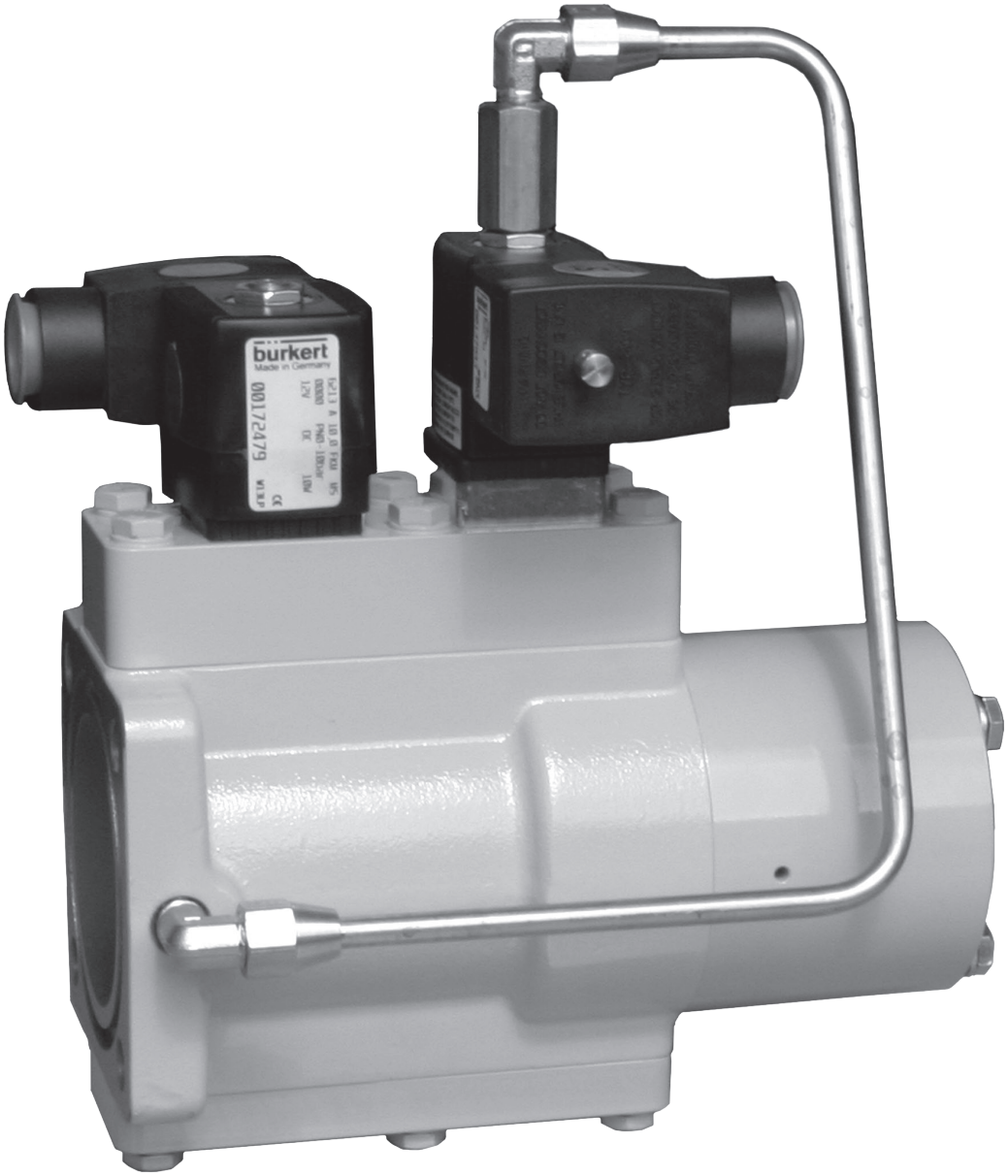
E-7 Electronic Preset Valve
with Flow Control Switch (Optional)

Installation and Parts Manual



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⚠ WARNING

- Before using this product, read and understand the instructions.
- Save these instructions for future reference.
- All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of equipment and/or systems in accordance with all applicable codes and ordinances.
- Failure to follow the instructions set forth in this publication could result in property damage, personal injury, or death from fire and/or explosion, or other hazards that may be associated with this type of equipment.

⚠ WARNING

Before disassembly of any meter or accessory component, **ALL INTERNAL PRESSURES MUST BE RELIEVED AND ALL LIQUID DRAINED FROM THE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE PROCEDURES**. Pressure must be 0 (zero) psi. Close all liquid and vapor lines between the meter and liquid source.

Failure to follow this warning could result in property damage, personal injury, or death from fire and/or explosion, or other hazards that may be associated with this type of equipment.

Publication Updates and Translations

The most current English versions of all Liquid Controls publications are available on our web site, **www.lcmeter.com**. It is the responsibility of the local distributor to provide the most current version of LC manuals, instructions, and specification sheets in the required language of the country, or the language of the end user to which the products are shipping . If there are questions about the language of any LC manuals, instructions, or specification sheets, please contact your local distributor.

Specifications

Environmental Rating
NEMA 4X

Safety
Designed to meet Class I, Division 2 requirements

Materials of Construction
Class 1
Valve Body: Aluminum
Elastomers: Viton O-rings, PTFE Seal, Acetal Wear Rings
Class 2
Valve Body: Anodized Aluminum
Elastomers: Viton O-rings, PTFE Seal, Acetal Wear Rings

Pilot Control System
Class 1
Brass solenoids and fittings with flared copper tubing
Class 2
Stainless steel solenoids and fittings with flared stainless steel tubing

Temperature Rating
-40° to 160°F (-40° to 71°C)

Pressure Rating
Maximum non-shock working pressure
• 150 PSI (10.3 BAR)
Maximum differential pressure
• 100 PSI (6.9 BAR)

Flow Range
150 GPM (568 L/min) for 30 SSU products

Viscosity Range
30 to 100 SSU

Products
Class 1 Refined Fuels
Gasoline, gasohol, diesel fuel, and fuel oil
Class 2 Aviation
Avgas and jetfuel

Solenoids
Voltage: +10.2 to 13.6 VDC
(**Optional Voltage**: +20.4 to 27.2 VDC)
Current: S1: 1 Amp, S2: 2 Amps maximum

Two-Stage Operation
Minimum recommended volume for trickle stage flow:
M5 Meters: 6 gallons (23 litres)
M7 Meters: 10 gallons (38 litres)
M10 Meters: 15 gallons (57 litres)

General Information

Liquid Controls valves are designed for a wide range of applications and flow rates. Careful engineering and construction ensure smooth, accurate, and controlled operation.

E-7 valves are installed on the outlet side of the meter. Operation is smooth and easy regardless of the line pressure since the vector forces are directed at right angles to the valve opening mechanism and are never in opposition.

Designed with the same mounting dimensions as the Liquid Controls V-7 and K-7 mechanical valves, the E-7 electronic valve does not require plumbing changes to retrofit existing meter installations.

Class 2

A Class 2 E-7 valve is available for aviation applications. The Class 2 E-7 valve has an anodized aluminum housing and stainless steel tubing, fittings, and solenoid valve parts. (Part #A298211A)

The Flow Control Switch is not available for Class 2 E-7 Valve

Flow Control Switch (Optional)

The Flow Control Switch is a bolt-on accessory for use with the Liquid Controls E-7 Valve. It is designed to control an air operated valve (AOV) connected to the pump. During low flow conditions, the Flow Control Switch is closed or OFF and air to the AOV is not present. When high flow conditions exist, the Flow Control Switch opens and activates the AOV. When the AOV is activated, the pump switches from low bypass mode to full flow mode (high bypass).

When the delivery returns to low flow, the Flow Control Switch closes and vents the air to the atmospheric pressure releasing air from the AOV. The AOV closes, and the pump returns to low bypass mode.

In many cases, the Flow Control Switch is routed to the engine throttle as well, to increase and decrease the RPM of the pump shaft.

The E-7 valve with Flow Control Switch is compatible with all Liquid Controls LectroCount Electronic Registers and may be used with M5, M7, and M10 Class 1 meters.

Operation

Two-Stage Closure

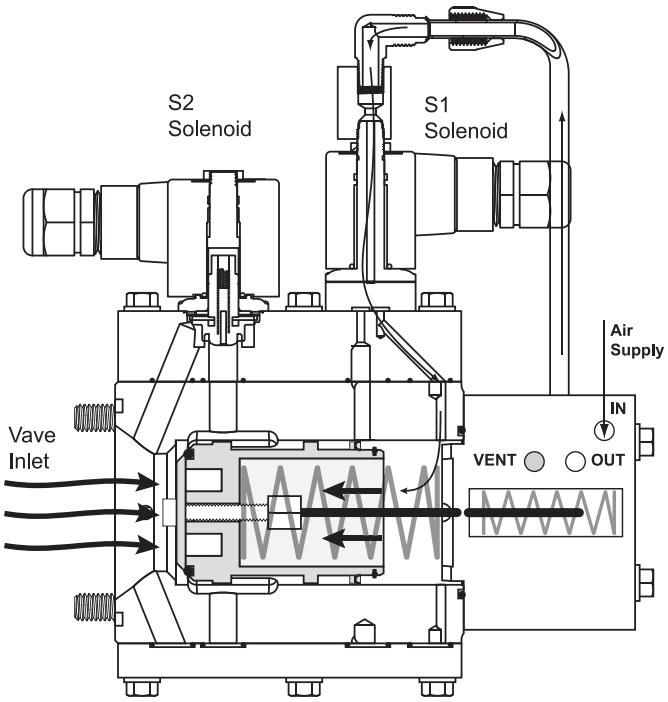
The E-7 valve has two solenoids to control the two-stage closure of the valve. During full flow, solenoid valve one (S1) opens and solenoid valve two (S2) closes. During dwell flow, S1 closes and S2 opens. In dwell flow, S2 closes to end deliveries. Shut-off during dwell flow reduces the risk of liquid hammer and accurately ends preset deliveries.

Valve Closed

When the E-7 Valve is closed, it is not possible to make a delivery. The S1 and S2 solenoids are both de-energized and closed. Fluid enters a port on the inlet side of the valve and flows through the tubing and the S1 solenoid into the valve chamber on the back side of the piston. Using this fluid pressure from the pump and the compression spring, the piston seals the inlet to the valve.

Flow Control Switch

The flow control switch is closed and does not allow any supply air to pass though the inlet of the flow control switch.



THE PORTS OF THE AIR SWITCH ARE SHOWN FACING THE FRONT FOR INSTRUCTION PURPOSES ONLY. They must be oriented so that the ports face the top or bottom of the air switch. The system is shipped with ports facing the top, which is the recommended orientation. A vertical position allows any condensation from the air pump to drain.

Full Flow

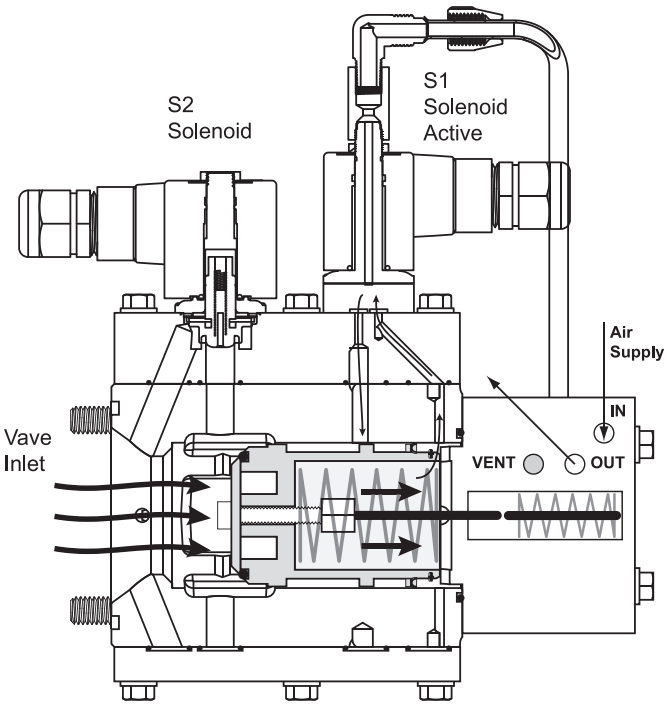
At the start of a delivery, the S1 solenoid valve energizes. This opens a port at the back of the valve by raising the piston inside the solenoid. Liquid passes through the S1 solenoid and out of a port on the outlet side of the valve. This allows the liquid pressure at the inlet side of the valve to compress the spring and force the piston to the back of the valve housing, opening a path for the liquid to pass through the valve.

