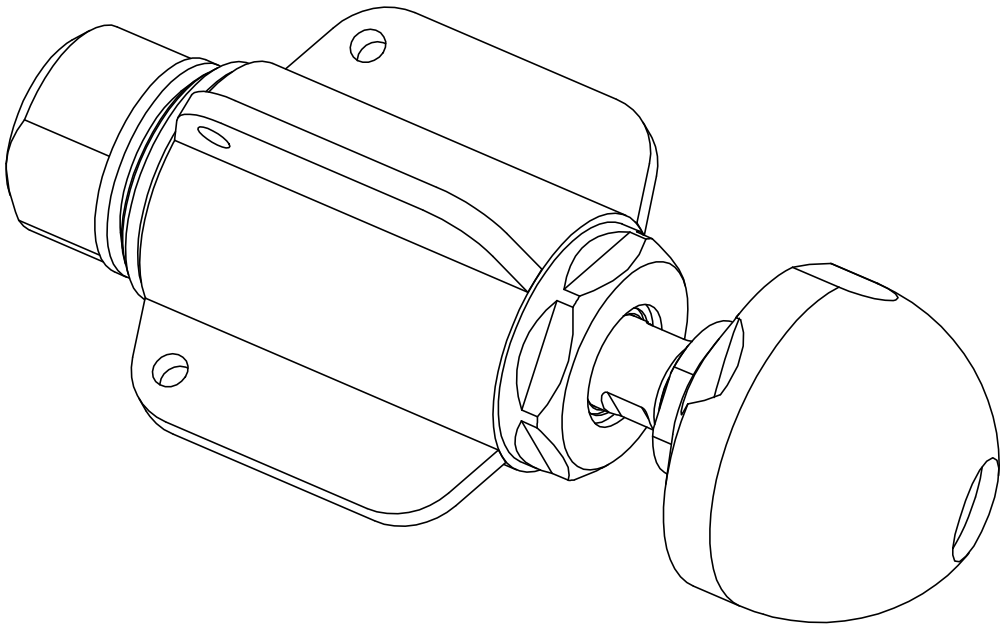
ROTARY SEWER NOZZLE

WARTHOG 1/2" & 3/4"

OPERATION AND MAINTENANCE MANUAL



StoneAge™
WATERJET TOOLS

54 Girard St. Durango, Colorado 81303 (970) 259-2869 Phone (970) 259-2868 Fax
www.stoneagetools.com sales@stoneagetools.com

06/02

TABLE OF CONTENTS

1.0 INTRODUCTION
2.0 SAFETY WARNING
3.0 DESCRIPTION
4.0 PARTS LIST
5.0 ASSEMBLY DRAWING
6.0 MAINTENANCE
7.0 WARRANTY
APPENDIX
A. Viscous Fluid Material Safety Data Sheet

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

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 The length of the tool and end fitting on hose should be equal to or greater than the inside diameter of the pipe to be cleaned. If not, use pipe between the hose end and the tool.
2.8 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.
2.9 Position the tool two feet or more into the line before going up to operating pressure.
2.10 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.
2.11 Build pressure slowly to ensure tool is positioned and functioning properly.
2.12 Do not exceed the maximum operating pressure specified for any component in a system.
2.13 Avoid operator/personnel positioning in possible path of out of control tool.
2.14 Turn off and secure pump before removing tool from line.

3.0 DESCRIPTION

The **Warthog 1/2" and 3/4"** Rotary Sewer Nozzle was designed for waterblast cleaning of pipes and sewer lines. Jet thrust powers rotation of the head and pulls the tool thru the line. The Warthog 1/2" has a 1/2" npt threaded inlet; the Warthog 3/4" has a 3/4" npt threaded inlet. The rest of the assembly has the same components, and the two types of Inlet Nut are interchangeable. The tool is constructed of stainless steel for corrosion resistance.

