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Instructions for  
 Xandex Pneumatic Controller Preventive  
 Maintenance Sets  
 370-0100 and 370-0101  
 for models 350-0002, 350-0006, 350-0018  
 and 350-0020 with Serial Numbers LESS  
 THAN 4000

**IMPORTANT! READ BEFORE INSTALLING!**

This instruction applies ONLY to Xandex Pneumatic Controllers with serial numbers LESS THAN 4000 that utilize a direct 100-240 Volt AC connection and have integral Cartridge and Shuttle valves. ***If your controller has a serial number 4000 OR HIGHER and is powered by a 24 Volt DC power supply, installing the valves in this set will result in an inoperable controller.*** If your controller serial number is 4000 OR HIGHER, you must order a different maintenance kit. See instruction 820-0322 in the Product Manuals / Controller Maintenance section at [www.xandexsemi.com](http://www.xandexsemi.com). If your controller operates a Xandex X5200 or 5210 Remote Valve Inker (used on TEL P8 and P12 probers) the controller does not have internal valves. See your product manual for maintenance requirements.

Two solenoid driven air valves are used in Xandex pneumatic controllers to drive the pneumatic shuttle and cartridge. Valve one (V1) supplies air to the pneumatic ink cartridge, and is referred to as the Cartridge Valve. Valve two (V2) supplies air to the pneumatic shuttle and is called the Shuttle Valve. In controllers with serial numbers LESS THAN 4000, these two valves have the same form factor, and are interchangeable (with appropriate fittings installed). Both the Cartridge Valve and the Shuttle Valve are 24VDC valves.

**PNEUMATIC CONTROLLER PREVENTIVE MAINTENANCE SCHEDULES**

Preventive maintenance for Xandex pneumatic controllers requires replacement of one or two of the controller valves at the intervals specified below.

Controller Model	Replace	Interval
All Models	Cartridge Valve (V1)	Continuous High Speed Use = 6 months All other applications = Every 12 million cycles
All Models	Cartridge Valve (V1), Shuttle Valve (V2) and internal tubing.	Every 24 months

Two valve replacement sets are available from Xandex to facilitate controller preventive maintenance. Instructions for both sets and all controller models are detailed in this document.

- Cartridge Valve Set, containing a single valve assembly, electrical connectors and replacement instructions. This set is used for the 6 and 12 million cycle controller preventive maintenance.
- Dual Valve Set containing two valve assemblies, electrical connectors, adequate tubing to replace all internal controller pneumatic routes in all Xandex pneumatic controllers and replacement instructions. Replacement of the polyurethane tubing is recommended as the internal operating temperature within the controller enclosure can cause the tubing to shrink slightly over time. This can result in leaking connections at the valve and coupling connections. This set is used for the 24 month controller preventive maintenance.

### **370-0100 (SINGLE) CARTRIDGE VALVE REPLACEMENT SET PARTS LIST**

The following is a list of parts included in the 370-0100 Cartridge Valve replacement set.

<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>
160-0011	QUICK FITTING 1/8 OD	1
160-0031	SILENCER/VENT	1
240-0261	VALVE ASSY., PNEUMATIC CONTROLLER	1
519-0031	INSULATED SNAP RECEPTACLE (shipped attached to valve leads)	2
517-0005	SM CABLE TIE	2
820-0117	PNEUMATIC CONTROLLER PM SET INSTRUCTION	1

### **370-0101 DUAL VALVE REPLACEMENT SET PARTS LIST**

The following is a list of parts included in the 370-0101 Dual Valve replacement set.

<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>
160-0011	QUICK FITTING 1/8 OD	2
160-0031	SILENCER/VENT	2
240-0261	VALVE ASSY., PNEUMATIC CONTROLLER	2
519-0031	INSULATED SNAP RECEPTACLE (shipped attached to valve leads)	4
518-0009	TUBING, BLUE POLYURETHANE 1/4 OD	4 ft
518-0002	TUBING, BLACK POLYURETHANE 1/8 OD	1.75 ft
518-0006	TUBING, CLEAR POLYURETHANE, 3mm X 5mm	0.5 ft
517-0005	SM CABLE TIE	2
820-0117	PNEUMATIC CONTROLLER PM SET INSTRUCTION	1
160-0028	ELBOW FITTING ¼ OD X 1/8 NPT	1
160-0036	ELBOW FITTING / SOCKET ¼ OD X ¼ TUBE INSERT	2

### **BEFORE YOU BEGIN**



**CAUTION:** Shock hazard! Disconnect AC power from unit before servicing. Use appropriate ESD precautions when working inside the controller! Do not place undue strain on internal electrical connections.

Disconnect all inputs/outputs from the rear panel of the controller, including AC power, input air and all inker electronic and pneumatic connections. Remove the controller to an appropriate maintenance area for servicing. Observe ESD precautions when working with the controller cover removed.

### **CONTROLLER CONNECTOR RETROFIT**

Controller units manufactured before June, 1999 used a soldered wire splice covered by heat shrink tubing for valve electrical connections instead of the snap plug connectors used in the current build. The replacement valve assembly P/N 240-0261 is shipped with the receptacles required for controller retrofit attached to the valve leads. The receptacles are crimp on style. If your controller has soldered wire splice connections, return to this point when prompted in the instructions and follow procedure below to add receptacle ends to the controller wiring harness.

1. Using diagonal cutters, cut the two controller wires from the valve at the splice. Cut cable ties from harness to facilitate access to wires if necessary.

2. Trim the two controller valve connection wires to remove old heat shrink and solder.
3. Strip the two controller valve connection wires to 0.50" nominal and twist the bare ends. Fold the bare wire ends in half (double the exposed wire over itself).
4. Remove the receptacles from the leads on the new valve assembly (P/N 240-0261). Slide a receptacle onto one controller wire and crimp in place using a standard wire-crimping tool. Repeat on second wire. Verify solid connections and re-crimp as necessary.
5. Replace cable ties if removed with supplied replacements. Return to appropriate valve installation section to complete installation.

### **MOTOR-Z AND AUTO-Z TUBING ROUTE MODIFICATION**

Internal pneumatic tubing in the Motor -Z and Auto-Z controllers built after September 2001 was re-routed to improve manufacturability. Elbow fittings were added to the routing that allow the tubing to better conform to the controllers internal form factor. Sufficient tubing and fittings have been added to this set to allow older models to be retrofitted to the new routing configuration, and this instruction has been modified accordingly. Sufficient tubing is also still contained in this set to ignore the re-routing and replace the tubing as built, however, this instruction does not contain accurate tube lengths for the previous configuration. Remove and cut tubing to length from the existing pieces if re-tubing to pre September 2001 configuration.

### **370-0100 CARTRIDGE VALVE REPLACEMENT SET INSTALLATION**

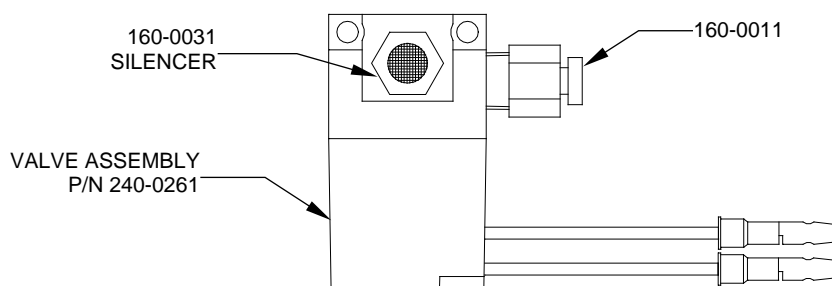
**Replacement of the cartridge valve is very similar in all Xandex pneumatic controllers, varying only in the fittings that are installed on the valve body. Illustrations of the appropriate cartridge valve fittings are supplied in this section. Use this instruction for cartridge valve replacement in all controllers.**

#### **With Power and Main Air removed:**

1. Remove the four (4) cover screws from each side of the controller and remove the controller cover.
2. Disconnect the input and output pneumatic hoses from the defective valve by depressing the colored fitting collar and pulling on the pneumatic hose simultaneously.
3. Disconnect the two snap in connectors that connect the valve wires to the controller.