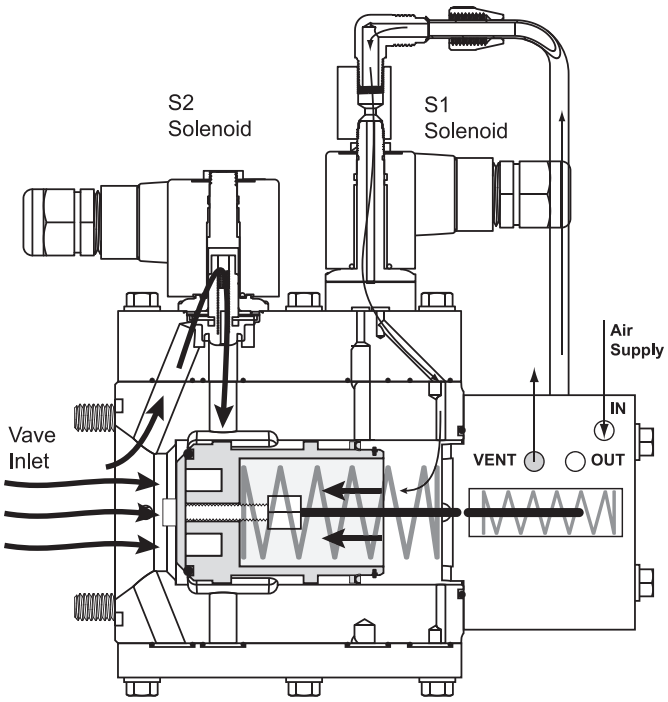
The S1 solenoid valve remains energized during the full flow portion of a delivery.

Flow Control Switch

The flow control switch is actuated by the shaft of the valve piston. When this occurs, the inlet air is allowed to pass through the switch to the outlet. This outlet air is then typically routed to the pump's air operated valve to increase bypass pressure. It simultaneously may be routed to the engine throttle to increase the shaft RPM delivered to the pump, increasing flow.

For LectroCount³, both solenoids will energize during full flow.





Dwell Flow

When making a preset delivery, the system will transition from full flow to dwell flow near the end of delivery. At the point when dwell flow begins, the S1 solenoid valve de-energizes at the same instant the S2 solenoid valve energizes.

After the S1 solenoid closes, the piston and compression spring move back into position and close the path through the valve. When the S2 solenoid valve energizes, it opens a path for the liquid from the front of the valve, through the solenoid, and to the outlet side of the valve. When the preset delivery volume is reached, the S2 solenoid valve closes and the delivery ends.

Flow Control Switch

The piston from the valve will de-energize the internal switch of the flow control switch. The outlet closes and air pressure in the outlet line vents though the vent port on the flow control switch, allowing the air operated valve on the pump to close. If the outlet air is also connected to the vehicle's throttle, it will reduce RPMs to the pump shaft as well.

For LectroCount³, S1 will de-energize during dwell flow and S2 will remain energized until the delivery preset is reached.

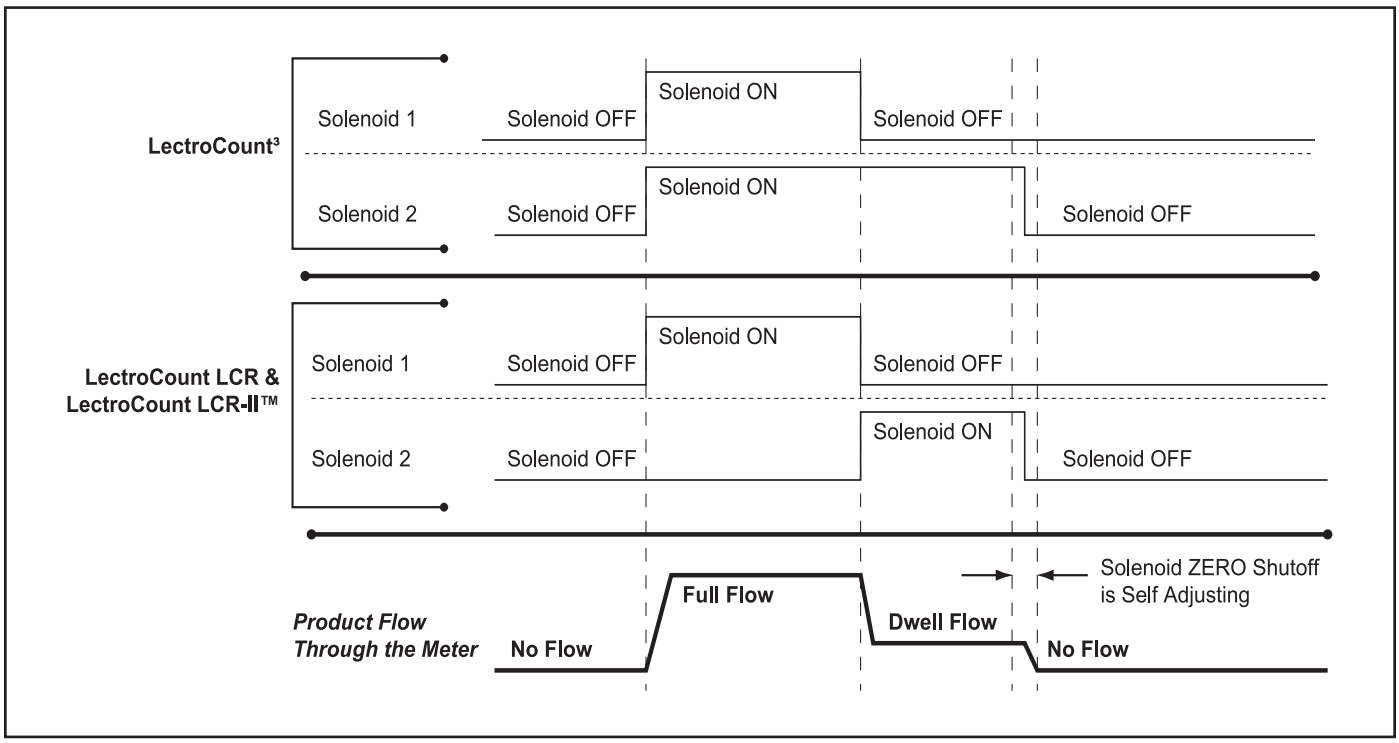


Figure 4: E-7 Valve operating sequence.

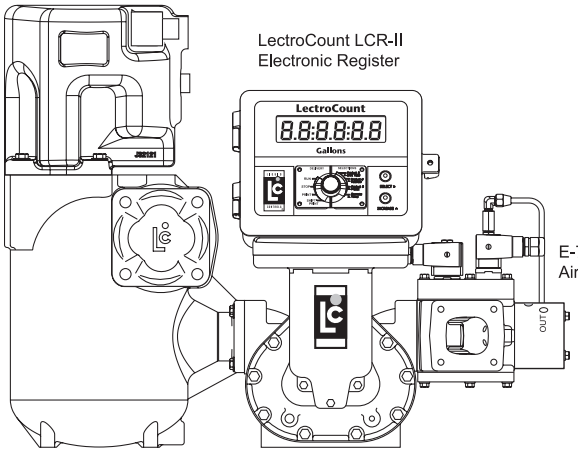
Installation

New Installations

When ordered with a new meter, the E-7 valve is supplied mounted to the outlet side of the meter. An example is the M7 meter with high capacity strainer, Optical Air Eliminator, and LectroCount LCR-II® Electronic Register shown in the figure to the right. The system piping is connected to the outlet side of the E-7 valve using the four bolts and washers provided.

The E-7 Valve solenoids are supplied pre-wired to the LectroCount Electronic Register and may be oriented with the outlet facing top, back, forward, or bottom.

Air lines are connected to the Flow Control Switch via the two 1/8" NPT ports. The Flow Control Switch may be rotated in 90° increments for ideal installation orientation.



⚠ WARNING

Before disassembly of any meter or accessory component, **ALL INTERNAL PRESSURES MUST BE RELIEVED AND ALL LIQUID DRAINED FROM THE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE PROCEDURES**. Pressure must be 0 (zero) psi. Close all liquid and vapor lines between the meter and liquid source.

Failure to follow this warning could result in property damage, personal injury, or death from fire and/or explosion, or other hazards that may be associated with this type of equipment.

Retrofit Installations

After the internal pressure is relieved from the system, and the liquid is drained from the meter and accessories, the outlet line can be disconnected from the outlet side of the meter or mechanical valve being replaced and then the mechanical valve can be removed. The new valve assembly can then be connected to the outlet side of the positive displacement meter.

Tools required for installation include:

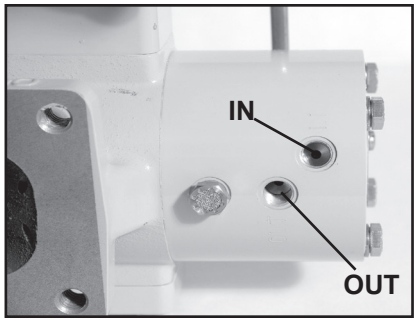
- Screwdriver, flat blade
- Screwdriver, Phillips
- Screwdriver, Torx
- 7/16" wrench
- 9/16" wrench

Valve Orientation

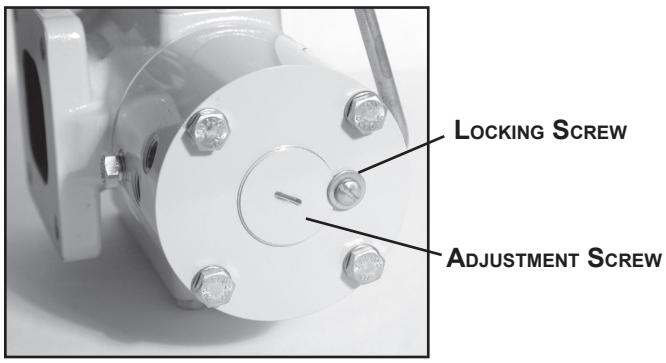
The valve has an arrow showing the direction of flow and the outlet side is clearly marked "OUTLET". The outlet may be positioned in one of four positions depending on the application. The solenoid mounting is interchangeable from one side of the valve to the other and may need to be changed to correctly position the solenoids with respect to the outlet location. The preferred locations for the solenoid are up "on top" of the valve or horizontally facing back or forward. We do not recommend positioning the solenoids so they are facing down.

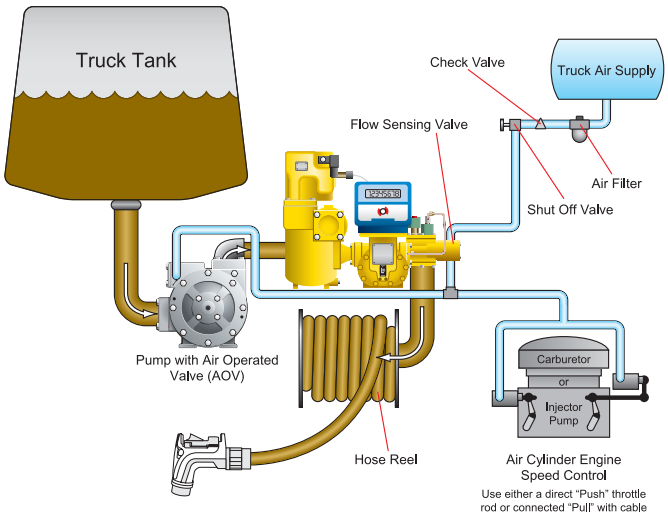
Use the four bolts and washers to fasten the valve assembly to the meter. Tighten the bolts in a crossing pattern. Once this is complete, the outlet piping may be reconnected to the outlet side of the E-7 valve.

Wiring instructions appear on Page 16.



The air switch ports are shown facing the front for instruction purposes only. The recommended orientation is the top. A vertical position (top or botom) allows any condensation from the air pump to drain.





Flow Control Switch Orientation

It is best to set the orientation of the flow control switch prior to filling the system with product. Remove the four fasteners holding the flow control switch to the E-7 valve. Rotate to the desired orientation and then refasten.

Connecting Air Lines

The "**IN**" and "**OUT**" air line connections on the flow control switch are 1/8" NPT. Use appropriate fittings and tubing for these connections. The air lines and fittings should be able to handle the air pressure provided by the system. It is recommended to regulate the air pressure between 50 and 150 psi.

Connect the supply air to the "**IN**" port on the flow control switch. Connect the "**OUT**" air line to the desired component or components to be controlled by the flow control switch. This is typically an air operated valve on the pump and may also include connection to the engine throttle control.

Adjustment

The flow control switch activation value is adjustable from approximately 10 GPM to 45 GPM depending on the fueling system being used. The advantages of adjusting the switch to match the intended use include the following:

- Improve split compartment performance
- Improve system wear
- Improve efficiency

When the flow control switch is shipped from the factory, it is adjusted to the mid-point of its adjustment at approximately 30 GPM. In this position, the flow control switch will be activated when the flow through the meter reaches 30 GPM. It will deactivate when the flowrate falls below 30 GPM.