The swivel is a straight flow through design with a single high pressure seal. The Warthog 1/2" and 3/4" is capable of working pressures up to 8000 psi and flow rates of 14 to 40 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

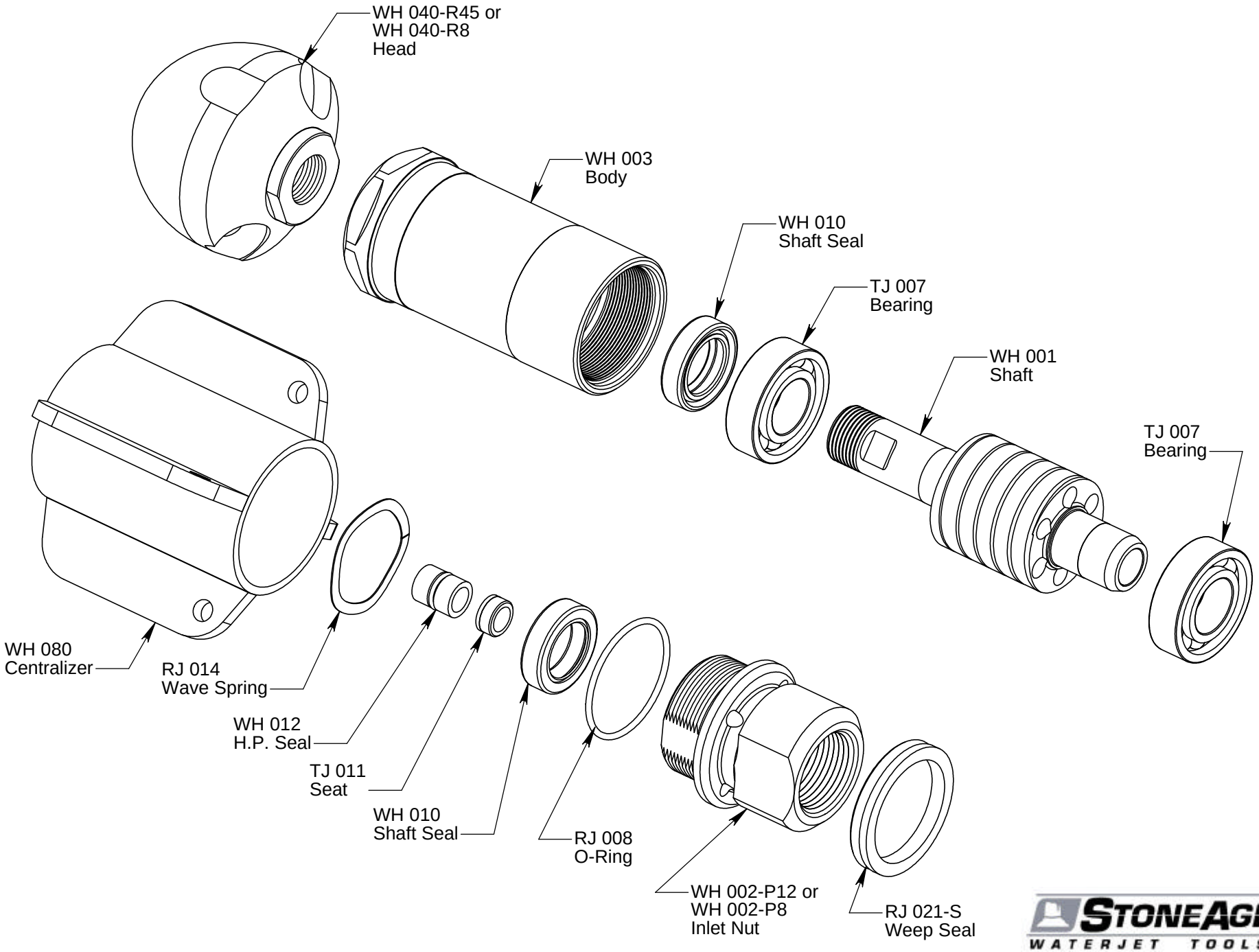
Part #	Description	Qty
RJ 008	O-Ring	1
RJ 014	Wave Spring	1
RJ 021-S	Weep Seal	1
TJ 007	Bearing	2
TJ 011	Seat, brass	1
WH 001	Shaft	1
WH 002-P8	Inlet Nut, 1/2 npt inlet	1*
WH 002-P12	Inlet Nut, 3/4 npt inlet	1*
WH 003	Body	1
WH 010	Shaft Seal	2
WH 012-O	H.P. Seal w/O-Ring	1
WH 040-R45	Head, .45 offset	1*
WH 040-R8	Head, .8 offset	1*
WH 080	Centralizer	1

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

Also available separately:

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

5.0 WH EXPLODED ASSEMBLY DRAWING



6.0 WH MAINTENANCE

The most important item in maintaining the Warthog is keeping the tool full of viscous fluid.

