



# BR5100

## Pneumatically Operated Chemical Injection Pump

### MAINTENANCE

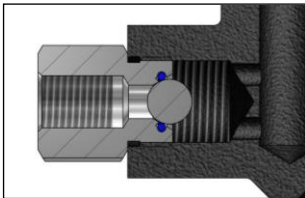


**Disconnect power source and ensure pressure is removed from pump head prior to performing any maintenance. Hazardous pressures can result in serious injury or property damage.**

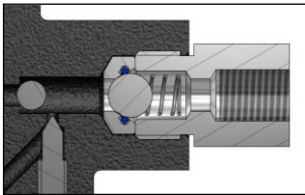
### Pump Head Maintenance

#### Pump Head Assembly

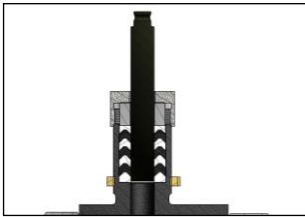
**Step 1:** Ensure all parts are clean and free from damage (see Inspection section). Lubricate all O-rings with petroleum based lubricant; lubricate packing and plunger with a Teflon or graphite based packing lubricant.



**Step 2:** Install O-ring into bottom seat. Place 3/8" ball into bottom seat (install metal gasket on seats for 3/16" plunger size) and thread bottom seat into suction end of body utilizing a thread sealant. Tighten bottom seat.



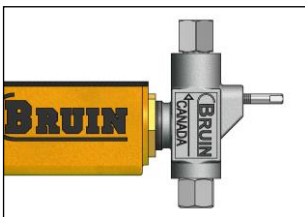
**Step 3:** Install the 1/4" ball into the discharge end body for plunger sizes 1/4" to 1/2". Install O-ring into top seat. Insert top seat into body. Place 3/8" ball and ball check spring into top bushing. Thread top bushing into body utilizing a thread sealant. Tighten top bushing.



**Step 4:** Install packing into body, ensuring it is installed in correct order and orientation. *Note: The "V-Ring" point should be pointing outward.* Install plunger packing gland onto the packing and insert the plunger into the packing. Thread yoke nut onto the body.



**Step 5:** Thread body into housing, ensuring plunger fits through the plunger packing gland nut and into the rod adapter. *Note: The adjusting pin can be temporarily removed to allow the rod adapter to extend and rotate to align pin holes.* Install plunger pin. Snugly tighten the plunger packing gland nut onto body, do **not** over tighten gland nut.



**Step 6:** Tighten lock nut. Install gasket and cover with wing screws. Install and tighten priming valve into head body. *Note: 3/16" plunger size head needs a 1/4" ball inserted into priming valve hole before installing priming valve.*

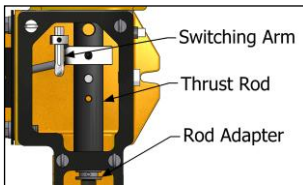
## Pump Head Disassembly

- Step 1:** Disconnect operating air supply and ensure all pressure is removed from pump head assembly and isolate fluid discharge and suction lines. Open and remove priming valve. Disconnect fluid discharge and suction lines.
- Step 2:** Remove cover and gasket by loosening and removing wing screws.
- Step 3:** Remove plunger pin and unthread plunger packing gland nut.
- Step 4:** Loosen lock nut and remove pump head assembly from housing.
- Step 5:** Remove plunger, plunger packing gland, and plunger packing.
- Step 6:** Loosen and remove top bushing, ball check spring, ball, and top seat and 1/4" ball. Remove O-ring from top seat.
- Step 7:** Loosen and remove bottom bushing and ball. Remove O-ring from bottom seat.

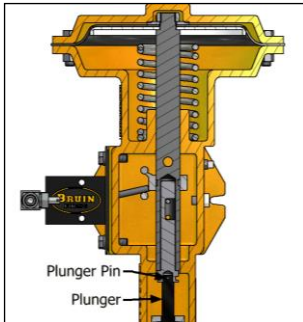
## Housing Maintenance

### Housing Assembly

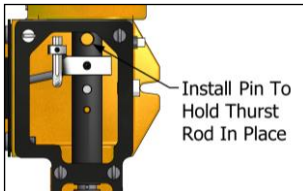
- Step 1:** Ensure all parts are clean and free from damage (see Inspection section).



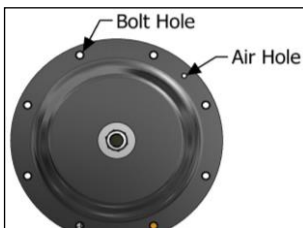
- Step 2:** Place rod adaptor into thrust rod. Lubricate thrust rod with molydisulfide lubricant grease. Install thrust rod into housing and through switching arm in the correct orientation.