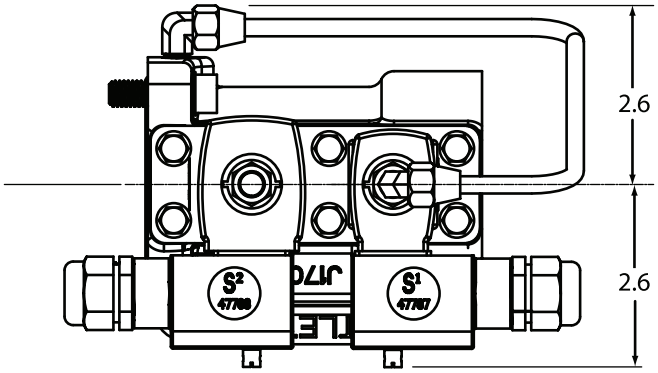
To adjust the flowrate activation setting, loosen the locking screw. The adjustment screw should have been shipped turned out ¾ turn. To set the flow control switch to a lower activation flow rate, rotate the adjustment screw clockwise. To set the flowrate at a higher activation flowrate, rotate the adjustment screw counter-clockwise. The counter-clockwise adjustment from the lowest setting to the highest setting should not exceed 2 turns.

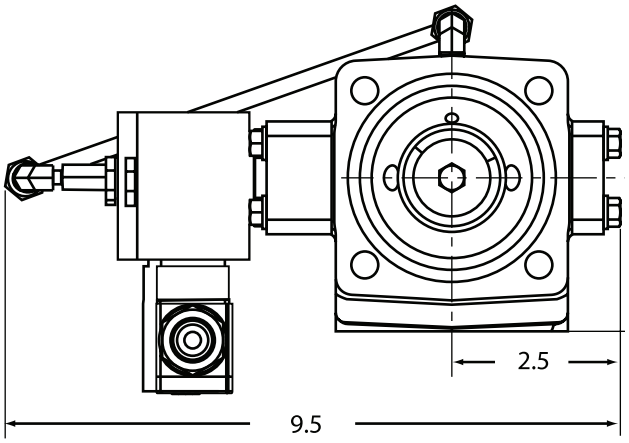
To set the desired activation flowrate, make small adjustments and test the system noting the flowrate when the flow control switch engages and disengages. When the desired flowrate activation is set, secure the adjustment screw with the locking screw.

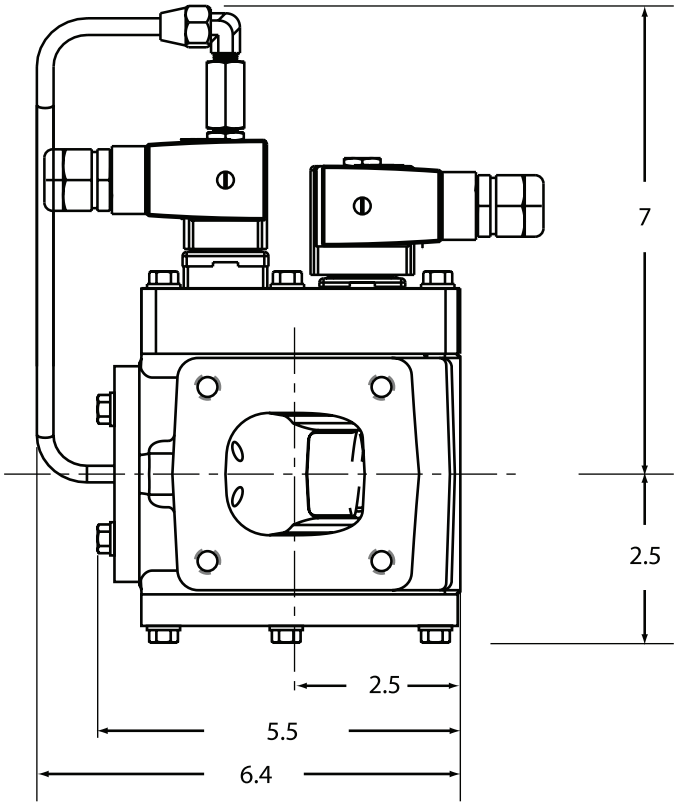
These adjustments can be made without removing the air supply line. If however, the adjustment screw is rotated beyond 2 turns and becomes unthreaded from the housing, it will be necessary to shut off the air supply before the adjustment screw can be reinstalled.

Dimensional Drawing

E-7 Valve (inches)



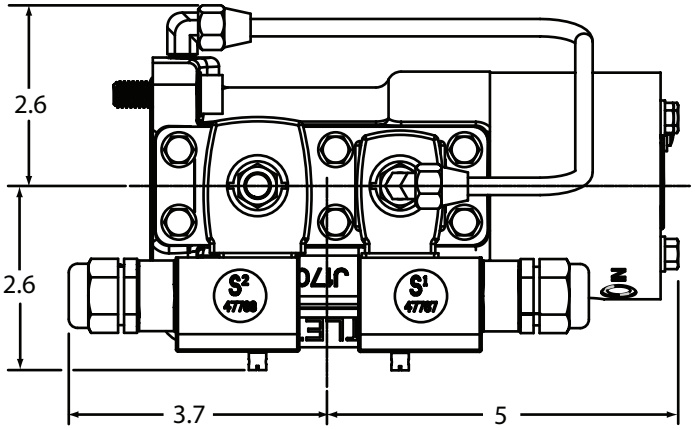


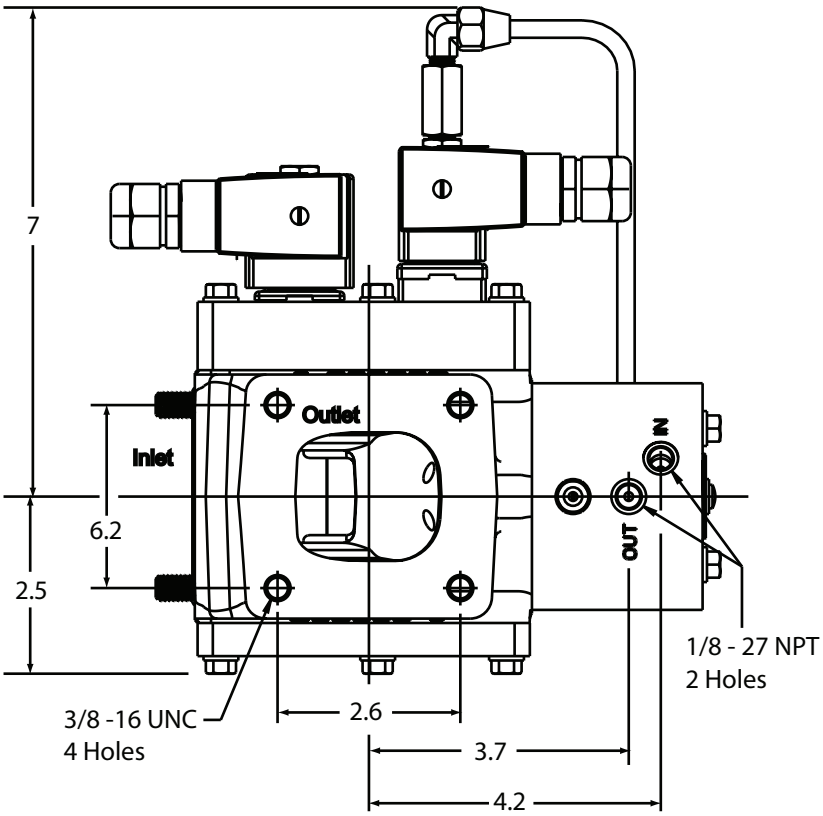


Dimensions shown are not for construction use.

Consult factory when certified Engineering Drawings are required.

E-7 Valve With Flow Control Switch (inches)

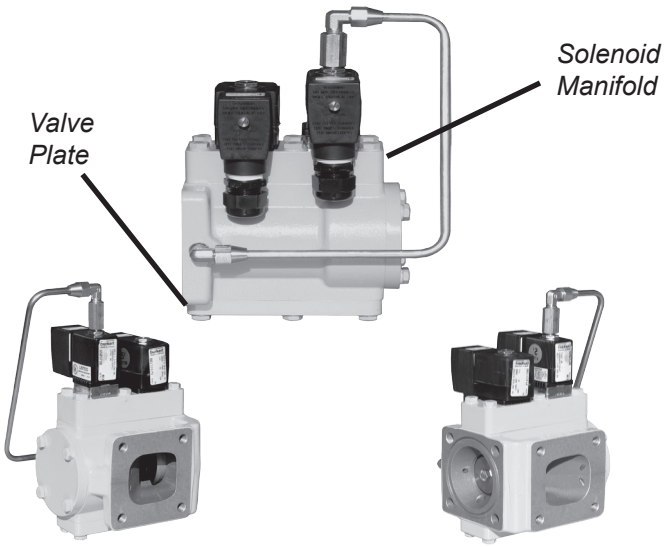




The ports of the air switch are shown facing the front for instruction purposes only. They must be oriented so that the ports face the top or bottom of the air switch. The system is shipped with ports facing the top, which is the recommended orientation. A vertical position allows any condensation from the air pump to drain.

Changing Solenoid Orientation

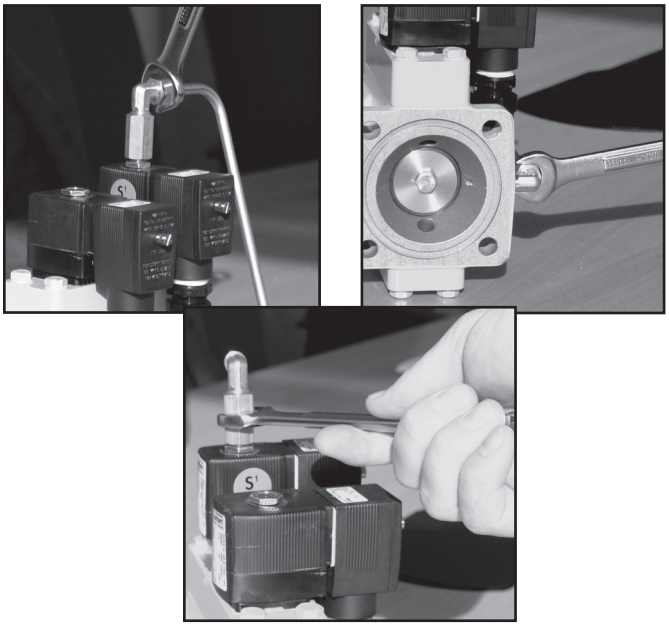
The E-7 valve, mounted on the outlet side of the meter, is typically oriented such that the outlet port of the valve faces the back or to the top of the meter. The valve, having a symmetrical bolt pattern, may be rotated in 90° increments allowing the outlet side of the valve to face upward, downward, forward, or backward. To do this remove the four bolts holding the valve in place, rotate the valve to the desired orientation, and refasten the bolts.



In some orientations, the solenoid manifold and the solenoid valves are upside down. This is the worst orientation for the operation of the solenoid valves. When mounted on some smaller sized meters, it may be physically impossible to rotate the valve with the solenoids pointing downward because the solenoids would extend beyond the bottom of the meter. In either case, it is possible to switch the solenoid manifold and the valve plate.

TOOLS:

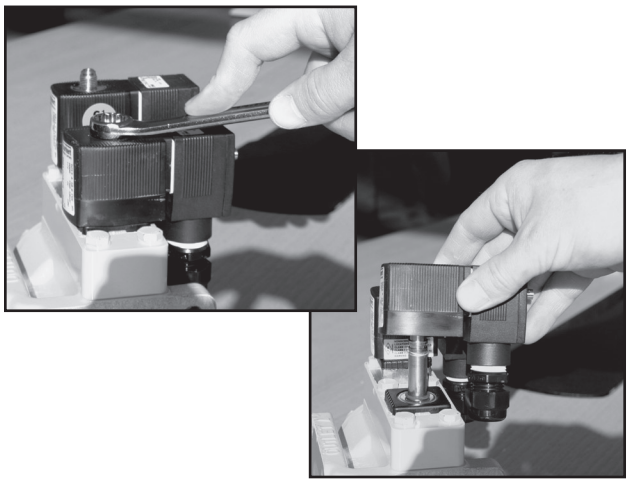
- 9/16” wrench or socket
- Torx screwdriver
- Straight screwdriver
- Phillips screwdriver



Step 1 -

Remove the S1 Bypass Tubing

Using an 9/16” wrench, loosen the two fittings on each end of the bypass tubing. Remove the tubing and set aside. Then, remove the fitting from the top of the S1 solenoid.



