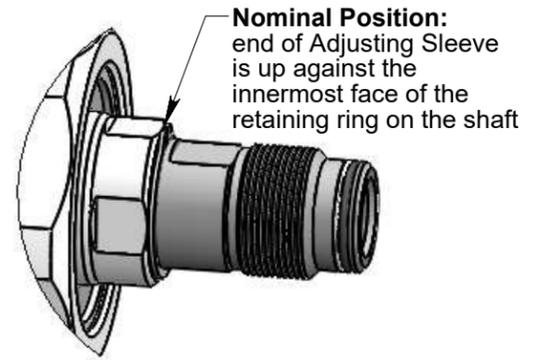


SCS Self-Rotary Swivel with Speed Control (10,12 or 22 kpsi)

Description:

The SCS with adjustable speed control is available in three configurations. The SCS-P20 has a 1.25" npt female inlet connection and is capable of working pressures up to 10000 psi (690 bar). The SCS-P16 has a 1" npt female inlet connection and is capable of working pressures up to 12000 psi (830 bar). The SCS-MP16 has a 1" medium pressure female inlet connection and is capable of working pressures up to 22000 psi (1500 bar). The P20 & P16 have flow rates of 15 to 300 gpm, and MP16 has flow rates of 15-200 gpm. Rotation speed is controlled by a combination of viscous fluid and a speed control adjustment; a thick fluid (BJ 048-S) is used for speed ranges of 5 to 50 rpm. If the desired swivel rpm is near the slow or fast end of this range a head with less or more nozzle offset can be specified. The "slow" end range would be approximately 5-25 rpm and the "fast" end would be approximately 20-50 rpm.

The adjustable speed control feature allows for rotational speed adjustment within these ranges. Speed adjustment is accomplished by rotating the adjusting sleeve on the outlet shaft. The nominal setting (where the edge of the sleeve is up against the innermost face of the retaining ring- **see detail**) allows for the fastest rotation speed in the desired range. As the sleeve is adjusted inward towards the swivel body, the rotational speed is reduced. Each 1/2 turn of the sleeve reduces the rotation speed by approximately one fourth of the range. The maximum sleeve adjustment is 2 turns. When making adjustments, it is recommended to adjust the sleeve about a quarter turn beyond the desired setting, rotating the shaft manually and then backing the sleeve out a quarter turn, thus allowing the viscous fluid to equalize more uniformly.



Adjusting Sleeve Detail

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 SCS to hose end. 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. Once the SCS is attached to the hose end, position it in the pipe or vessel to be cleaned. 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 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. Double check the head offset and nozzle sizes to make sure they are correct for the expected flow rate.

Head spins too fast: Check the nozzle sizes and head offset to make sure they are correct. 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 initially leak at low pressure, 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 .758" ID (MP16) or .883" ID (P16 & P20), the shaft will need to be replaced.

Maintenance:

The high pressure seal will need to be replaced when water is leaking continuously out of the weep ports (under the Weep Seal) at or near operating pressure. The viscous fluid should also be checked and filled or replaced during seal maintenance.

1. Remove the Port Screw (BJ 026).

2. Hold Body by flats; unscrew the Inlet Nut (SCS 002-P20-88, SCS 002-P16-88 or SCS 002-MP16-75).

3. Remove the Seat (SM 011 or BJ 211-C) and H.P. Seal (SM 012-O or BJ 212-O) from the bore of the Shaft.

4. Inspect the Seat for chips on the edges and erosion pits on the face. Replace if damaged.

5. Inspect the face of the Inlet Nut where the Seat makes contact for dings, dents or erosion; these must be faced off to stop all leaking.

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

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

8. Install the Seat with the flat side against the Seal (see detail view). Push it in just far enough that it will stay in the bore.

9. Apply anti-seize to the threads of the Inlet nut; thread into Body, checking that the Seat stays centered in bore of shaft. Tighten to 60 ft-lb.

10. Install the Port Screw.

11. Apply anti-seize to the threads of the Inlet nut; thread into Body, checking that the Seat stays centered in bore of shaft. Tighten to 60 ft-lb.

12. Install the Port Screw.

13. Apply anti-seize to the threads of the Inlet nut; thread into Body, checking that the Seat stays centered in bore of shaft. Tighten to 60 ft-lb.

