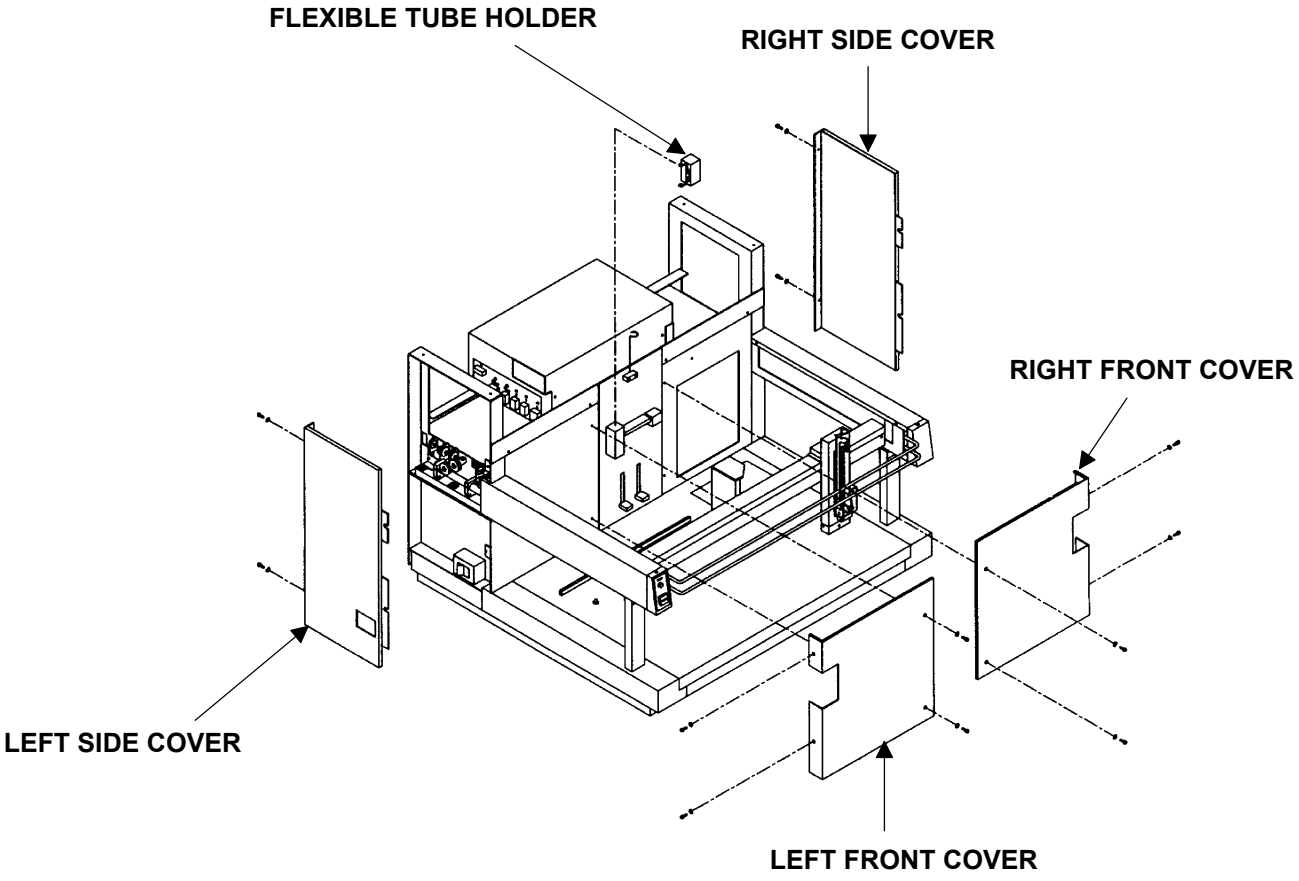
2. Prior to assembling the left side, the Switch Mounting Panel must be removed, then assemble the Left Arm Covers and the Switch Mounting Plate by installing and tightening the screws (BK3X6, W3, and MS3X8), as shown.



SIDE AND FRONT COVER INSTALLATION

SIDE AND FRONT COVER INSTALLATION

1. Assemble the Right and Left Side Covers by installing and tightening screws (BK3X6) and W3), as shown.
2. Assemble the Right and Left Front Covers by installing and tightening screws (BK3X12 and W3), as shown.
3. Install the Flexible Tube Holder by pushing it in until it snaps.

