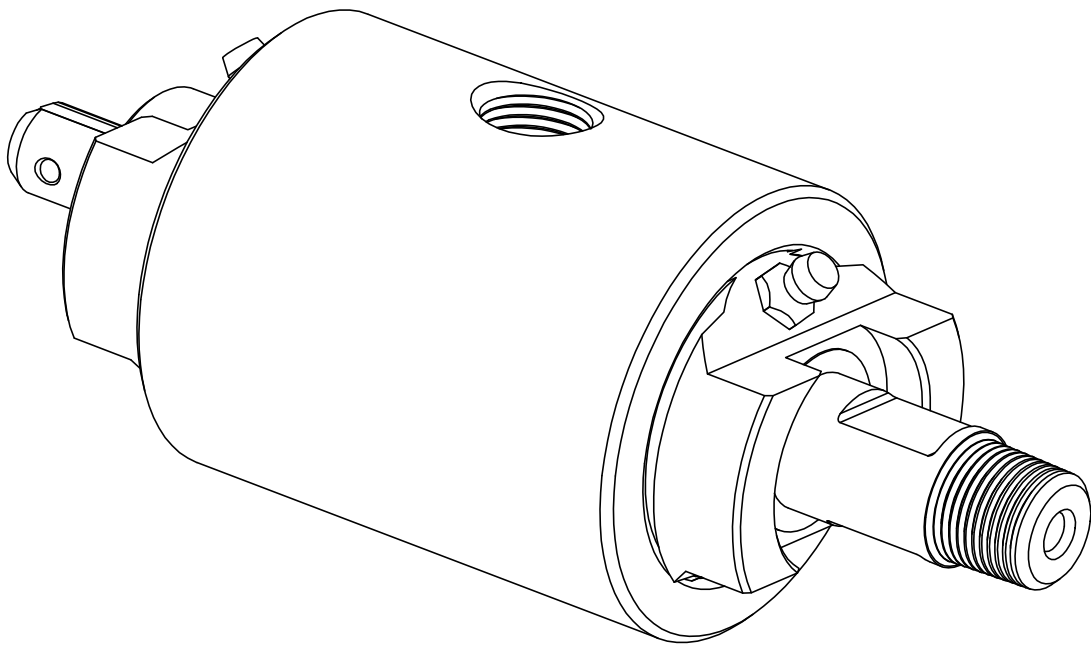


HIGH PRESSURE WATER SWIVEL

HI-P6 and HI-M9

OPERATION AND MAINTENANCE MANUAL



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1.0 INTRODUCTION

This manual was prepared to provide the operator with the basic information needed to operate and service this equipment. The operating recommendations in the manual will ensure that you receive satisfactory performance. All operating personnel responsible for the care of this equipment should be familiar with the information in this manual.

If you have any questions or problems with this equipment, please contact the distributor you obtained the product from, or the manufacturer:

StoneAge, Inc.
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2.0 SAFETY WARNING

Operations with this equipment can be potentially dangerous if caution is not exercised prior to and during tool use. Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook.

- 2.1 Only competent and trained persons should operate this equipment.
- 2.2 Do not exceed the maximum operating pressure specified for any component in a system.
- 2.3 This equipment should always be used with an operator controlled dump mechanism to release the high pressure water.
- 2.4 The immediate work area should be marked off to keep out untrained persons.
- 2.5 All personnel in the area should wear eye and hearing protection, as well as other protective clothing in accordance with specific conditions.
- 2.6 Inspect the equipment for visible signs of deterioration, damage, or improper assembly. Do not operate until repaired. Make sure all threaded connections are tight and leak free.
- 2.7 Check to see that all control functions work properly before going to high pressure.
- 2.8 If it is necessary to have a person work near the cleaning jets, then it is this person who should have control of the pressure dump mechanism.

3.0 DESCRIPTION

The HI high pressure water swivel is constructed of hardened stainless steel. It has radial and thrust bearings at both ends of the through shaft. Two long-wearing high pressure seals offer many hours of leak-free operation. The unit is easy to work on, no special equipment or adjustments are necessary.

The Model HI-P has pipe thread connections and is rated for working pressures up to 15,000 psi. The Model HI-M9 has Autoclave Engineering high pressure porting and is rated for working pressures up to 22,000 psi. Both models use the same components except for the shaft and body.