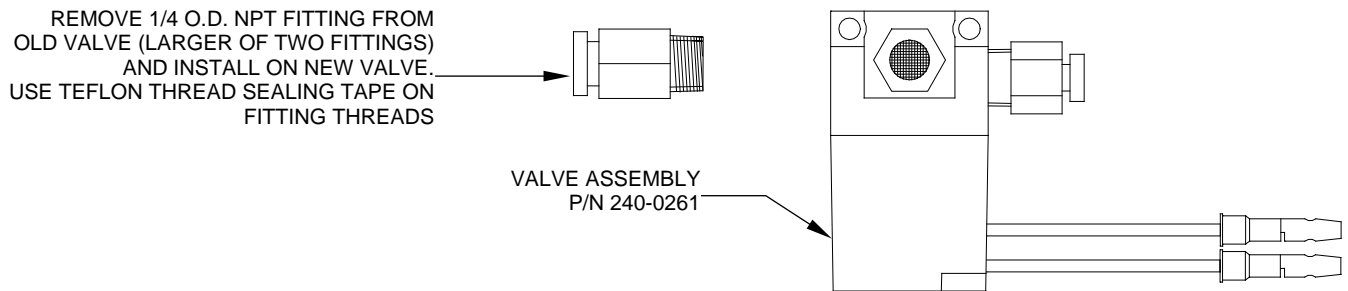
**Note:** *If your controller has soldered valve electrical connections go to the "Controller Connector Retrofit" section of this instruction and retrofit the controller leads with snap receptacle connections.*

4. Remove the two Phillips mounting screws securing the valve to the Controller base and remove the valve.
5. Prepare the new 240-0261 valve for installation by installing Teflon tape onto the threads of the 160-0011 fitting and the 160-0031 silencer and installing them on the valve body as shown in the following figure



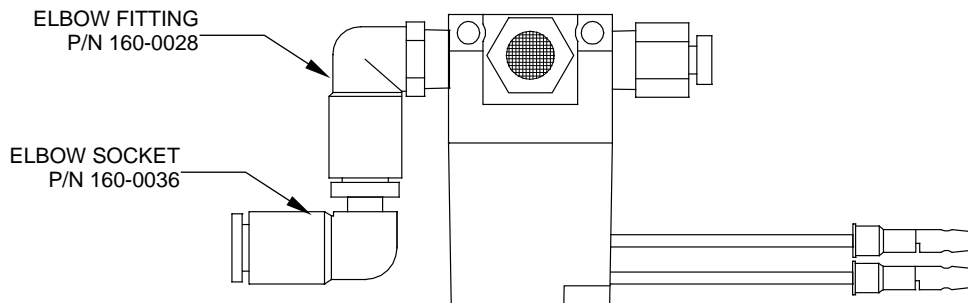
NOTE: If replacing the cartridge valve on a Standard Controller (350-0002) or pre-September 2001 Motor-Z or Auto-Z continue with steps 6 and 7. If replacing the cartridge valve on a post September 2001 Auto-Z or Motor-Z controller, move ahead to step 8.

6. (Standard Controller) Remove the 1/4 O.D. NPT fitting from the old valve (the larger of the two fittings). Remove any Teflon tape from the fitting threads.
7. (Standard Controller) Apply new Teflon pipe sealing tape (not supplied) to the fitting threads and install the fitting onto the new valve assembly (P/N 240-0261). Continue with step 10.



Assembling the fittings on the cartridge valve in the Standard Controller (350-0002)

8. (Auto-Z / Motor-Z post September 2001) Remove the 160-0028 elbow fitting from the old valve. Remove any Teflon tape from the fitting threads.
9. Apply new Teflon tape to the 160-0028 elbow fitting and install it onto the new valve body as shown.



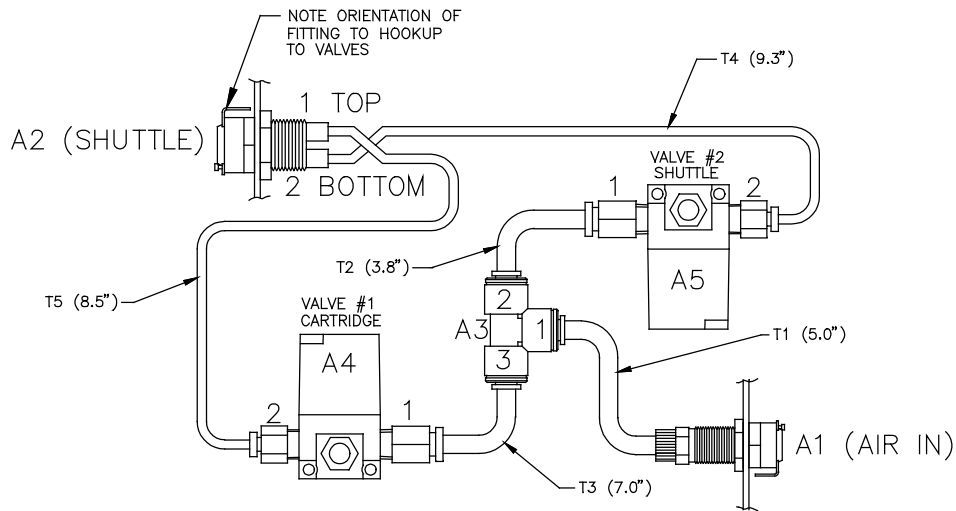
NOTE: The 160-0028 Elbow and 160-0036 Elbow socket are included in the 370-0101 Dual Valve replacement set so that older controllers can be updated when re-tubing the controller. These two parts are not included in the 370-0100 Cartridge valve set.

10. Install the replacement valve assembly in the *controller base*, securing with the two Phillips screws previously removed.
7. Connect the two snap in connectors on the valve wires to the receptacle connectors on the controller. Polarity does not matter.
8. Install the pneumatic lines accordingly, insuring that each hose is firmly seated in the valve fitting. Apply power and main air. Check for leaks and repair as necessary.
9. Refer to “**Controller Diagnostics**” section of this instruction appropriate for your controller and perform appropriate valve functional and diagnostic tests. Re-install the controller cover after testing is satisfactory.

## 350-0002 STANDARD CONTROLLER AND 350-0020 LONG PULSE PARTS IDENTIFICATION REFERENCE

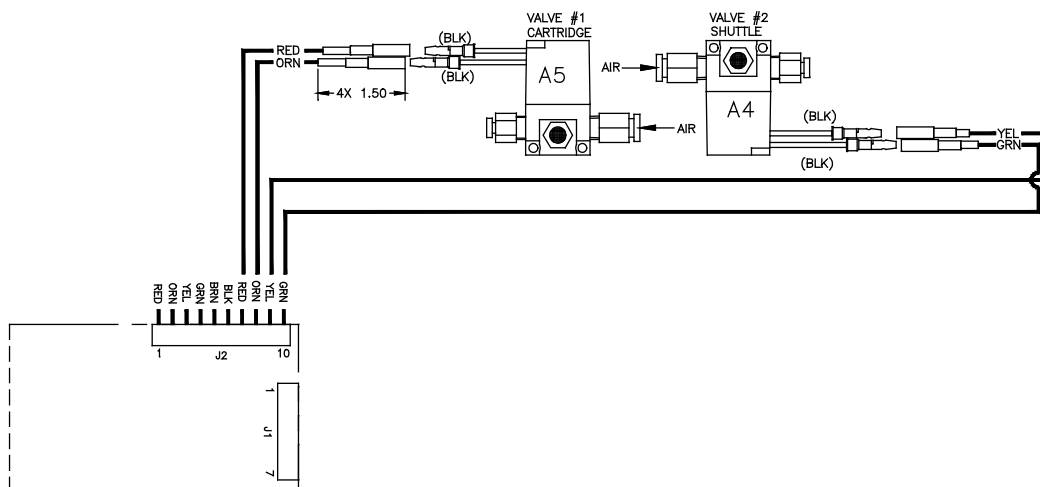
Reference the diagrams below for part identification, pneumatic tube cut lengths and routing. The 350-0020 controller is identical to the 350-0002 standard controller except for different software that enables the valves for longer periods for use with specialized inks.