14. Install the Port Screw.

15. Apply anti-seize to the threads of the Inlet nut; thread into Body, checking that the Seat stays centered in bore of shaft. Tighten to 60 ft-lb.

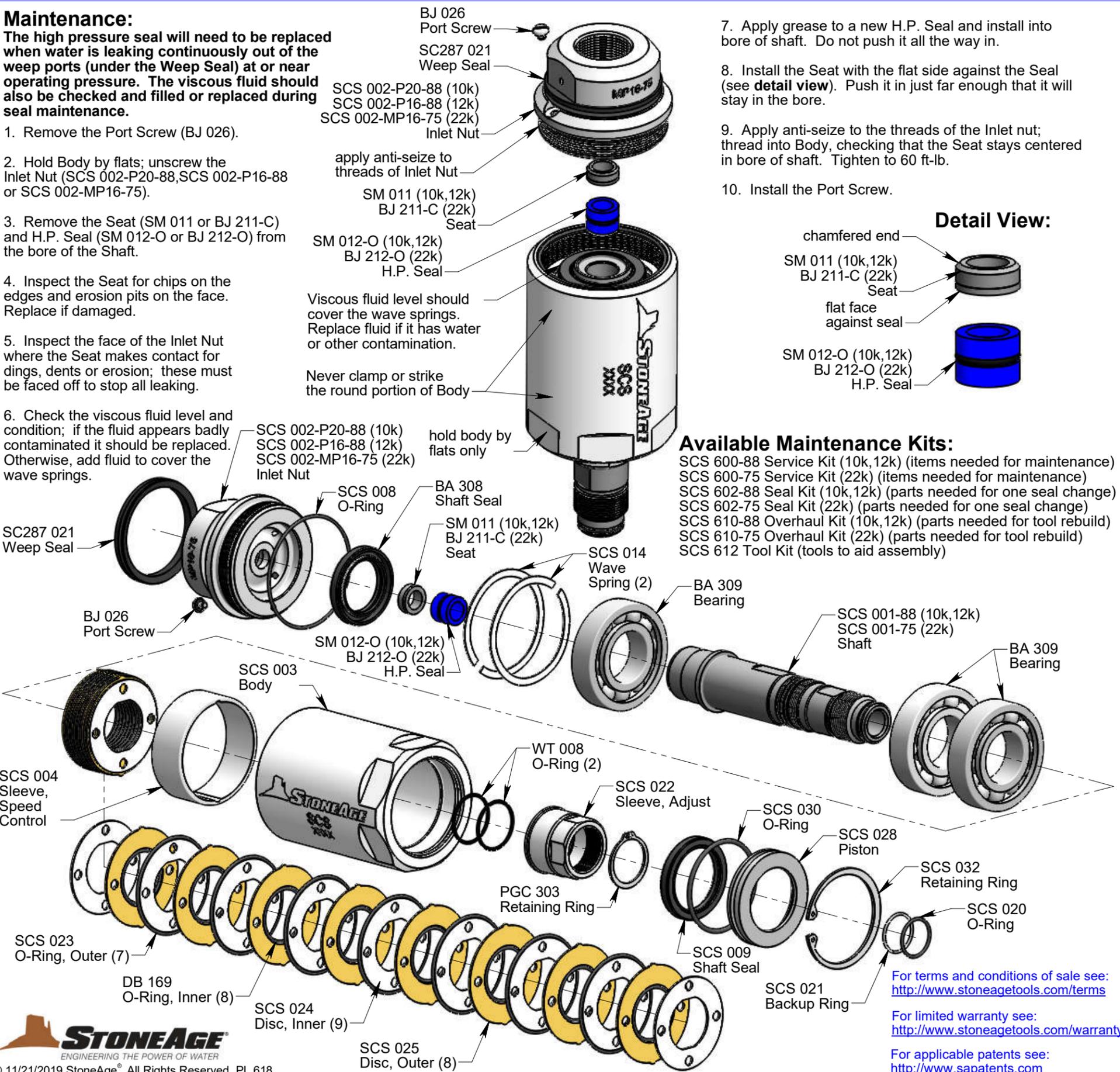
16. Install the Port Screw.

17. Apply anti-seize to the threads of the Inlet nut; thread into Body, checking that the Seat stays centered in bore of shaft. Tighten to 60 ft-lb.

