

Raptor Self-Rotary Nozzle (RPT-P8, RPT-M9)

Description:

The Raptor has either a 1/2 npt or 9/16 medium pressure cone and thread female inlet connection. It is capable of working pressures up to 22,000 psi and flow rates of 10 to 60 gpm. Speed is controlled by a viscous fluid; a thick fluid (BJ 048-S) is used for speeds of 10 to 100 rpm, and a thinner fluid (BJ 048-F) is used for speeds of 50 to 250 rpm. The fluid in the swivel can be changed to provide either fast or slow rotation. Two different nozzle heads are available; the RPT 043 heads are 2 inch diameter with 1/8 npt ports and the RPT 044 heads are 2.5 inch diameter with 1/4 npt ports.

Stamped or engraved on the Raptor nozzle head is an R followed by a number, such as R18 or R30. This number is the offset of the head that makes it rotate. This number must match the flow range given in the table below. If your flow is 24 gpm, you should have a head with R18 on it. If it has an R11 on it, the tool will not rotate, because not enough rotating force (torque) will be produced. If the head is an R30, the tool will spin too fast and wear out quicker.

The next step is to determine where the jets should go in the head. Remember that using more jets means they must be smaller and not hit as hard. The thrust of the jets can be used to pull the tool thru the pipe. If no pull is needed, as few as two jets can be used, just in the 90 degree ports. If jet pull is needed, use two jets in the back ports, as big as they need to be to produce the pull needed, then put jets in other ports for effective cleaning. There is also a pulling ring available that attaches to the RPT 044 head, so a cable can be used to pull the tool so no back jets are used. When installing nozzles into the head, we recommend using Parker Thread Mate and Teflon Tape.

| Head Offset | R30 | R18 | R11 |
|-------------|-------------|-------------|-------------|
| 5k psi | 10 - 23 gpm | 16 - 38 gpm | 25 - 60 gpm |
| 10k psi | 10 - 18 gpm | 15 - 31 gpm | 25 - 51 gpm |
| 15k psi | 10 - 17 gpm | 16 - 28 gpm | 26 - 47 gpm |
| 20k psi | 10 - 16 gpm | 17 - 26 gpm | 27 - 43 gpm |

Operation:

Make sure there is an operator controlled dump in the system, operated by the person closest to the cleaning job. Flush out the high pressure hoses before connecting Raptor to hose end or stinger. When pipe cleaning, it is recommended that the hose be marked a few feet from the end with a piece of tape so the operator knows when to stop on the way back out. When tube cleaning, a stinger is recommended; a stinger is a rigid piece of pipe or tubing used between the end of the hose and the nozzle. It is typically 2 feet in length, and is primarily a safety device for hand flex lancing. Install tool on hose, position it in a tube or the pipe while the pressure is being set. The high pressure seal may leak initially; it should stop when pressure is increased and rotation begins. Close the dump and slowly bring up to pressure the first time, to make sure no nozzles are plugged and that the jet thrust is correct. The swivel should begin to slowly rotate. Once operating pressure is reached, feed the tool into the tube or pipe to begin the cleaning job. Allow the jets time to do their work by feeding the hose out at a controlled rate. Once the work is complete and the tool is disconnected from the hose, blow out all water to prolong the life of the tool. A small amount of oil can be blown into the inlet nut as well.

Troubleshooting:

Head will not rotate: First try rotating head by hand and see if it feels rough or gritty to turn. If it does, the tool must be disassembled and repaired. If the head starts to rotate but as pressure is increased it slows down and stops, it likely has bad bearings. If the tool feels okay, check to see if any nozzles are plugged; even if a nozzle is only partially blocked it can keep the head from rotating. Nozzles must be removed from the head to properly clean them; it does not do any good to poke the material plugging the nozzle back into the head, as it will just replug a nozzle. If none of these are the problem, the jets are too small or the head offset is not correct; refer to the above description about the head offset and double check the nozzle sizes to make sure they are correct for the expected flow rate.

Head spins too fast: Check the nozzles sizes and head offset to make sure they are correct; refer to the description section above. If these are correct, it is likely that the swivel is low on viscous fluid, or the viscous fluid has water in it. The best thing to do is drain all the fluid, wipe the parts clean and refill with the proper fluid. Check that the shaft seals are still good and will keep the fluid from leaking out.