### 350-0002 Pneumatic Tubing Routes

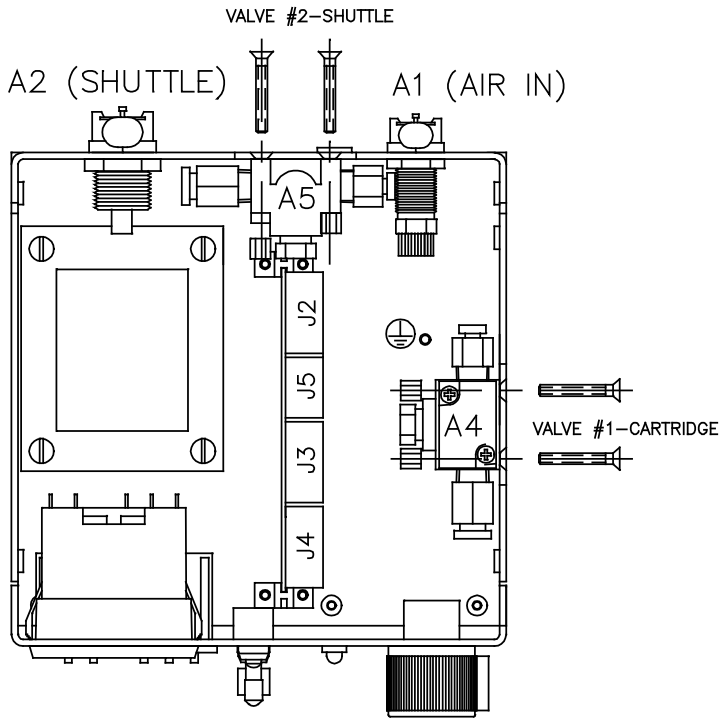


Tube Ref.	Start Point	End Point	Length	Item
T1	A1	A3-1	5.0	518-0009
T2	A3-2	A5-1	3.8	518-0009
T3	A3-3	A4-1	7	518-0009
T4	A2-2	A5-2	9.3	518-0002
T5	A2-1	A4-2	8.5	518-0002
Total 518-0009 required			15.8 Inches	
Total 518-0002 required			17.8 Inches	

### 350-0002 Cartridge (V1) and Shuttle (V2) Valve Wiring



## 350-0002 / 350-0020 Part Location Reference



Reference	Description	Part Number
A1	AIR INPUT	160-0015
A2	SHUTTLE OUTPUT	160-0014
A3*	TEE, 1/4 O.D.	160-0020
A4	CARTRIDGE VALVE (V1)	240-0261
A5	SHUTTLE VALVE (V2)	240-0261
T1-T3*	TUBING, BLUE POLYURETHANE 1/4 OD	518-0009
T4-T5*	TUBING, BLACK POLYURETHANE 1/8 OD	518-0002

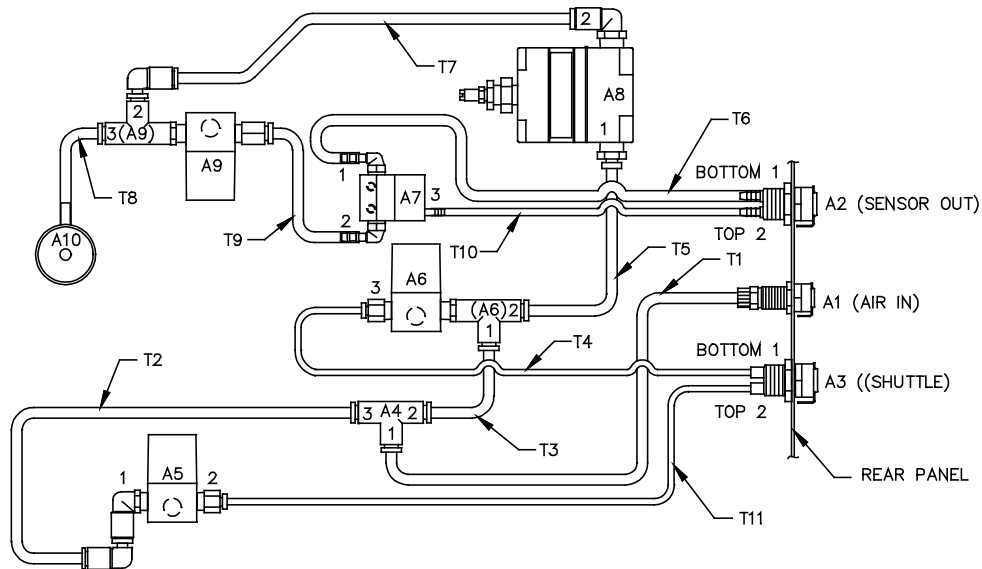
\*Not shown in this view

## 350-0002 / 350-0020 STANDARD CONTROLLER SHUTTLE VALVE (V2) REPLACEMENT

The procedure for Shuttle Valve replacement in the 350-0002 standard pneumatic controller is identical to the procedure for Cartridge Valve Replacement Set 370-0100. Refer to Cartridge Valve Replacement Set 370-0100 section of this instruction to replace the Standard Controller Shuttle Valve.

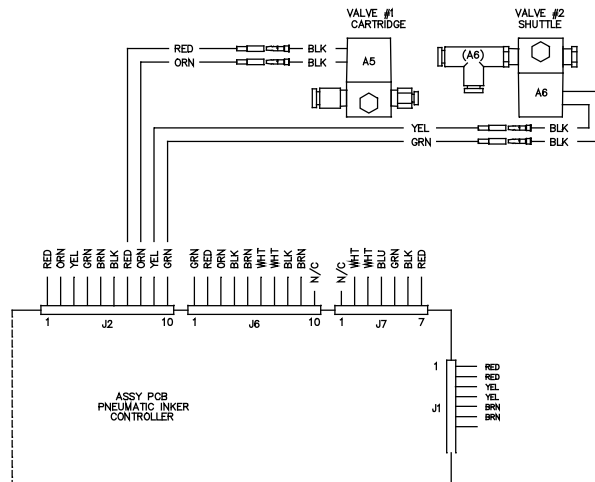
# AUTO Z CONTROLLER 350-0006 PARTS IDENTIFICATION REFERENCE

## 350-0006 Auto Z Controller Pneumatic Tubing Routes

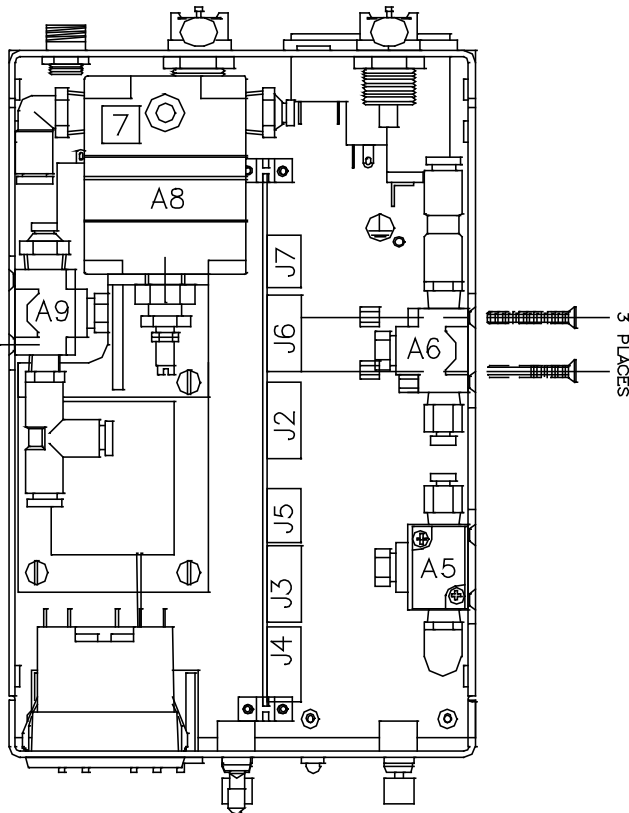


Tube	Start Point	End Point	Length	Item
T1	A1	A4-1	5.5	518-0009
T2	A4-3	A5-1	2.5	518-0009
T3	A4-2	A6-1	4.0	518-0009
T4	A3-1	A6-3	8.5	518-0002
T5	A6-2	A8-1	3.6	518-0009
T6	A2-1	A7-1	7.0	518-0009
T7	A8-2	A9-2	3.6	518-0009
T8	A9-3	A10	2.0	518-0009
T9	A7-2	A9-1	7.0	518-0009
T10	A2-2	A7-3	11	518-0006
T11	A3-2	A5-2	7	518-0002
Total 518-0009 Required			35 Inches	
Total 518-0002 Required			15.5 Inches	
Total 518-0006 Required			11.0 Inches	

