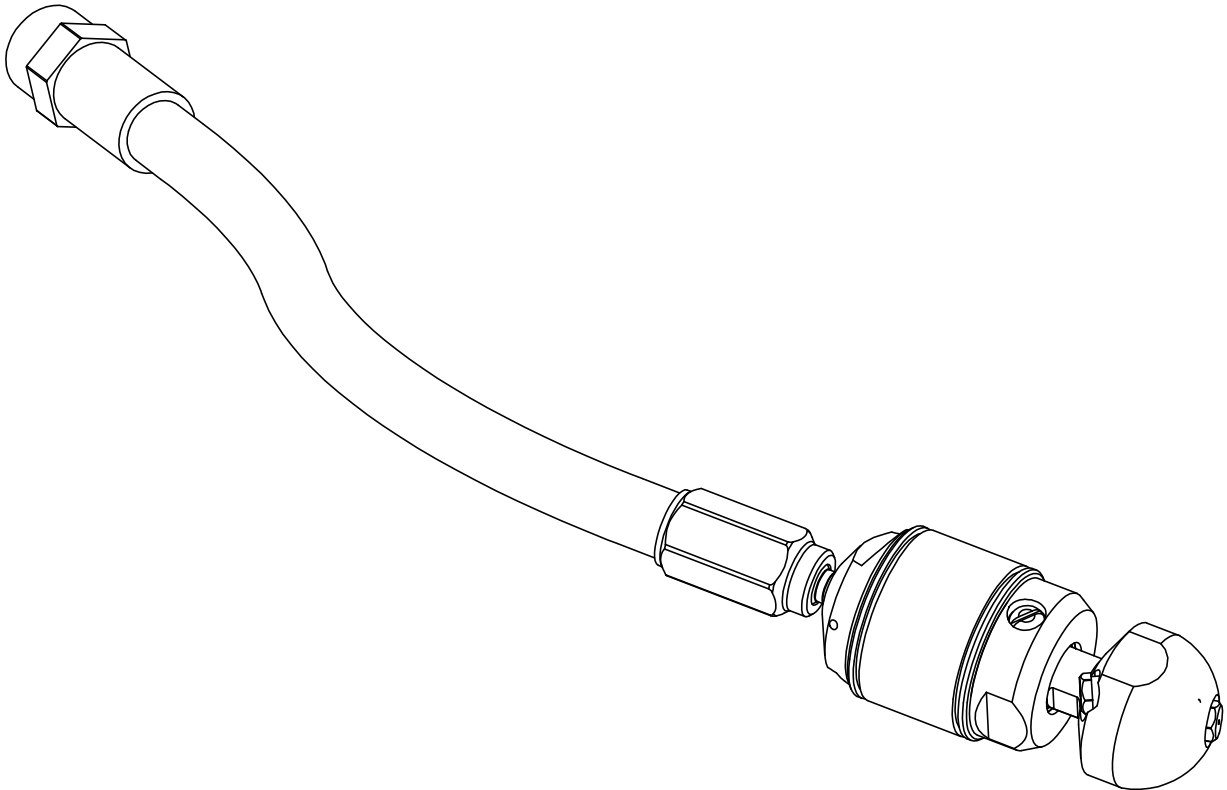


**ROTARY SEWER NOZZLE**

# **WARTHOG-WS-1/2-J**

## **OPERATION AND MAINTENANCE MANUAL**



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 **STONEAGE<sup>TM</sup>**  
**WATERJET TOOLS**

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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:

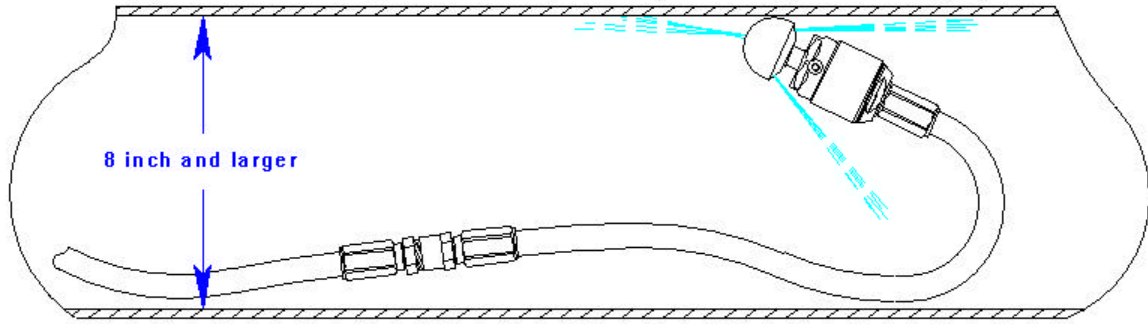
**StoneAge, Inc.**  
54 Girard St.  
Durango, CO 81303  
970-259-2869 Phone 970-259-2868 Fax  
[www.stoneagetools.com](http://www.stoneagetools.com)

