BR2400

Electric Drive Chemical Injection Pump

MAINTENANCE

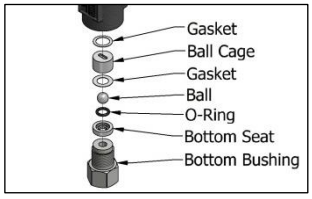
CAUTION

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.

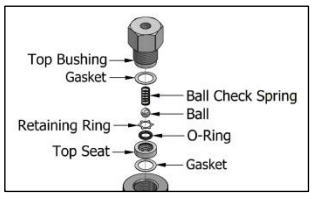
Pump Head Maintenance

Pump Head Assembly

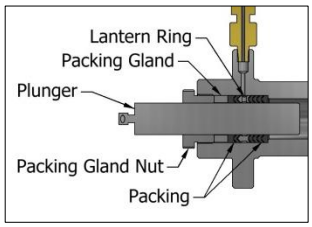
Step 1: Ensure all parts are clean and free from damage (see Inspection section). Lubricate all O-rings with a light assembly lubricant; lubricate packing and plunger with a suitable packing lubricant grease (with or without additives - Teflon, Graphite, or Molybdenum Disulfide are all acceptable additives).



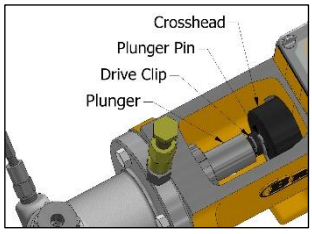
Step 2: Install O-ring into bottom seat. Place the 1/2" ball into bottom seat and the gasket (the widest of the four gaskets) onto the seat and cover ball with ball cage. Place gasket onto ball cage and insert into suction end of body. Thread bottom bushing into suction end of body utilizing a thread sealant. Tighten bottom bushing.



Step 3: Install O-ring and retaining ring into the top seat. Install top seat into body with a gasket on both sides of seat. 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 with lantern ring in body, ensuring it is installed in the correct order and orientation. *Note: The "V-Ring" point should be pointing outward and the lantern ring in line with the grease jack.* Place plunger packing gland on packing. Loosely thread packing gland nut into the body. Carefully insert plunger into packing. Install grease jack lubricating assembly onto pump head.



Step 5: Install head assembly into housing, ensuring plunger fits into the crosshead assembly and install drive clip and plunger pin. Install and tighten hex bolts.

Step 6: Install gasket and cover with wing screws. Install and tighten priming valve into body utilizing a thread sealant.

Pump Head Disassembly

Step 1: Disconnect power source, 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 the cover, to get access to and remove drive clip and plunger pin from the crosshead assembly.
Step 3: Remove the hex bolts and the pump head assembly from the housing.
Step 4: Loosen and remove top bushing, ball check spring, ball, gaskets, and top check valve seat. Remove the retaining ring and O-ring from the top check valve seat.
Step 5: Loosen and remove bottom bushing, bottom check valve seat, ball, ball cage and gaskets. Remove the O-ring and retaining ring from the bottom check valve seat.
Step 6: Unthread packing gland nut and remove plunger, plunger packing gland, packing and lantern ring.

Housing Maintenance

Housing Assembly

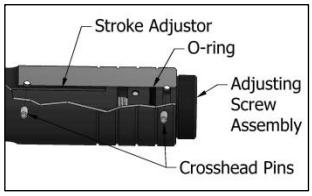
The following Steps 4 through 12 are for one housing assembly.

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

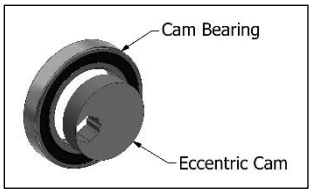
Step 2: Bolt down the gearbox reducer onto the base plate. Leave bolting loose to allow gearbox reducer to move freely during remainder of assembly process.

Step 3: Insert key into the drive shaft. Center the drive shaft into the gearbox reducer and tighten fasteners. Rotate the motor input of the gearbox reducer manually so that the hex on the drive shaft has flats positioned parallel to the base plate.

Step 4: Ensure the shaft bearings and crosshead bearings are installed in the pump housing, allowing the drive shaft to be properly orientated when the housing is correctly bolted to the base plate. Press the screen into the hole in the bottom of the housing.

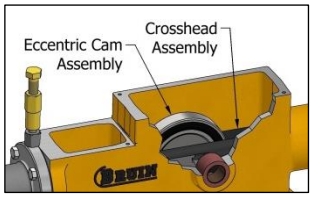


Step 5: Using a light assembly lubricant, grease the O-ring and slide it into position on the adjusting screw assembly. Screw the stroke adjustor onto the adjusting screw assembly. Slide the stroke adjustor into the crosshead assembly and insert the crosshead pins to hold it in place.