## 350-0006 Auto Z Controller Cartridge (V1) and Shuttle (V2) Valve Wiring



## 350-0006 Auto Z Controller Part Location Reference



Reference	Description	Part Number
A1*	AIR INPUT	160-0015
A2	SENSOR OUTPUT	160-0052
A3	SHUTTLE OUTPUT	160-0014
A4*	TEE, 1/4 O.D.	160-0020
A5	CARTRIDGE VALVE (V1)	240-0261
A6	SHUTTLE VALVE (V2)	240-0261
A7*	PEL SWITCH	158-0149
A8	REGULATOR	160-0054
A9	SENSOR VALVE (V3)	240-0261
A10*	PRESSURE SWITCH	160-0008
T1-T3 *	TUBING, BLUE POLYURETHANE 1/4 OD	518-0009
T6-T9*	TUBING, BLACK POLYURETHANE 1/8 OD	518-0002
T4, T11*	TUBING, CLEAR POLYURETHANE, 3mm X 5mm	518-0006
*Not shown in this view		

## 350-0006 AUTO Z CONTROLLER SHUTTLE VALVE (V2) REPLACEMENT

### With Power and Main Air removed:

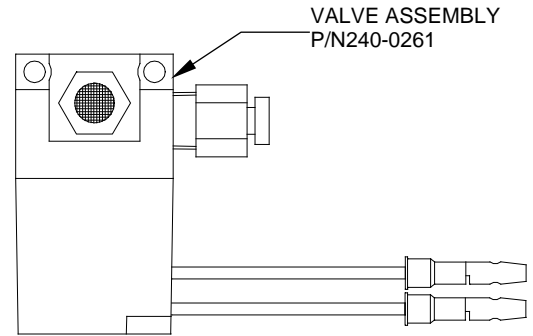
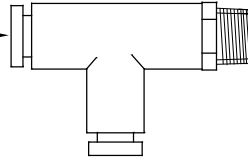
1. Remove the four (4) cover screws from each side of the controller and remove the controller cover.
2. Disconnect the input and output pneumatic hoses from the Shuttle valve by depressing the colored fitting collar and pulling on the pneumatic hose simultaneously.
3. Disconnect the two snap in connectors that connect the valve wires to the controller.

**Note:** *If your controller has soldered valve electrical connections go to the "Controller Connector Retrofit" section of this instruction and retrofit the controller leads with snap receptacle connections.*

4. Remove the two Phillips mounting screws securing the valve to the Controller base and remove the valve.
5. Remove the 1/4 O.D. NPT TEE fitting from the old valve. Remove any Teflon tape from the fitting threads.
6. Apply new Teflon pipe sealing tape (not supplied) to the fitting threads and install the TEE fitting onto the new valve assembly (P/N 240-0261)



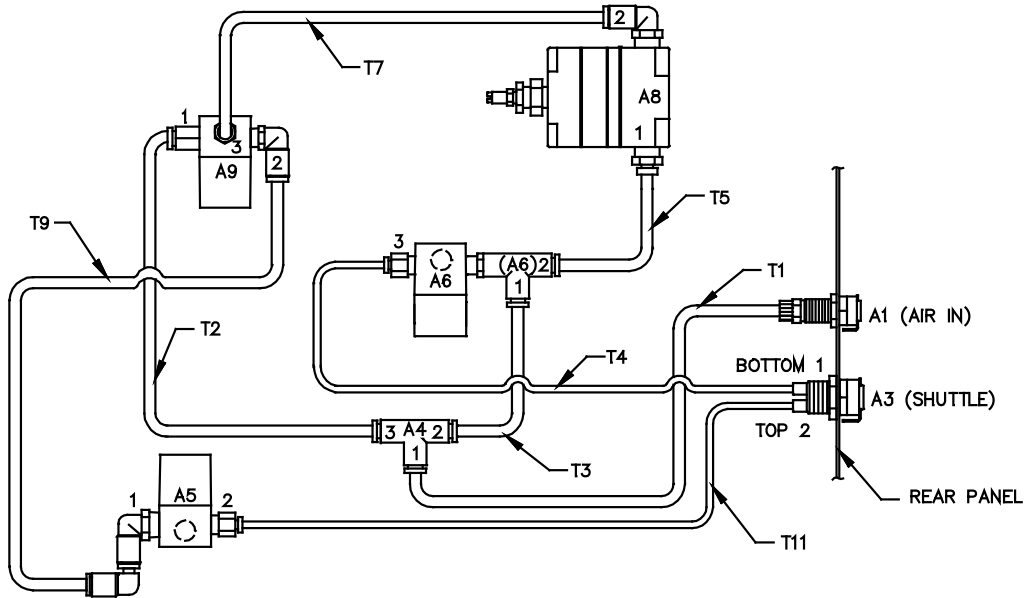
REMOVE 1/4 O.D. NPT TEE FITTING FROM OLD VALVE (LARGER OF TWO FITTINGS) AND INSTALL ON NEW VALVE. USE TEFLON THREAD SEALING TAPE ON FITTING THREADS



10. Install the replacement valve assembly in the *controller base*, securing with the two Phillips screws previously removed.
11. Connect the two snap in connectors on the valve wires to the receptacle connectors on the controller. Polarity does not matter.
12. Install the pneumatic lines accordingly, insuring that each hose is firmly seated in the valve fitting. Apply power and main air. Check for leaks and repair as necessary.
13. Refer to “**Controller Diagnostics**” section of this instruction appropriate for your controller and perform appropriate valve functional and diagnostic tests. Re-install the controller cover after testing is satisfactory.