Seal Leak: The seal may leak initially up to several thousand psi, but should pop closed as pressure is increased. If operating pressure is reached and the seal is leaking continuously, the high pressure seal may need to be replaced. Refer to the maintenance below.

Seals wear out quickly: The tool must be disassembled and inspected. The carbide seat should be checked for being installed in the right direction, and it should not have any chips or erosion marks on it. The bore of the shaft where the high pressure seal is located should be checked for grooving. If it is worn larger than .508", the shaft will need to be replaced.

Maintenance: *Blow out all water with compressed air before storing tool!

The most important item in maintaining this swivel is keeping the tool full of viscous fluid, which provides lubrication and speed control. The viscous fluid should be checked when the tool begins to run faster than usual, and during high pressure seal replacement. If the fluid appears contaminated, it should be drained and replaced.

The high pressure seal should be replaced when there is a continuous leak at operating pressure from under the Weep Seal (BJ 021-S) around the Inlet Nut.

To replace the high pressure seal:

1. Remove the Port Screw (BJ 026).
2. Unscrew the Inlet Nut (RPT 002-M9 or P8) from the Body.
3. Pull out the Seat (BJ 011-C) and H.P. Seal (BJ 012-TRO) from the bore of Shaft.
4. Inspect the bore of the Shaft; if it is badly grooved it should be replaced.
5. Inspect the face of the Inlet Nut where the Seat makes contact; if it is pitted or dented, it should be faced or replaced.

6. Check the viscous fluid level and condition; if the fluid appears badly contaminated it should be replaced. Otherwise add fluid to cover the Bearing.

