

JET PUMP

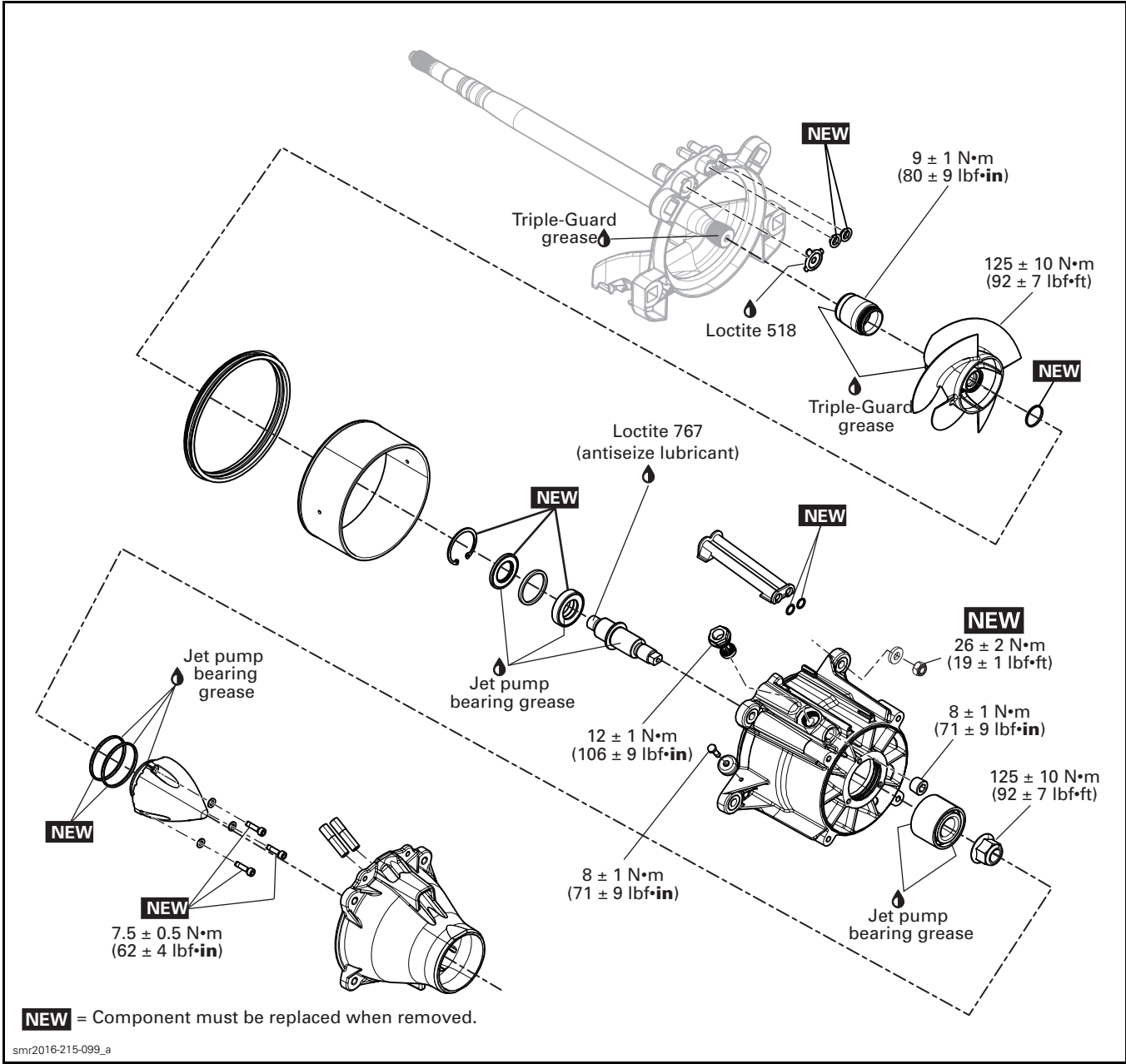
SERVICE TOOLS

Description	Part Number	Page
IMPELLER REMOVER/INSTALLER.....	529 035 956	9, 11, 15
IMPELLER SHAFT BEARING TOOL	529 036 168	12–13
IMPELLER SHAFT PUSHER.....	529 035 955	12–13
PRESSURE CAP	529 036 172	4
PUMP PLATE.....	529 036 224	5
SEAL/BEARING PUSHER.....	529 035 819	14
VACUUM/PRESSURE PUMP	529 021 800	4

SERVICE PRODUCTS

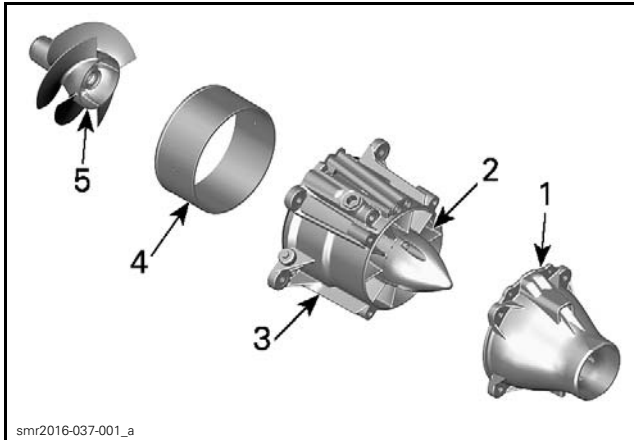
Description	Part Number	Page
JET PUMP BEARING GREASE	293 550 032	8, 13, 15
LOCTITE 518.....	293 800 038	7
LOCTITE 577 (THREAD SEALANT)	293 800 050	11
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Subsection XX (JET PUMP)



GENERAL

JET PUMP MAIN COMPONENTS



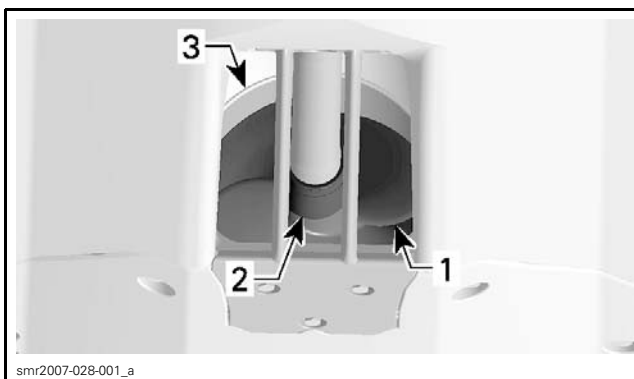
TYPICAL

1. Venturi
2. Stator
3. Jet pump housing
4. Wear ring
5. Impeller

INSPECTION

IMPELLER CONDITION

Condition of impeller, impeller boot and wear ring can be quickly checked from underneath the watercraft. With the vehicle on the trailer, use a flashlight to visually inspect them through the inlet grate.



