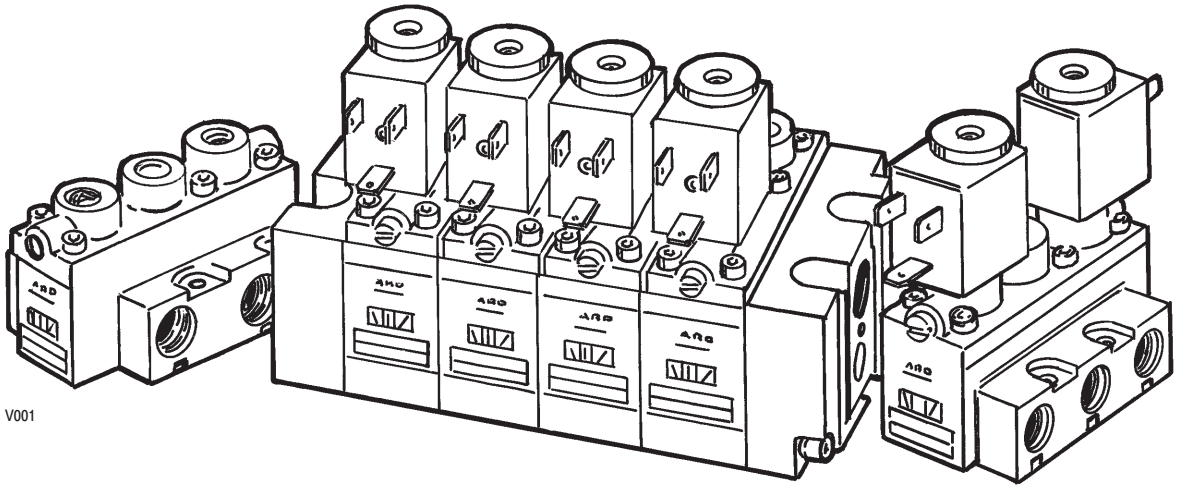
RELEASED: 8-1-83
REVISED: 9-22-03
(REV. D)

# Alpha Series Valves
# Parts List / Service Instructions



V001



ARO®

# Warnings and Cautions

## APPLICATION

## WARNINGS:

1. ARO valves are designed for use only in industrial pneumatic (air) and / or vacuum systems applications and are NOT to be used for individual consumer use, application or service.

2. When any ARO valve is used in any type application, safeguards must be provided to insure against bodily injury for the operator and / or other persons in the immediate area.

3. ARO valves are NOT to be used as a safety device or to operate and / or control the operation of full revolution clutch systems and / or brake systems on power presses or similar equipment. ARO valves are not designed or intended for such uses.

## LUBRICATION

Valve components are lubricated at the time of assembly at the factory and can normally be operated without air line lubrication to an approximate life of twenty million cycles, depending on application. If air line cylinders or other air line devices, used in conjunction with ARO valves, require lubrication, be sure the lubricating oils used are compatible with the valve seals and are of sufficient viscosity to assure adequate lubrication.

## INSTALLATION AND SERVICE

## WARNINGS:

1. Shut off, disconnect and exhaust air pressure from system before installing or performing service to any ARO valve.

2. Shut off and disconnect electrical supply to system before installing or performing service to any ARO valve.

3. Allow only persons with a thorough understanding of the operation and application of all ARO valves being used in a particular system and how the ARO valve(s) relate to and interact with other components of the system to install or perform maintenance or service to any ARO valve or other components of the system.

4. DO NOT subject any ARO valve to any condition that exceeds the limits set forth in the specifications for a particular valve model.

5. When a manually operated (actuated) valve is used or installed into a system, provisions must be made to prevent the valve from being accidentally operated (actuated), which may in turn cause bodily injury or otherwise cause a hazardous or dangerous condition.

6. Damaged air pressure hoses or electrical wiring, or connections, can cause accidental valve operation (actuation), which may in turn cause bodily injury or otherwise cause a hazardous or dangerous condition. KEEP ALL HOSES, ELECTRICAL WIRING, FITTINGS AND CONNECTIONS IN FIRST CLASS OPERATING CONDITION.