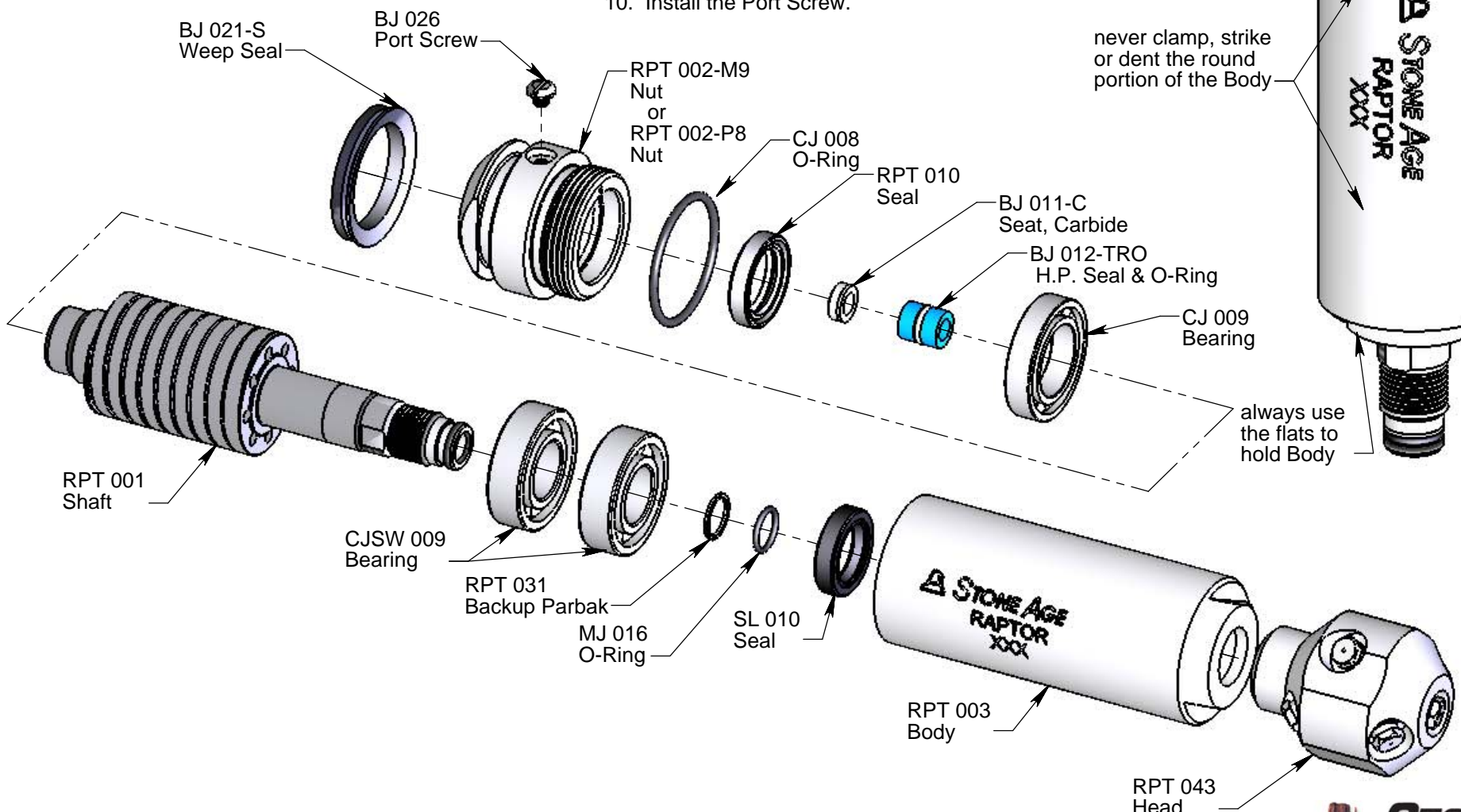
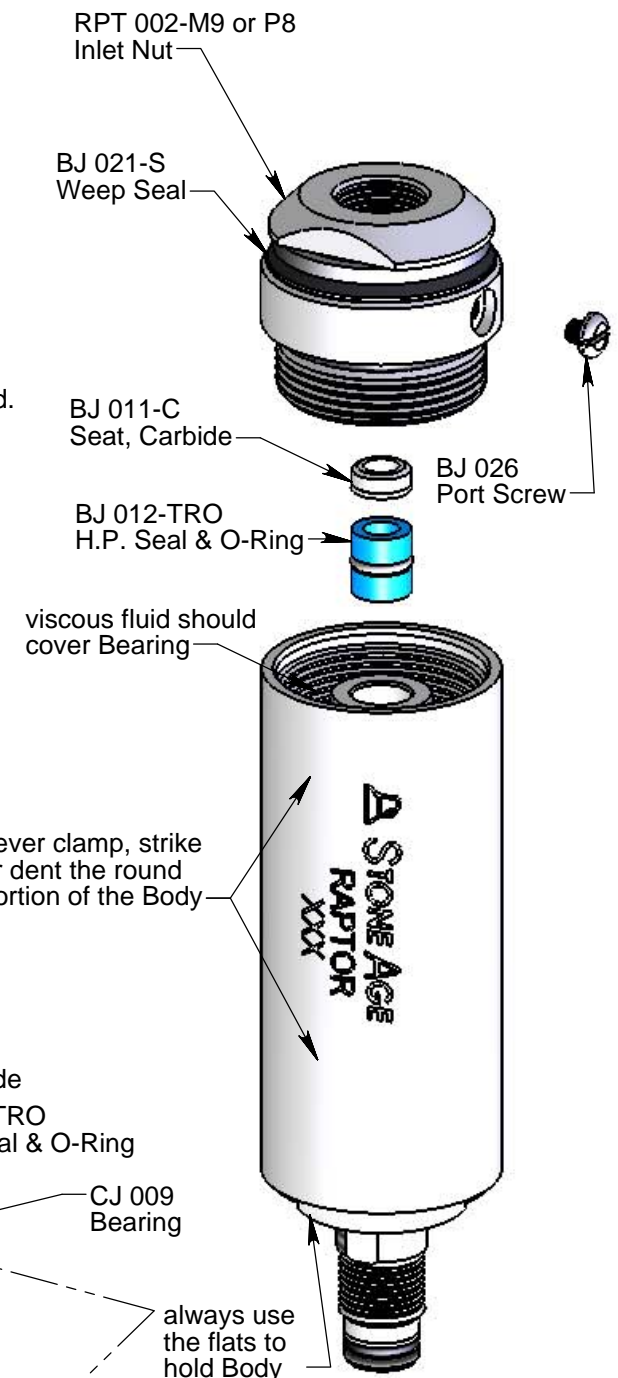
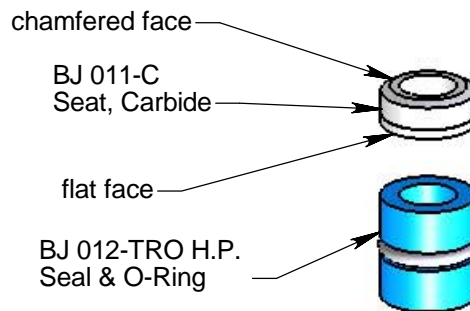
7. Apply grease to a new H.P. Seal and install into bore of Shaft. Do not push it all the way in.