## **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 tool.
- 2.2 The immediate work area should be marked off to keep out untrained persons.
- 2.3 All personnel in the area should wear appropriate personal protective equipment.
- 2.4 Make sure all threaded connections are tight and leak free.
- 2.5 Check nozzle orifices before use. If any are plugged, they must be cleaned or replaced.
- 2.6 A protective sleeve (Tiger Tail) should be used. The retaining clamp and rope should be attached to the end of the sleeve nearest the truck.
- 2.7 Never operate tools in a pipe or opening of a large enough diameter that would allow the tool to turn around. This tool should not be used to flush debris from the manhole.
- 2.8 Position the tool two feet or more into the line before going up to operating pressure.
- 2.9 Tape a flag or marker to the reel hose, two to three feet above manhole grade, after the tool is positioned in the line. There should be only one marker on the hose. Do not rely on the reel counter to determine length of hose remaining in line.
- 2.10 Build pressure slowly to ensure tool is positioned and functioning properly.
- 2.11 Do not exceed the maximum operating pressure specified for any component in a system.
- 2.12 Avoid operator/personnel positioning in possible path of out of control tool.
- 2.13 Turn off and secure pump before removing tool from line.

**The WS can turn around in 8 inch and larger pipe sizes, resulting in it coming back out of the pipe toward the operator and possibly causing serious injury or death.**



### **3.0 DESCRIPTION**

The **Warthog WS-1/2-J Rotary Sewer Nozzle** was designed for cleaning 4 to 6 inch pipes and sewer lines with elbows. Jet thrust powers rotation of the head and pulls the tool thru the line. The WS-J has a 2 foot hose attached to a swiveling ball joint, with a 1/2 npt female thread on the other end. This flexible arrangement allows the tool to go around elbows and enter thru cleanouts.

The swivel is a straight flow through design with a single high pressure seal. The WS is capable of working pressures up to 4000 psi and flow rates of 7 to 20 gpm, with rotation speeds from 200 to 400 rpm. The unit is filled with a thick viscous fluid that controls the rotation speed.

The nozzle head and nozzle orifice sizes should match the operating conditions of pressure and flow desired. Hose length and size must be known to correctly determine the proper head and orifice sizes. Contact StoneAge or your distributor to help in nozzle selection. If the wrong head is used, it may not provide enough torque to rotate the swivel, or it may provide too much torque resulting in excessive rotation speed and rapid seal wear.

### **4.0 PARTS LIST**

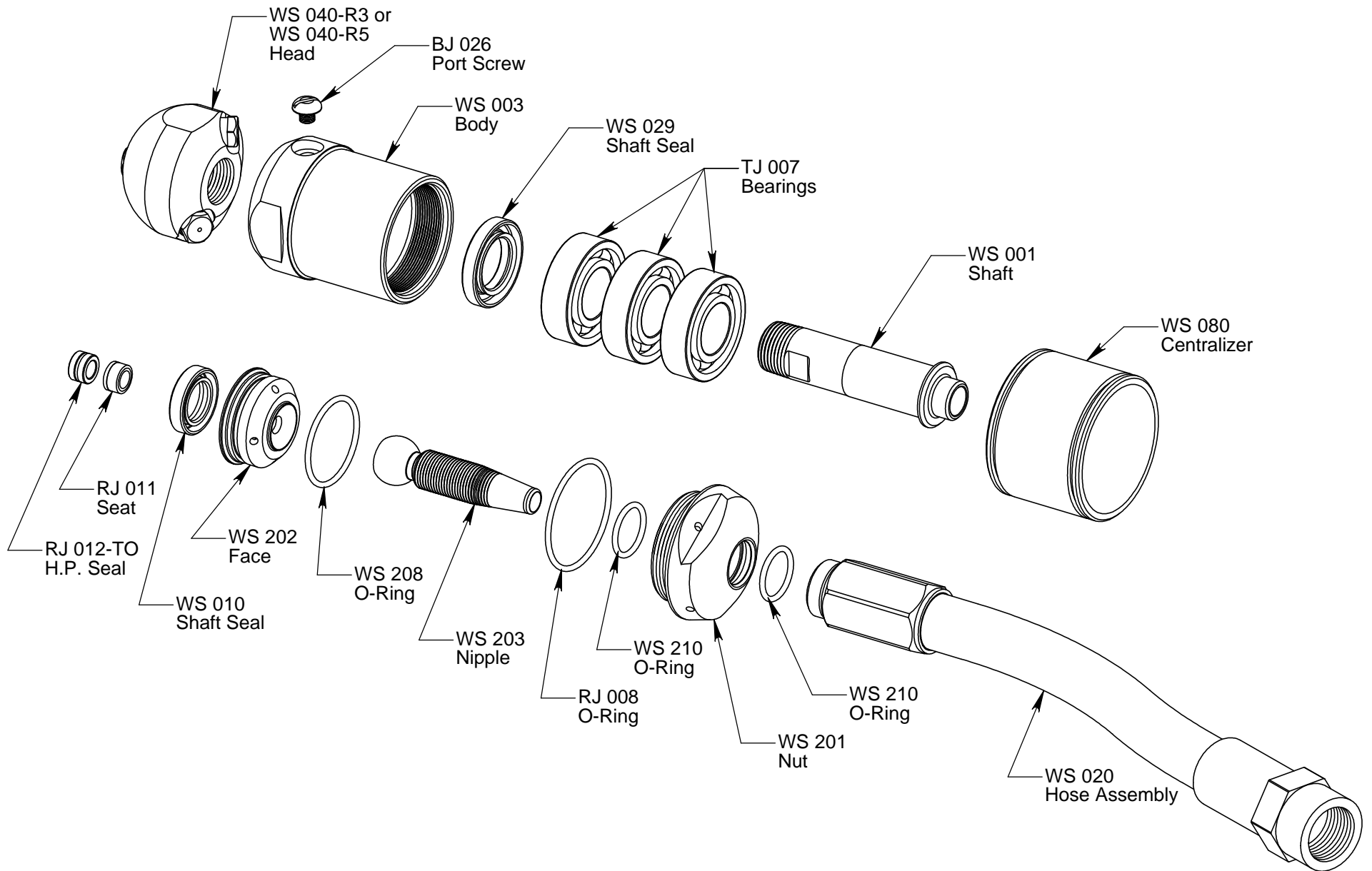
<b>Part #</b>	<b>Description</b>	<b>Qty</b>
BJ 026	Port Screw	1
RJ 008	O-Ring	1
RJ 011	Seat, brass	1
RJ 012-TO	High Pressure Seal	1
TJ 007	Bearing	3
WS 001	Shaft	1
WS 003	Body	1
WS 010	Shaft Seal	2
WS 020	Hose	1
WS 029	Shaft Seal	1
WS 040-R3	Head, .45 offset	1*
WS 040-R5	Head, .8 offset	1*
WS 080	Centralizer	1
WS 201	Nut	1
WS 202	Face	1
WS 203	Nipple	1
WS 208	O-Ring	1
WS 210	O-Ring	2