7. **ARO 2-POSITION, 4-WAY VALVES:** Regardless of which of the 2-positions this type of ARO valve is in, when air pressure is applied to the inlet port(s) of these valves, there will always be an open flow path of air from the inlet to one of the valve outlets. A method to exhaust this trapped air pressure must be installed into the system so all air pressure can be removed from valve or system before performing service or maintenance to valve.

8. **ARO 3-POSITION, 4-WAY VALVES:** To actuate this type of ARO valve, either a double solenoid, double remote air pilot pressure or manual operation is used. When the valve actuator has shifted the valve, air pressure applied at the inlet port(s) will flow thru the valve to one of the two outlet ports. When the valve is not in a shifted position, the valve will automatically move to a center position. ARO valves can be either closed center or open center type and will reveal the following characteristics when the valve is in the center position:

   a. **OPEN CENTER VALVES:** When this type ARO valve is in the center position, the inlet port(s) is blocked and the two outlet ports are open to the exhaust port(s) of the valve. With this type valve, in the center position, air pressure is not present at either outlet port. Do not use this type ARO valve if exhausting the air pressure from the valve will cause hazardous or dangerous condition.

   b. **CLOSED CENTER VALVES:** When this type valve is in the center position, all inlet, outlet and exhaust ports are blocked. Do not use this type valve if having the air pressure blocked at the port(s) may cause a hazardous or dangerous condition in the application, installation and/or servicing of an ARO valve. These valves must not be used to control load holding devices without an additional mechanical positive stop on the holding device.


**SPOOL TYPE**
2 - 2 Position
3 - 3 Position
8 - 3 Position, Viton
(spring centered, ports blocked)
4 - 2 Position, Viton
7 - 3 Position
9 - 3 Position, Viton
(spring centered, cylinder ports open)

**VALVE BODY STYLE**
1 - Body Ported
2 - Stacking Valve
3 - Subbase Body
4 - Thin

**PORT SIZE**
1 - 1/8 N.P.T.F.
2 - 1/4 N.P.T.F.
3 - 3/8 N.P.T.F.
9 - None

**ACTUATOR**
BD - Double Bleed
PD - Double Pilot
PS - Pilot / Spring
SD - Double Solenoid
SS - Solenoid / Spring
SP - Solenoid / Pilot

**COIL VOLTAGE**
000 - No Coil
005 - 5 Volts (DC only)
012 - 12 Volts (AC or DC)
024 - 24 Volts (AC or DC)
120 - 120 Volts (AC or DC)
240 - 240 Volts (AC only)
380 - 380 Volts (AC only)

**COIL AND CURRENT TYPE**
See Coil Chart below

## COIL CHART

| CURRENT TYPE | DESCRIPTION | COIL |
|---|---|---|
| -A | STANDARD AC | 116218-XX |
| -B | MOLDED LEADS AC | 116647-XX |
| -C | CABLE AC | 115046-XX |
| -D | STANDARD DC | 116218-XX |
| -E | MOLDED LEADS DC | 116647-XX |
| -F | CABLE DC | 115046-XX |
| -G | CONDUIT AC | 118154-XX |
| -K | CONDUIT DC | 118154-XX |
| -L | LOW WATT DC | 115064-XX |
| -M ∗ | LOW WATT DC | NO COIL |
| -N ∗ | NO COIL | NO COIL |
| -S ❑ | INTRINSICALLY SAFE | 114357 |