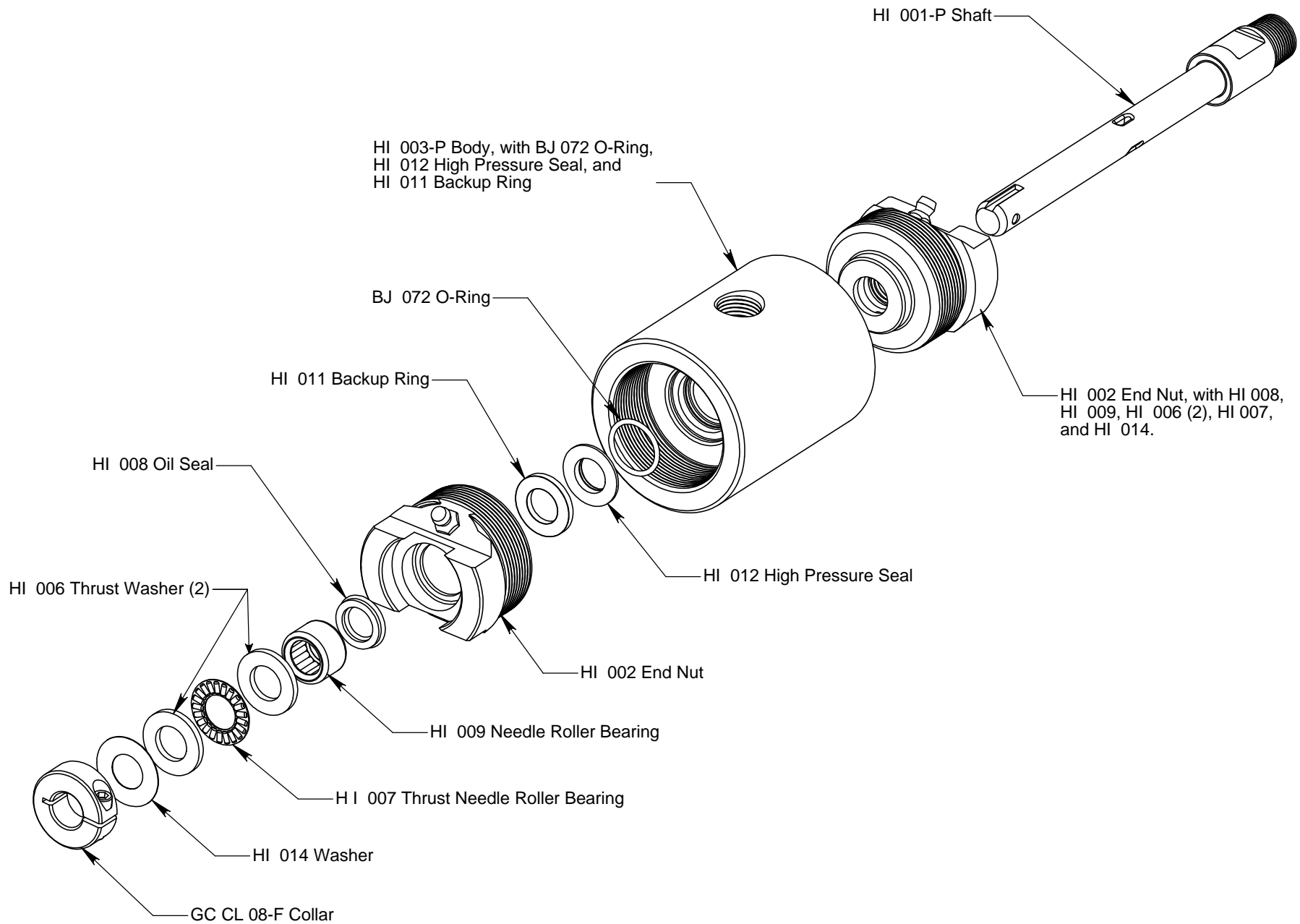
The tool is designed to be used with all common waterblast pumps and compressed air systems. It can be used with standard lance rods and nozzle tips. Special cutting edge bits are available.