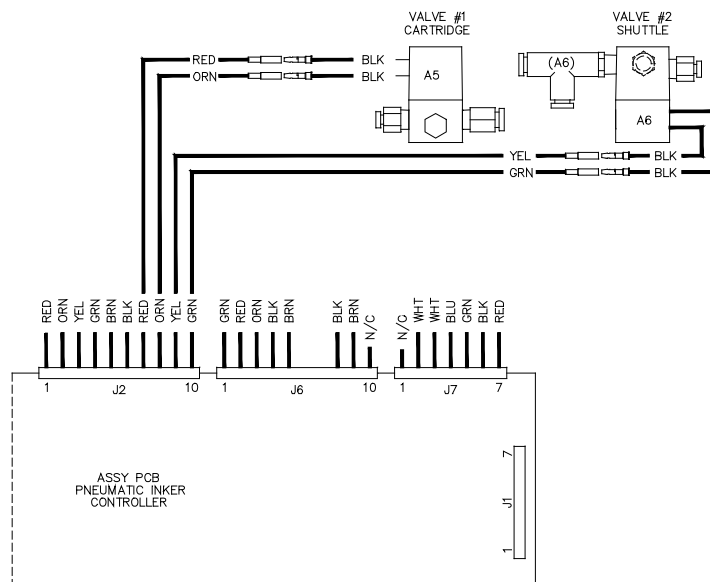
# MOTORIZED Z CONTROLLER 350-0018 PARTS IDENTIFICATION REFERENCE

## 350-0018 Motorized Z Controller Pneumatic Tubing Routes

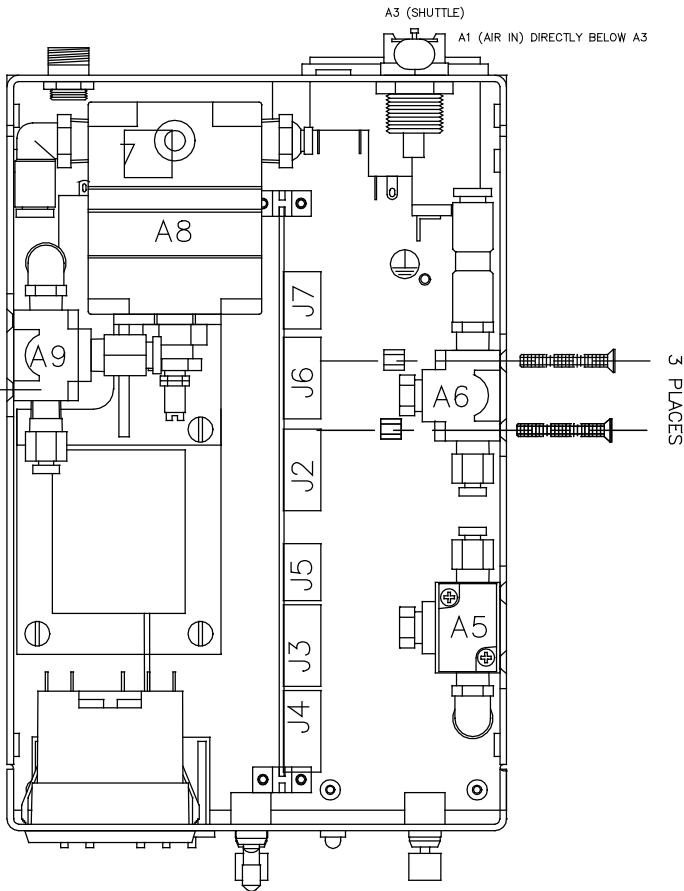


Tube	Start Point	End Point	Length (IN.)	Item
T1	A1	A4-1	5.5	518-0009
T2	A4-3	A9-1	6.5	518-0009
T3	A4-2	A6-1	3.5	518-0009
T4	A3-1	A6-3	8	518-0002
T5	A6-2	A8-1	4	518-0009
T7	A8-2	A9-3	9	518-0009
T9	A5-1	A9-2	13.5	518-0009
T11	A3-2	A5-2	7	518-0002
Total 518-0009 Required			42 Inches	
Total 518-0002 Required			15 Inches	

## 350-0018 Motorized Z Controller Cartridge (V1) and Shuttle (V2) Valve Wiring



## 350-0018 Motorized Z Controller Part Location Reference



Reference	Description	Part Number
A1*	AIR INPUT	160-0015
A3	SHUTTLE OUTPUT	160-0014
A4*	TEE, 1/4 OD	160-0020
A5	CARTRIDGE VALVE ASSY (V1)	240-0261
A6	SHUTTLE VALVE ASSY (V2)	240-0261
A8	REGULATOR	160-0054
A9	PRESSURE VALVE ASSY (V3)	240-0261
T1-T3 *	TUBING, BLUE POLYURETHANE 1/4 OD	518-0009
T5, T7, T9*	TUBING, BLUE POLYURETHANE 1/4 OD	
T4, T11*	TUBING, BLACK POLYURETHANE 1/8 OD	518-0002
*Not shown in this view		

## 350-0018 MOTORIZED Z CONTROLLER SHUTTLE VALVE (V2) REPLACEMENT

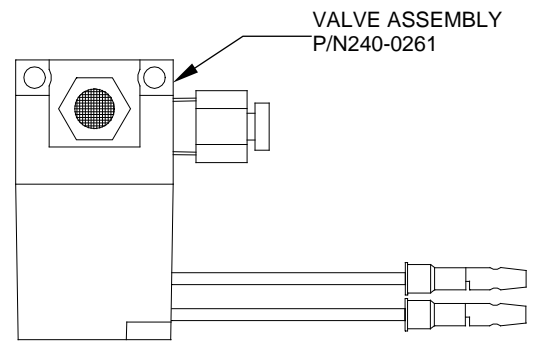
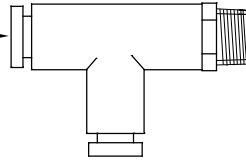
**With Power and Main Air removed:**

1. Remove the four (4) cover screws from each side of the controller and remove the controller cover.
2. Disconnect the input and output pneumatic hoses from the Shuttle valve by depressing the colored fitting collar and pulling on the pneumatic hose simultaneously.
3. Disconnect the two snap in connectors that connect the valve wires to the controller.

**Note:** *If your controller has soldered valve electrical connections go to the "Controller Connector Retrofit" section of this instruction and retrofit the controller leads with snap receptacle connections.*

4. Remove the two Phillips mounting screws securing the valve to the Controller base and remove the valve.
5. Remove the 1/4 O.D. NPT TEE fitting from the old valve. Remove any Teflon tape from the fitting threads.
6. Apply new Teflon pipe sealing tape (not supplied) to the fitting threads and install the fitting onto the new valve assembly (P/N 240-0261)

REMOVE 1/4 O.D. NPT TEE FITTING FROM OLD VALVE (LARGER OF TWO FITTINGS) AND INSTALL ON NEW VALVE. USE TEFLON THREAD SEALING TAPE ON FITTING THREADS



7. Install the replacement valve assembly in the *controller base*, securing with the two Phillips screws previously removed.
8. Connect the two snap in connectors on the valve wires to the receptacle connectors on the controller. Polarity does not matter.
9. Install the pneumatic lines accordingly, insuring that each hose is firmly seated in the valve fitting. Apply power and main air. Check for leaks and repair as necessary.
10. Refer to “**Controller Diagnostics**” section of this instruction appropriate for your controller and perform appropriate valve functional and diagnostic tests. Re-install the controller cover after testing is satisfactory.

## **PNEUMATIC TUBING REPLACEMENT GUIDELINES**

**IMPORTANT: Read this section completely before beginning tubing replacement.**

The tubing used in Xandex pneumatic controllers is made of polyurethane. Repair history indicates that the heat generated inside the controller can cause the tubing to shrink slightly over time. This can cause air leakage at valve connections and couplings. The recommended preventive maintenance schedule calls for replacement of the pneumatic tubing within the controller at 24 month intervals to insure trouble free operation.

Tubing replacement is done in conjunction with Shuttle and Cartridge Valve replacement. Remove the valves per instructions and replace tubing as the valves are reinstalled.

It is important that tubing is not kinked or pinched to restrict air flow. The recommended method for tubing replacement is to cut the tubing lengths listed in the chart for your controller model before beginning. Use a sharp cutting tool (diagonal cutters or similar tool) to cut tubing. Make 90 degree cuts without burrs. It is helpful to label each tube length at each end with beginning and end point designations with an indelible marker as it is cut.

Remove and replace **one tube length at a time** to avoid misconnection. Exception to this is when a TEE fitting is in the route. The best method in this case is to disconnect the tubing from the three endpoints and remove the TEE fitting and tubing together. Replace the three tubing sections on the TEE fitting with appropriate tube lengths, reinstall the TEE fitting (with tubing) into the controller and reconnect the three tubing endpoints.

Use caution when routing tubing around electrical connections and the Printed Circuit Assembly (PCA). Do not place stress on electrical connections.

See special instructions for the 350-0006 Auto Z controller following connection type descriptions for important information specific to this controller.

### **Connection types**

#### ***Air Input Connection (A1)***

The air input coupling, designated A1 on all models, uses a compression lock nut to retain the internal tubing. To disconnect the tube from this fitting, use a 7/16 wrench to loosen the silver compression nut and slide the nut back over the clear tubing. Support the coupling with one hand and pull the tubing, gently moving it from side to side to disconnect the tube from the barbed fitting in the coupling. To reconnect new tube to the fitting, press the end of the appropriate tube length onto the barbed fitting in the coupling. Slide the compression nut over the unconnected end of the tube and tighten it onto the coupling. Connect the other end of the tube to its appropriate endpoint.

#### ***Locking Collar Fittings***

All valve, TEE and Elbow fittings use a locking collar to retain the tubing in the fitting. To remove tubing from this type of connection, depress the fitting collar and pull on the tube simultaneously. To install tubing, depress the fitting collar and push the tubing firmly into the fitting. The fitting collar should retain the tubing when the tubing is gently pulled (tugged) after installation.