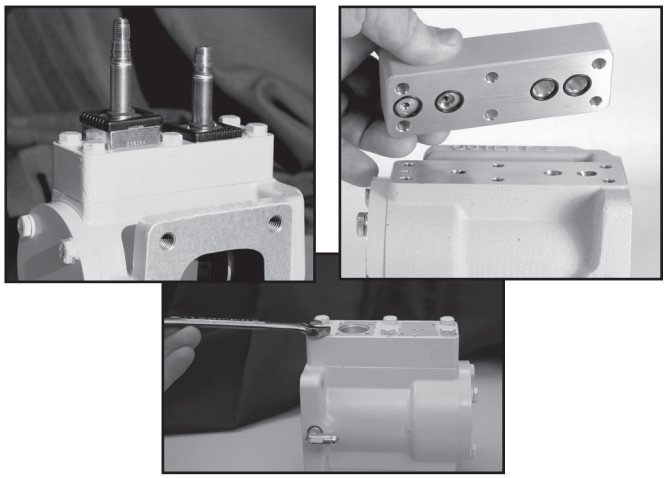
Step 2 -

Remove the S1 and S2 Solenoids

Using an 9/16” wrench, remove the nuts on top of the S1 and S2 solenoids.

Lift the solenoid coils off their post.

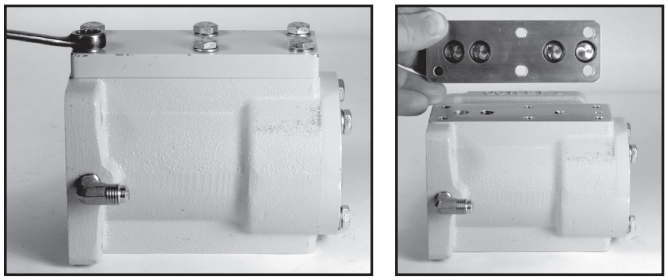
Changing Solenoid Orientation



Step 3 -

Remove the Solenoid Manifold

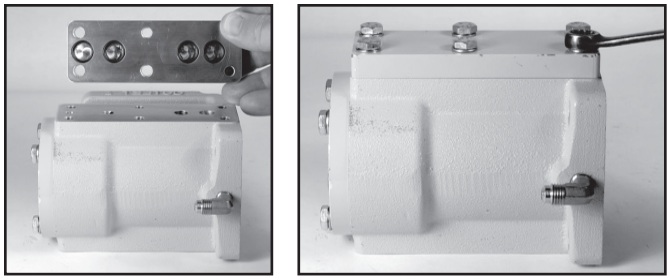
Using a 7/16” wrench, remove the six screws which hold the manifold in place. Remove the manifold. The manifold has four O-rings which seal against the valve body. These should be inspected and replaced as needed.



Step 4 -

Remove the Valve Plate

To remove the valve plate, use a 7/16” wrench to remove the six screws holding it in place. Remove the valve plate from the valve body. This plate has four O-rings. These are identical to the four O-rings under the solenoid manifold. These should be inspected and replaced as needed.



Step 5 -

Re-Mount the Valve Plate

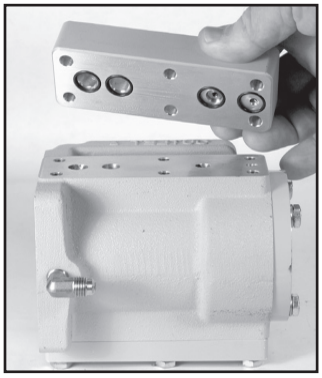
Turn the valve body over and install the valve plate on the side which originally had the solenoid manifold. Make sure the O-ring seals are in place. Ensure that the holes of the valve plate line up with the fastener connections of the valve body. If the center holes do not line up correctly, rotate the valve plate 180°.

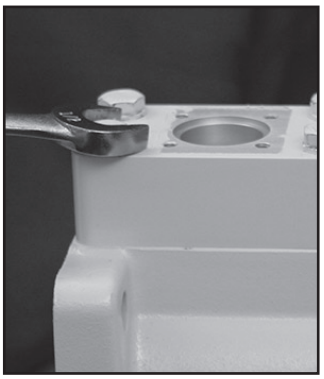
Changing Solenoid Orientation

Step 6 -

Re-Mount the Solenoid Manifold

Turn the valve body over and install the solenoid manifold on the side which originally had the valve plate. Make sure the O-ring seals are in place. Ensure that the holes of the solenoid manifold line up with the fastener connections of the valve body. If the center holes do not line up correctly, rotate the solenoid manifold 180°.



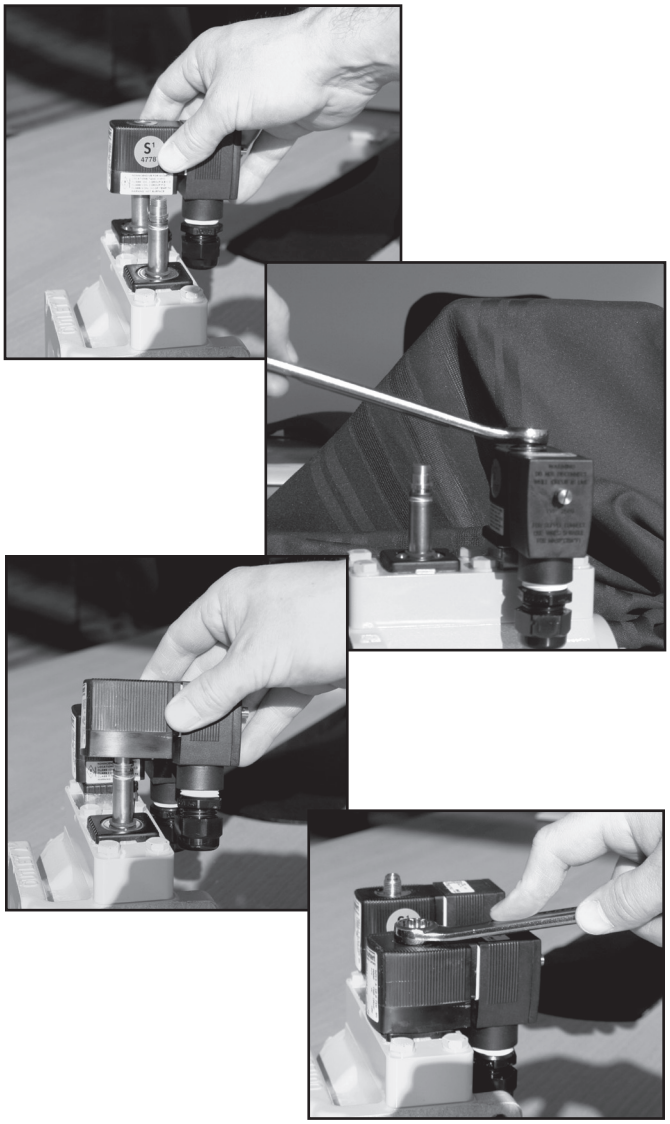


Step 7 -

Reinstall the S1 and S2 Solenoids

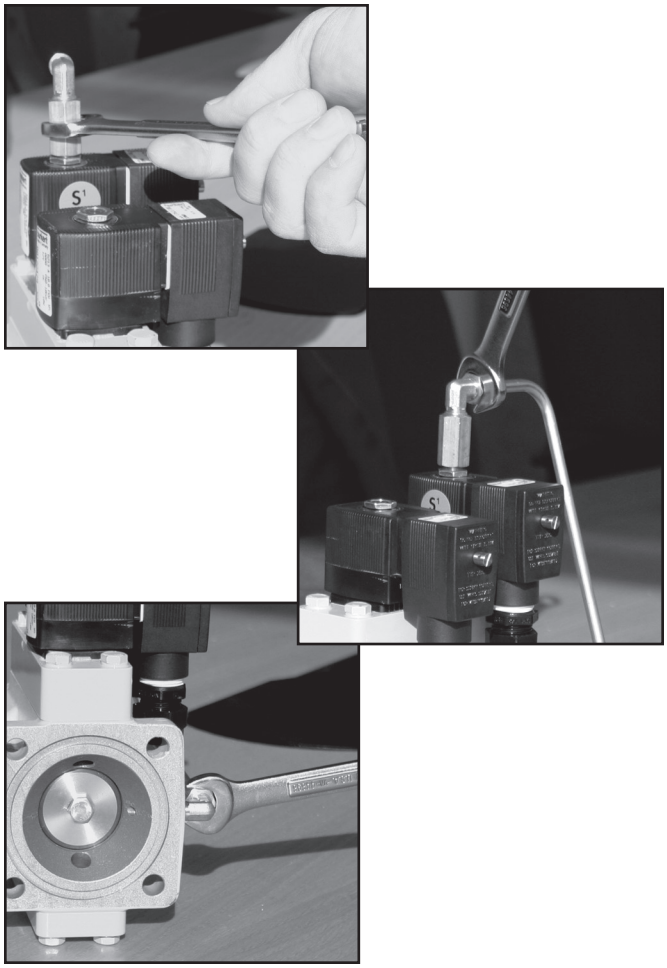
Place the solenoid coils over the posts. Position the solenoid coils facing the side of the valve most suitable for installation and repair.

Replace the nuts and tighten with an 9/16” wrench.



Once the bypass tubing is installed, the S1 solenoid cannot be rotated from one side of the valve to the other. Ensure that the solenoid is in the desired orientation before installing the bypass tubing.

Changing Solenoid Orientation



Step 8 -

Reinstall the Bypass Tubing

Replace the fitting over the S1 solenoid. Then, reconnect the bypass tubing to the solenoid fitting and the valve housing fitting.

Wiring

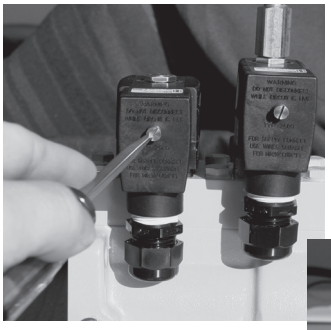
⚠ WARNING

For North American Installations, the installation must be fully in accordance with the National Electrical Code (US) or the Canadian Electrical Code respectively to maintain the hazardous location ratings on the product.

Prior to installing the cables between the solenoids and the LectroCount register, determine the orientation of the solenoids that will be the best for installation. Both solenoids have a cable connector which can be rotated in 90° increments providing four options for orientation. Choose any orientation in which the solenoid is not upside down.

Step 1 -

Using a flat screw driver, loosen the screw on the cable connector cover.

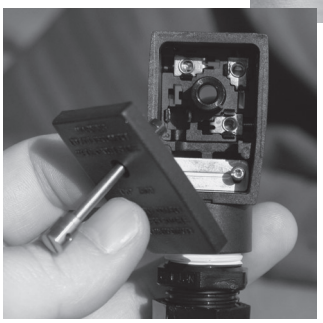


Step 2 -

Remove the cable connector from the solenoid.

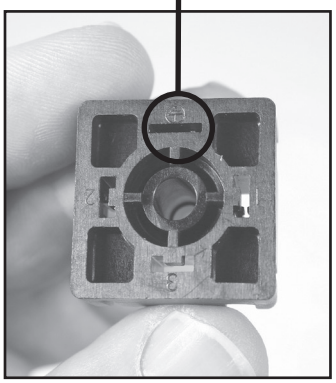
Step 3 -

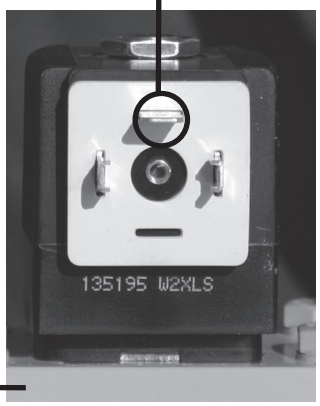
Remove the cover and screw from the cable connector.



Terminal Block's Straight Slot

Ground Post





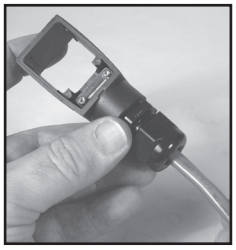
Valve Housing

Note the markings on the back of the terminal block. To connect the cable connector to the solenoid valve, the straight slot of the terminal block must be positioned so it is the female to the male of the ground post on the solenoid valve. Both must be positioned farthest from the valve housing. To change the cable connectors orientation in relation to the valve, rotate and reinsert the terminal block into the cable connector.

Wiring

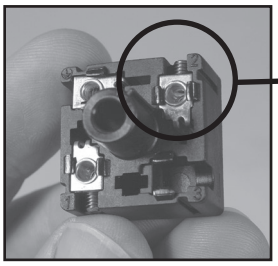
Step 4 -

Remove the terminal block from the back of the cable connector.