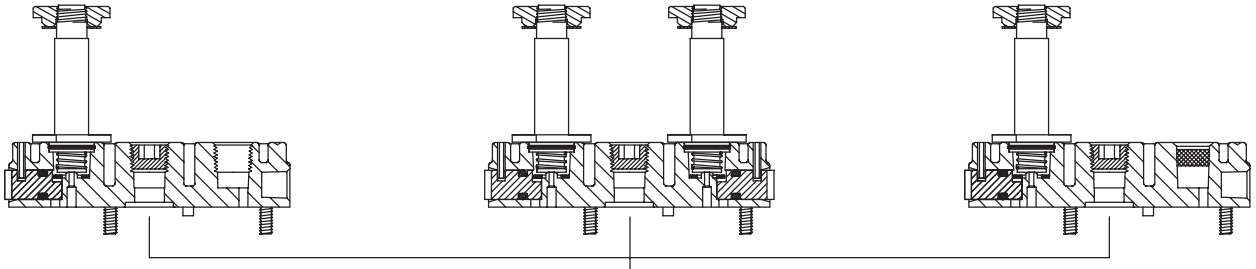
| COIL DASH | VOLTAGE |
|---|---|
| 31 | 12 VAC |
| 33 | 120 VAC |
| 35 | 240 VAC OR 120 VDC |
| 37 | 5 VDC |
| 38 | 24 VAC OR 12 VDC |
| 39 | 24 VDC |
| 42 | 380 VAC |

**❑ INCLUDES 24 VOLT LOW WATT COIL, ARMATURE, CONNECTOR AND NUT.**

**∗ NOTE: TO ORDER COVER PLATE ASSEMBLIES FOR "NO COIL" MODELS, -M (LOW WATT) MODELS USE THE SAME ASSEMBLY AS BASE MODELS WITH -L SUFFIX (SEE CHART, PAGE 4) AND -N (STANDARD) MODELS USE THE SAME ASSEMBLY AS BASE MODELS WITH -X SUFFIX (SEE CHART, PAGE 4).**

| VALVE MODEL | "A" SPOOL KIT | "B" COVER PLATE KIT |
|---|---|---|
| A2XXBD | 118597-12 | 114776 |
| A2XXPS | 118597-2 | 116538 |
| A2XXPD | 118597-12 | 116539 |
| A2XXSS-XXX-X | 118597-2 | 119238 |
| A2XXSD-XXX-X | 118597-12 | 119236 |
| A2XXSS-XXX-L | 118597-2 | 119241 |
| A2XXSD-XXX-L | 118597-12 | 119239 |
| A2XXSP-XXX-X | 118597-12 | 119237 |
| A2XXSP-XXX-L | 118597-12 | 119240 |
| A3XXPD | 118597-3 | 116539 |
| A3XXSD-XXX-X | 118597-3 | 119236 |
| A3XXSD-XXX-L | 118597-3 | 119239 |
| A3XXSP-XXX-X | 118597-3 | 119237 |
| A3XXSP-XXX-L | 118597-3 | 119240 |
| A4XXPS | 118598-4 | 116538 |
| A4XXPD | 118598-14 | 116539 |
| A4XXSS-XXX-X | 118598-4 | 119238 |
| A4XXSD-XXX-X | 118598-14 | 119236 |
| A4XXSS-XXX-L | 118598-4 | 119241 |
| A4XXSD-XXX-L | 118598-14 | 119239 |
| A4XXSP-XXX-X | 118598-14 | 119237 |
| A4XXSP-XXX-L | 118598-14 | 119240 |
| A7XXPD | 118597-7 | 116539 |
| A7XXSD-XXX-X | 118597-7 | 119236 |
| A7XXSD-XXX-L | 118597-7 | 119239 |
| A7XXSP-XXX-X | 118597-7 | 119237 |
| A7XXSP-XXX-L | 118597-7 | 119240 |
| A8XXPD | 118598-8 | 116539 |
| A8XXSD-XXX-X | 118598-8 | 119236 |
| A8XXSD-XXX-L | 118598-8 | 119239 |
| A8XXSP-XXX-X | 118598-8 | 119237 |
| A8XXSP-XXX-L | 118598-8 | 119240 |
| A9XXPD | 118598-9 | 116539 |
| A9XXSD-XXX-X | 118598-9 | 119236 |
| A9XXSD-XXX-L | 118598-9 | 119239 |
| A9XXSP-XXX-X | 118598-9 | 119237 |
| A9XXSP-XXX-L | 118598-9 | 119240 |