TYPICAL — UNDERNEATH HULL

1. Impeller
2. Impeller boot
3. Wear ring

IMPELLER/WEAR RING CLEARANCE

This clearance is critical for jet pump performance. To check clearance, remove jet pump.

Using a feeler gauge, measure clearance between impeller blade tip and wear ring. Measure each blade at its center.



MODEL	MAXIMUM WEAR CLEARANCE
All models	0.35 mm (.014 in)

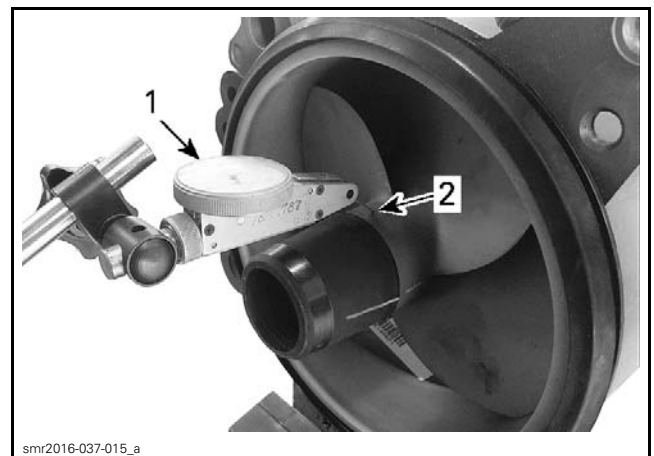
IMPELLER SHAFT RADIAL PLAY

Radial play is critical for jet pump life span.

To check radial play, remove jet pump.

Make sure impeller shaft turns freely and smoothly.

1. Retain housing in a soft jaw vise making sure not to damage housing lug.
2. Set a dial gauge and position its tip onto metal end, close to the end of the impeller hub.
3. Move shaft end up and down. Difference between highest and lowest dial gauge reading is radial play.



TYPICAL — MEASURING IMPELLER SHAFT RADIAL PLAY

1. Dial gauge
2. Measure close to impeller hub end

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RADIAL PLAY
0.5 mm (.02 in)

Excessive play can come either from worn bearing or damaged jet pump housing bearing surface.

LEAK TEST

Whenever performing any type of repair on the jet pump, a leak test should be carry out.

Proceed as follows:

- 1. Remove impeller cover. Refer to *IMPELLER COVER* in this subsection.
- 2. Install the PRESSURE CAP (P/N 529 036 172) on pump housing.



- 3. Connect the VACUUM/PRESSURE PUMP (P/N 529 021 800) to the pressure cap fitting.



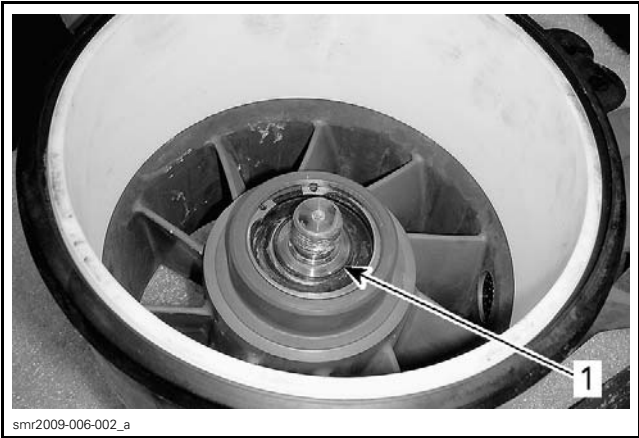
TYPICAL

- 4. Pressurize pump.

LEAK TEST PRESSURE
Maximum 70 kPa (10 PSI)

- 5. Pump must maintain this pressure for at least 5 minutes.

NOTE: If there is 2 or 3 bubbles coming out from the seal on the impeller side it is acceptable. Leaks from other areas must be repaired.



TYPICAL

1. Small leak here is acceptable

NOTICE Repair any leak. Failure to correct a leak will lead to premature wear of pump components.

- 6. Disconnect pump and remove pressure cap.
- 7. Reinstall impeller cover. Refer to *IMPELLER COVER* in this subsection.

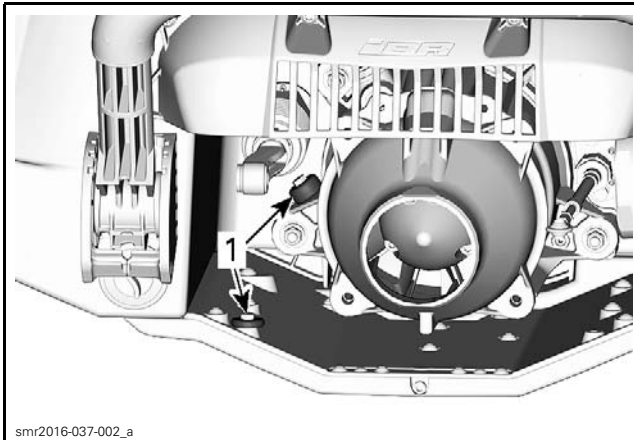
PROCEDURES

NOTE: Whenever removing a part, visually check for damage such as: corrosion, cracks, split, break, porosity, cavitation, deformation, distortion, heating discoloration, wear pattern, defective plating, missing or broken balls in ball bearing, water damage diagnosed by black-colored spots on metal parts, etc. Replace any damaged parts. As a quick check, manually feel clearance and end play, where applicable, to detect excessive wear.