The tool also has a high pressure seal and seat that will need to be replaced if the tool begins to leak water from under the Weep Seal (RJ 021-S). The tool may leak water at low pressure intermittently, but if it leaks at or near operating pressure, it is time to change the seal.

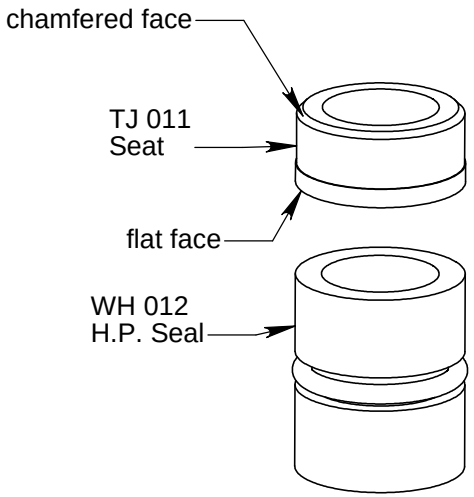
To service the viscous fluid and high pressure seal:

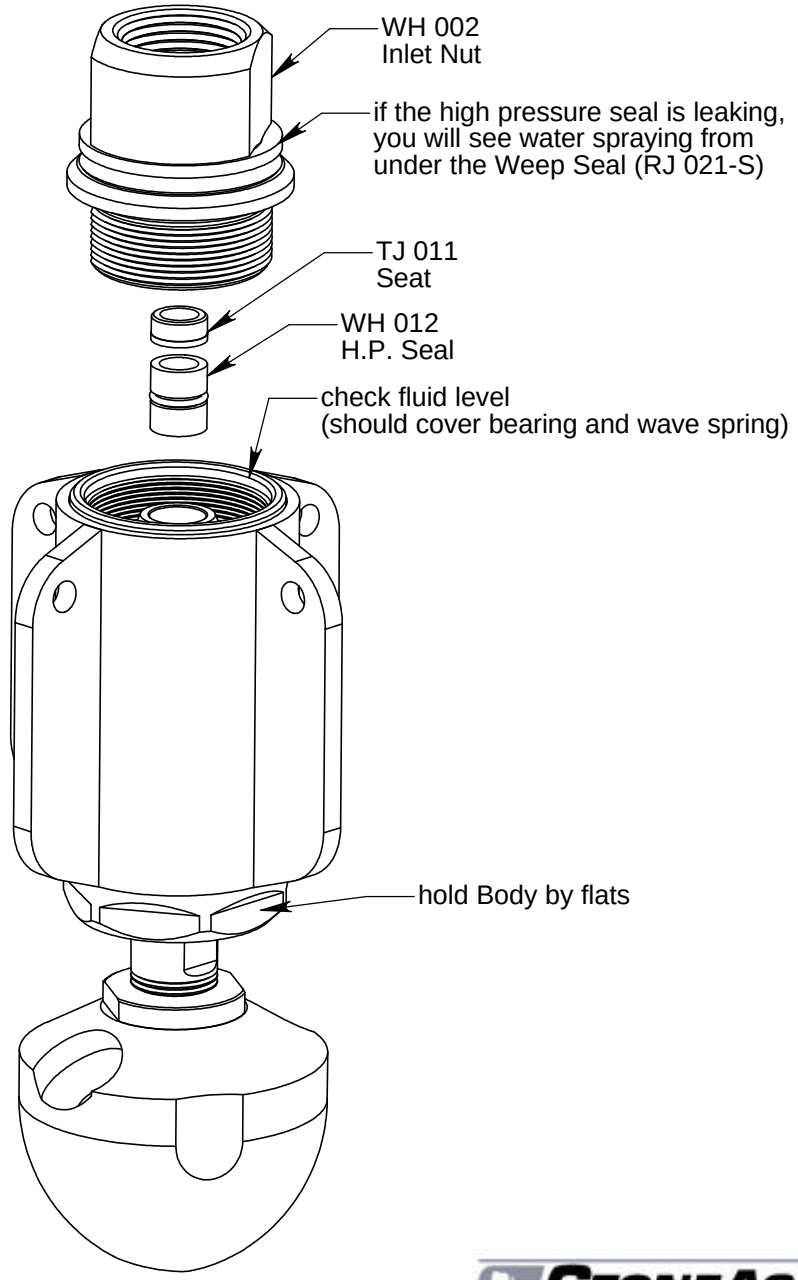
1. Unscrew the Inlet Nut (WH 002) from the Body. Hold the Body by the flats near the head.