#### ***Barbed Fittings***

The Shuttle output coupling on all models has two barbed fittings that connect to 518-0002 1/8 O.D. black tubing. To remove tubing from the barbed fitting, grasp the tubing as close to the coupling as possible and pull on the tubing, gently moving the tubing from side to side if necessary, until the tubing is disconnected. To replace tubing, push the tubing onto the barbed fitting until the cut end of the tubing stops against the coupling body. The 350-0006 Auto-Z controller also has four other barbed fitting connections, which are discussed below.

## **Special Instructions for 350-0006 Auto Z Controller Pneumatic Tubing Replacement**

The Auto Z controller requires extra steps in order to replace its pneumatic tubing. This is due to the presence of an air pressure switch and a pressure differential (PEL) switch and manifold necessary for the Auto Z function. Replacing the PEL switch tubing necessitates the removal of the air regulator assembly (A8) and the V3 Sensor Valve (A9) to access the PEL switch pneumatic connections. Refer to the Auto-Z diagrams on pages 6 & 7 to identify item designations.

*Note: It will be helpful to label each replacement tubing length at each end as it is cut with the beginning and end point designation before beginning this operation.*

1. Disconnect tube T9 from the Sensor Valve (A9) connection A9-1 and T7 from A9-2 (middle point on Sensor Valve TEE fitting). Remove the two Phillips head screws and nuts that retain the valve. Carefully move the Sensor Valve (A9) out of the way of the Regulator (A8) and bracket, adjusting the valve leads running under the regulator mounting bracket as necessary.
2. Disconnect T5 and T7 from Regulator (A8) connections A8-1 and A8-2 respectively. Remove the two slotted screws that secure the regulator mounting bracket to the transformer and carefully remove the regulator and bracket from the controller.
3. Remove T7 (previously disconnected from A8-2 and A9-2) from the controller.
4. Disconnect T10 from A2-2 (top fitting on the Sensor coupling)
5. Disconnect T6 from A2-1 (bottom fitting on the Sensor coupling) and A7-1 (PEL switch connection closest to the side wall of the enclosure).
6. Replace T6 between A2-1 and A7-1, following the original route. Take care not to kink the tubing.
7. Disconnect T9 from A7-2 (PEL switch connection closest to the controller PCA). The other end of T9 was previously disconnected from A9-1.
8. Connect replacement T9 tube to A7-2 and follow original routing to place end for reconnection to Sensor valve (A9) connection A9-1. T9 will be connected after the Sensor Valve (A9) is re-installed. Take care not to kink the tubing.
9. Carefully disconnect T10 from the barbed fitting on the back side of PEL switch A7 (A7-3). If necessary, use a needle nose pliers to grasp the tubing to ease removal. Take care not to damage the wire leads attached to the A7 PEL switch. The other end of T10 was previously disconnected from A2-2 (top Sensor coupling fitting).
10. Connect replacement T10 tubing to the barbed fitting on the back side of PEL switch A7 (A7-3). Route the tubing in an "S" shape and connect the other end to A2-2 (top Sensor coupling fitting).
11. Route replacement T7 between the A7 PEL switch and the transformer. One end will come up between the PCA and the transformer for connection to A9-2 Sensor Valve TEE fitting. The other end will connect to A8-2, Regulator elbow fitting (closest to the side wall of the controller) after the Regulator (A8) is reinstalled.
12. Replace the Regulator (8A) and bracket, making sure that all tubing is beneath the bracket and not kinked, and that the Sensor Valve (A9) wire leads are beneath the bracket and not pinched between the bracket and the transformer. Reinstall the mounting screws to secure the Regulator in place.

13. With the Regulator (A8) reinstalled, connect T7 to A8-2 (regulator elbow fitting).

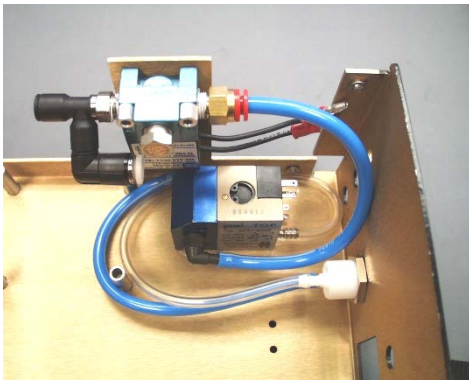
14. Reinstall the Sensor Valve (A9) using the Phillips head screws and nuts.

15. Trim the hard white section of tubing on the 160-0036 Elbow Socket (supplied with the set) to approx. 1/2" and A9-2 (middle port on TEE fitting). Connect T7 to this fitting.

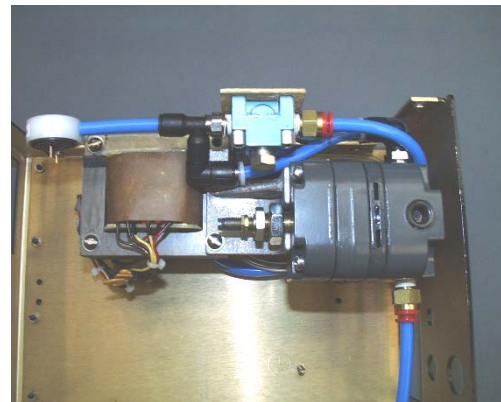


16. Replace the Shuttle and Cartridge Valves and remaining tubing runs per valve installation instructions and the pneumatic tubing replacement guidelines. Figures x-x below show correct tubing routes without the PCA installed for clarity.

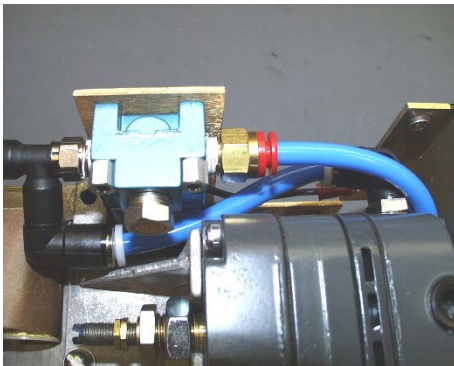
17. The Auto Z function should be verified after controller diagnostic tests have been passed. If re-calibration is required re calibrate the Auto Z function per instructions in the Auto Z Installation and Operation manual P/N 820-0002. This manual is available online at <http://www.xandexsemi.com> or by contacting Xandex Customer Service.