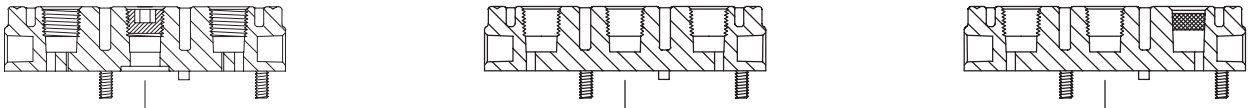
| MODEL NUMBER | PORT SIZE | "C" VALVE BODY |
|---|---|---|
| AX11XX- | 1/8 NPTF | 116205-1 |
| AX12XX- | 1/4 NPTF | 116205-2 |
| AX13XX- | 3/8 NPTF | 119644 |
| AX21XX- | 1/8 NPTF | 116206-1 |
| AX22XX- | 1/4 NPTF | 116206-2 |
| AX39XX- | NONE | 115030 |
| AX49XX- | NONE | 115081 |



**SP**
**Solenoid / Pilot**

**SD**
**Double Solenoid**

**SS**
**Single Solenoid**



**BD**
**Double Bleed**

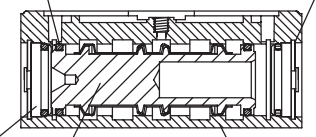
**PD**
**Double Pilot**

**PS**
**Single Pilot**

**“B” Cover Plate Kits include:**
**Cover Plate Assembly**
**Mounting Screws**
**Armature Assembly (where applicable)**
**Cover Plate Gasket**

**“O” Ring, marked:**
**Yellow - Nitrile**
**Red - Viton**
**(included in “A”)**

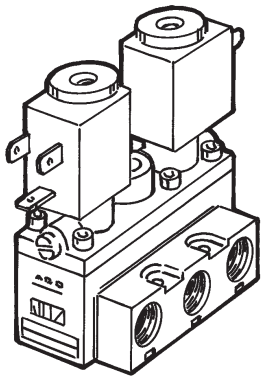
**Retaining Ring**
**(included in “A”)**



**“C” Valve Body**

**119242 End Cap Kit**
**(includes: end cap (2) &**
**“O” ring (2), not marked)**

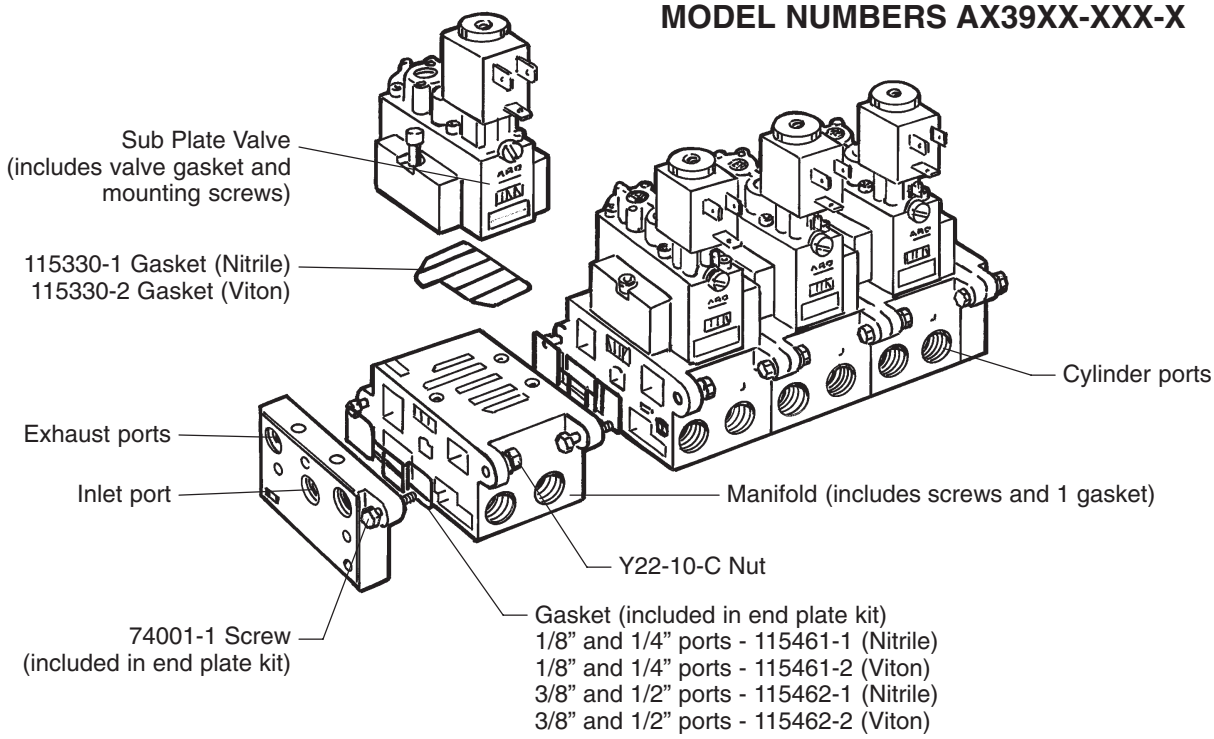
**“A” Spool Kits Include:**
**Spool Assembly**
**“O” Rings (4)**
**Retaining Rings**
**Spring (where applicable)**