2. Check the fluid condition and level. If the fluid appears to have water contamination or is very dirty, we recommend further disassembly of the tool to clean out the old fluid. Otherwise, drain out as much of the old fluid as possible and add new viscous fluid to cover the top bearing and wave spring.

3. Remove the Seat (TJ 011) and Seal (WH 012) from the bore of the Shaft. Apply grease to a new H.P. Seal and install in the bore. Install a new seat on top of the seal, with the flat face of the Seat facing toward the Seal, as shown below.

4. Apply anti-seize to the threads of the Inlet Nut and thread into the Body. Make sure that the seat stays centered in the bore of the Shaft. Tighten to 40 ft-lb torque.





6.1 WH DISASSEMBLY INSTRUCTIONS

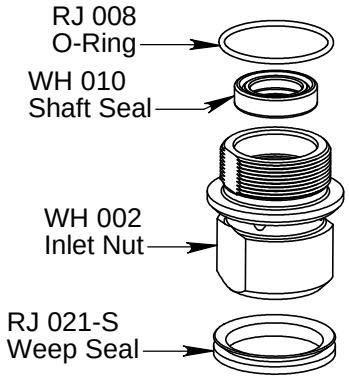
To disassemble the Warthog:

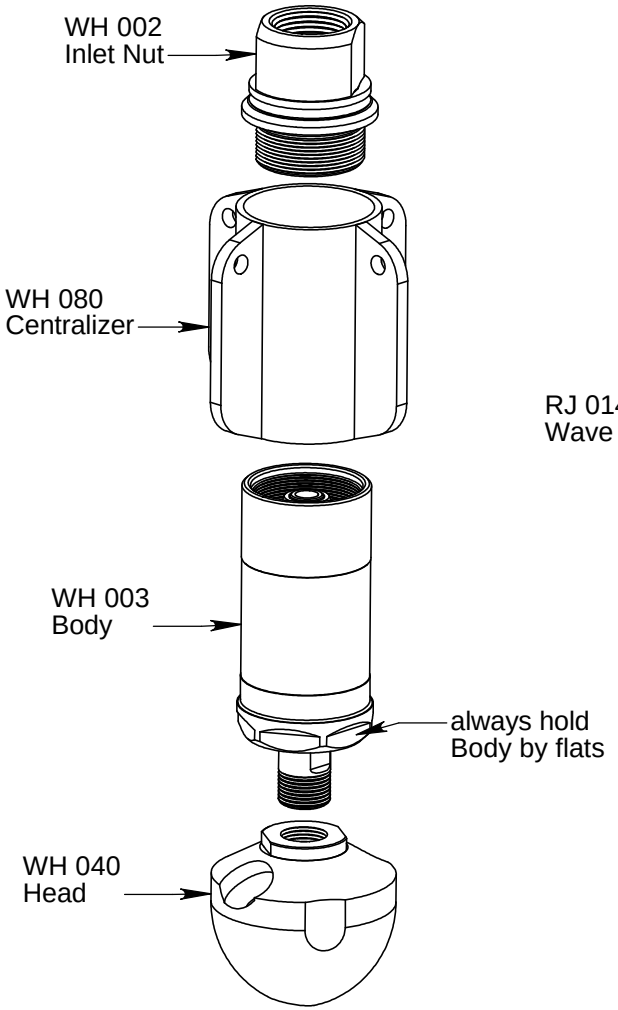
1. Unscrew the Head (WH 040) from the Shaft.