8. Place a new Seat (BJ 011-C) on top of H.P. Seal; the flat face of the Seat goes against the seal (see detail). Push it in just far enough so that it will stay in the bore.

9. Apply anti-seize to threads of Inlet Nut and thread into Body; make sure the Seat stays centered in bore of Shaft. Tighten to 50 ft-lb.

10. Install the Port Screw.

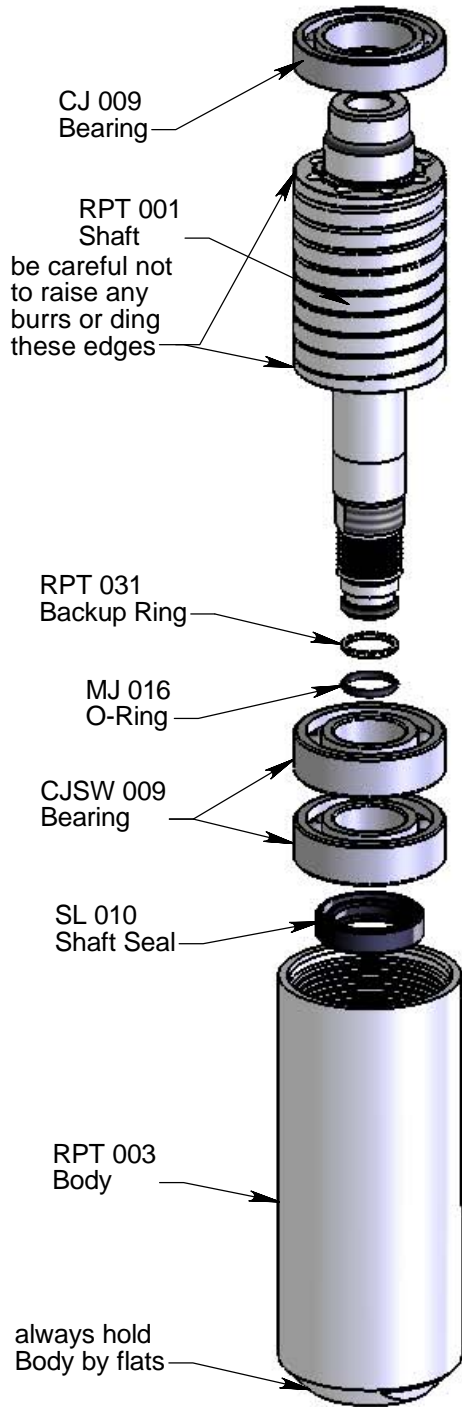
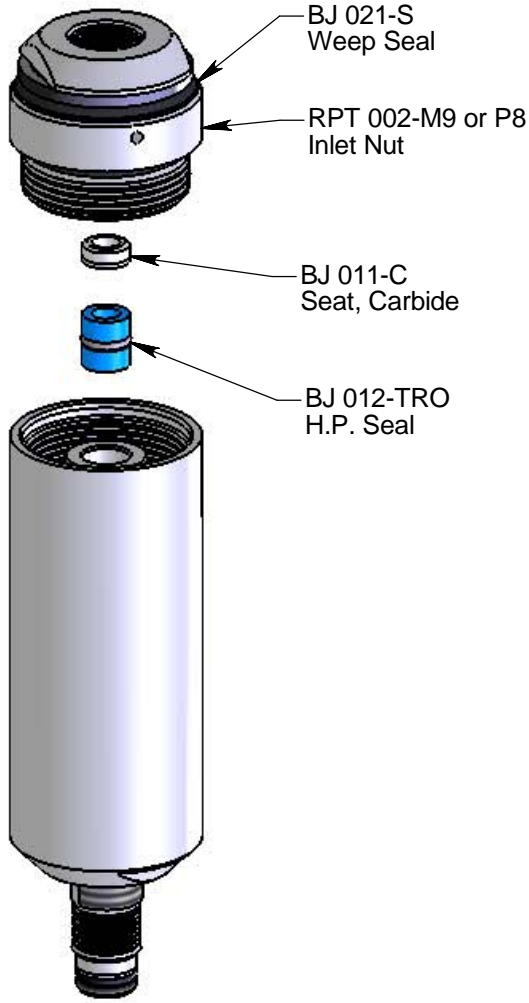
Detailed View:



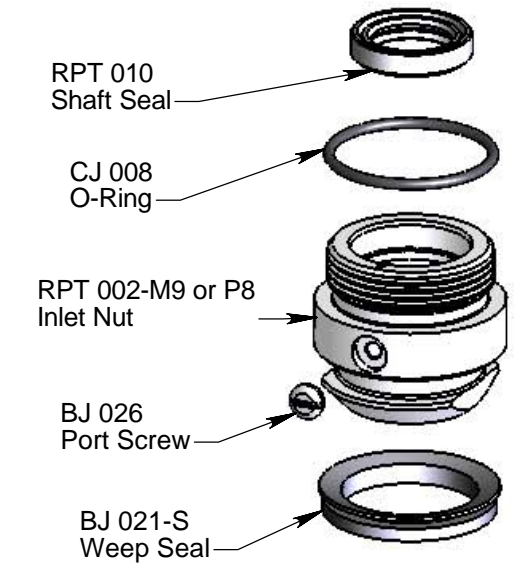
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Disassembly:

1. Unscrew the Inlet Nut (RPT 002-M9 or P8) from the Body (RPT 003).
2. Pull out the Seat (BJ 011-C) and H.P. Seal (BJ 012-TRO).

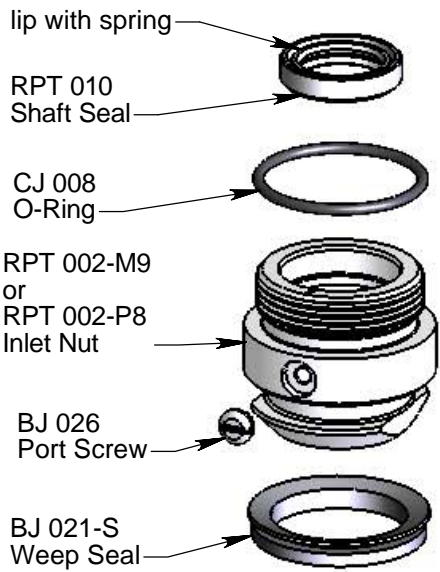


3. Push the Shaft (RPT 001) with bearings out of the Body.
4. Carefully remove Bearings (CJ 009, CJSW 009) from the Shaft.
5. Inspect the O-ring (MJ 016) and Backup Ring (RPT 031) and remove from Shaft if damaged.
6. The Shaft Seal (SL 010) can be removed from the Body if it needs to be replaced.
7. The Shaft Seal (RPT 010) can be removed from the Inlet Nut if it needs to be replaced.
8. Remove the O-Ring (RJ 008) and Weep Seal (RJ 021-S) from the Inlet Nut if necessary.