**Figure 1. Note 160-0036 installed into Tee fitting on sensor valve**



**Figure 2. View after regulator and transformer are installed.**



**Figure 3. Close up of sensor valve routing**

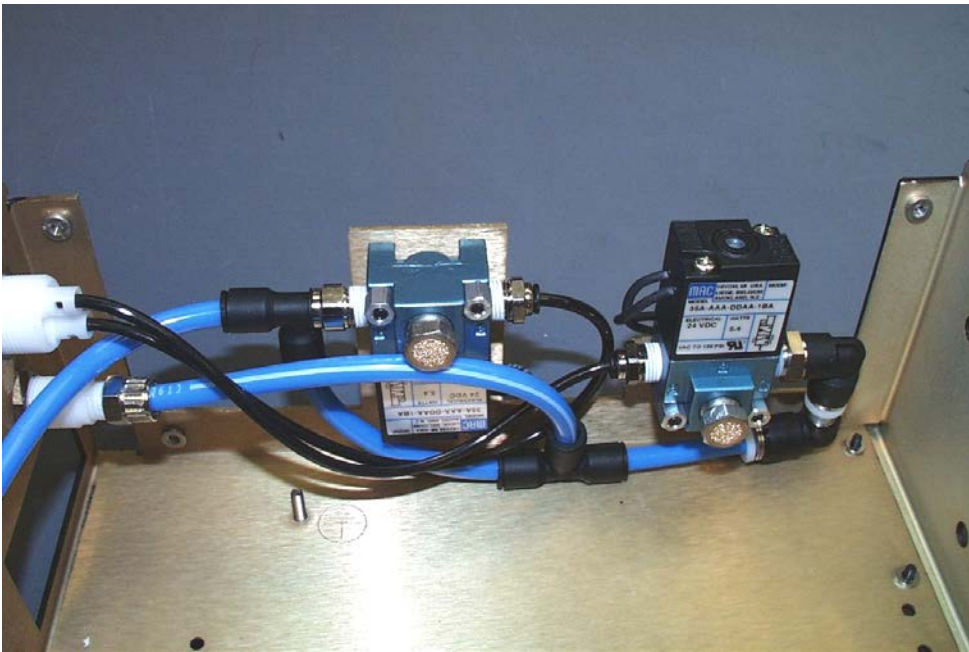


Figure 4. Shuttle (left) and Cartridge valve (right) tube routing

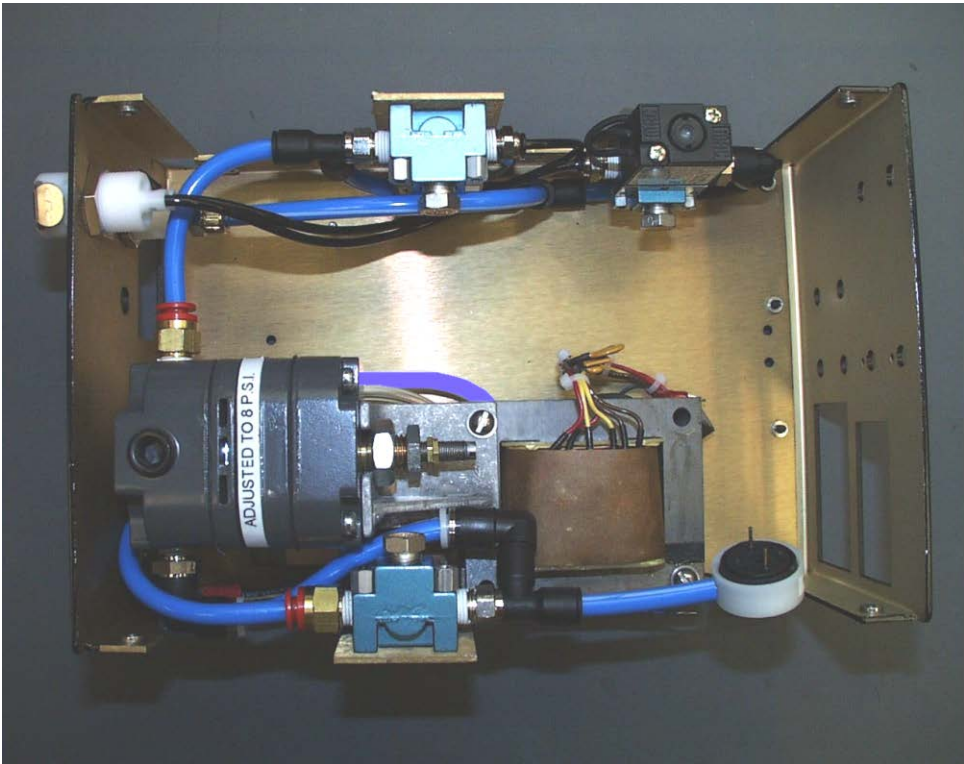
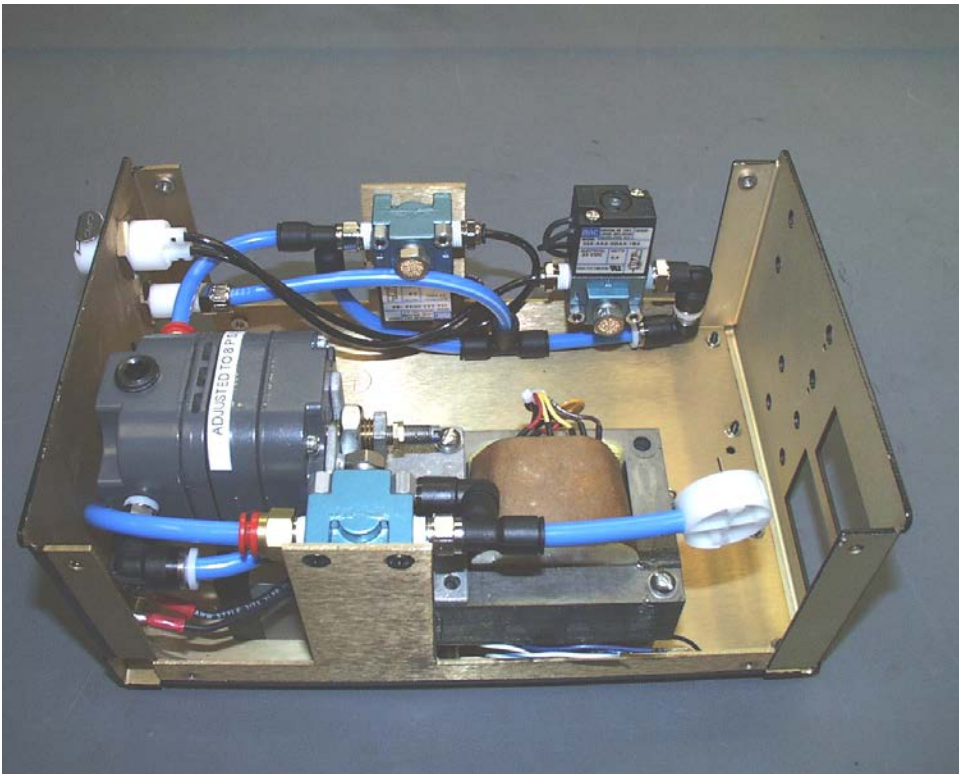


Figure 5. Completed routing from above





**Figure 6. Top/side view of completed tubing**

## CONTROLLER DIAGNOSTIC TESTS

There are several internal diagnostic tests available for testing the operation of the all Xandex Pneumatic Controllers. To enter the Diagnostics mode, apply power to the Controller with the “RESET” button depressed. All tests should be run after each preventive maintenance is performed to verify controller operation prior to return to service.

### 350-0002 / 350-0020 Standard and Long Pulse Controller Diagnostics

- **Test Thumbwheels**

1. Place the toggle switch on the front panel to SET-UP, set the thumbwheels to 12345, then reset the LCD Counter.
2. Press the RESET button and verify that the counter increments 15 counts.
3. Place the toggle switch to RUN, set the thumbwheels to all 1's, reset the LCD Counter, and press RESET. The counter should increment one count.
4. Repeat the procedure for the rest of the digits (2 through 9). With the thumbwheels set for 00000, the counter increments 10 counts.

- **Test Dot Size Potentiometer**

1. Place the toggle switch to DISABLE, set the HOURS thumbwheels to 01, then reset the LCD Counter.
2. With the Dot Size knob set at the minimum position, press the RESET button and verify that the LCD Counter does not increment.
3. Set the knob to 50% and press RESET. The Counter should display approximately 130 counts. (Variations in Dot Size knob alignment to scale may occur. An increment of  $\pm 10$  is not significant in this case.)
4. Reset the LCD Counter, adjust the knob to maximum, and press RESET. The Counter should display 255 counts.

- **Test Cartridge Valve. To test fire the Cartridge Valve 20 times:**

1. Set the HOURS thumbwheels to 02
2. Place the toggle switch to DISABLE
3. Reset the LCD Counter
4. Press RESET. *The cartridge valve fires 20 times, each time incrementing the LCD Counter.*

- **Test Shuttle Valve. To test fire the Shuttle Valve 20 times:**

1. Set the HOURS thumbwheels to 03
2. Place the toggle switch to DISABLE
3. Reset the LCD Counter
4. Press RESET. *The shuttle valve fires 20 times, each time incrementing the LCD Counter.*

- **Life Test** *This test will continuously fire the Cartridge and Shuttle valves for a predetermined number of cycles as set on the thumbwheels.*

1. Place the toggle switch to DISABLE.
2. Set the HOURS thumbwheels to 10.
3. Set the DOTS X1000 thumbwheels for the desired number of cycles times 1000 (i.e.: 250 Equals 250,000 cycles).
4. Reset the LCD Counter.
5. Press RESET. *The Controller begins continuous firing, incrementing the Counter each cycle. To discontinue the Life Test prior to reaching the set amount, remove power.*

## 350-0006 Auto Z Controller Diagnostic Tests

All references to “mode switch” in the following tests refer to the top mode (toggle) switch. The bottom mode switch should be set to RUN during testing.