SACRIFICIAL ANODE

Inspecting the Sacrificial Anode

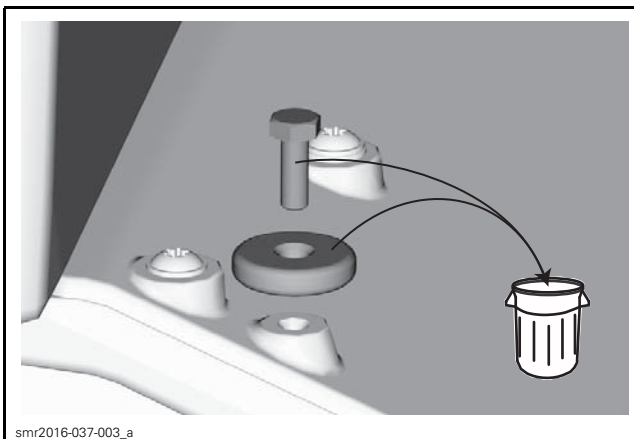
Check for wear. If worn more than half, replace anode.



1. Sacrificial anode location

Removing the Sacrificial Anode

Remove and discard screw and anode.



Installing the Sacrificial Anode

Installation is the reverse of the removal procedure.

TIGHTENING TORQUE

Sacrificial anode screw	8 N•m ± 1 N•m (71 lbf•in ± 9 lbf•in)
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VENTURI

Removing the Venturi

1. Remove the iBR gate, VTS trim ring and nozzle. Refer to *iBR, REVERSE AND VTS* subsection.
2. Remove the venturi from the jet pump housing.

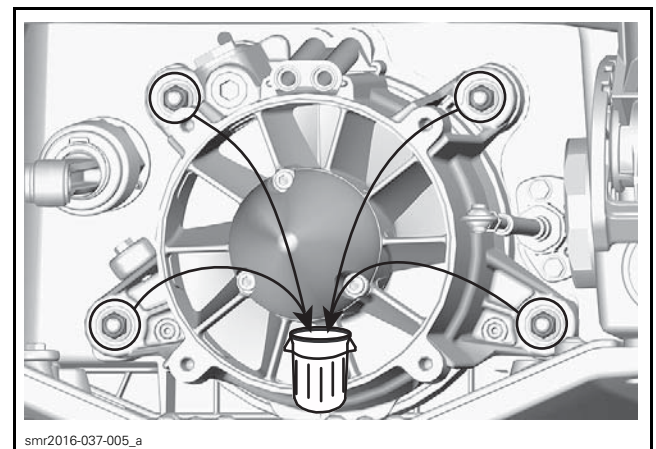
Installing the Venturi

The installation is the reverse of the removal procedure.

JET PUMP HOUSING

Removing the Jet Pump Housing

1. Remove the iBR gate, VTS trim ring and nozzle. Refer to *iBR, REVERSE AND VTS* subsection.
2. Remove the venturi.
3. Remove and discard the nuts that retain the jet pump to the pump support.



4. Pull back jet pump housing to remove it from the pump support. It may be necessary to wiggle it slightly as you pull back on the pump.

Temporarily fasten the PUMP PLATE (P/N 529 036 224) to pump support to support drive shaft and avoid PTO oil seal damage.

Subsection XX (JET PUMP)

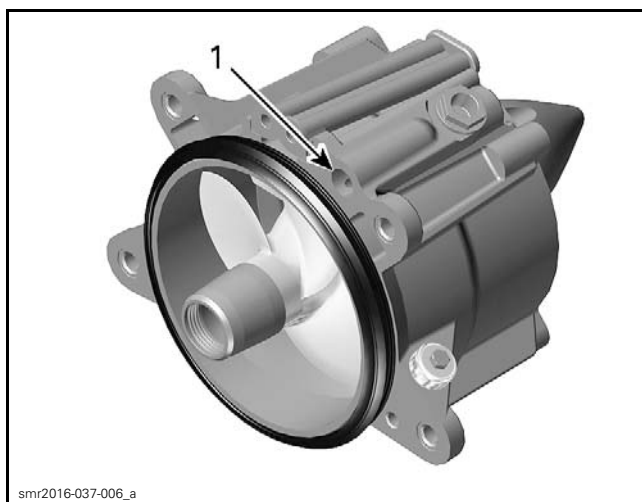


Inspecting and Cleaning the Jet Pump Housing

1. Visually inspect jet pump housing. Pay attention to the stator. Ensure the assembly is clean and free of any debris and defects.

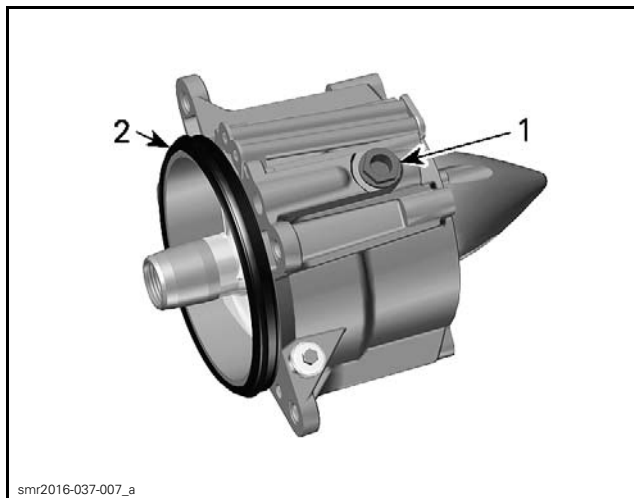
Do the following as applicable.