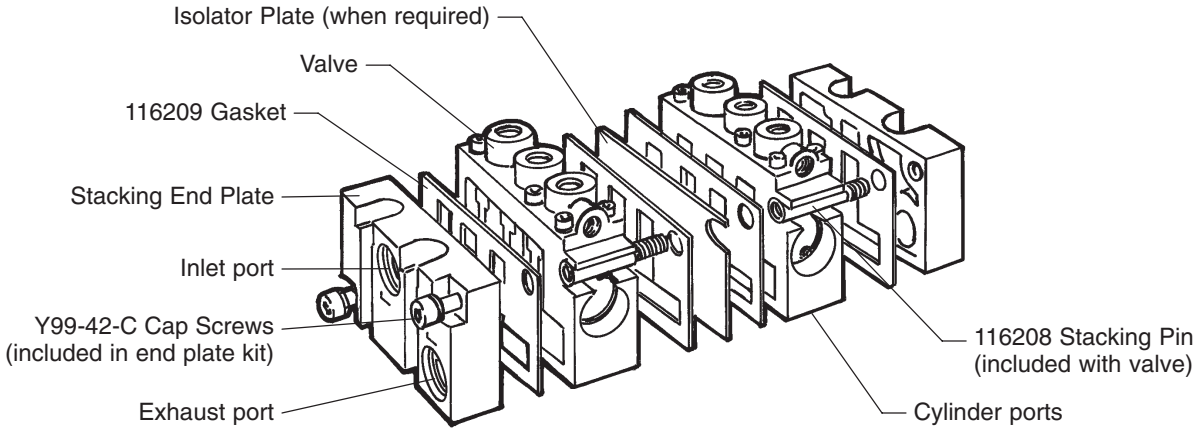
V002

## 4-WAY BODY PORTED VALVE
## MODEL NUMBERS AX1XXX-XXX-X

## ASSEMBLY - TYPICAL ALPHA SUB BASE VALVE
## MODEL NUMBERS AX39XX-XXX-X



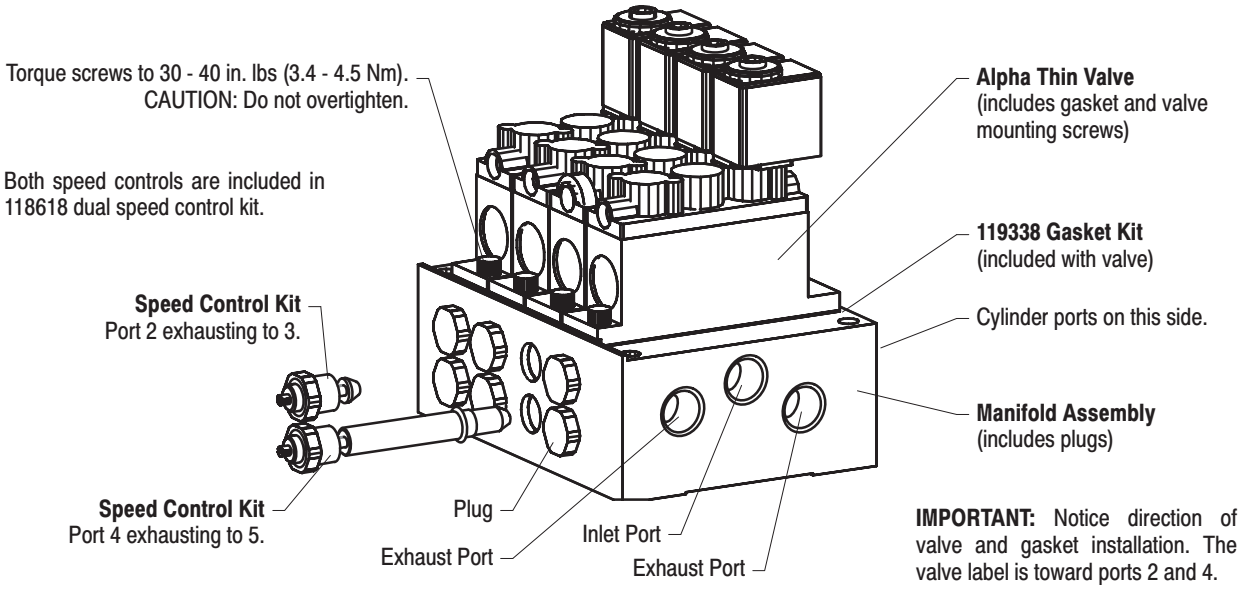

V003




V004

## ASSEMBLY - TYPICAL ALPHA STACKING VALVE
## MODEL NUMBERS AX2XXX-XXX-X

## ASSEMBLY-TYPICAL ALPHA THIN VALVE
## MODEL NUMBERS AX49XX-XXX-X




# 119306 SEPARATOR PLUG INSTALLATION

## GENERAL DESCRIPTION

To change the Alpha Series Valves from an internal to an external source of pilot air.

## INSTALLATION

**CAUTION: ISOLATE THE VALVE TO BE CONVERTED FROM ALL SOURCES OF AIR PRESSURE.** Failure to do this could expose the operator to unregulated sources of high pressure air and cause personal injury.

SEE FIGURE 1

1. Remove the sealing plug using a 3/16" hex socket drive. This part will not be reused.

SEE FIGURE 2