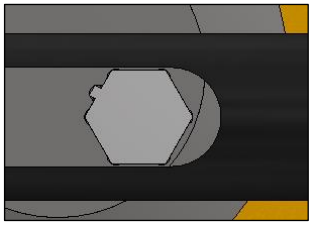


Step 6: Lubricate the crosshead assembly with a multipurpose bearing grease and insert it into the housing with the longer slot facing up.

Step 7: Press eccentric cam into the cam bearing to create the eccentric cam assembly.



Step 8: Place the eccentric cam assembly into the large slot of the crosshead assembly.



Step 9: Slide housing onto the base with the drive shaft going through the housing, crosshead assembly and the eccentric cam assembly. The slot in the eccentric cam must be lined up with the assembly key of the drive shaft hex for the housing to properly slide on. *Note: A hex flat must be positioned horizontally or it will not fit through the crosshead assembly. Note: Assembly information for Keyed Drive Shafts/Cam can be found at the end of the Housing Assembly section.*

Step 10: Bolt down the housing onto the base plate. Install second housing assembly in the same manner for a duplex unit. Tighten gearbox reducer bolting.

Step 11: Bolt the head assembly into the housing with the plunger lining up to the crosshead assembly and insert the drive clip and plunger pin.

Step 12: Install gasket and cover with wing screws.

Step 13: Mount the motor onto the gearbox reducer.

Keyed Drive Shafts/Cam Assembly

The keyed connection can be updated to the hex connection by replacing the following parts:

Part Description	Hex Part Numbers (Updated)	Keyed Part Numbers (Legacy)
Eccentric Cam Assembly	BB-1646H	BB-1646
Drive Shaft – Single	BC-2173H	BC-2173
Drive Shaft – Double	BC-2172H	BC-2172
Cam Key	Not Required	BA-6470

ATTENTION: Care must be taken to ensure that the key of the Drive Shaft is aligned with both the slot in the Crosshead and the alignment notch in the eccentric Cam during assembly.

Step 1: Insert keys into drive shaft. Center drive shaft into the gearbox and tighten fasteners.

Step 2: With the crosshead already in the pump housing, place the eccentric cam assembly into the large slot of the crosshead (Image 1). Slide the pump housing onto the base aligning the drive shaft key with the eccentric cam assembly key slot. Refer to Images below. *Note: Ensure that the key is positioned horizontally parallel to the flat edge of the crosshead slot (Image 2).* ***Mis-alignment will result in interference with the crosshead and the drive shaft will not go through***. The drive shaft will go through the pump housing, crosshead assembly, and eccentric cam assembly (Image 3). Locate the pump housing on the base such that the drive shaft key is completely centered within the eccentric cam, so that the key will not interfere with the crosshead during operation.

Step 3: Repeat on other side of drive shaft for Duplex pumps ensuring the eccentric cams are offset 180 degrees in rotation from each other. The plungers will be in direct opposition to each other so that when one plunger is at the end of the discharge stroke, the other will be at the beginning.

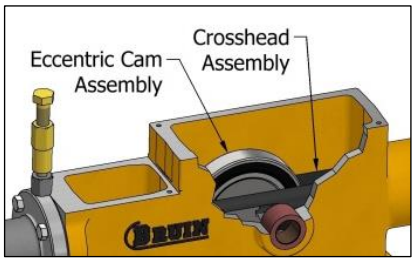


Image 1

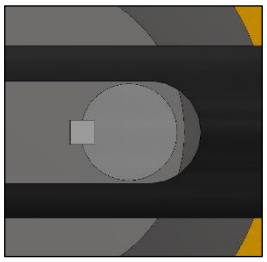


Image 2

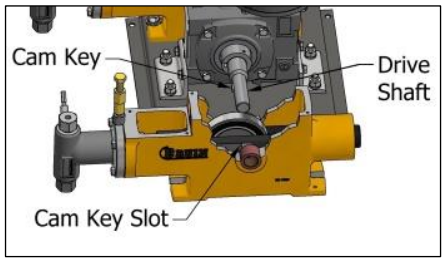


Image 3

Housing Disassembly

The following Steps 3 through 9 are for a single housing assembly.

Step 1: Disconnect power source, 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 the motor. (Some gearbox reducer mounts have two threaded holes on the flange to assist with motor removal.)

Step 3: Remove wing screws, covers and gaskets from housing.

Step 4: Remove drive clip and plunger pin from plunger/crosshead assembly. Unbolt and remove head assembly from housing. See Pump Head Disassembly instructions for further disassembly of pump head assembly.