2. Blow low pressure compressed air through the pressure outlet fitting and make sure it is clear.



1. Pressure outlet

3. Ensure cap screw is tight.
4. Ensure the neoprene seal is in good condition. Replace as required.



1. Cap screw
2. Neoprene seal

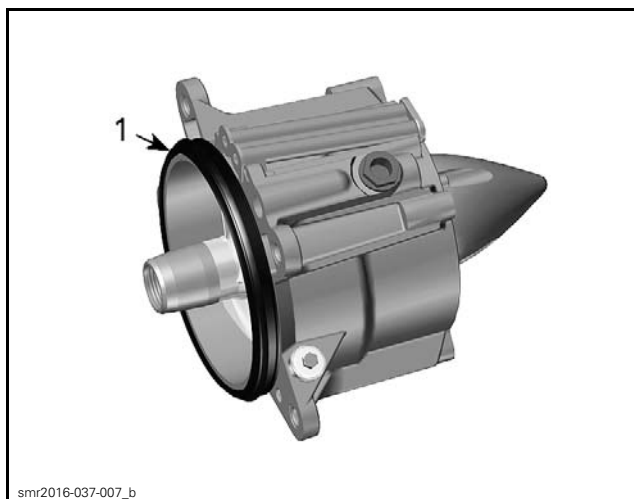
Installing the Jet Pump Housing

Clean impeller splines and drive shaft splines with PULLEY FLANGE CLEANER (P/N 413 711 809) or equivalent. Splines must be free of any residue.

NOTICE To avoid damaging the drive shaft finish, never use a metallic brush.

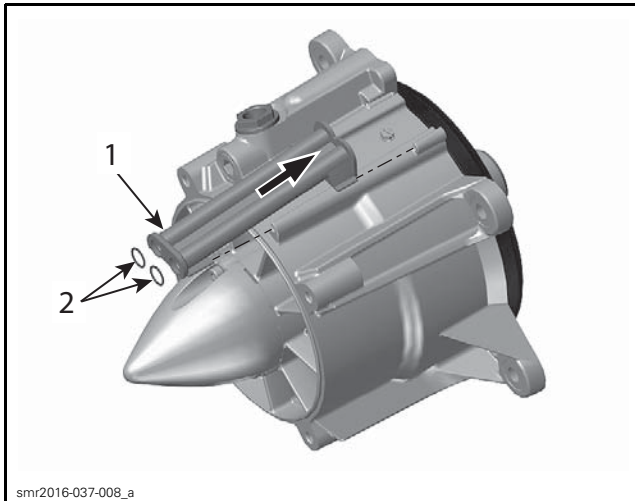
Lubricate drive shaft splines, impeller splines and the inside of the impeller boot with TRIPLE-GUARD GREASE (P/N 296 000 329).

Ensure the neoprene seal is properly installed on the jet pump.



1. Neoprene seal

Install new O-rings then slide water outlet adapter onto pump.



1. Slide adapter onto pump
2. New O-rings here

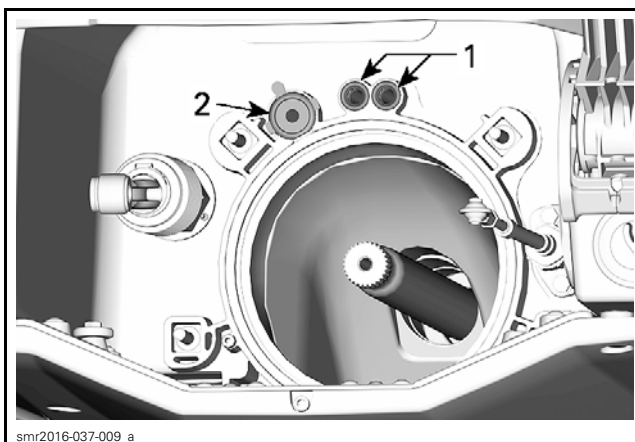
Install new O-rings on pump support.

The water flow is controlled by a calibrated reducer. Ensure to install the proper reducer.

Apply a thin layer of LOCTITE 518 (P/N 293 800 038) on the rounded portion of the reducer to hold it against the support.

REDUCER	
ENGINE	COLOR CODE
All models	Green

NOTICE Improper reducer can cause overheating and damage to exhaust system.



1. Install new O-rings
2. Calibrated reducer

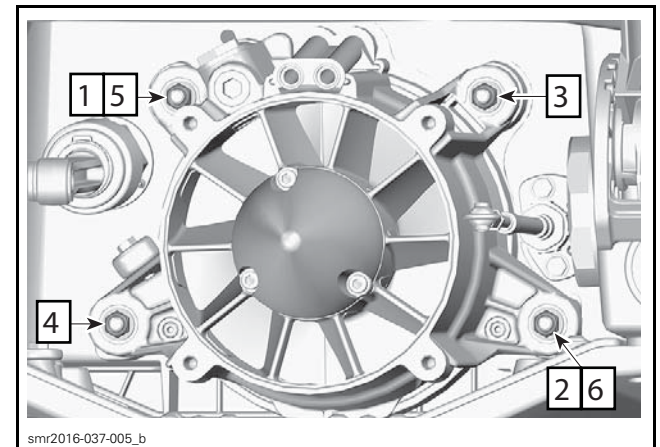
Generously apply TRIPLE-GUARD GREASE (P/N 296 000 329) on drive shaft splines.

Install jet pump.

NOTE: If necessary, wiggle jet pump to engage drive shaft splines in impeller.

Install new nuts and torque as per table and the illustrated sequence.