\*assembly contains one or the other, depending on operating conditions

**Also available separately:**

WS 085	Super Centralizer	(for use in pipes 6 to 8" ID)
WS 600	Service Kit	(Includes items needed for maintenance)
WS 602	Seal Kit	(Includes parts needed for one seal change)
WS 610-J	Overhaul Kit	(Includes parts needed for tool rebuild)
WS 612	Tool Kit	(Includes tools to aid assembly)

## 5.0 WS-J EXPLODED ASSEMBLY DRAWING

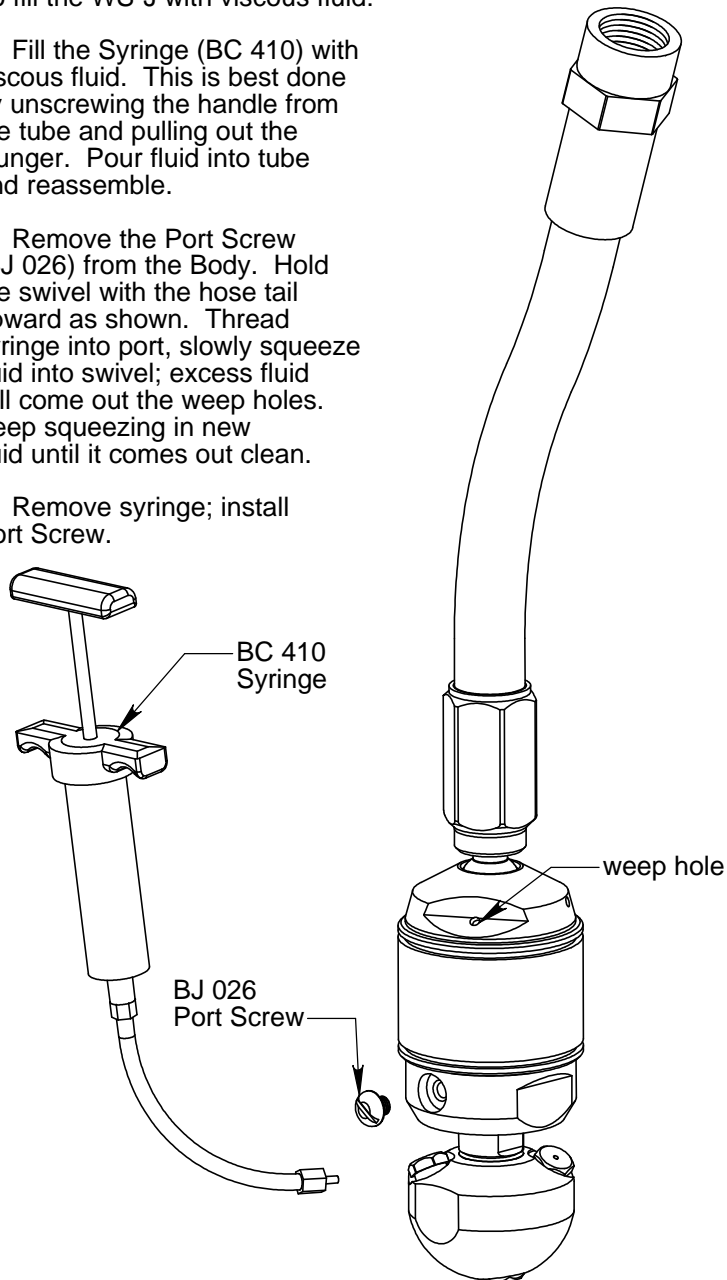


## 6.0 WS-J MAINTENANCE

The most important item in maintaining the WS-J is keeping the tool full of viscous fluid. We recommend that this is done after every 40 to 50 hours of operation. If the tool is spinning much faster than when new, this is an indication that it needs fluid.

To fill the WS-J with viscous fluid:

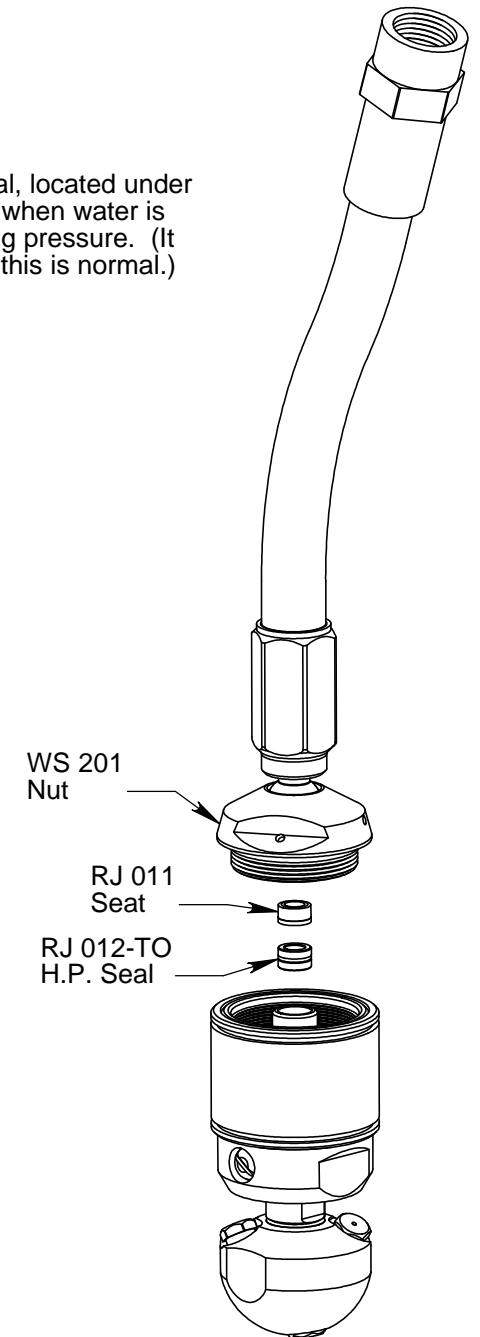
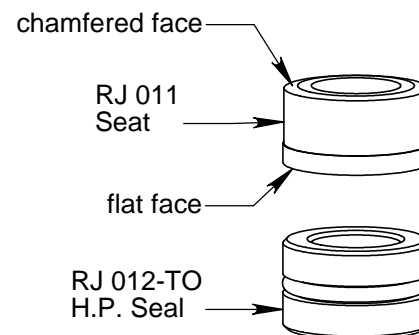
1. Fill the Syringe (BC 410) with viscous fluid. This is best done by unscrewing the handle from the tube and pulling out the plunger. Pour fluid into tube and reassemble.
2. Remove the Port Screw (BJ 026) from the Body. Hold the swivel with the hose tail upward as shown. Thread syringe into port, slowly squeeze fluid into swivel; excess fluid will come out the weep holes. Keep squeezing in new fluid until it comes out clean.
3. Remove syringe; install Port Screw.



The WS-J has a single high pressure seal, located under the Nut and Face. It should be replaced when water is coming out of the weep holes at operating pressure. (It may leak intermittently at tap pressures; this is normal.)

To replace the high pressure seal:

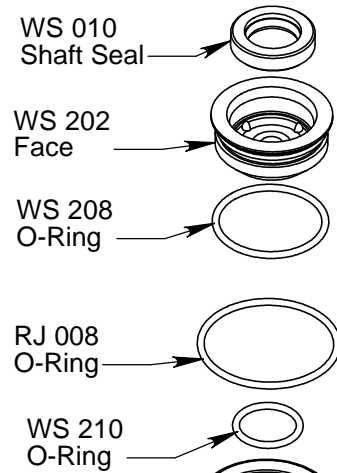
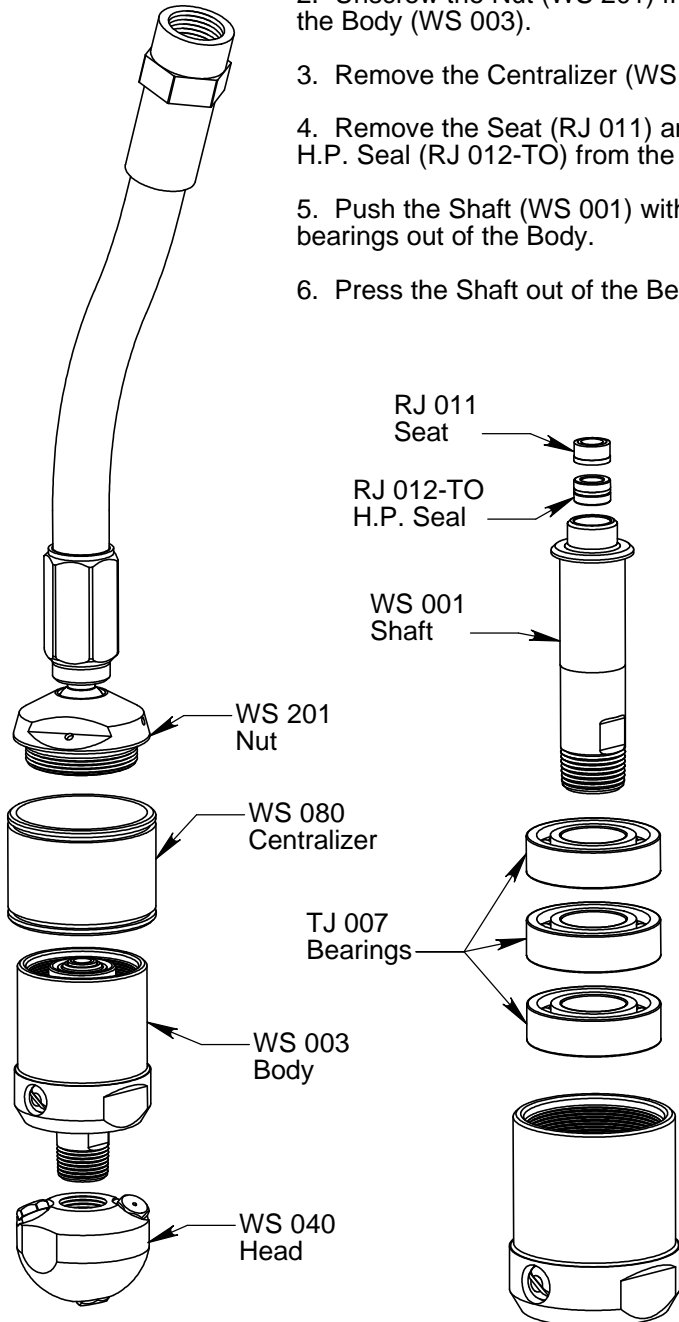
1. Hold Body (WS 003) by flats, unscrew the Nut (WS 201). Lift the Nut off by holding onto the hose; you want to keep this assembly together as much as possible. The Face (WS 202) should also lift out with the Nut and hose assembly; if not, pull the Face out of the Body and insert it into the Nut.
2. Remove Seat (RJ 011) and H.P. Seal (RJ 012-TO) from Shaft bore.
3. Apply grease to new H.P. Seal, push into shaft bore until it is flush with the Shaft end.
4. Place flat side of Seat against H.P. Seal; push both in a little bit but not all the way to the bottom.
5. Thread Nut assembly into Body, tighten to 30 ft-lb.



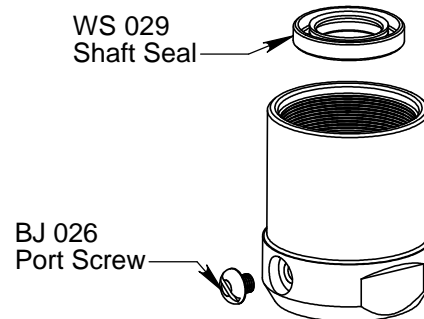
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## 6.1 WS-J DISASSEMBLY INSTRUCTIONS

1. Remove the Head (WS 040).
2. Unscrew the Nut (WS 201) from the Body (WS 003).
3. Remove the Centralizer (WS 080).
4. Remove the Seat (RJ 011) and H.P. Seal (RJ 012-TO) from the Shaft.
5. Push the Shaft (WS 001) with bearings out of the Body.
6. Press the Shaft out of the Bearings.



7. Remove the Face (WS 202) from the Nut.
8. The Shaft Seal (WS 010) can be removed from the Face if it needs replacing.
9. Inspect the O-Rings for damage, replace if necessary.
10. Remove the Shaft Seal (WS 029) from the Body if it is damaged.
11. Remove the Port Screw (BJ 026).