- **Test Thumbwheels**

1. Place the mode switch on the front panel to SETUP, set the DOTS X1000 thumbwheels to 12345, then reset the LCD Counter.
2. Press the RESET button and verify that the counter increments 15 counts.
3. Place the toggle switch to RUN, set the thumbwheels to all 1's, reset the LCD Counter, and press RESET. The counter should increment one count.
4. Repeat the procedure for the rest of the digits (2 through 9). With the thumbwheels set for 00000, the counter increments 10 counts.

- **Test Cartridge Valve.** *To test fire the Cartridge Valve 20 times:*

1. Set the DOT SIZE thumbwheels to 02
2. Place the mode switch to CALIBRATE
3. Reset the LCD Counter
4. Press RESET. *The cartridge valve fires 20 times, each time incrementing the LCD Counter.*

- **Test Shuttle Valve.** *To test fire the Shuttle Valve 20 times:*

1. Set the DOT SIZE thumbwheels to 03
2. Place the mode switch to CALIBRATE
3. Reset the LCD Counter
4. Press RESET. *The shuttle valve fires 20 times, each time incrementing the LCD Counter.*

- **Test Sensor Valve.** *To test fire the Sensor Valve 20 times:*

1. Set the DOT SIZE thumbwheels to 09
2. Place the mode switch to CALIBRATE
3. Reset the LCD Counter
4. Press RESET. *The sensor valve fires 20 times, each time incrementing the LCD Counter.*

- **Life Test.** *This test will continuously fire the Cartridge and Shuttle valves for a predetermined number of cycles as set on the thumbwheels.*

1. Place the mode switch to CALIBRATE
2. Set the DOTS X1000 thumbwheels for the desired number of cycles times 1000 (i.e.: 250 Equals 250,000 cycles).
3. Reset the LCD Counter.
4. Press RESET. *The Controller begins continuous firing, incrementing the Counter each cycle. To discontinue the Life Test prior to reaching the set amount, remove power.*

## 350-0018 Motorized Z Controller Diagnostic Tests

All references to “mode switch” in the following tests refer to the top mode (toggle) switch. The bottom mode switch should be set to RUN during testing.

- **Test Thumbwheels**

1. Place the mode switch on the front panel to SETUP, set the DOTS X1000 thumbwheels to 12345, then reset the LCD Counter.
2. Press the RESET button and verify that the counter increments 15 counts.
3. Place the toggle switch to RUN, set the thumbwheels to all 1's, reset the LCD Counter, and press RESET. The counter should increment one count.
4. Repeat the procedure for the rest of the digits (2 through 9). With the thumbwheels set for 00000, the counter increments 10 counts.

- **Test Cartridge Valve.** *To test fire the Cartridge Valve 20 times:*

1. Set the DOT SIZE thumbwheels to 02
2. Place the mode switch to DISABLE
3. Reset the LCD Counter
4. Press RESET. *The cartridge valve fires 20 times, each time incrementing the LCD Counter.*

- **Test Shuttle Valve.** *To test fire the Shuttle Valve 20 times:*

1. Set the DOT SIZE thumbwheels to 03
2. Place the mode switch to DISABLE
3. Reset the LCD Counter
4. Press RESET. *The shuttle valve fires 20 times, each time incrementing the LCD Counter.*

- **Test Pressure Valve.** *To test fire the Pressure Valve 20 times:*

1. Set the DOT SIZE thumbwheels to 09
2. Place the mode switch to DISABLE
3. Reset the LCD Counter
4. Press RESET. *The pressure valve fires 20 times, each time incrementing the LCD Counter.*

- **Life Test.** *This test will continuously fire the Cartridge, Shuttle and Pressure valves for a predetermined number of cycles as set on the thumbwheels.*

1. Set the DOT SIZE thumbwheels to 10
2. Place the mode switch to DISABLE
3. Set the DOTS X1000 thumbwheels for the desired number of cycles times 1000 (i.e.: 250 Equals 250,000 cycles). If the thumbwheel count is zero, the valves cycle 6,553,600 times.
4. Reset the LCD Counter.
5. Press RESET. *The Controller begins continuous firing, incrementing the LCD Counter each cycle. To discontinue the Life Test prior to reaching the set amount, remove power.*

- **Alarm Test.** *Pressing the RESET button will toggle the state of the alarm signal.*

1. Set the DOT SIZE thumbwheels to 06
2. Place the mode switch to DISABLE
3. Press RESET to change the state of the alarm. *The alarm alternately is turned on and off.*

**Note:** *The alarm test is used to verify that the audible alarm is functional, not to enable or disable the alarm itself. To enable or disable the alarm function, a jumper must be moved on the controller PCB. See your product manual for instructions.*

**Pneumatic Controller Preventive Maintenance Record**

Model Number	
Serial Number	
Date Purchased	
Installation Date	
Location / Prober	

**Installation Notes:**

Date of Cartridge Valve PM* (Xandex Set P/N 370-0100)	Done By	Tested By	Notes

Date of Cartridge and Shuttle Valve PM** (Xandex Set P/N 370-0101)	Done By	Tested By	Notes

\*Cartridge Valve replacement due every 12 million cycles (dots placed)

\*\*Cartridge Valve, Shuttle Valve and internal tubing due every 24 months.

## **Pneumatic Shuttle Maintenance**

In addition to maintaining the pneumatic controller, periodic preventive maintenance of the inker shuttle mechanism is recommended to insure continued, trouble free operation of your Xandex pneumatic inking system. The recommended maintenance schedule is as follows;

- Off-line use = 6 month intervals
- In-Line / Post Probe use = Once per year

Shuttle preventive maintenance kits are available, which include all parts necessary for one normal shuttle maintenance procedure. These kits may be ordered direct from Xandex or through your local Xandex distributor. To determine which kit to order, consult the inker assembly drawing in your inker manual for the shuttle assembly part number used on your inker, then reference the following table.

Inker Model Reference	Shuttle Assembly Part Number	Preventive Maintenance Kit Part Number
All models except those listed below	216-0001 216-0002 216-0003 216-0005 316-0005	370-0001
Series X1100, X1200, X1300, X7100	316-0001 316-0002 316-0003	370-0002
Series X5200	216-0004	370-0003
Series X5100	X5100 Series Inkers (integral shuttle)	370-0004

To order or for assistance selecting the correct kit for your inker, contact Xandex Customer Service at (707) 763-7799 or Toll Free in the U.S. (800) 767-9543. FAX (707) 763-2631. Each kit comes with maintenance instructions. To view the instruction sheet and parts list for each kit, visit our web site at <http://www.xandexsemi.com/>

# SERVICE AND SUPPORT INFORMATION



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**Product manual description and part number:** Xandex Pneumatic Controller PM Kit Instruction 820-0117

**Product description and part number:** Xandex Pneumatic Controller PM Kit 370-0100 (single valve) and 370-0101 (dual valve)

## Initial Release

<u>Revision</u>	<u>Number</u>	<u>Date</u>	<u>Department</u>	<u>Review after redline?</u>	<u>Approval</u>	<u>Date</u>
A			Customer Operations	Y/N	NA	
			Marketing	Y/N	NA	
			Engineering	Y/N	NA	
			Quality Assurance	Y/N	NA	
			Project Lead	Y/N	NA	
			Field Service	Y/N	GL	

## Revisions

<u>Revision</u>	<u>Number</u>	<u>Date</u>	<u>Description of Changes</u>	<u>Approval</u>	<u>Date</u>
B	2525	4/27/00	Replace 518-0004 with 518-0030	C. Camerino	4/30/01
C	2572	8/01	Revised controller tubing routing	C. Camerino	11/16/01
D	ECO4072	06/19/2012	Address change and ISO logo	K. Anderson	06/19/2012
E	ECO4351	07/21/2017	New Front Page Advisory	K. Anderson 	07/21/2017

Print double sided on 11 x 17, fold in middle and staple to make booklet.