TIGHTENING TORQUE	
Jet pump nuts	26 N•m ± 2 N•m (19 lbf•ft ± 1 lbf•ft)

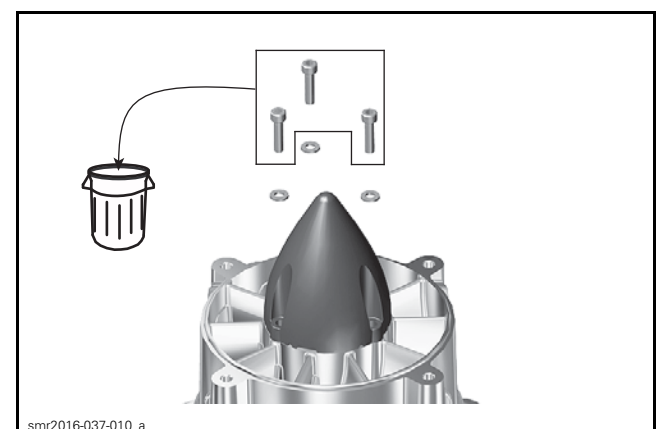


NOTE: Slightly lubricate wear ring with XPS LUBE (P/N 293 600 016) to minimize friction during initial impeller start.

IMPELLER COVER

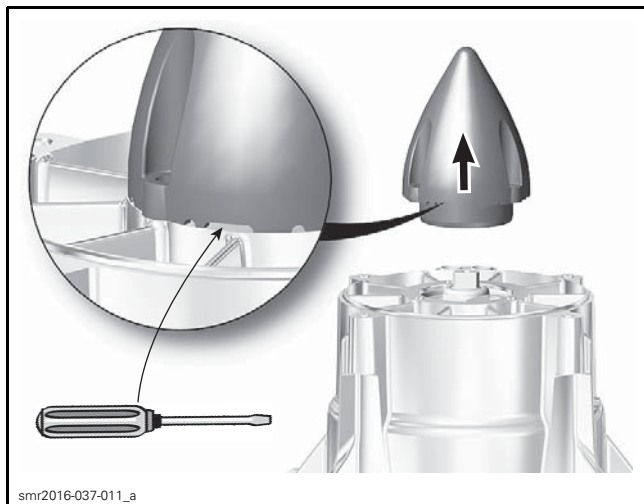
Removing the Impeller Cover

1. Remove the jet pump housing.
2. With pump housing in vertical position, remove and discard the 3 retaining screws.

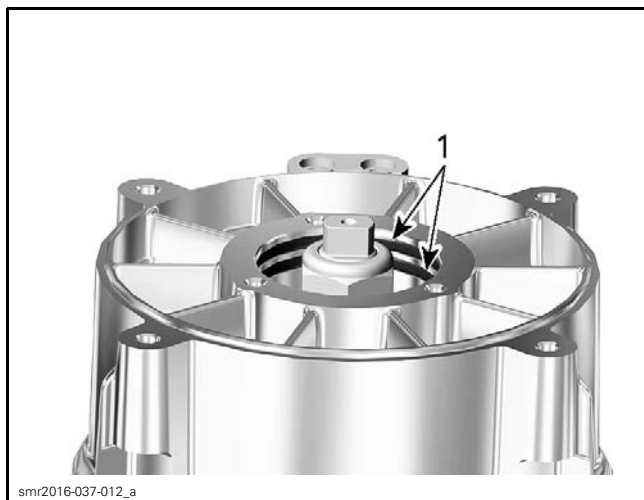


3. Using a fiber hammer, gently tap impeller cover to help release it from the jet pump housing.
4. Use a flat screwdriver in the slots provided as pry points to remove it from the jet pump housing.

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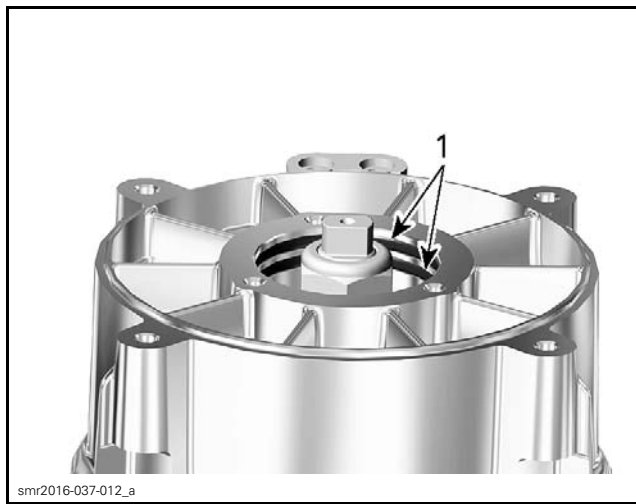
5. Remove both cover O-rings.



1. Cover O-rings

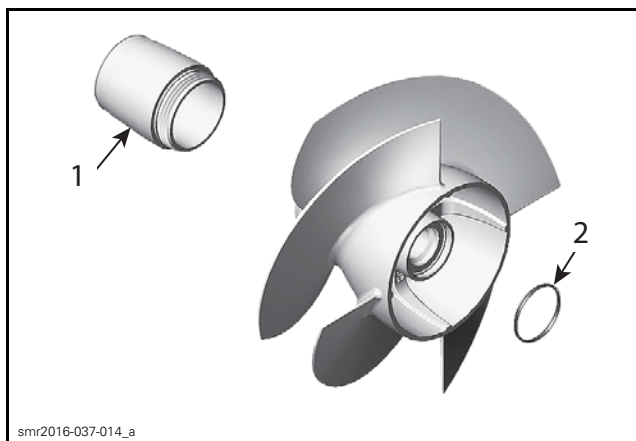
Inspecting the Impeller Cover

Check for presence of water in cover and bearing area. If water is found, replace O-rings and/or impeller cover.



1. Cover O-rings

Check impeller boot and O-rings condition on impeller. Replace as required.

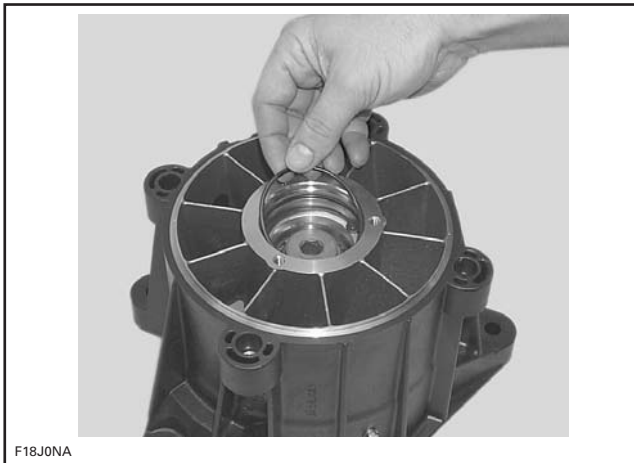


1. Impeller boot
2. Impeller O-ring

Perform a leak test. Refer to *LEAK TEST* in this subsection.