WARNING: **The swivel shaft can potentially break in half and the two pieces will be ejected from the body with great force. A guard should always be used to contain these pieces from flying and injuring someone. If a drive motor is mounted behind the swivel it should be securely mounted.**

4.0 PARTS LIST

<u>Part #</u>	<u>Description</u>	<u>Qty</u>
HI 001-P	Shaft, 1/2 NPT	1
HI 001-M9	Shaft, 9/16 MP	Used in 20K assembly
HI 002	End Nut	2
HI 003-P	Body, NPT	1
HI 003-M9	Body, 9/16 MP	Used in 20K assembly
FS 004	Grease Zerk	2
GC CL-08-F	Shaft Collar	1
HI 006	Thrust Washer	4
HI 007	Thrust Bearing	2
HI 008	Grease Seal	2
HI 009	Radial Bearing	2
HI 011	Back-up Ring	2
HI 012	High Pressure Seal	2
HI 014	Retainer Washer	2
BJ 072	O-Ring	2

5.0 HI EXPLODED ASSEMBLY DRAWING



6.0 MAINTENANCE

Care has been taken to keep the MODEL HI water swivel as simple to operate and maintain as possible. However, as with any mechanical device, some care must be exercised to insure safety and long life.

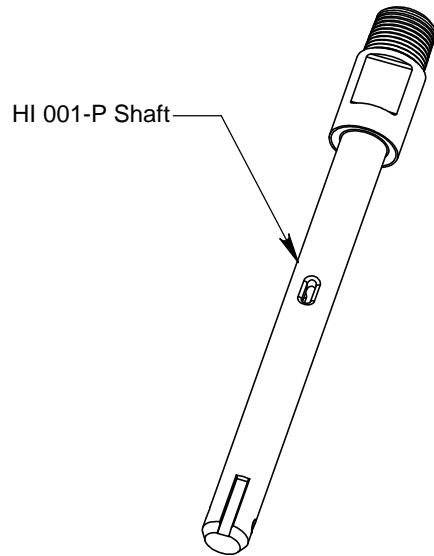
1. Grease the bearings regularly. Every few hours of operation inject enough to cause some grease to push out past the retainer washer.
2. Periodically check the shaft collar and end nuts to be sure they are tight. Any looseness may cause a premature seal or bearing failure.
3. The high pressure seals may leak occasionally but heal themselves during continued use. The seals do not fail abruptly and can be used for several hours even after continuous leaking begins. As long as the leak is tolerable the swivel can be operated without fear of damaging it.
4. Keep all connections clean and flush out the supply hoses before connecting to the swivel.

TROUBLESHOOTING GUIDE

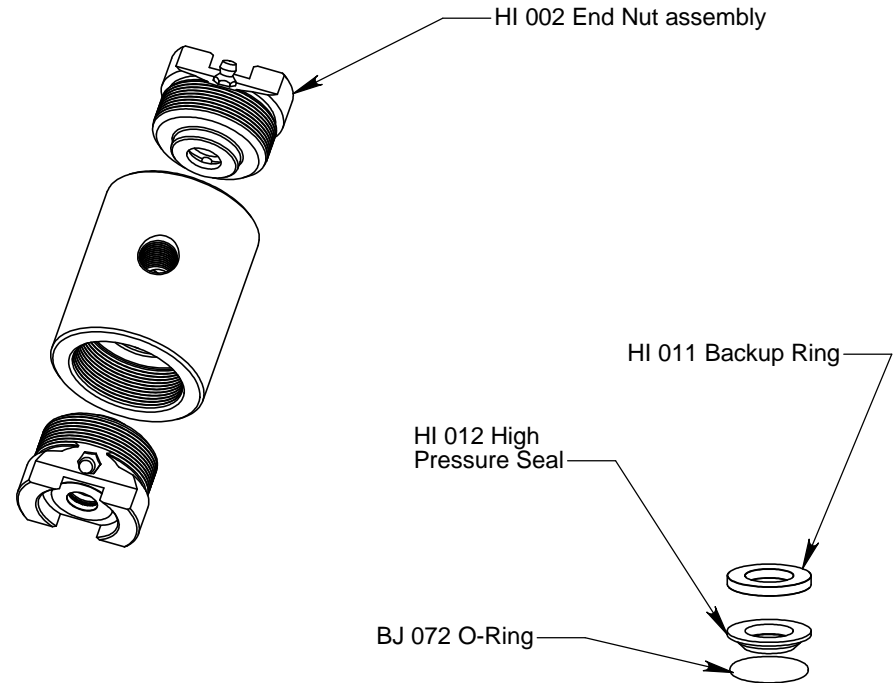
<u>SYMPTOM</u>	<u>PROBLEM</u>	<u>SOLUTION</u>
Leaks out weep holes At high pressure.	1. Worn H.P. seal.	1. Replace seal.
Leaks elsewhere around shaft and nut threads.	1. End nut not tightened. 2. O-Ring blown. 3. H.P. seal and grease seal are worn.	1. Remove, check seal, re-install tight. 2. Replace O-Ring, check seal. 3. Replace, regrease.
Leaks only at low pressure.	1. H.P. Seal is worn.	1. Continue to use, be ready to replace H.P. seal.
Seals wear out quickly.	1. Rough shaft finish. 2. Worn out back-up ring.	1. Polish shaft with fast 600 grit paper or replace. 2. Replace if gap on shaft is greater than .005 in.
Shaft won't rotate.	1. Bad radial bearings. 2. Galled back-up ring. 3. Internal damage.	1. Replace bearing's. 2. Polish shaft & back-up ring. 3. Inspect and repair.