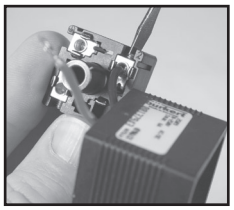


Step 5 -

Feed one end of the cable through the cable gland of the cable connector.



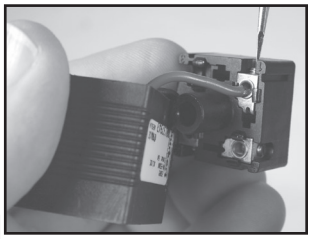
Terminal 2



Step 6 -

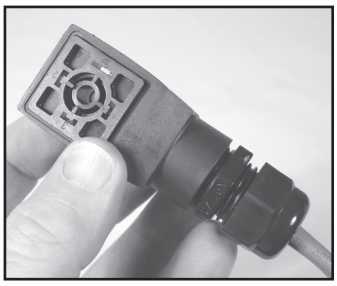
Connect the black wire to terminal 2 and tighten with a flat blade screwdriver.

The correct terminals can be identified by raised plastic numbers beside each terminal.



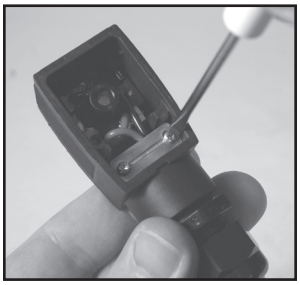
Step 7 -

Connect the red wire to terminal 1 and tighten with a flat blade screwdriver.



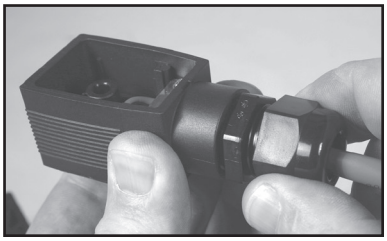
Step 8 -

Rotate the terminal block to the desired orientation and then put back into place. In the picture to the right, the straight slot is orientated so that the cable connector will point to the side of the valve.



Step 9 -

Tighten the retention clamp on the inside of the connector housing using a screwdriver.



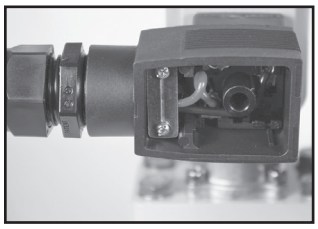
Step 10 -

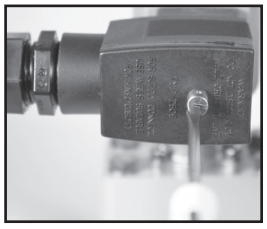
Tighten the cable gland around the cable.

Wiring

Step 11 -

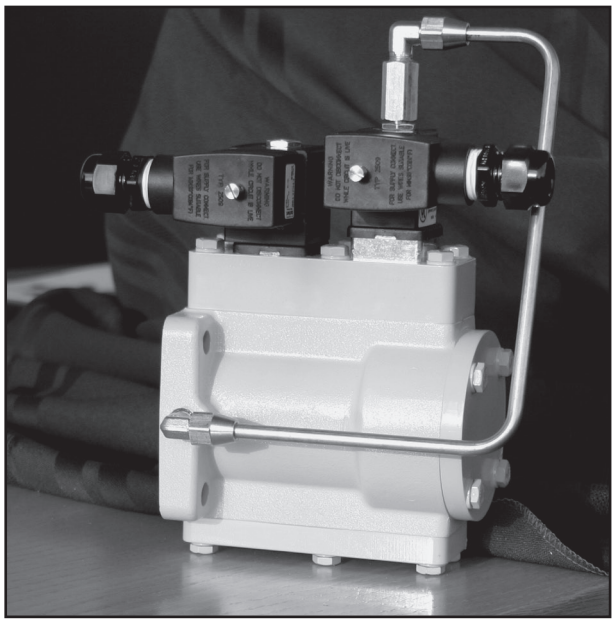
Plug the connector back into the solenoid. If the cable is not pointing in the desired direction, unplug the cable connector, take out the terminal block, rotate to the desired orientation, and then place the terminal block back in place.





Step 12 -

Place the cover over the cable connector and screw in place.



Step 13 -

Repeat steps 1 through 12 for the second cable connector.

Step 14 -

Proceed with routing the cables to the back of the LectroCount register. Refer to Publication Number 500301, “Installation Manual - LectroCount LCR-II Electronic Register” for detailed instructions on wiring the E-7 valve to the LectroCount. A wiring diagram for this connection is also provided below.

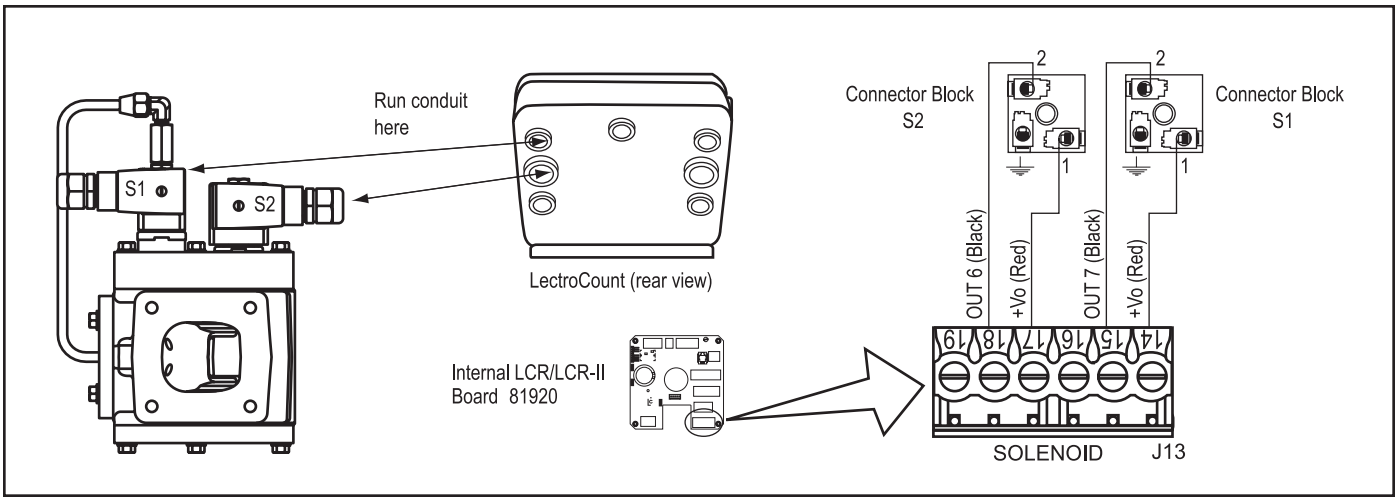


Figure 6: LectroCount wiring diagram

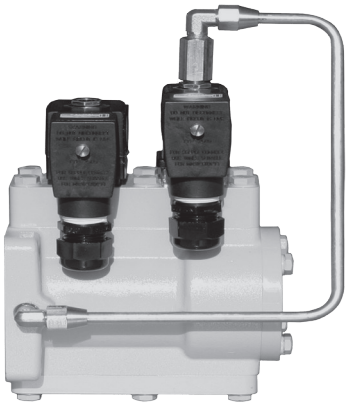
Disassembling the Valve

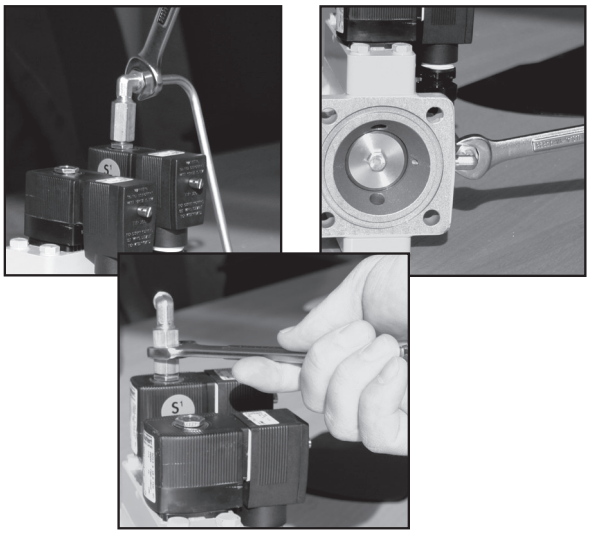
⚠ WARNING

Before disassembly of any meter or accessory component, **ALL INTERNAL PRESSURES MUST BE RELIEVED AND ALL LIQUID DRAINED FROM THE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE PROCEDURES**. Pressure must be 0 (zero) psi. Close all liquid and vapor lines between the meter and liquid source.

Failure to follow this warning could result in property damage, personal injury, or death from fire and/or explosion, or other hazards that may be associated with this type of equipment.

This section covers complete disassembly of the E-7 valve. Complete disassembly is often not required when performing maintenance or troubleshooting on the valve. Most components can be removed without removing the valve from the meter on which it is installed.





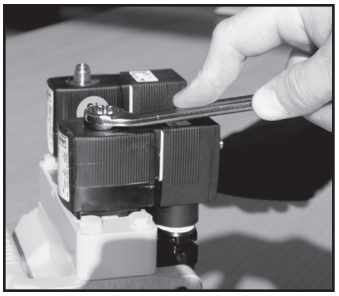
Step 1 -

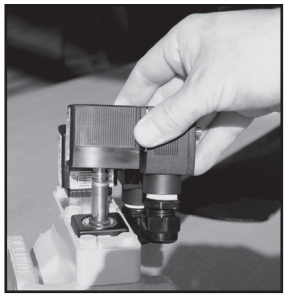
Remove the S1 Bypass Tubing

Using an 9/16” wrench, loosen the two fittings on each end of the bypass tubing.

Remove the fitting from the top of the S1 solenoid.

Disassembling

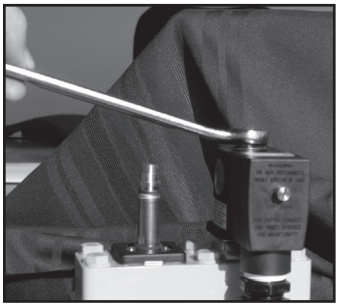


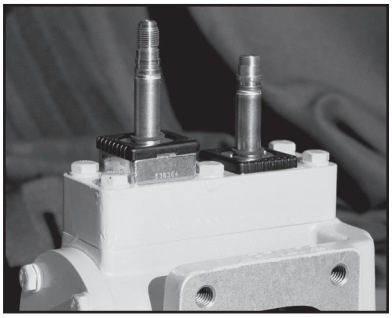


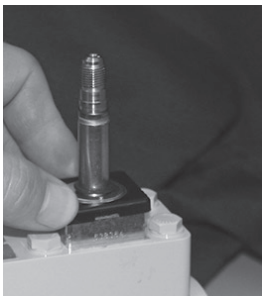
Step 2 -

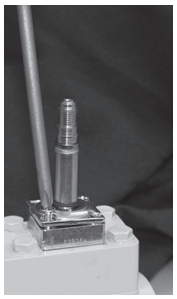
Remove the S1 and S2 Solenoids

Using an 9/16” wrench, remove the nuts on top of the S1 and S2 solenoid. Lift the solenoid coils off their posts.









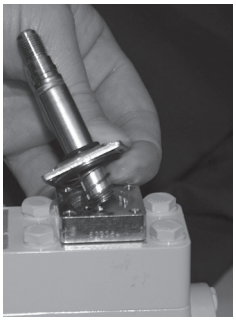
Step 3 -

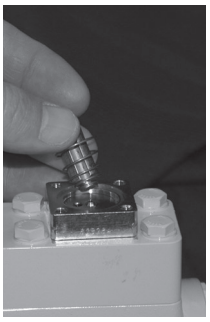
Remove the S1 Solenoid Guide Post

Remove the plastic bonnet from the base. Next, remove the two Torx head screws threaded into the solenoid base. Then, remove the Phillips head screws threaded into the solenoid manifold.

When pulling the post from the base, be sure to catch the spring and poppet as they slip from the inside of the guide post cylinder.

If there is no need to inspect the spring and poppet of the guide post assembly, the base and the guide post can be removed from the solenoid manifold as a single unit. Simply remove the long Phillips screws and remove the base and guide post.