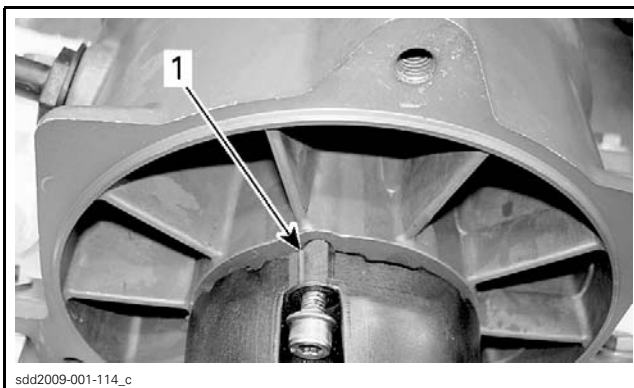
Installing the Impeller Cover

1. Apply a thin layer of JET PUMP BEARING GREASE (P/N 293 550 032) in O-ring grooves.
2. Install O-rings in their respective groove and make sure they are properly lubricated.



TYPICAL

3. Install impeller cover by aligning the cover index mark with the pump top fin as shown.



1. Align mark with top fin

NOTE: Cover can only be installed in one position as screw holes are not located symmetrically.

4. Secure cover with **NEW** self-locking screws.

NOTE: Push cover against pump housing while alternately tightening screws. Make sure O-rings are positioned correctly and they are not damaged when pushing the cover.

TIGHTENING TORQUE	
Cover screw	7.5 N•m ± 0.5 N•m (66 lbf•in ± 4 lbf•in)

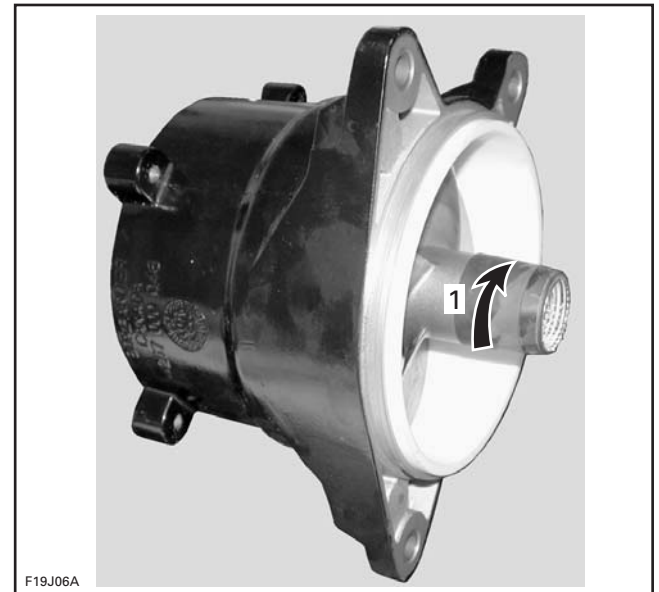
IMPELLER

Removing the Impeller

NOTE: If impeller shaft is to be disassembled, loosen the impeller shaft nut prior to removing the impeller.

1. Remove jet pump housing. Refer to *JET PUMP HOUSING* in this subsection.

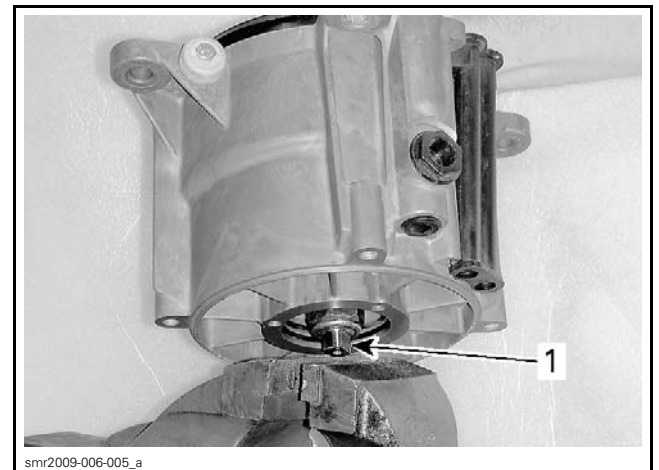
2. Remove impeller cover. Refer to *IMPELLER COVER* in this subsection.
3. Remove impeller boot by turning it **clockwise** (LH threads).



TYPICAL

1. Unscrew clockwise

4. Mount the flat sides of impeller shaft in a vise.



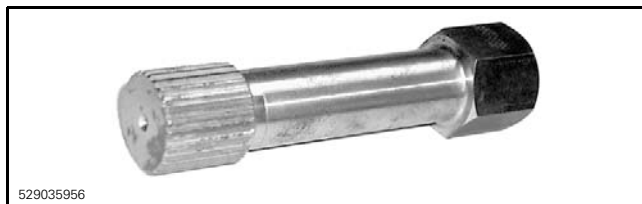
TYPICAL

1. Flat side

5. Unscrew the impeller counterclockwise using the required tool.

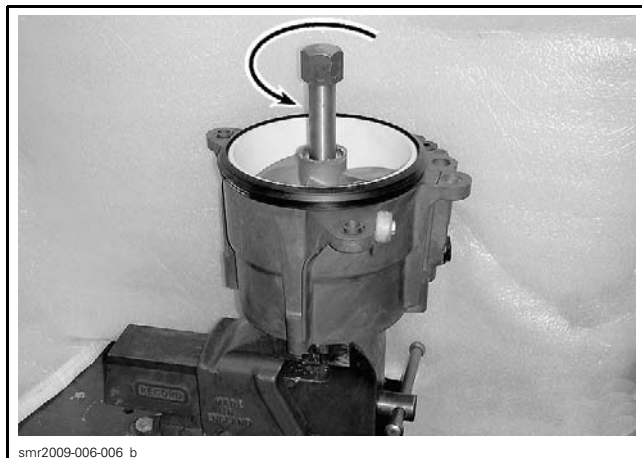
REQUIRED TOOL
IMPELLER REMOVER/INSTALLER (P/N 529 035 956)

Subsection XX (JET PUMP)



TYPICAL

NOTICE Never use an impact wrench to loosen impeller.