Step 5: Rotate motor input manually so that drive shaft hex flats are aligned horizontally to allow for drive shaft removal. Remove bolts holding pump housing onto base plate and slide it off the drive shaft.

Step 6: Remove the eccentric cam assembly out of the crosshead assembly and housing.

Step 7: If necessary, press out the eccentric cam from the cam bearing.

Step 8: Slide the crosshead assembly out of the housing.

Step 9: Push out crosshead pins holding stroke adjustor and adjusting screw assembly in the crosshead assembly. Unscrew the stroke adjustor off the adjusting screw assembly.

Step 10: Unscrew the fasteners on the gearbox reducer and slide out the drive shaft. *Note: The key on the drive shaft is not attached and can fall out.*

Step 11: Unbolt the gearbox reducer from the base plate.

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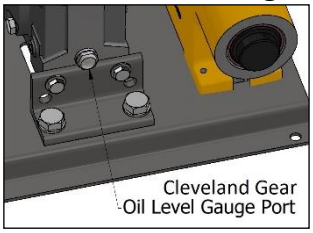
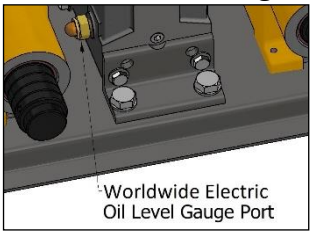
INSPECTION

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

- Inspect all threads, seals and packing 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, bottom seat and ball check spring for corrosion or damage.
- Inspect plunger for wear, scarring, or damage.
- Inspect drive shaft, eccentric cam and bearing for wear or damage.
- Inspect housing and all other components for damage.

Oil Level Information:

With the unit stopped, visually inspect the gearbox reducer oil level in the sight level gauge. There are 2 types of gearbox reducer (Cleveland Gear and Worldwide Electric) differentiated by the name plaque on the side of the gearbox reducer, location of, and the type of the oil level gauge. *Refer to the following chart for more information.*

	Cleveland Gear	Worldwide Electric
Sight Gauge Type	Flat Button	Domed
Sight Gauge Location	Below the output shaft horizontal plane on the back of the gearbox 	Below the output shaft horizontal plane on the side of the gearbox 
Oil Capacity	400ml (13.5 fl oz) Bruin ISO 460 Refill Part No.: BPG460-0400	800ml (27.0 fl oz) Bruin ISO 460 Refill Part No.: BPG460-0800
Oil Level	At midpoint of the sight level gauge	Sight level gauge filled completely with oil *Note: There may be trapped air*
Oil Flush Schedule Recommendations	100 – 300 hours of operation after startup Every 2500 hours of operation **Extremely severe or dirty conditions as well as high humidity, will require more frequent oil changes. The use of synthetics can extend the period.*	
Oil Recommendations	Synthetic ISO 460 (AGMA 7) for temperature range: -29°C (-20°F) to 100°C (212°F) **EP oils should **NOT** be used with worm gears.* **For most worm gear applications, an AGMA 7 oil is satisfactory. For low speeds (<600 RPM), or high temperatures, a higher viscosity, AGMA 8 will provide better service. Synthetic lubricants provide a lower co-efficient of friction and better wear characteristics than a straight mineral oil.*	

Lubricants must meet or exceed these standards	**AGMA Lubricant No.**	**Viscosity Range**	**ISO Number**	**Non-Synthetic Ambient Temp. Reference**
	AGMA 7	cSt @ 104°F (40°C): 414-506	460	15°F to 50°F (-9°C to 10°C)
	AGMA 8	cSt @ 104°F (40°C): 612-748	680	50°F to 125°F (10°C to 52°C)

Gearbox Reducer Oil Change Procedure:

Do not mix synthetic and non-synthetic or mineral oil. Between switching oil types first flush the gearbox reducer with a general purpose solvent such as kerosene before refilling with oil. Do not use "all purpose" oils, automotive engine or gear oil, extreme pressure oils (EP oils) or any lubricant not specially formulated for worm gear service. Using them may result in severe worm wheel wear and failure.

With the unit stopped, open the lowest threaded port on the gearbox reducer and let the oil drain out. *Note: Opening the highest threaded port will help the oil to drain.*

After the oil has drained, thread the plug back into the gearbox reducer. Open the highest threaded port on the gearbox reducer and fill with the proper lubricant refill amount. Do **NOT** overfill. *Note: Each type of gearbox reducer contains different amount of oil. Refer to chart above for the correct refill amount.* Excessive oil levels will result in a higher operating temperature.