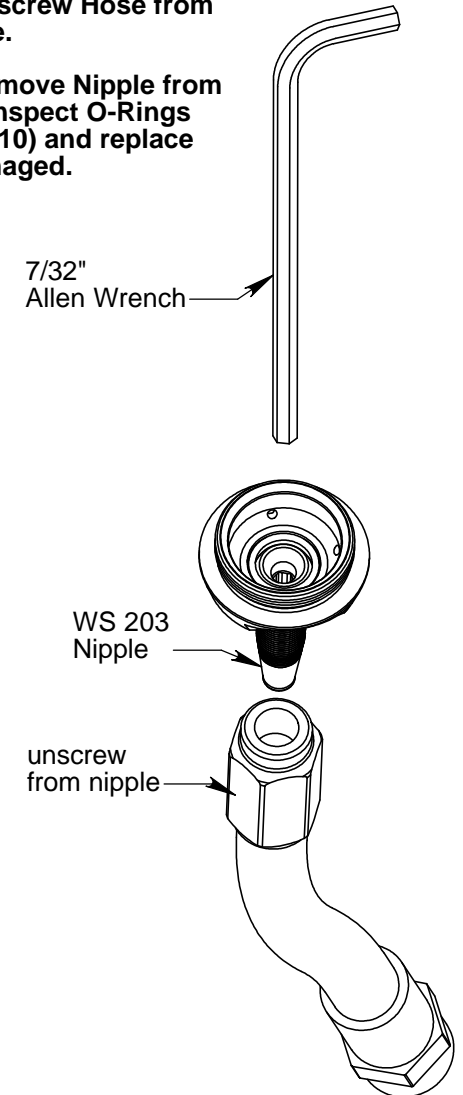


The hose (WS 020) should be replaced if wire braids are broken or frayed. (Do not disassemble hose if you are not replacing it.)

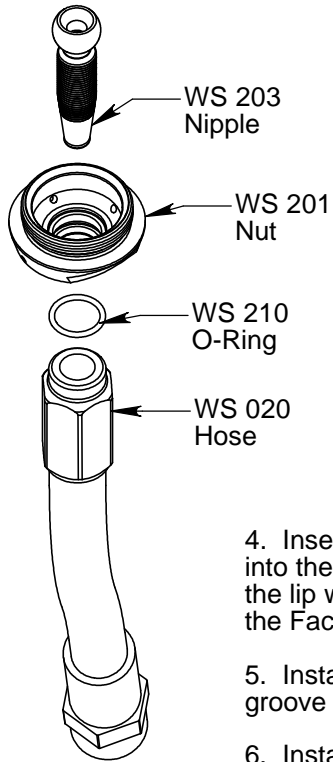
1. Insert 7/32 Allen Wrench into end of Nipple (WS 203).

2. Unscrew Hose from Nipple.

3. Remove Nipple from Nut; inspect O-Rings (WS 210) and replace if damaged.

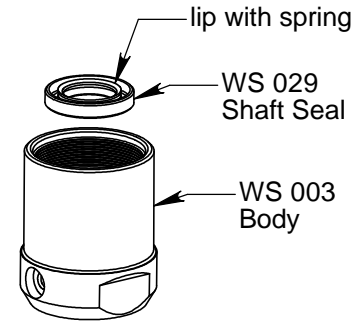
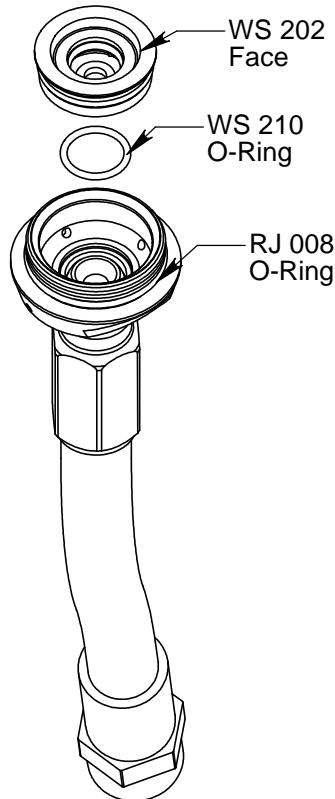
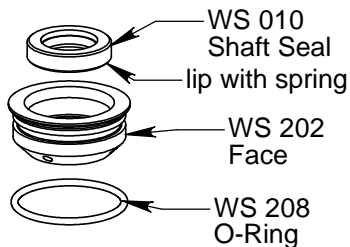


## 6.2 WS-J ASSEMBLY INSTRUCTIONS



1. If the hose assembly is being replaced, begin by inserting O-Ring (WS 210) into the groove inside of the Nut (WS 201). Install the Nipple (WS 203) thru the Nut.
2. Apply a lot of lubricating oil (10W-40 will work) to the threads of the Nipple and inside of the hose.
3. Use a 7/32 Allen Wrench inserted into the ball end of the Nipple to screw on the hose. If it gets very difficult to turn, take it apart and add more oil. Thread hose on nipple until the nipple threads cannot be seen.

4. Insert Shaft Seal (WS 010) into the Face (WS 202) with the lip with spring facing into the Face as shown.
5. Install O-Ring (WS 208) into groove on outside of Face.
6. Install O-Ring (WS 210) into Nut.
7. Push Face into Nut.
8. Install O-Ring (RJ 008) around threads of Nut.