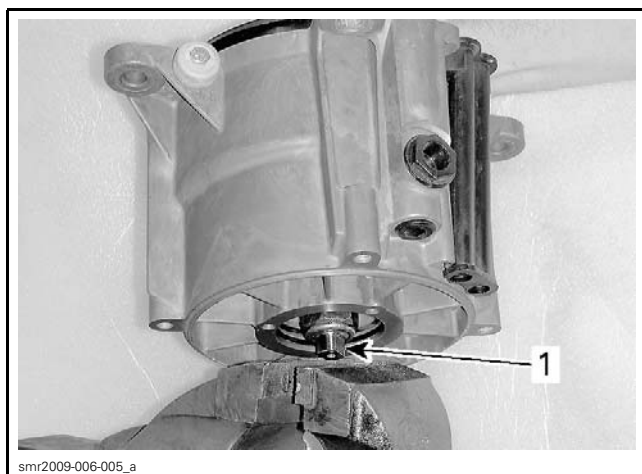


TYPICAL

6. To pull impeller out of the pump, apply a rotating movement as you pull on the impeller.

Installing the Impeller

1. Mount the flat sides of the impeller shaft in a vise.



TYPICAL

1. Flat side

2. Apply LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070) on threads of impeller shaft.



TYPICAL

1. Antiseize lubricant

3. Apply XPS LUBE (P/N 293 600 016) on the wear ring surface.



TYPICAL

1. Spray XPS lube on this surface

4. Install and lubricate impeller O-ring.

5. Start screwing the impeller on its shaft.



TYPICAL

6. Mount the required tool in impeller splines.

REQUIRED TOOL

IMPELLER REMOVER/INSTALLER (P/N 529 035 956)



TYPICAL

7. Torque impeller as per table.

NOTICE Never use an impact wrench to tighten impeller shaft.

TIGHTENING TORQUE

Impeller	125 N•m ± 10 N•m (92 lbf•ft ± 7 lbf•ft)
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Remove tool.

8. Apply LOCTITE 577 (THREAD SEALANT) (P/N 293 800 050) on impeller boot threads.

9. Apply TRIPLE-GUARD GREASE (P/N 296 000 329) inside impeller boot.

10. Install impeller boot on impeller and tighten **counterclockwise**.

WEAR RING

Inspecting the Wear Ring

Check wear ring for:

- Deep scratches
- Irregular surface
- Any apparent damage.

Check *IMPELLER/WEAR RING CLEARANCE*, see procedure at the beginning of this subsection.

Removing the Wear Ring

1. Remove jet pump housing. Refer to *JET PUMP HOUSING* in this subsection.
2. Remove impeller, refer to *IMPELLER* in this subsection.

Two methods can be used to remove the wear ring, use the most appropriate as your situation.

Method Using a Freezer

1. Place the jet pump housing and the wear ring in a freezer for approximately 1-1/2 hour at -10°C (14°F).
2. Remove the housing from the freezer and pull the wear ring out.

Method by Cutting the Wear Ring

1. Place jet pump housing in a vise with soft jaws. It is best to clamp housing using a lower ear.
2. Cut wear ring at two places.

NOTICE When cutting ring, be careful not to damage jet pump housing.

NOTE: Wear ring can be cut using a jigsaw, a small grinder or a low clearance hacksaw.

3. After cutting ring, insert a screwdriver blade between jet pump housing and ring outside diameter.
4. Push ring so that it can collapse internally.
5. Pull ring out.

Installing the Wear Ring

Like the removing procedure, two methods can be used to install the wear ring, use the most appropriate as your situation.

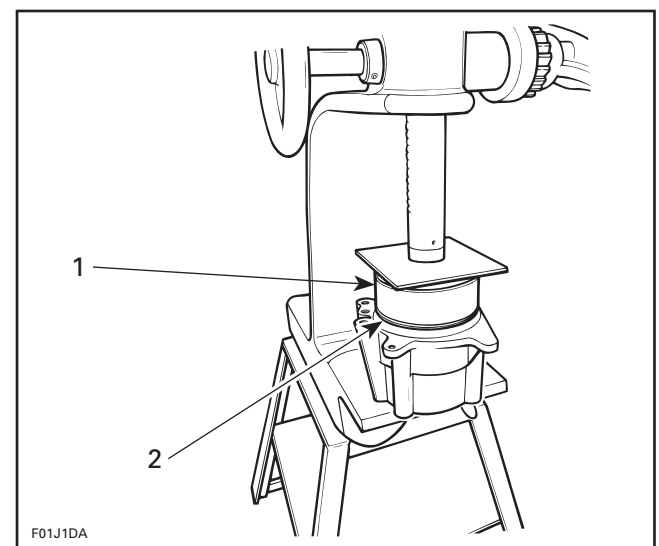
Method Using a Freezer

Insert the new wear ring (previously placed in the freezer) in the housing.

Method Using a Press

To install wear ring in housing, use a square steel plate of approximately 180 x 180 mm x 6 mm thick (7 x 7 in x 1/4 in) and a press.

Manually engage ring in housing making sure it is equally inserted all around. Press ring until it seats into bottom of housing.