Disassembling

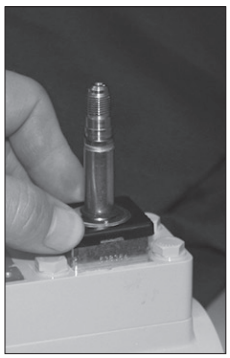
Step 4 -

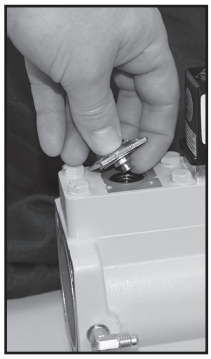
Remove Solenoid S2 Guide Post

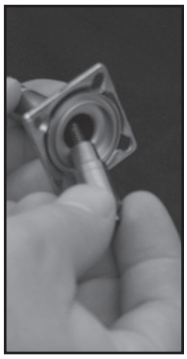
Using a Torx screwdriver, remove the four screws which hold the guide post in place. Then, lift the guide post off of the valve.

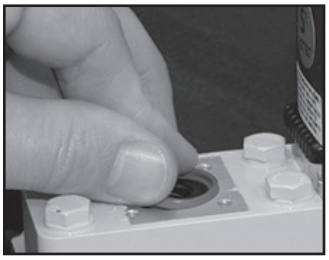
When pulling the post from the base, be sure to catch the spring and poppet as they slip from inside of the guide post cylinder.

Remove the diaphragm from the hole in the solenoid manifold.







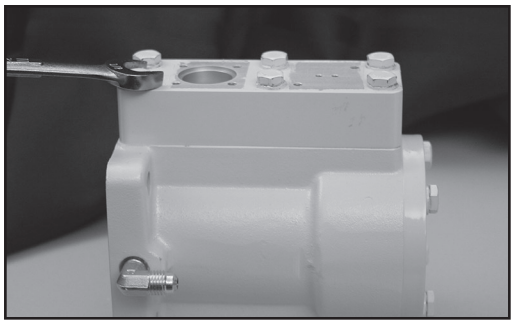


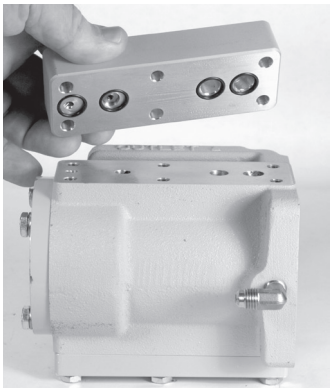
Be careful not to puncture the diaphagm if using a tool to loosen it from the manifold hole.

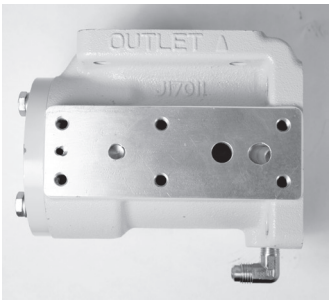
Step 5 -

Remove the Solenoid Manifold

Using a 7/16” wrench, remove the six screws that hold the solenoid manifold in place. Remove the solenoid manifold.







Disassembling

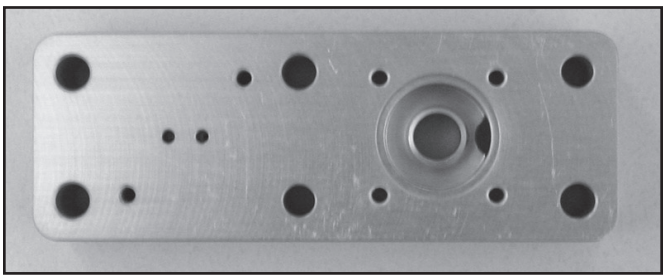
Step 6 -

Solenoid Manifold O-Rings

There are four O-rings found between the solenoid manifold and the valve body. These should be inspected and replaced if necessary.

The S1 solenoid has two O-rings at the bottom of the base. These should be inspected and replaced if necessary.

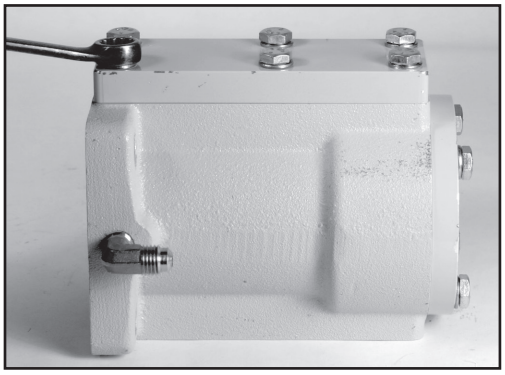
The S2 solenoid has a seal between the manifold and the mounting plate. Check the seal and ensure it is positioned correctly. It must be positioned correctly for the valve to operate.

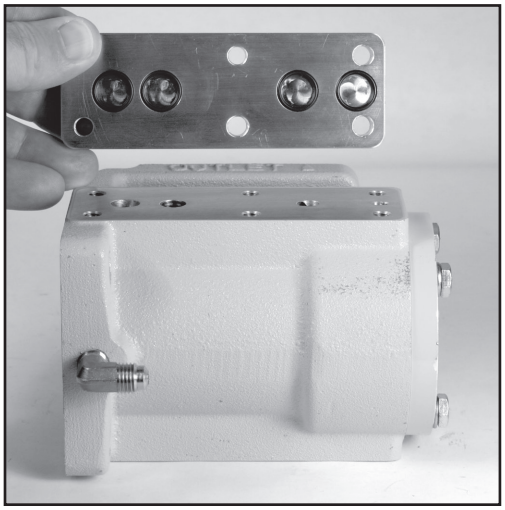


Step 7 -

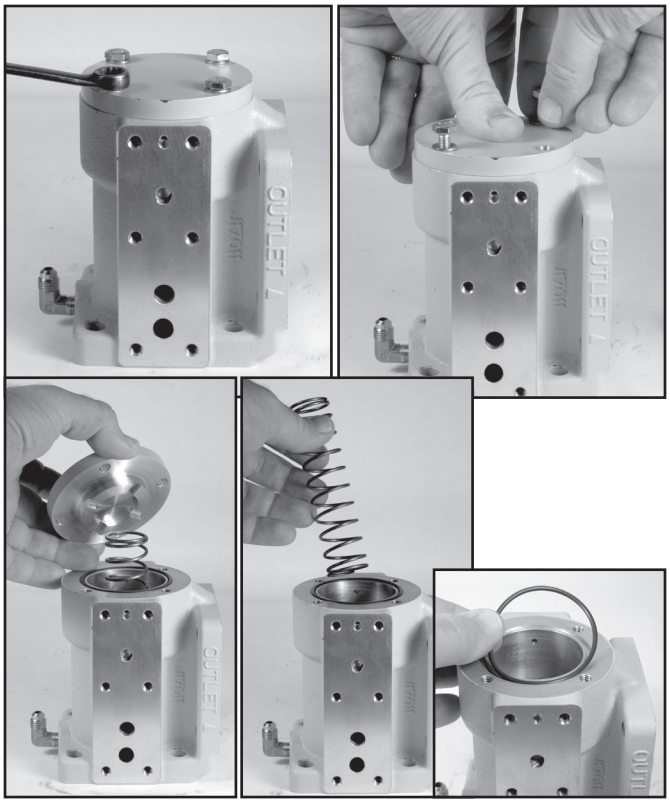
Remove the Cover Plate

To remove the cover plate, use a 7/16” wrench to remove the six screws holding it in place. Remove the cover plate from the valve body. This cover plate has four O-rings. These are identical to the four O-rings under the solenoid manifold . These should be inspected and replaced as needed.





Disassembling



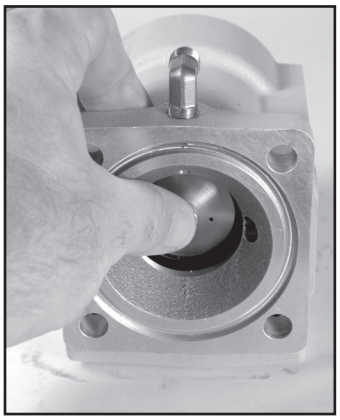
Step 8 -

Remove the Piston Cover Plate

Using a 7/16” wrench, loosen the four screws which hold the cover plate on the back end of the valve. Behind the cover plate is a spring. Hold the cover plate down with one hand before removing the four screws completely.

When the four screws have been removed, allow the spring to completely expand and relax before removing the cover plate.

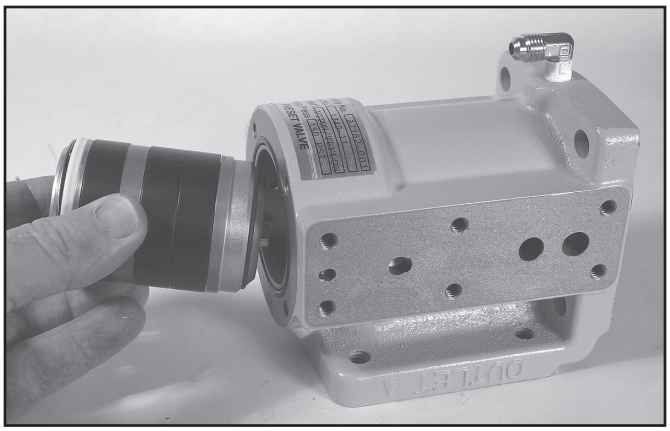
Remove the spring from the valve. The piston will remain in the valve. Remove and inspect the O-ring. This should be replaced as needed.



Step 9 -

Remove the Piston

To remove the piston from the valve body, lay the valve on its side. Push the piston out from the front end and pull it out from the valve body from the back end.



SERVICE TIP

When the valve is service in the vehicle, a slight vacuum will be created when removing the piston from the valve. The fastener which holds the piston O-ring washer was left long so that a long nose pliers can be used to aid in removal of the piston.

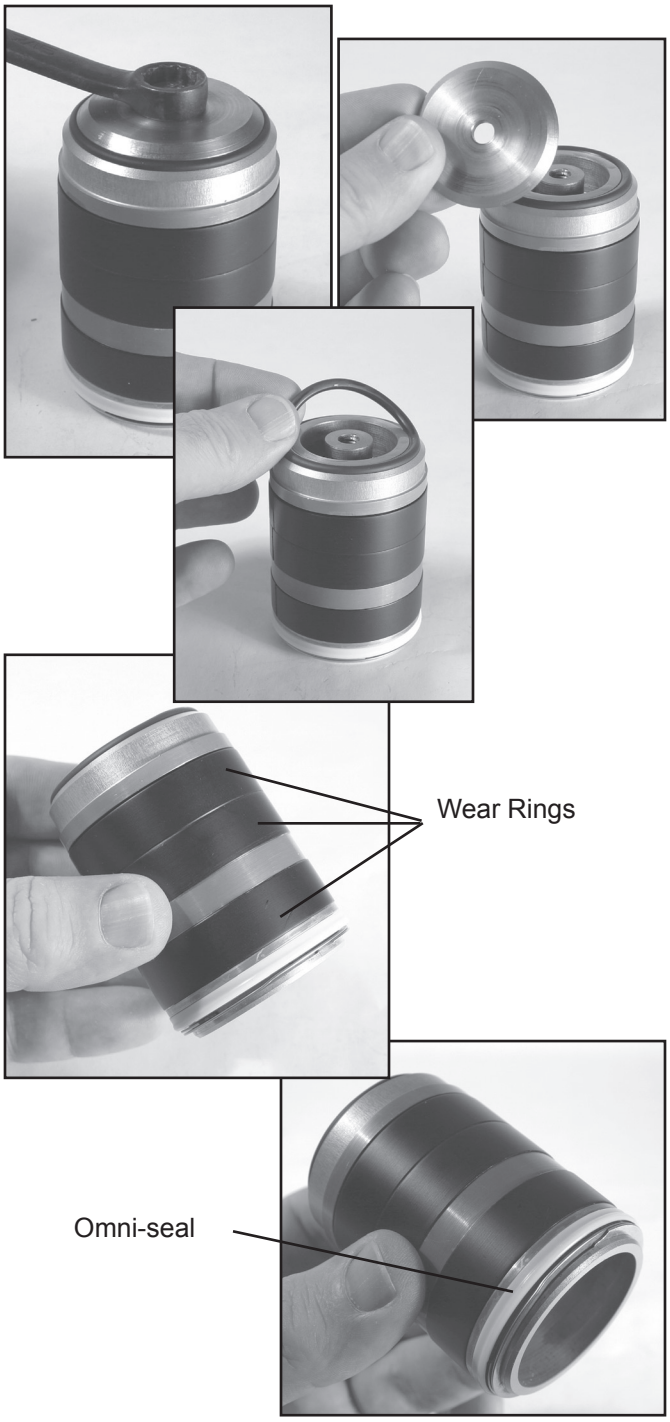
Disassembling

Step 10 -

Disassemble the Piston

Use a 7/16” wrench to remove the screw which holds the piston washer and O-ring in place. When the screw is removed, the piston washer is removed and then the O-ring.

Inspect the O-ring and replace as needed. Check the wear rings. If they show signs of excessive wear, replace them with new wear rings. Check the Omni-seal® and replace if it shows signs of wear.