9. Install Shaft Seal (WS 029) into Body (WS 003). The lip with the spring faces up as shown.

10. Press Bearings (TJ 007) onto Shaft (WS 001) one at a time. It is best to push only on the inner race of the bearings.

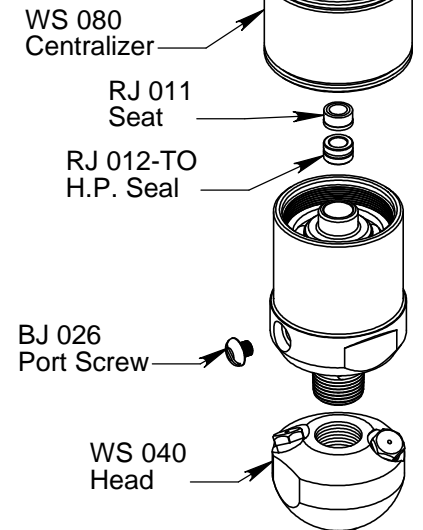
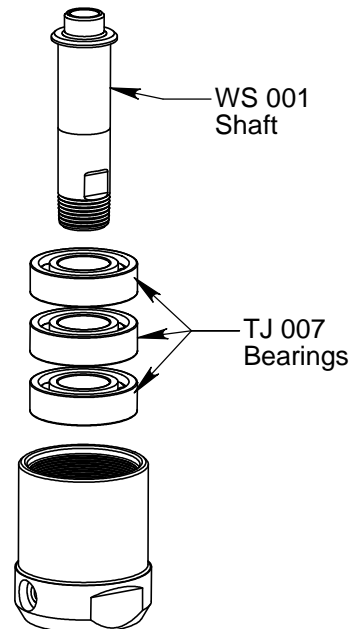
11. Push Shaft/bearing assembly into the Body. It is easiest to turn the shaft to thread the pipe threads thru the shaft seal in Body.

12. Slide the Centralizer (WS 080) onto the Body.

13. Install the H.P. Seal (RJ 012-TO) and Seat (RJ 011) into the shaft bore, as shown in Section 6.0.

14. Thread the Nut assembly into the Body, tighten to 40 ft-lb.

15. Fill the tool with viscous fluid as shown in Section 6.0; install the Port Screw (BJ 026).



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## 6.3 TROUBLESHOOTING GUIDE

<b><u>SYMPTOM</u></b>	<b><u>PROBLEM</u></b>	<b><u>SOLUTION</u></b>
Leaks around weep seal	Worn H.P. seal Worn seat Damaged Inlet Nut	Replace H.P. Seal (RJ 012) Replace Seat (RJ 011) Face or replace Inlet Nut
Seals wear out quickly	Worn seat Worn Shaft bore	Replace Seat (RJ 011) Replace Shaft if bore >.385"
Will not rotate	Not enough jet torque  Internal damage	Check nozzles for plugging or wear. Rotate head by hand, if rough to turn, check bearings.
Water inside tool	Bad H.P. Seal leak Worn shaft seals	Replace H.P. Seal Replace shaft seals
Spins too fast	Low or empty viscous fluid Water in viscous fluid	Refill with viscous fluid. Clean and refill viscous fluid.



## **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.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE AND NEITHER ASSUMES, NOR AUTHORIZES ANY PERSON TO ASSUME FOR STONEAGE, INC. ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. THIS WARRANTY SHALL NOT APPLY TO PRODUCTS OR ANY PARTS THEREOF WHICH HAVE BEEN SUBJECT TO ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, OR MISUSE. STONEAGE, INC. MAKES NO WARRANTY WHATSOEVER IN RESPECT TO ACCESSORIES, PARTS OR PRODUCTS NOT MANUFACTURED BY STONEAGE, INC.

# APPENDIX BJ 048-S VISCOUS FLUID

OSI SPECIALTIES INC — POLYDIMETHYLSILOXANE L-405-12500  
MATERIAL SAFETY DATA SHEET Revision: 1.0 9/27/2000

## MSDS Safety Information

MSDS Date: 9/27/2000  
MSDS Num: 91000000791  
Product ID: L-405-12500  
Chemical Name: Polydimethylsiloxane(inhibited)  
Responsible Party: Mr. Dana Dalrymple  
Name: OSI SPECIALTIES INC  
Address: ONE AMERICAN LANE  
City: GREENWICH CT 06831-2559  
Info Phone Number: 304-652-8446  
Emergency Phone Number: 800-809-9998; 800-424-9300(CHEMTREC)  
Published: Y

## Ingredients

Proprietary: NO  
Ingredient: POLYDIMETHYLSILOXANE  
Ingredient Sequence Number: 01  
Percent: <100%  
CAS Number: 63148-62-9  
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO  
Ingredient: PROPRIETARY inhibitors  
Ingredient Sequence Number: 02  
Percent: <1%  
Trade secret