2. Install the new separator plug using a small slotted head screwdriver. Apply a small amount of pipe sealant to the threaded surface of the plug to provide a positive seal. The threads are located below the surface of the cover plate.
3. Thread the plug into the valve body. Use care when placing the plug into the valve.
4. Connect the external pilot air supply to the valve using a 1/8 N.P.T. male connector. The connector should be installed to a torque value between 40 and 50 inch lbs (4.5 to 5.6 Nm). DO NOT OVER-TIGHTEN. The application of excessive torque to the connector can damage the cover plate and cause leakage.

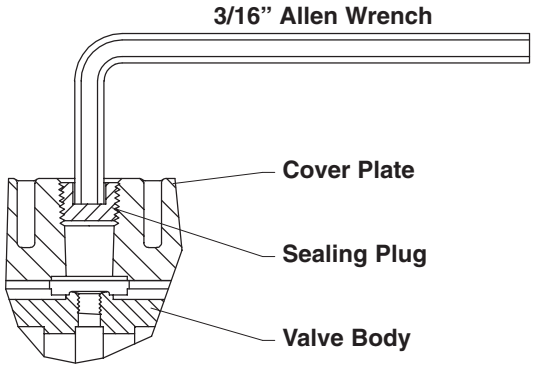



**Figure 1**

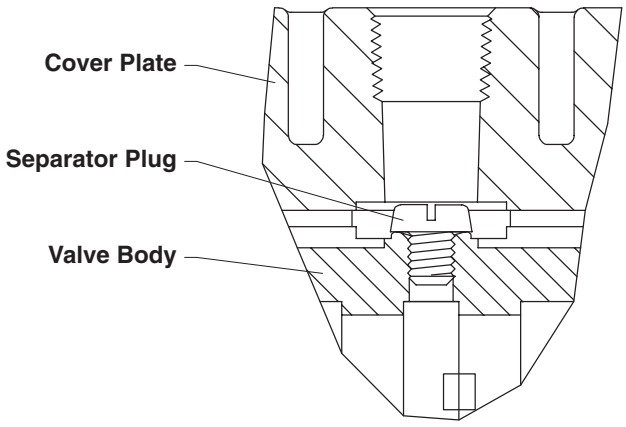



**Figure 2**

## GENERAL CONSIDERATIONS

1. Remove valve from service and disconnect all lines, inlet, outlet and pilot on side ported and stacking models. On subplate mounted and “Thin” models, remove valve from base.
2. Disconnect all electrical connections from coil.
3. Remove all fittings from ports and pilot connections.