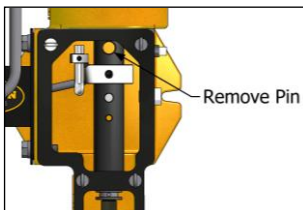
- Step 3:** Slide rod adaptor onto plunger and install plunger pin. Place main return spring over thrust rod. Install diaphragm plate and diaphragm onto thrust rod. Place a small amount of silicone on diaphragm around the thrust rod and cover with washer. Install hex lock nut but do **not** tighten.



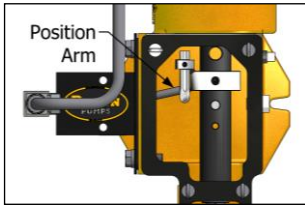
- Step 4:** Push thrust rod into housing against return spring until large hole in thrust rod is visible and install a pin (punch or drift pin) into hole to retain spring preload and prevent rod from turning. Ensure thrust rod fits through second hole in housing while pushing thrust rod.



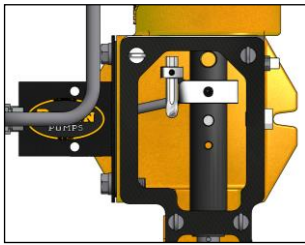
- Step 5:** Align air hole and bolt holes in diaphragm with mating holes in housing. Tighten hex lock nut ensuring holes in diaphragm remain aligned. *Note: Do **not** over tighten hex nut resulting in the diaphragm being over compressed.*



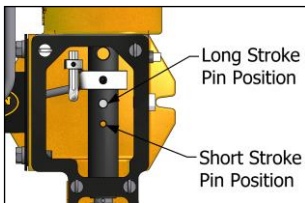
- Step 6:** Install diaphragm cover with cap screws and hex nuts. Evenly tighten cap screws. *Note: Do **not** over tighten cap screws, as it could result in the diaphragm being over compressed.* Remove pin installed in thrust rod hole.



**Step 7:** Position switching arm on correct side of micro switch arm so that setscrew is positioned in the groove of the thrust rod. Tighten the set screw to lock it into place with the arm in a vertical position.



**Step 8:** To configure adjustment switch arm, move micro switch arm manually so that it is furthest away from the main switching arm rod. Slide adjustment switch arm into main switching arm until micro switch arm switches over. Continue to slide adjustment switch arm 1/16" to 1/8" further after micro switch arm switches. Tighten set screw to hold adjustment switch arm vertical and in place. Further adjustments may need to be made as required to ensure pump operates correctly and continuously.



**Step 9:** Install air vent, male tube connector (utilizing thread sealant) and micro switch line assembly. Install adjusting pin into correct location for desired stroke. Install cover gasket and cover with wing screws.

## Housing Disassembly

- Step 1:** Disconnect operating air supply and ensure all pressure is removed from pump head assembly and isolate fluid discharge and suction lines. Open and remove priming valve. Disconnect fluid discharge and suction lines.
- Step 2:** Remove wing screws, cover and gasket.
- Step 3:** Remove plunger pin and adjusting pin. Loosen both set screws on main switching arm.
- Step 4:** Place pin into large hole next to main switching arm on the thrust rod to prevent the rod from turning or moving under spring load.
- Step 5:** Loosen diaphragm cover cap screws and hex nuts. Leave one cap screw and hex nut combination loosely installed while removing remaining cap screws. Ensure diaphragm cover is loose and free prior to removing all cap screws. Remove diaphragm cover.
- Step 6:** Loosen but do not remove hex locknut. Remove pin installed in thrust rod, being careful to retain the small spring load. Remove the thrust rod and diaphragm assembly from the housing by sliding main switching arm along the thrust rod.
- Step 7:** Remove the rod adapter, switching arm, and return spring. Remove the adjustment switch arm from the main switch arm.
- Step 8:** Remove hex lock nut, washer, diaphragm and diaphragm plate from thrust rod.
- Step 9:** Remove air vent and male tube connector from housing.

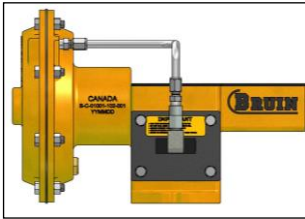
## Micro Switch Maintenance

### Micro Switch Assembly

**Step 1:** Ensure all parts are clean and free from damage (see Inspection section). See Housing Assembly Instructions for switch arm installation.



**Step 2:** Thread elbow into micro switch valve, control valve into elbow and male tube connector into valve, utilizing a thread sealant. Mount micro switch onto mounting plate with cap screws and lock washers.



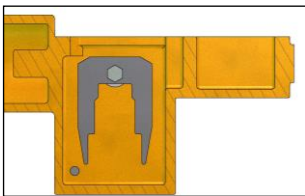
**Step 3:** Connect mounting plate and gasket to housing with cap screws and lock washers ensuring micro switch arm extends between the switch arms. Connect line assembly between micro switch connector and housing connector.