6.1 HI DISASSEMBLY INSTRUCTIONS

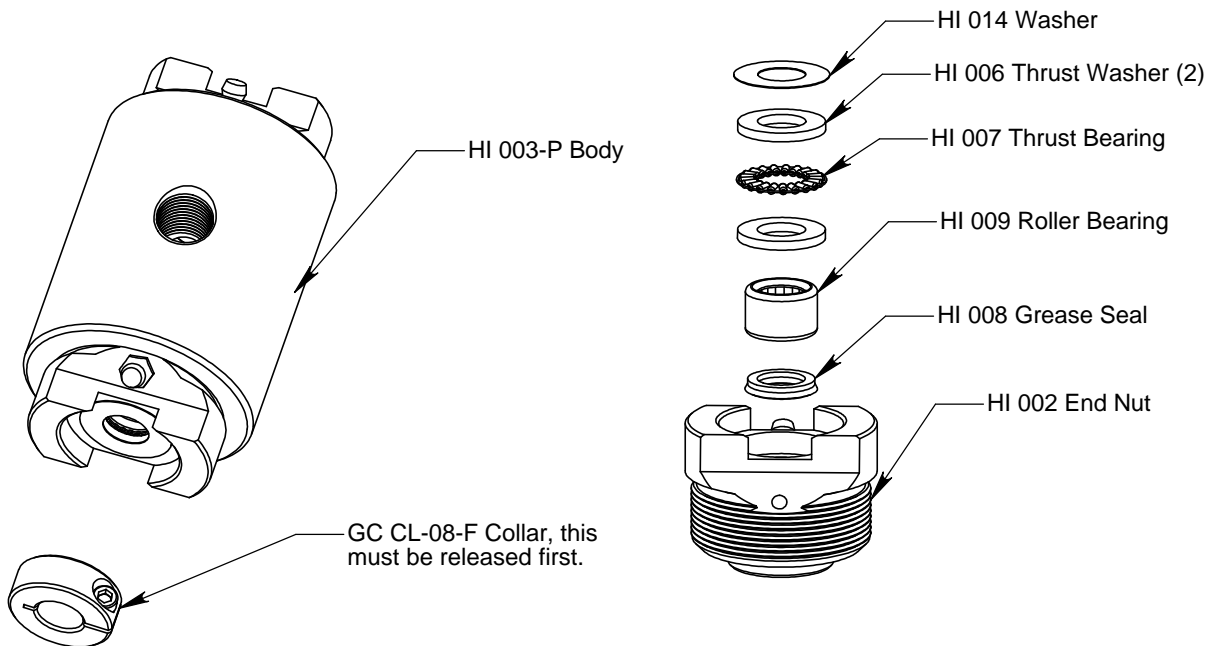
1. The shaft (HI 001) can be examined by simply loosening the rear collar (HI 005) and pulling the shaft out through the front of the housing (HI 003). Make sure to remove any sharp burrs from the shaft before pulling through seals.