## SINGLE AND DOUBLE SOLENOID VALVE DISASSEMBLY

1. Remove nut and washer from top of coil, then lift coil vertically to clear stem. NOTE: Cover plate disassembly is not required beyond this point. If cover plate is defective, replace with appropriate kit.
2. Remove the four socket head screws, lift cover plate vertically until locating pins are clear, then remove gasket.
3. Remove retaining rings from valve body. Caution is to be used on spring return and spring centered valves, as spring or spool may eject.
4. Remove end caps from body.
5. Remove spool. Spool may require forcible removal, use a wooden or plastic dowel, do not use a metal punch or screwdriver in valve bore, as this could result in damage to body seal lands.
6. De-grease body, then inspect i.d. for damage to seal lands. If lands show scratches or burrs, replace body. Do not degrease elastomer components in hot water based solvents, trichloroethylene or methylethyl ketone.

## SINGLE AND DOUBLE SOLENOID VALVE REASSEMBLY

1. Be sure valve body is completely dry both internally and externally.
2. Lubricate all seals, o.d. of spool and i.d. of valve body with a light coat of 36460 “O” ring lube or equivalent.
3. Install one end cap and retaining ring in body with “O” ring toward bore - on spring return valve, the end opposite the spring should be installed.
4. Install spool in body (spring cavity, if so equipped, facing out) be sure spool is centered in bore. Do not cock. While a slight force may be required, do not beat spool into valve.
5. After spool is seated, install spring in spring cavity in spool (where applicable). Install end cap, depressing spring, and install retaining ring.
6. Install gasket in valve body and assemble cover plate on valve. NOTE: On single solenoid valves, the coil stem installs on opposite end to spring.
7. Install four socket head cap screws, taking care not to cross thread screw, and torque to 18 - 23 in. lbs (2.0 - 2.6 Nm).
8. Install coils over stems, with single horizontal pin closest to valve. Place spring washer over stem, then reinstall nut and hand tighten.

## SINGLE AND DOUBLE PILOT VALVE DISASSEMBLY

1. Remove the four socket head screws. Lift cover plate vertically until locating pins are clear, then remove gasket.
2. Remove retaining rings from valve body. Caution is to be used on spring return and spring centered valves as spring or spool may eject.
3. Remove end caps from body.
4. Remove spool. Spool may require forcible removal. Use a wooden or plastic dowel, do not use a metal punch or screwdriver in valve bore, as this could result in damage to body seal lands.
5. De-grease body, then inspect i.d. for damage to seal lands. If lands show scratches or burrs, replace body. Do not degrease elastomer components in hot water based solvents, trichloroethylene or methylethyl ketone.

## SINGLE AND DOUBLE PILOT VALVE REASSEMBLY

1. Be sure valve body is completely dry both internally and externally.
2. Lubricate all seals, o.d. of spool and i.d. of valve body with a light coat of 36460 “O” ring lube or equivalent.
3. Install one end cap and retaining ring in body with “O” ring toward bore - on spring return valve, the end opposite the spring should be installed.
4. Install spool in body (spring cavity, if so equipped, facing out) be sure spool is centered in bore. Do not cock. While a slight force may be required, do not beat spool into valve.
5. After spool is seated, install spring in spring cavity in spool (where applicable). Install end cap, depressing spring, and install snap ring.
6. Install gasket in valve body and assemble cover plate on valve. NOTE: On single pilot valves, the coil stem installs on opposite end to spring.
7. Install four socket head cap screws, taking care not to cross thread screw, and torque to 18 - 23 in. lbs (2.0 - 2.6 Nm).