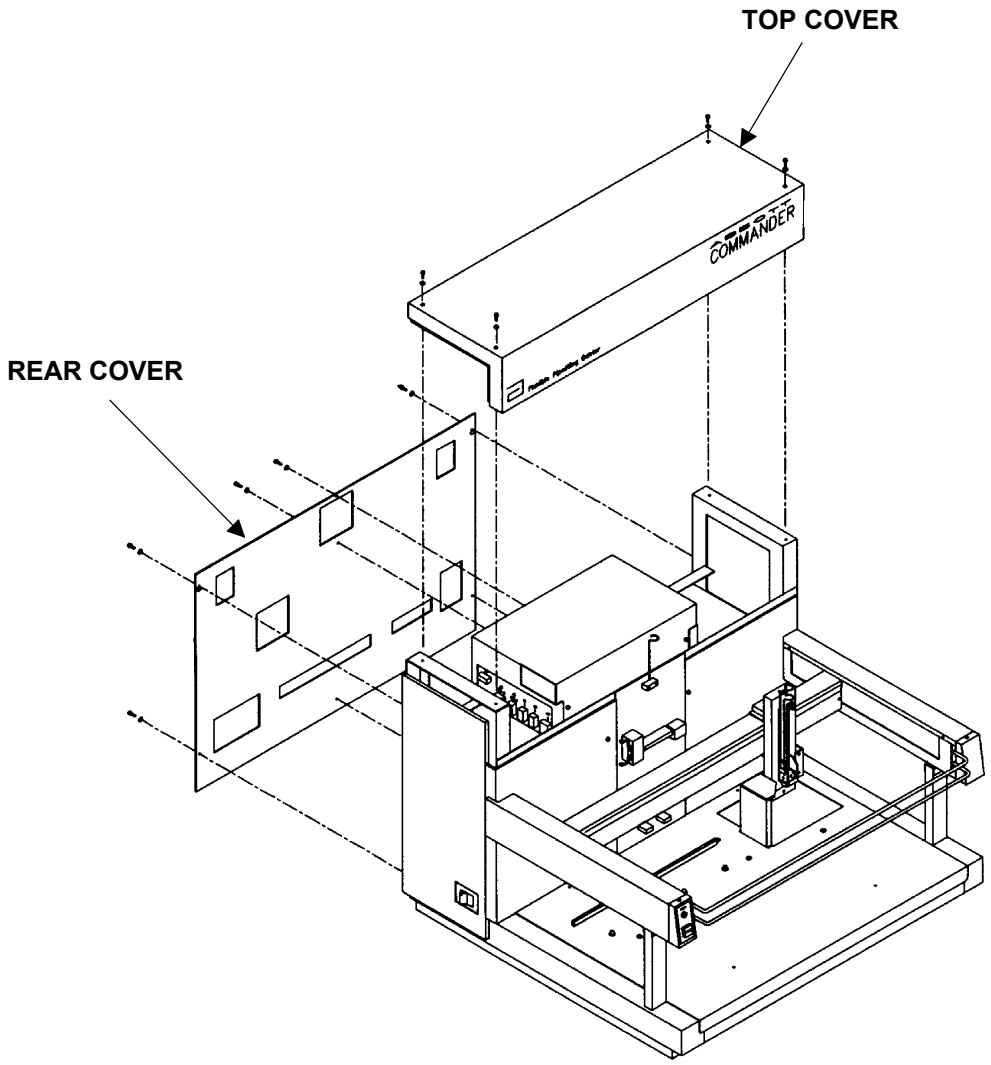


REAR AND TOP COVER INSTALLATION

REAR AND TOP COVER INSTALLATION

1. Assemble the Rear Cover by installing 2 screws (BK3X12 and W3) on the top corners and the remaining screws (BK3X6 and W3) on the cover, as shown.

2. Assemble the Top Cover by installing screws (BK3X12 and W3), as shown.



PARTS AND TOOLS LIST

PARTS LIST

Part Number	Description
42914-101	PULLEY KIT
42913-101	CABLE KIT

TOOLS LIST

Part Number	Description
APS-930-G1	WIRE DRUM RETAINING TOOL
1-42722-01	WIRE TENSION METER
14207-127	FLD SVC, DRIVER, IMPACT, HAND
14207-128	FLD SVC, DRIVER, SOCKET, PHILLIPS HEAD, #2