## Micro Switch Disassembly

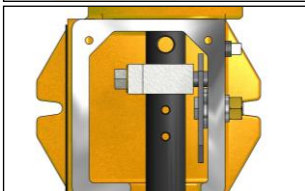
- Step 1:** Disconnect operating air supply. Loosen and disconnect micro switch line assembly.
- Step 2:** Remove cap screws and lock washers. Remove micro switch assembly and gasket from pump housing.
- Step 3:** Remove cap screws and lock washers. Remove micro switch from mounting plate.
- Step 4:** Remove connector, control valve and elbow from micro switch.
- Step 5:** See Housing Disassembly Instructions for switching arm removal.

## Pilot Valve Maintenance

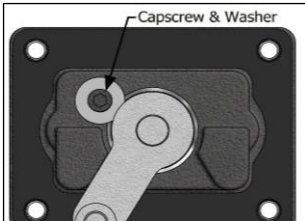
### Pilot Valve Assembly



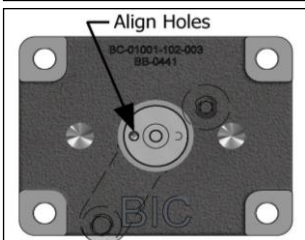
**Step 1:** Insert bumper plate screw through bumper plate and through all three washers. Thread bumper plate screw into housing from inside. Ensure bumper plate can be rotated with ease and install lock washer and hex nut onto bumper plate screw to secure it to the housing.



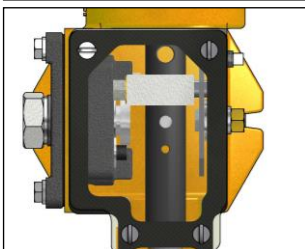
**Step 2:** Follow the Housing Disassembly and Assembly Instructions to replace the main switching arm assembly with the trip stirrup assembly. Ensure that the trip stirrup assembly is positioned on the groove of the thrust rod and locked in position with the hex head screw.



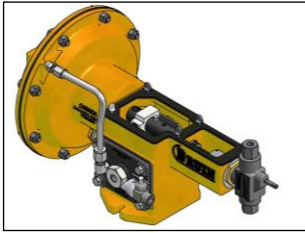
**Step 3:** Install the flipper arm assembly into the pilot valve body. Ensure that the flipper arm is in the correct orientation as shown in figure. Lock flipper arm assembly in position with socket head cap screw and washer.



**Step 4:** Install drive pin into flipper arm. Lubricate face of valve disc with light petroleum grease or oil and install valve disc onto drive pin. *Note: Ensure valve disc is correctly orientated in regard to the flipper arm position with holes aligned as shown in figure.* Install elbow tube connector, elbow and exhaust valve control to pilot valve body utilizing a thread sealant. Install washer, spring and disc retainer.



**Step 5:** Place gasket onto pilot valve body. Place pilot valve body into pump housing with the flipper arm inserted into the bottom spring adapter and between the arms of the bumper plate. Secure pilot valve body with lock washers and cap screws (utilizing thread sealant).



**Step 6:** Install line assembly to tube connectors. Install drain plug, utilizing a thread sealant and fill main cavity to bottom of thrust rod with SAE 30 non-detergent oil (ISO 100 and AGMA 3 are equivalents). *Note: Use SAE 10W oil (ISO 32 and AGMA 0 are equivalents) for low ambient temperatures.* Install gasket and cover with wing screws.

## Pilot Valve Disassembly

- Step 1:** Disconnect operating air supply. Loosen and disconnect line assembly.
- Step 2:** Drain pump housing cavity of oil by removing drain plug. Remove cover and gasket.
- Step 3:** Remove disc retainer, spring, washer, valve disc and pin.
- Step 4:** Remove elbow tube connector, gas exhaust valve and elbow.
- Step 5:** Remove hex head cap screws and lock washers. Remove pilot valve assembly from pump housing by rotating pilot valve body and sliding flipper arm from bottom spring adapter. Remove gasket.
- Step 6:** Remove socket head cap screw and retaining washer. Remove flipper arm assembly from pilot valve body with a punch and tapping the assembly out or threading a 3/8" bolt through pilot valve body center.
- Step 7:** If the trip stirrup assembly needs to be removed, follow Housing Disassembly Instructions replacing the switch arm assembly with the trip stirrup assembly.
- Step 8:** Remove hex nut and lock washer. Unthread bumper plate screw and remove washers and bumper plate.

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## INSPECTION

**Inspect all components for damage. Replace or repair parts as necessary. The following is a guideline of what to inspect:**

- Inspect all threads for damage.
- Inspect all seals, packing and diaphragms for damage.
- Inspect body seal areas for corrosion, pitting or damage. Seal areas on the body include the packing area and the area below the top seat and ball cage.
- Inspect balls, top seat and bottom seat and ball check spring for corrosion or damage.
- Inspect plunger and thrust rod for wear, scarring or damage.
- Inspect housing for wear, scarring or damage.

### Optional Pilot Valve Assembly Inspection

- Inspect valve disc sealing face for pitting, scratches or damage. Inspect mating face on pilot valve body.
- Inspect valve disc pin.
- Inspect flipper arm assembly for ease of operation.
- Inspect flipper spring for damage.