18. Install the Port Screw.

19. Apply anti-seize to the threads of the Inlet nut; thread into Body, checking that the Seat stays centered in bore of shaft. Tighten to 60 ft-lb.

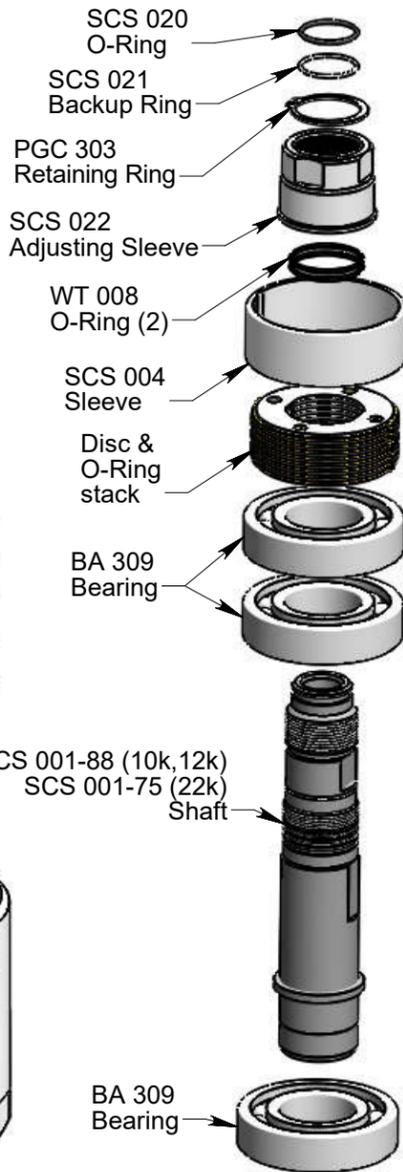
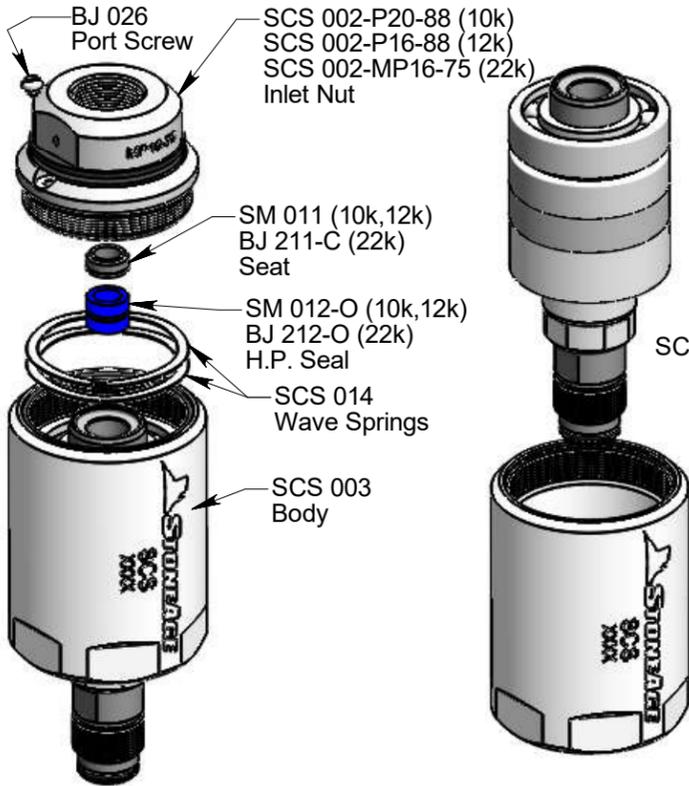
20. Install the Port Screw.



SCS Self-Rotary Swivel with Speed Control (10, 12 or 22 kpsi)

Disassembly:

1. Remove the Port Screw (BJ 026) from the Inlet Nut (SCS 002-P20-88, SCS 002-P16-88 or SCS 002-MP16-75); unscrew the Inlet Nut from the Body (SCS 003).
2. Remove the Seat (SM 011 or BJ 211-C) and H.P. Seal (SM 012-O or BJ 212-O) from the bore of the Shaft.
3. Remove the Wave Springs (SCS 014).
4. Push the Shaft (SCS 001-88 or SCS 001-75) with bearings and sleeve out of the Body. It may be necessary to remove the Sleeve from the Body separately.