## Health Hazards Data

LD50-LC50 Mixture: LD50 (ORAL RAT) IS UNKNOWN  
Route Of Entry - Inhalation: NO  
Route Of Entry - Skin: NO  
Route Of Entry - Ingestion: NO  
Health Haz Acute And Chronic: ACUTE & CHRONIC: NO EVIDENCE OF ADVERSE FROM AVAILABLE INFORMATION.  
Carcinogenicity - NTP: NO  
Carcinogenicity - IARC: NO  
Carcinogenicity - OSHA: NO  
Signs/Symptoms Of Overexp: No Adverse Effects.  
Med Cond Aggravated By Exp: None Specified By Manufacturer.  
Emergency/First Aid Proc:  
INGESTION: NO EMERGENCY CARE ANTICIPATED.  
SKIN:WASH WITH SOAP AND WATER.  
INHALATION: NO EMERGENCY CARE ANTICIPATED.  
EYES: FLUSH THOROUGHLY WITH WATER FOR SEVERAL MINUTES.  
NOTES TO PHYSICIAN: THERE IS NO SPECIFIC ANTIDOTE. TREATMENT OF OVEREXPOSURE SHOULD BE DIRECTED AT THE CONTROL OF SYMPTOMS AND THE CLINICAL CONDITION OF THE PATIENT

## Handling and Disposal

## Fire and Explosion Hazard Information

Flash Point: 254°C/(490°F)  
Extinguishing Media: DO NOT SPRAY A SOLID STREAM OF WATER DIRECTLY INTO BURNING LIQUID.  
USE CARBON DIOXIDE, ALCOHOL FOAM, OR DRY CHEMICAL.  
Special Fire Fighting Proc: WEAR SELF CONTAINED BREATHING APPARATUS.  
CONTAIN RUNOFF.  
Unusual Fire And Expl Hazrds: MAY CAUSE FLOATING FIRE HAZARD

## Control Measures

Respiratory Protection: NONE EXPECTED TO BE REQUIRED.  
Protective Gloves: 4H, BUTYL, NEOPRENE, NITRILE(NBR), PVC COATED  
Eye Protection: SAFETY GLASSES  
Work Hygienic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES. DO NOT WEAR CONTAMINATED CLOTHING OR FOOTWEAR.  
Other Protective Equipment: SAFETY SHOWER, EYE BATH

Physical/Chemical Properties

Appearance:  
Physical state: Clear to Hazy Liquid  
Color: Yellow  
Odor: Mild  
Other Properties:  
Boiling Point: >250°C @STP unless specified below  
Melting Point: <-50°C @ STP unless specified below  
pH: N/A  
Spec Gravity: 0.9738@25°C  
Vapor Pres: <1.33hPa (1.00mmHg) @20°C  
Vapor Density: Heavier Than Air  
Solubility in Water: Insoluble  
Evaporation Rate: <1  
Flash Point: >254°C / >490°F  
Upper Explosion Limit: N/A  
Lower Explosion Limit: N/A  
Percent Volatile: Not Determined  
Molecular Weight: Polymer

Reactivity Data

Stability: Stable  
Stability Condition To Avoid: None Known.  
Materials To Avoid: Strong oxidizing agents  
Hazardous Combustion Products:  
Burning Can Produce The Following Combustion Products:  
OXIDES OF CARBON, OXIDES OF SILICON, FORMALDEHYDE, CARBON MONOXIDE IS  
HIGHLY TOXIC IF INHALED; CARBON DIOXIDE IN SUFFICIENT CONCENTRATIONS CAN  
ACT AS AN ASPHYXIANT.  
ACUTE OVEREXPOSURE TO THE PRODUCTS OF COMBUSTION MAY RESULT IN  
IRRITATION OF THE RESPIRATORY TRACT.  
Hazardous Polymerization: Will Not Occur.  
Conditions To Avoid Polymerization: None Known.

Toxicological Information

No information relevant to human health hazard evaluation is currently available

Ecological Information

Prevent Runoff  
Use Absorbent To Clean Up

MSDS Transport Information

This product is not regulated by the DOT, IMDG, ICAO.  
Freight description road: OIL, O/T PETROLEUM, LUBRICATING, NOIBN

Regulatory Information

CERCLA; None  
SARA; None  
MSL; None  
EPA; None  
California Prop 65; None  
California SCAQMD; VOC=>0.5mmHg@ 104°C / 219.2°F \*\*Not determined\*\*

Other Information

Chemical Inventory  
Europe: The ingredients of this mixture are on the EINECS inventory.  
United States: The ingredients of this product are listed on the TSCA  
inventory or are exempt.

HAZCOM Label

Product ID: POLYDIMETHYLSILOXANE L-45-12500  
Supplier: Crompton Corporation  
Street: One American Lane  
City: Greenwich, CT  
Zipcode: 06831-2559, USA  
Health Emergency Phone: 800-809-9998;800-424-9300(CHEMTREC)  
Label Required: Yes  
Health Hazard: 0  
Flammability: 1  
Reactivity: 0  
PPE: X