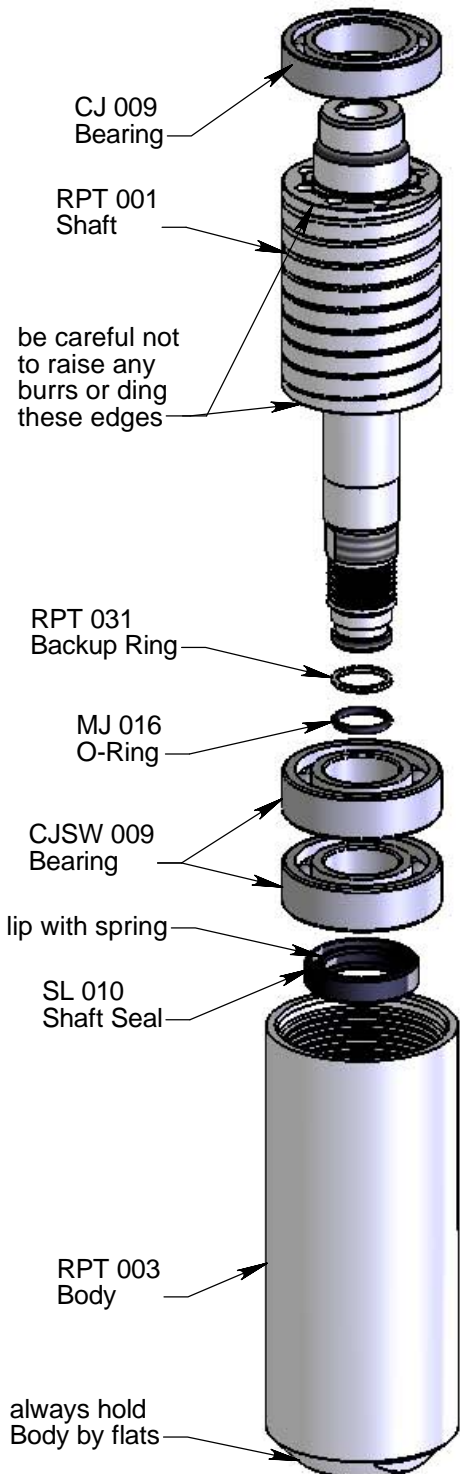


Assembly:

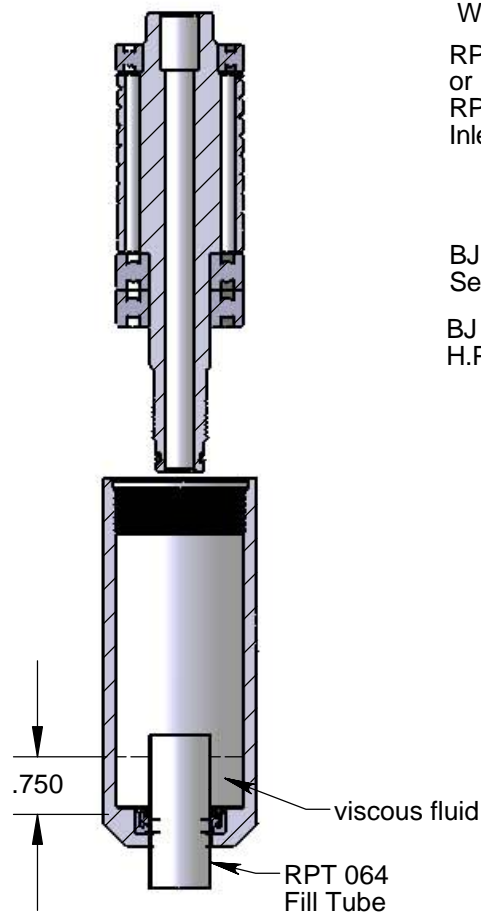
1. Install the Shaft Seal (RPT 010) into the Inlet Nut (RPT 002-M9 or P8). Note the direction of lip with spring. Apply Armour-All to lips of Seal.
2. Install the O-Ring (CJ 008) and Weep Seal (BJ 021-S) onto the Inlet Nut. Apply anti-sieze to threads of Nut.



3. Install Shaft Seal (SL 010) into Body. Note direction of lip with spring. Apply Armour-All to lips of Seal.
4. Install Backup Ring (RPT 031) and then O-Ring (MJ 016) onto Shaft. Note order they sit.
5. Carefully install Bearings (CJ 009, CJSW 009) onto the Shaft.



6. If a Fill Tube (RPT 064) is available, insert it thru the Shaft Seal in Body and pour viscous fluid into Body until about 3/4" deep. Insert the Shaft with Bearings into the Body and pour viscous fluid in to fill up above top Bearing. Allow fluid to settle until no air bubbles come out.



7. Apply grease to and install H.P. Seal (BJ 012-TRO) into the shaft bore. Do not press all the way in.
8. Install Seat (BJ 011-C) with the chamfered face toward Inlet Nut. Press in just far enough so that the seat is captured in the shaft bore.
9. Thread Inlet Nut into Body; tighten to 50 ft-lb.
10. Install Port Screw.