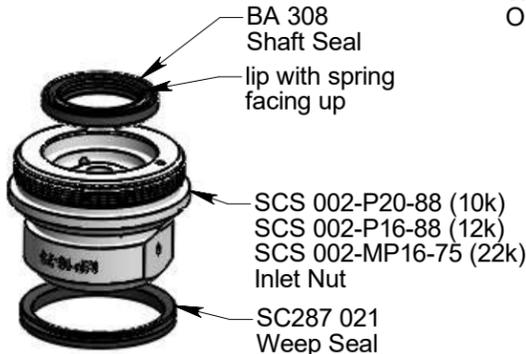


5. Remove O-Ring (SCS 020) and Backup Ring (SCS 021) from end of shaft.
6. Remove Retaining Ring (PGC 303) from end of shaft.
7. Unscrew Adjusting Sleeve (SCS 022) from the end of the Shaft.
8. Remove the two O-Rings (WT 008) from the grooves in the Shaft.
9. Remove the Sleeve (SCS 004).
10. Remove the stack of Discs and O-Rings.
11. Remove the Bearings (BA 309).
12. Press off the remaining Bearing (BA 309) from other side of the shoulder on the Shaft.
13. Remove the Retaining Ring (SCS 032) from the Body. Push out the Piston (SCS 028).
14. Inspect the O-Ring (SCS 030) and the Shaft Seal (SCS 009); replace if damaged.
15. Inspect the O-Ring SCS 008, Shaft Seal (BA 308) and Weep Seal (SC287 021) on the Inlet Nut; replace if damaged.

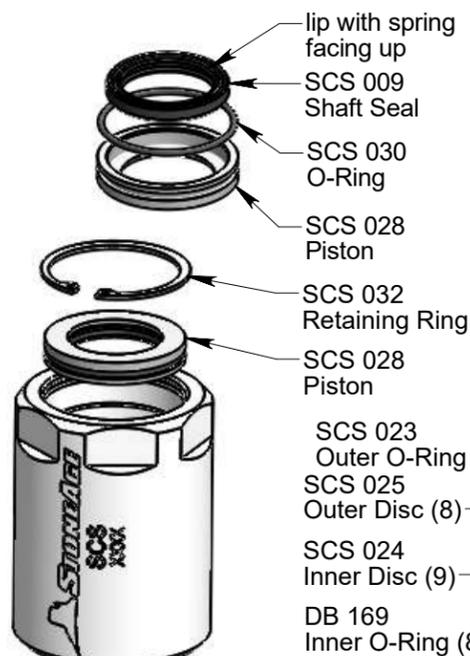


Assembly:

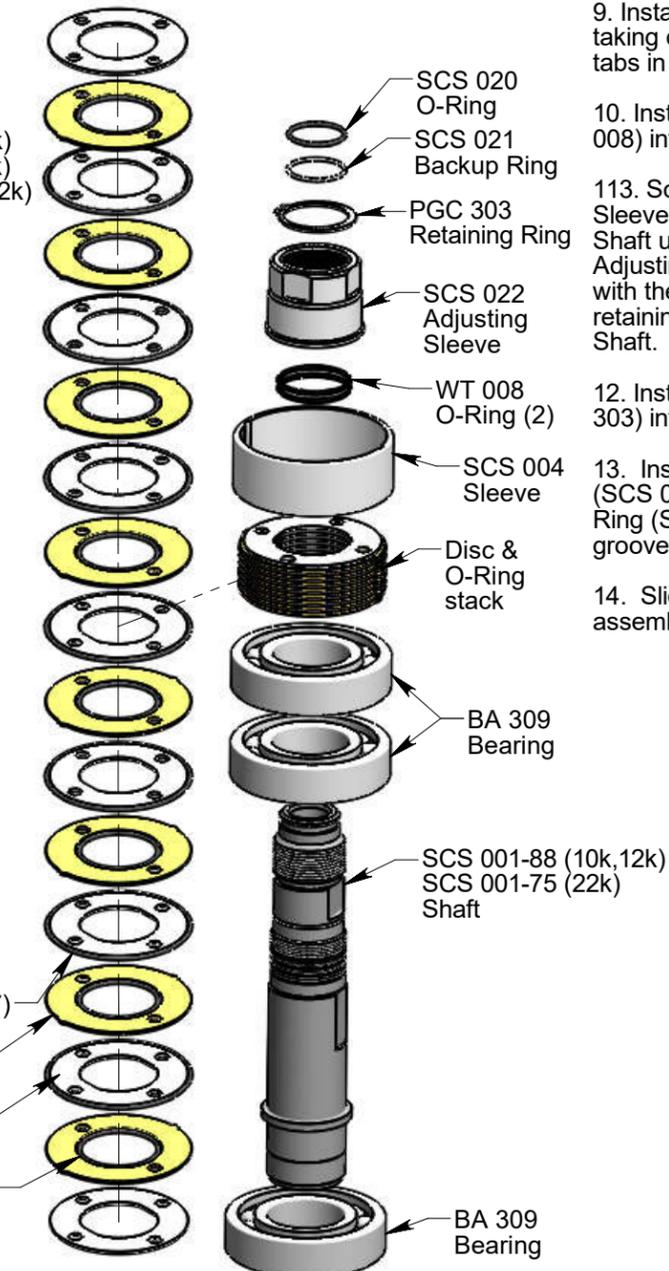
1. Install Shaft Seal (BA 308) in Inlet Nut (SCS 002-P20-88, SCS 002-P16-88 or SCS 002-MP16-75) as shown.
2. Place O-Ring (SCS 008) over threads of Inlet Nut.
3. Install Weep Seal (SC287 021).