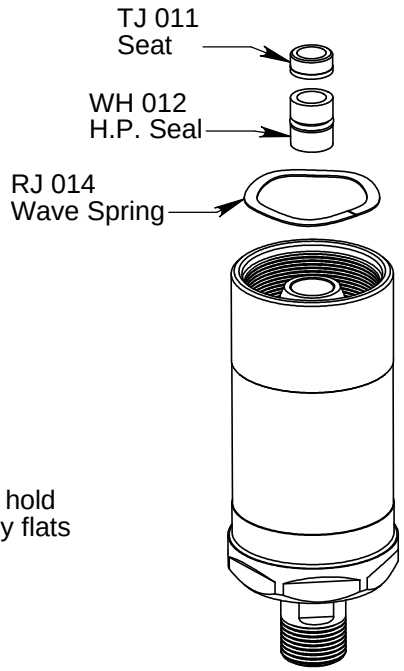
2. Unscrew the Inlet Nut (WH 002) from the Body (WH 003). Always hold Body by flats. Pull off the Centralizer (WH 080).

3. Remove the O-Ring (RJ 008) and Weep Seal (RJ 021-S) from the Inlet Nut.

4. Remove the Shaft Seal (WH 010) from the Inlet Nut if it appears damaged.







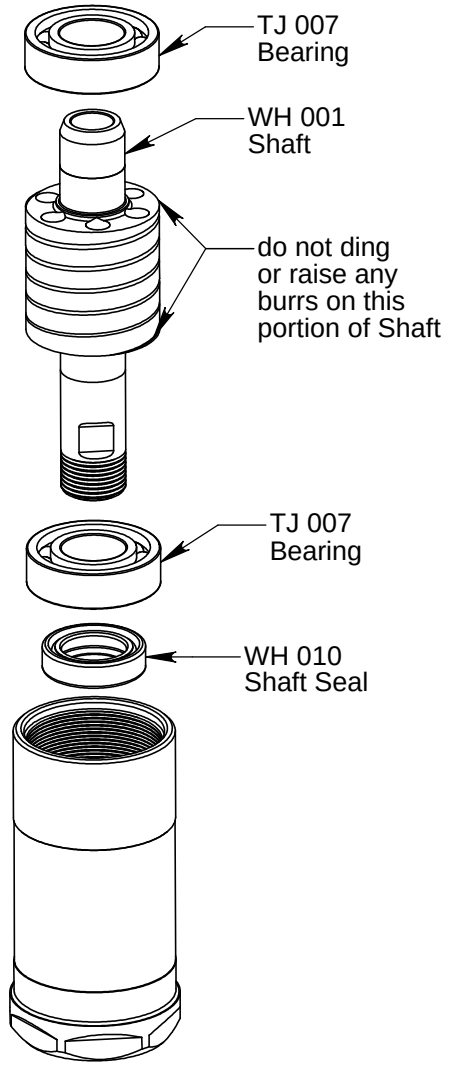
5. Remove the Seat (TJ 011) and Seal (WH 012) from the Shaft bore.

6. Remove the Wave Spring (RJ 014) from the Body.

7. Push the Shaft (WH 001) out of the Body.

8. Remove the Shaft Seal (WH 010) from the Body if it appears damaged.

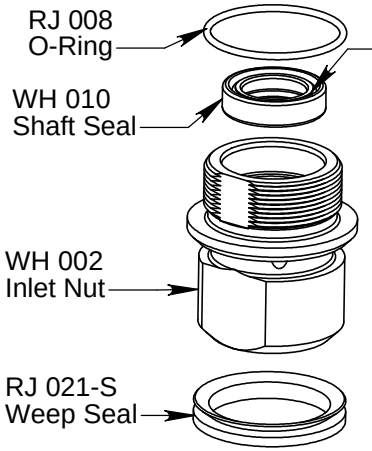
9. Carefully pry the Bearings (TJ 007) off of the Shaft. Make sure not to raise any burrs on the large diameter portion of the Shaft with the groove.