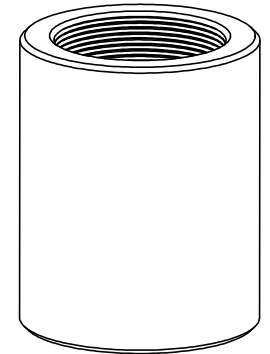
2. Loosen the end nuts and unscrew; both are right hand thread.



3. The thrust bearing (HI 007), thrust washers (HI 006), and retainer washer (HI 014) can be removed from the end nut (HI 002) by hand. The radial bearing (HI 009) and grease seal (HI 008) can be pressed out if replacement is necessary.



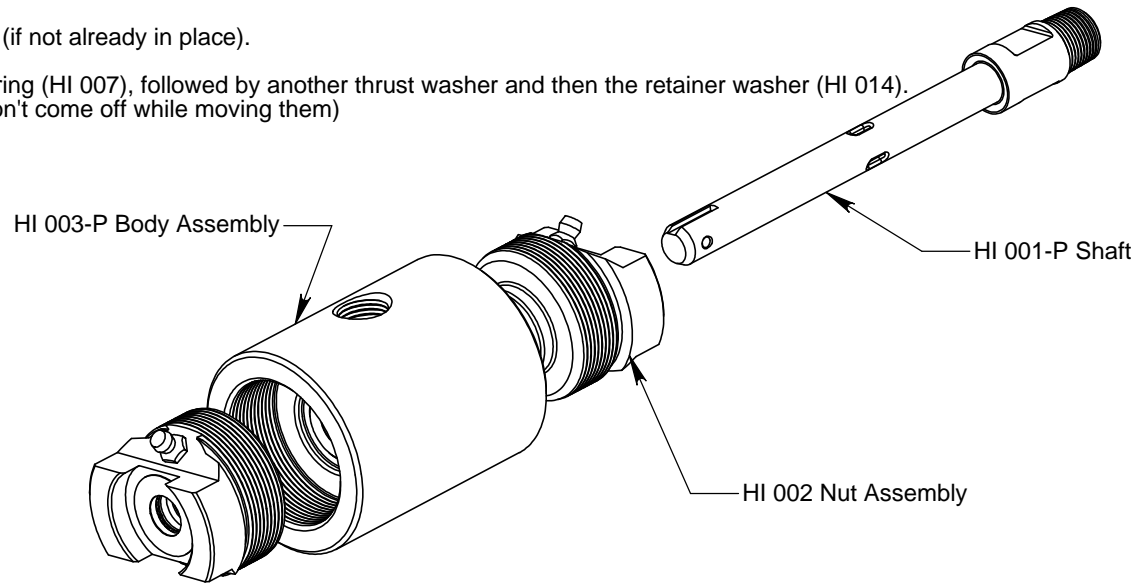
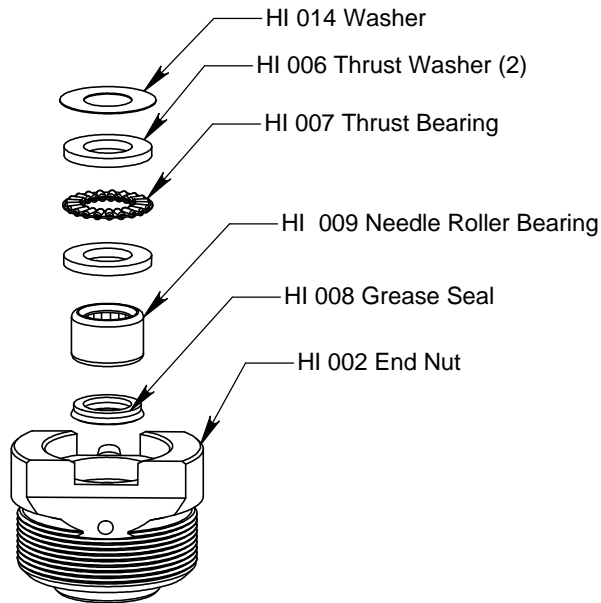
4. The back-up ring (HI 011), high pressure seal (HI 012), and o-ring (BJ 072) can now be removed from the housing by hand.



6.2 HI ASSEMBLY INSTRUCTIONS

Caution: Be careful to keep all of the parts clean and free of grit and dirt. Apply a light coating of grease to all parts during assembly.