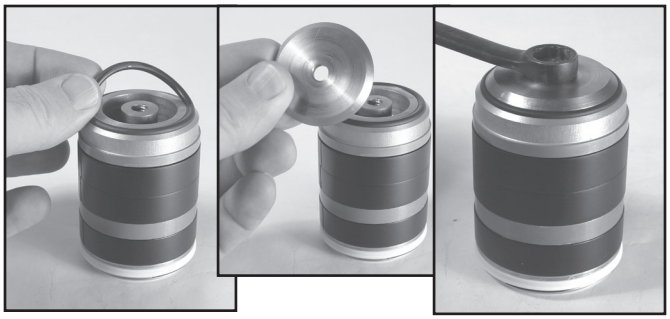
Reassembling the Valve

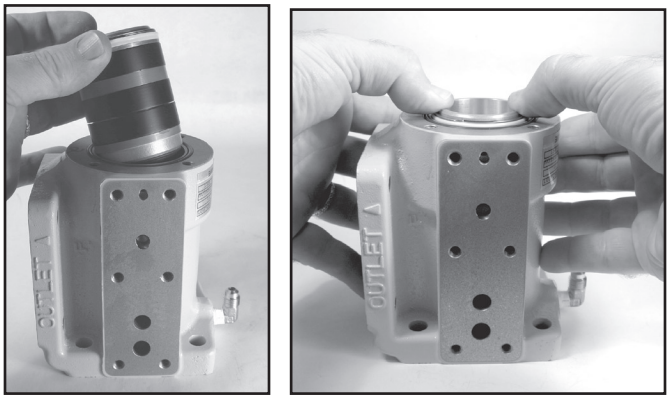
Step 1 -

Assemble the Piston

Place the O-ring into the groove on the face of the piston. Place the piston washer on top of the O-ring and fasten with the screw.

Slide the piston into the valve body and press it in until it rests against the opposite side.

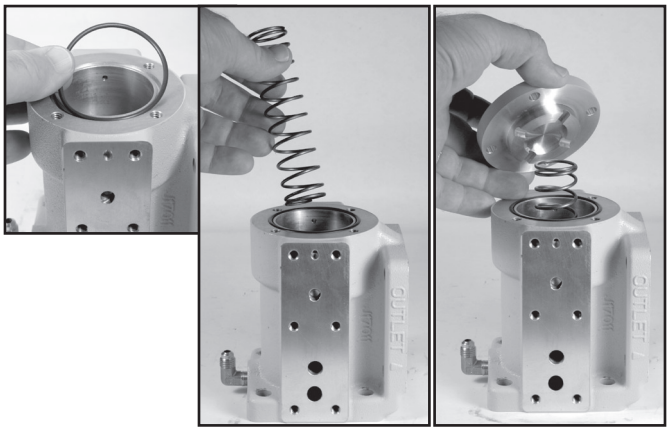


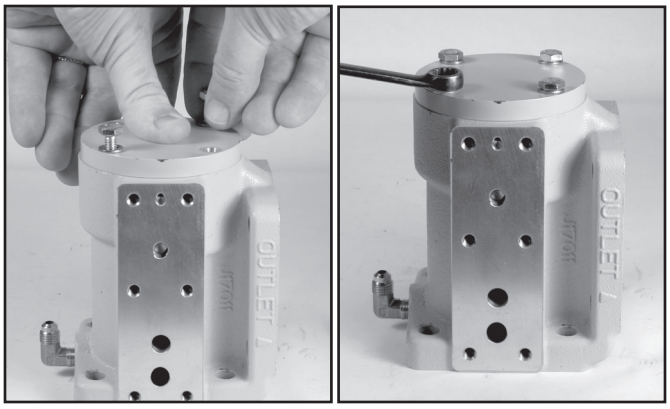


Step 2 -

Replace the Piston Cover Plate

Place the O-ring in the groove in the valve housing. Insert the spring into the center of the piston. Place the cover on the spring and compress. Insert the four screws and tighten by hand, holding the cover plate in place. Tighten the four screws using a 7/16” wrench.



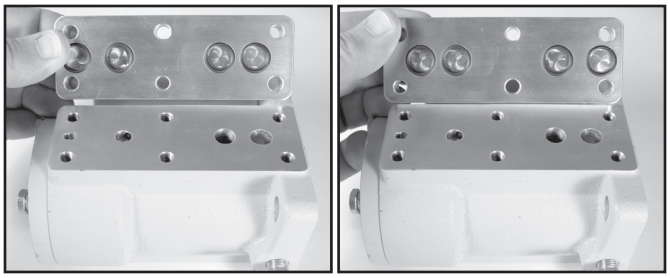


Reassembling

Step 3 -

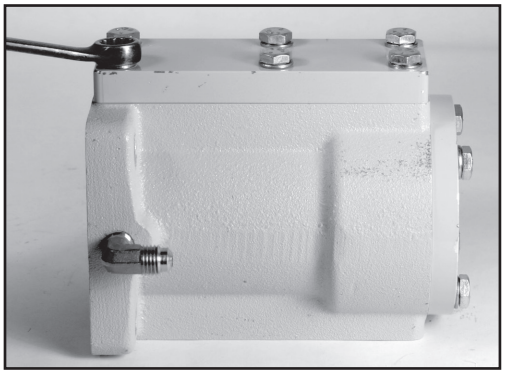
Replace the Valve Plate

The valve body is symmetrical with respect to the placement of the valve plate and the solenoid manifold. Select the side of the valve which provides for the most convenient orientation, taking into consideration the valve inlet, outlet, and solenoid location.



Correct **Incorrect**

The valve plate is not symmetrical with respect to its placement on the valve. The center holes are offset. The figures to the right show the difference if the plate is rotated 180° out of proper orientation. The center holes of the valve will not line up with the center holes of the plate. It is important to install in the proper orientation so that all six screws and washers are used.

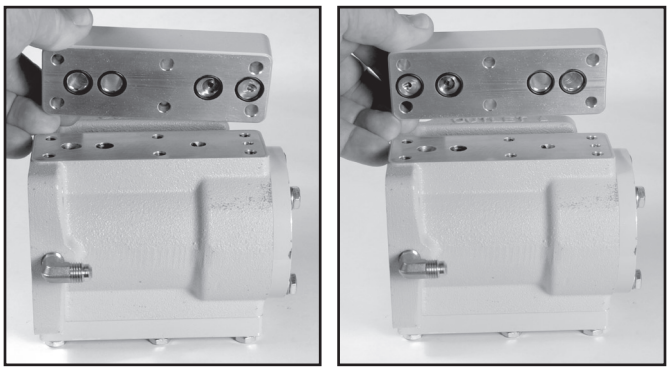


Insert the six screws and washer and fasten with a 7/16” wrench. The six screws for this plate are the shorter of the set of six screws.

Step 4 -

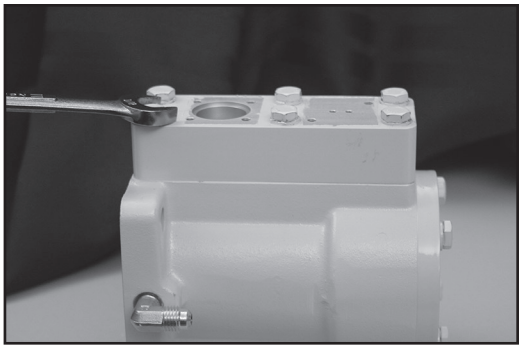
Install the Solenoid Manifold

Like the valve plate, the solenoid manifold must be installed in the proper orientation to ensure the porting is properly aligned.



Correct **Incorrect**

Place the solenoid manifold on the valve body and insert the six longer screws and washers fasten with a 7/16” wrench.



Reassembling

Step 5 -

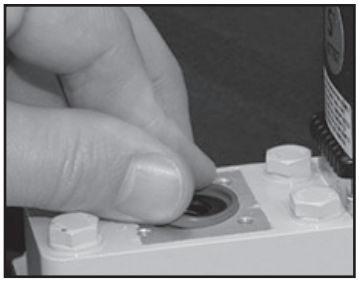
Install the S2 Solenoid Post

Replace the diaphragm into the large hole on the top of the solenoid manifold.

Assemble the guide post, poppet and spring. Put the spring in the hole on the top of the poppet. Push the poppet, spring first, into the guide post,

Place the guide post assembly into the diaphragm, poppet first and hold while starting the screws. Tighten the assembly to the manifold using a Torx screwdriver.

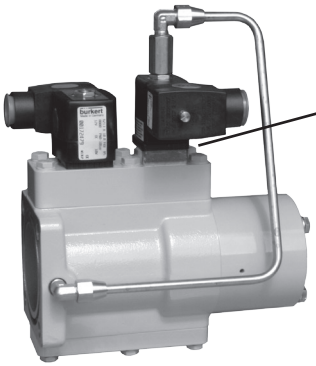
Place the plastic bonnet over the metal base.



Step 6 -

Install the S1 Solenoid

Place the S1 base onto the manifold so the the *engraved numbers face the side opposite the outlet opening*.



Engraved numbers must face the side opposite of the outlet opening

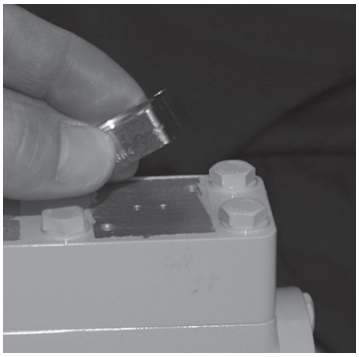
The S1 solenoid will NOT operate if it is oriented incorrectly.

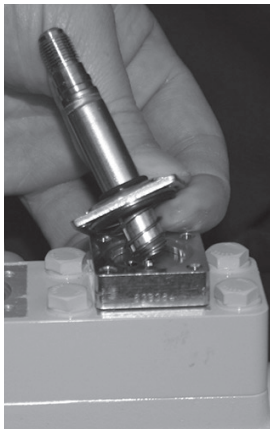
Assemble the poppet and spring into the guide post. The wide end of the spring loosely fits into the bottom of the guide. The narrow end of the poppet should face down and away from the guide post. Compressing the spring should move the poppet in and out of the guide post.

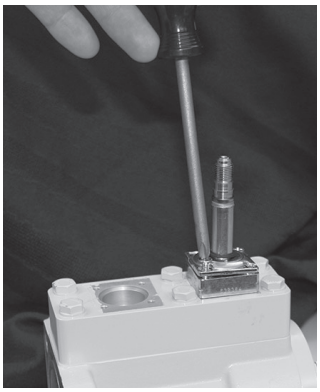
Place the guide post assembly, the narrow end of the poppet first, over the base. Hold both to the solenoid manifold and start the two long Phillps screws into the threaded holes of the manifold.

Tighten the two Torx screws and the two Phillips screws.

Reattach the plastic bonnet to the base







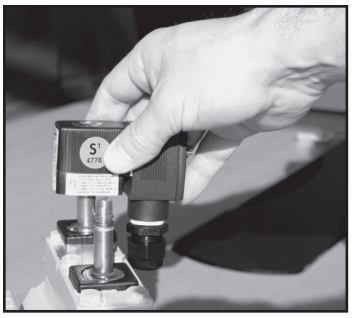
Reassembling

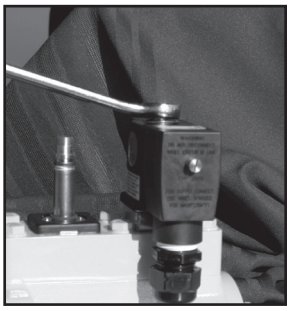
Step 7 -

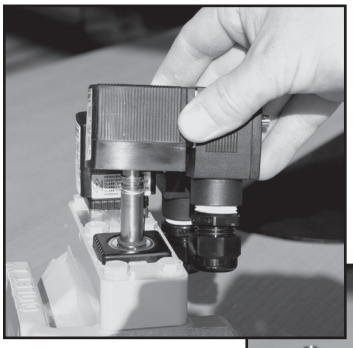
Install the S1 and S2 Solenoid

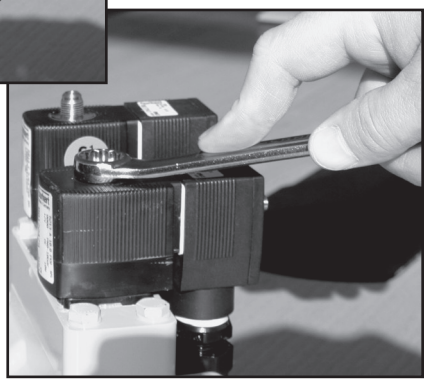
Place the solenoid coils over the posts.

Replace the nuts and tighten with an 9/16” wrench.