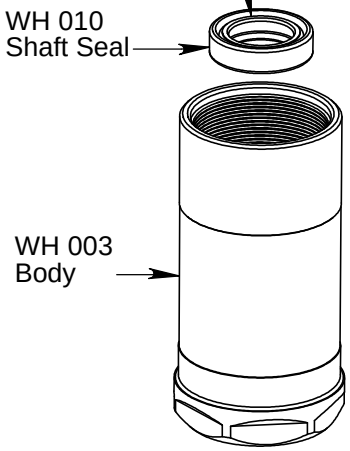


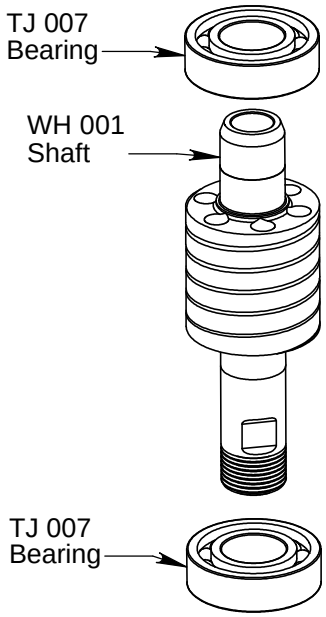
6.2 WH ASSEMBLY INSTRUCTIONS

1. Install Shaft Seals (WH 010) in the Body (WH 003) and Inlet Nut (WH 002). Both seals are installed so the lip with the spring faces up when installing. Apply grease to the lips of the seals.

2. Install the O-Ring (RJ 008) and Weep Seal (RJ 021-S) on the Inlet Nut.



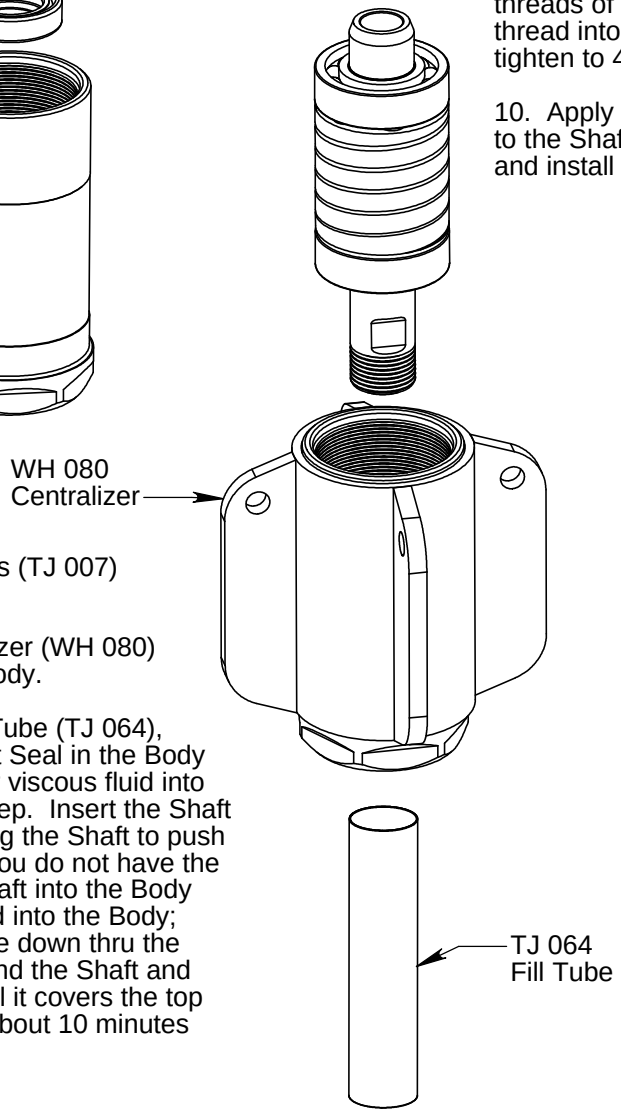




3. Press the Bearings (TJ 007) onto the Shaft.

4. Place the Centralizer (WH 080) over the outside of Body.

5. If you have a Fill Tube (TJ 064), insert it thru the Shaft Seal in the Body about 2 inches. Pour viscous fluid into the Body about 1" deep. Insert the Shaft into the Body, allowing the Shaft to push out the Fill Tube. If you do not have the fill tube, insert the Shaft into the Body and pour viscous fluid into the Body; allow the fluid to settle down thru the top bearing and around the Shaft and keep adding fluid until it covers the top bearing. It will take about 10 minutes to get the tool full.