1. Prepare to assemble the two end nuts (HI 002) by placing both face down on the table with concave end up.
2. Place the grease seal (HI 008) in the nut with the lips facing the bottom of the bore.
3. Place the radial bearing (HI 009) in on top of the seal until flush (if not already in place).
4. Place one thrust washer (HI 006) in the nut, then the thrust bearing (HI 007), followed by another thrust washer and then the retainer washer (HI 014). (this is the fully assembled end nut, be careful that the washers don't come off while moving them)



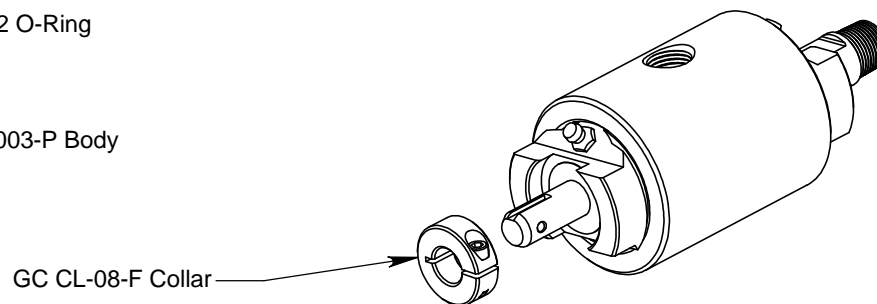
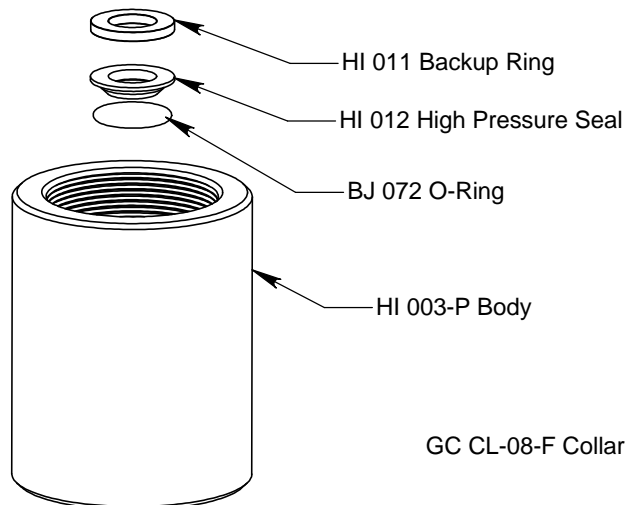
5. Place the o-rings (BJ 072) around the high pressure seals (HI 012) and push into the housing (HI 003). Place a back-up ring (HI 011) flush against the high pressure seal. A coating of grease will help hold it in place. (this must be done on both ends)

6. Screw in both of the end nut assemblies (HI 002), only hand tighten at this point.

7. Check the shaft (HI 001) for any sharp edges or burrs, and remove any that may be found with a stone or file. The shaft can be polished with a 600 grit paper for best results. Slide the shaft carefully through the housing and end nut

8. Tighten the end nuts (HI 002) until they bottom. They will offer some resistance (squeezing the seal flange) before the bottom on metal-to-metal contact.

9. Push the shaft in snug against its shoulder. Slide on the shaft collar (HI 005) against the assembly and tighten the clamp bolt. Rotate the shaft to be sure it is not bound up.



7.0 LIMITED WARRANTY

StoneAge, Inc. warrants to the extent herein provided the products of its own manufacture against defects in material and workmanship under normal use and service for which the products were designed for a period of six months after shipment from the factory. If such products should fail through defect in workmanship or material and specific written notice of failure is made within six months after date of shipment from factory, StoneAge, Inc. will either repair or replace any such items, F.O.B. its factory without charge. StoneAge, Inc. shall not be liable for expense incurred in repairs or alterations made outside the factory without the proper and prior authorization. StoneAge, Inc. shall have the option of requiring the return of the defective products to its factory, with transportation charges prepaid, to establish the claim. StoneAge, Inc. shall in no event be held liable for damages or delay resulting from or arising out of defective products nor for consequential damages or otherwise except for repair or replacement of items of defective material or workmanship aforesaid.

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