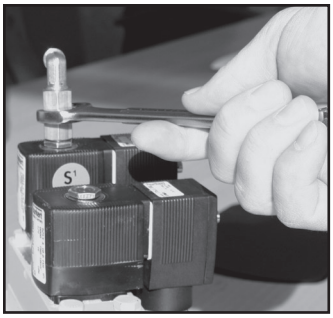
Reassembling

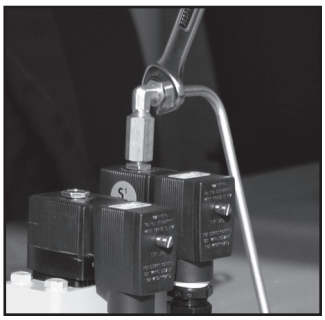
Step 8 -

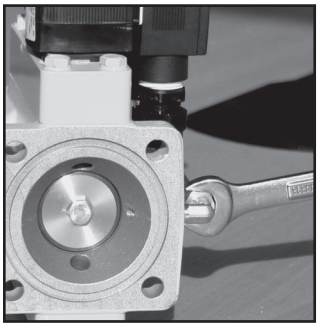
Install the Bypass Tubing

Install the bypass tubing so that there is no tension and the fittings attach with ease. If this is not the case, adjust the elbow fitting on the S1 solenoid.

Tighten the fittings using an 9/16” wrench.





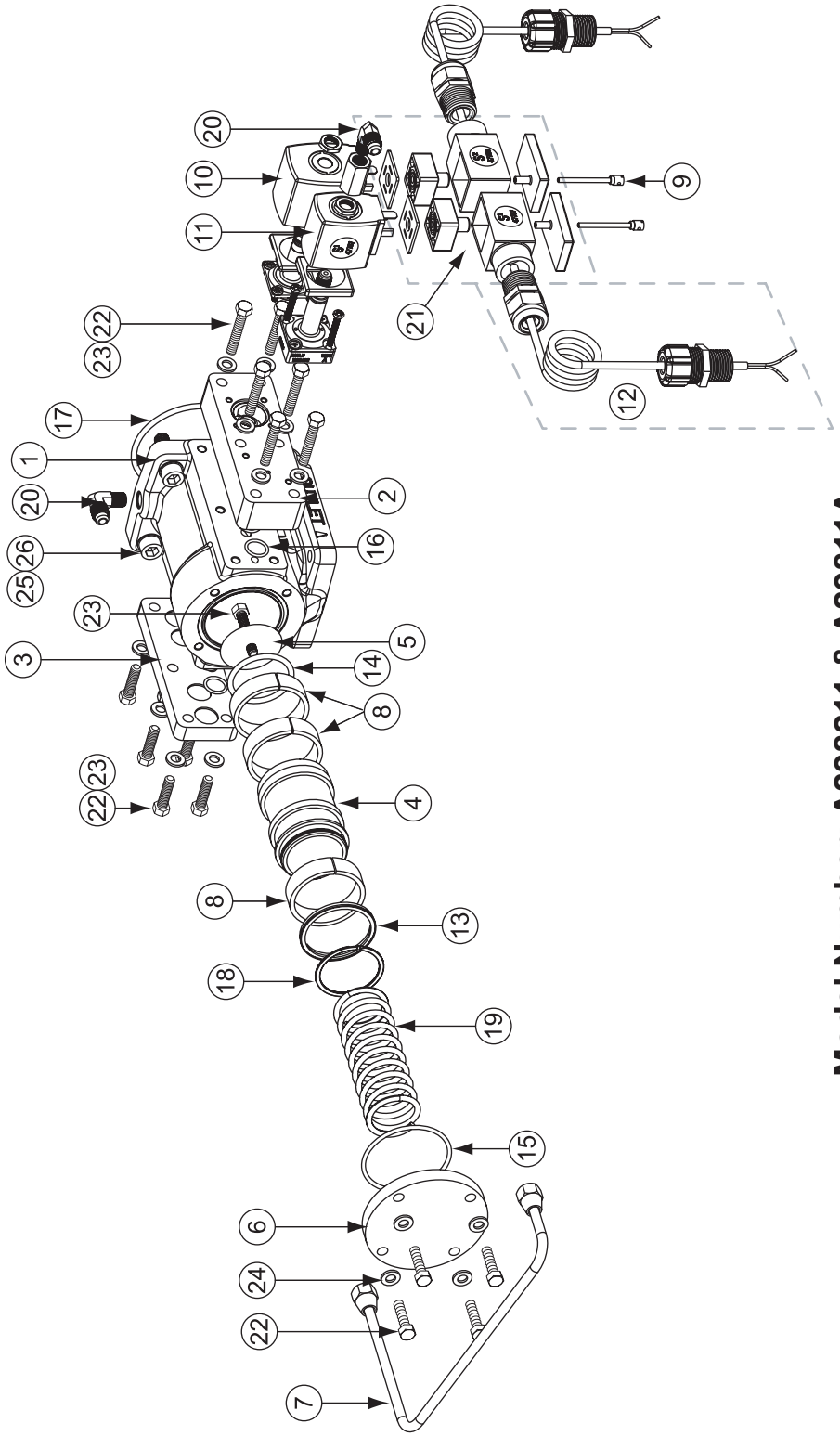


Torque Chart

Bolt Size	Grade 5 Fasteners		Grade 8	
	Foot-Pounds	Newton-Meter	Foot-Pounds	Newton-Meter
	NOMINAL*	NOMINAL*	NOMINAL*	NOMINAL*
#8 (.164) - 32 UNC-2A	3.5	4.8		
#10 (.190) - 24 UNC-2A	5.2	7.1		
1/4" (.250) - 20 UNC-2A	7.3	9.9	8.6	11.7
5/16" (.3125) - 18 UNC-2A	15.3	20.7	17.7	24
3/8" (.375) - 16 UNC-2A	27	37	31.4	42.6
7/16" (.4375) - 14 UNC-2A	43	58	50.3	68.2
1/2" (.500) - 13 UNC-2A	66	90	112	152
5/8" (.625) - 11 UNC-2A	132	179	222	301
3/4" (.750) - 10 UNC-2A	233	316	395	535

**Torque tolerance is ± 10%*

Exploded View: A298211 & A298211A (Class 2)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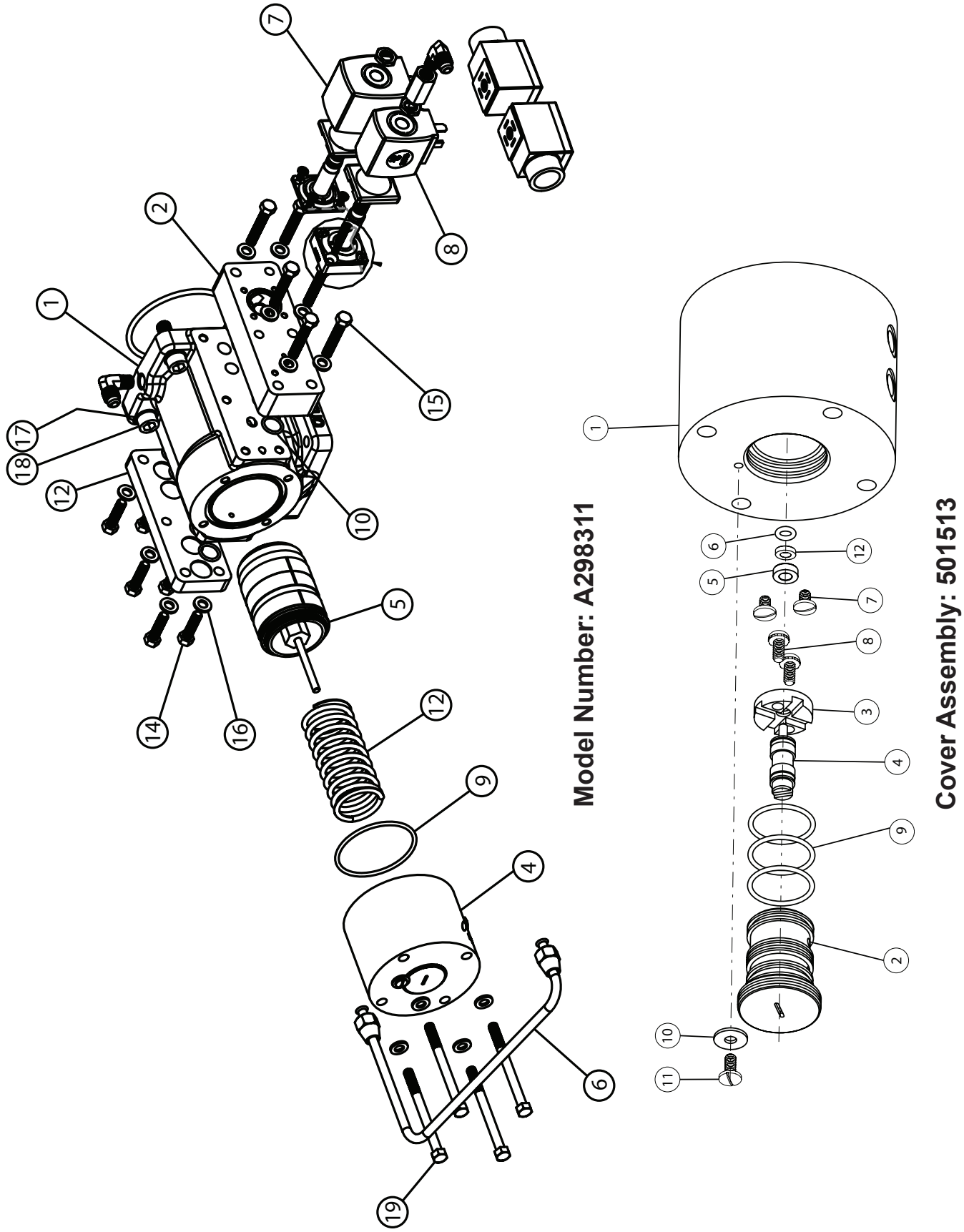
Model Number: A298211

A298211A (Class 2) parts are listed in parantheses and are included in the place of the listed A298211 (Class 1) part

ITEM NO.	DESCRIPTION	PART NUMBER
1	Valve Housing	501363
2	Solenoid Cover	501373
3	Solenoid Blank Cover	501371
4	Valve Piston	501365
5	Valve Piston Washer	501366
6	Valve Piston Cover	501367
7	Valve Tube Assembly	501433 (501541)
8	Wear Ring, Acetal (3)	501413
9	Screw w/ seal wire hole (2)	81475
10	S2 Solenoid	81926
11	S1 Solenoid (3-way)	81925 (84017)
12	Valve Cable Kit (2)	81859
13	Omni-seal	09383
14	O-ring, Viton	09384
15	O-ring, Viton	09385
16	O-ring, Viton (8)	09388
17	O-ring, Viton	07025
18	Spiral Retaining Ring	09390
19	Compression Spring	09396
20	Male Elbow (2)	09393 (09417)
21	DIN Connector Assembly (2)	09395
22	Screw >25-20 x 1 (10)	07405
23	Screw >25-20 x 1.5 (7)	09391
24	Flat Washer (16)	06743
25	Flat Washer (4)	04607
26	Screw .375-16 x 1.25 (4)	06991

Exploded View: A298311 - 501513



Model Number: A298311

ITEM NO.	DESCRIPTION	PART NUMBER
1	Valve Housing	501363
2	Solenoid Cover	501373
3	Solenoid Blank Cover	501371
4	Air Switch Cover Ass'y	501513
5	Piston Ass'y (Air Switch)	501514
6	Valve Tube Assembly	501433
7	S2 Solenoid	81926
8	S1 Solenoid (3-way)	81925
9	O-ring, Viton	09385
10	O-ring, Viton (8)	09388
11	O-ring, Viton	07025
12	Compression Spring	09396
13	Male Elbow (2)	09393
14	Screw, .25-20 x 1 (10)	07405
15	Screw, .25-20 x 1.5 (7)	09391
16	Flat Washer (16)	06743
17	Flat Washer (4)	04607
18	Screw, .375-16 x 1.25 (4)	06991
19	Screw .250-20 x 3 (4)	09400

Cover Assembly: 501513

ITEM NO.	DESCRIPTION	PART NUMBER
1	End Cover (Air Switch)	501422
2	Cartridge HSG (Air Switch)	501421
3	Shaft Stop (Air Switch)	501424
4	3-Way Valve Cartridge`	501458
5	Bushing (Air Switch)	501423
6	O-ring, Viton (2)	09407
7	Screw #8-32 x .25	06706***
8	Screw #8-32 x .375	08148***
9	O-ring, Buna	09401
10	Flat Washer	09029
11	Screw #8-32 x .375	06797
12	O-ring, PTFE	501527

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