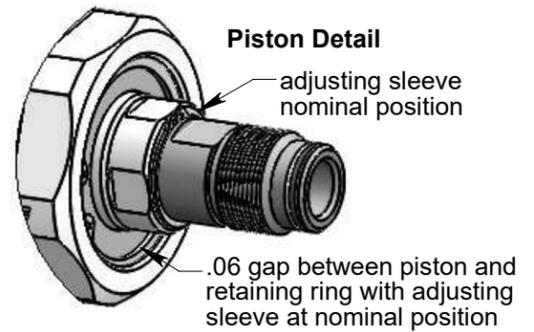
4. Install Shaft Seal (SCS 009) in Piston (SCS 028) as shown.
5. Place O-Ring (SCS 030) in groove around Piston.
6. Push Piston into Body (BJ 003), install Retaining Ring (SCS 032).



7. Press Bearing (BA 309) onto other side of the shoulder on Shaft (SCS 001-88 or SCS 001-75). Press two Bearings (BA 309) onto near side of shoulder on Shaft.
8. Begin disc stack on shaft with an Inner Disc (SCS 024). Slip an Inner O-Ring (DB 169) onto Shaft. Stack an Outer Disc (SCS 025) onto Shaft. Add another Inner Disc, and then slip an Outer O-Ring (SCS 023) over the OD of the Inner Disc. Continue stacking arrangement as shown using a total of (9) Inner Discs, (8) Outer Discs, (8) Inner O-Rings and (7) Outer O-Rings. No Outer O-Ring is required at either end.



9. Install Sleeve over discs taking care to align outer disc tabs in grooves of Sleeve.
10. Install two O-Rings (WT 008) into grooves in Shaft.
11. Screw the Adjusting Sleeve (SCS 022) onto the Shaft until the end of the Adjusting Sleeve is aligned with the innermost edge of the retaining ring groove on the Shaft.
12. Install Retaining Ring (PGC 303) into groove on Shaft.
13. Install the Backup Ring (SCS 021) and finally the O-Ring (SCS 022) into the groove at the end of the Shaft.
14. Slide entire Shaft assembly into Body.



15. Adjust the piston depth so that there is about a 1/16" (.06) gap between the outer face of the piston and the inner face of the retaining ring (see detail).
16. Place the two Wave Springs (SCS 014) on top of bearing. Fill the swivel with viscous fluid until the Wave Springs are covered. Rotate shaft occasionally to aid in removing air bubbles. It may take several hours to fully bleed out all of the air from the fluid.
17. Apply grease to the H.P. Seal (SM 012-O or BJ 211-O) and install in bore of shaft. Install Seat (SM 011 or BJ 211-C) on top of Seal, as shown in the Maintenance Section.
18. Apply anti-seize to threads of Inlet Nut and thread into Body. Tighten to 60 ft-lb.
19. Install Port Screw (BJ 026).