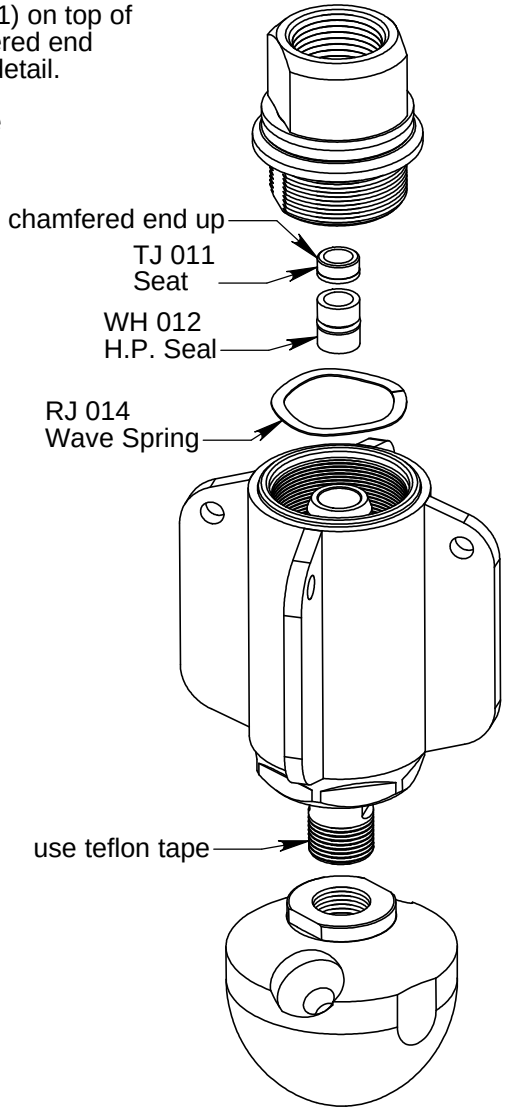
6. Place the Wave Spring (RJ 014) on top of the bearing. Add more viscous fluid until the wave spring is covered.

7. Apply grease to the H.P. Seal (WH 012) and insert into bore of Shaft.

8. Place the Seat (TJ 011) on top of the Seal, with the chamfered end up. See Section 6.0 for detail.

9. Apply anti-seize to the threads of the Inlet Nut; thread into Body and tighten to 40 ft-lb.

10. Apply tefon tape to the Shaft threads and install head.



6.3 TROUBLESHOOTING GUIDE

SYMPTOM	PROBLEM	SOLUTION
Leaks around weep seal	Worn H.P. seal	Replace H.P. Seal (WH 012)
	Worn seat	Replace Seat (TJ 011)
	Damaged Inlet Nut	Face or replace Inlet Nut
Seals wear out quickly	Worn seat	Replace Seat (TJ 011)
	Worn Shaft bore	Replace Shaft if bore >.448”
Will not rotate	Not enough jet torque	Check nozzles for plugging or wear.
	Internal damage	Rotate head by hand, if rough to turn, check bearings.
Water inside tool	Bad H.P. Seal leak	Replace H.P. Seal
	Worn shaft seals	Replace shaft seals
Spins too fast	Low or empty viscous fluid	Refill with viscous fluid.
	Water in 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 O48-F VISCOUS FLUID

OSI SPECIALTIES INC — POLYDIMETHYLSILOXANE L-405-2000
MATERIAL SAFETY DATA SHEET Revision: 1.0 9/27/2000
==========
MSDS Safety Information
==========
MSDS Date: 9/27/2000
MSDS Num: 491
Product ID: L-405-2000
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: 0.9729@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-45-2000
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
==========