1. Rounded edge
2. Press wear ring

IMPELLER SHAFT, BEARING AND SEALS

Removing the Impeller Shaft, Bearing and Seals

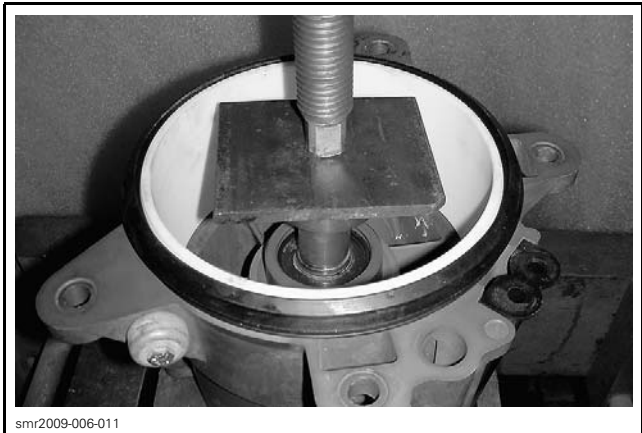
Removing the Shaft

- 1. Remove impeller. Refer to *IMPELLER* in this subsection.
- 2. Use the IMPELLER SHAFT PUSHER (P/N 529 035 955) to press impeller shaft out of pump housing.

NOTE: Bearing will come out with the impeller shaft.



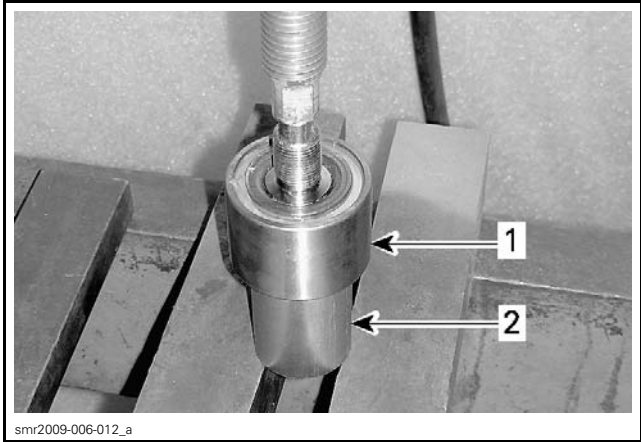
TYPICAL



TYPICAL

Removing the Bearing

- 1. Use the IMPELLER SHAFT BEARING TOOL (P/N 529 036 168) to press bearing off impeller shaft.

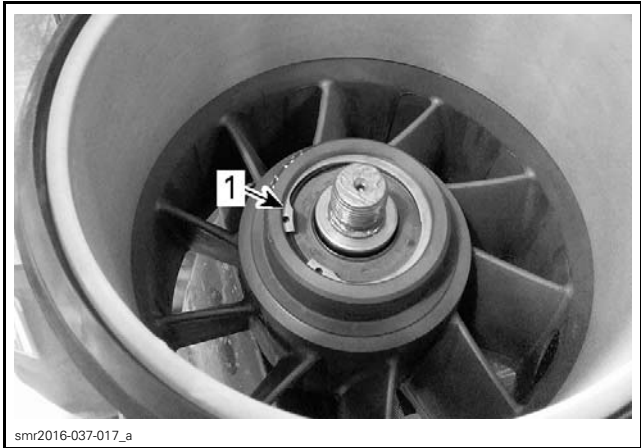


TYPICAL

- 1. Impeller shaft and bearing
- 2. Bearing tool on INNER race

Removing The Seals

- 1. Remove and discard the circlip securing the seals.



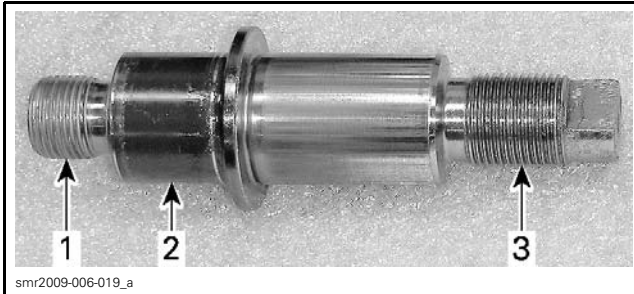
1. Circlip

- 2. Using an appropriate tool, press seals out of the housing.

Inspecting the Impeller Shaft and its Bearing

With your finger nail, feel seal lip contact surface on shaft. If any irregular surface is found, replace shaft and seals.

Check condition of shaft threads.



TYPICAL

1. Threads
2. Seal lip contact surface
3. Threads

Inspect ball bearing for corrosion.

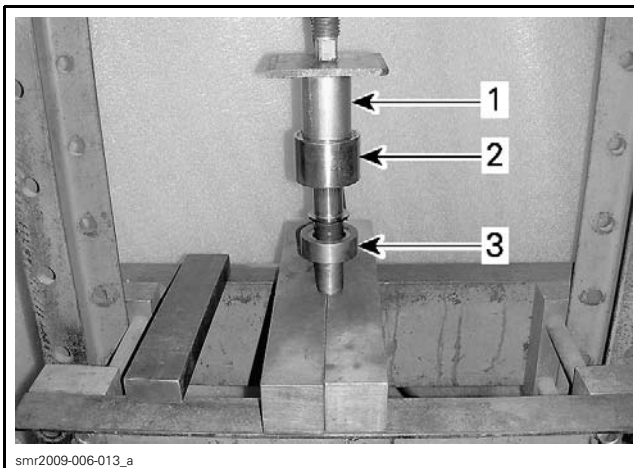
Installing the Impeller Shaft, Bearing and Seals

Installing the Bearing

The installation is essentially the reverse of the removal procedure. However, pay attention to the following.

1. Using the IMPELLER SHAFT BEARING TOOL (P/N 529 036 168) on the bearing inner race, press the bearing on the impeller shaft.
2. Use the IMPELLER SHAFT PUSHER (P/N 529 035 955) to protect the impeller shaft threads.

NOTE: The bearing can be installed in either direction.



TYPICAL

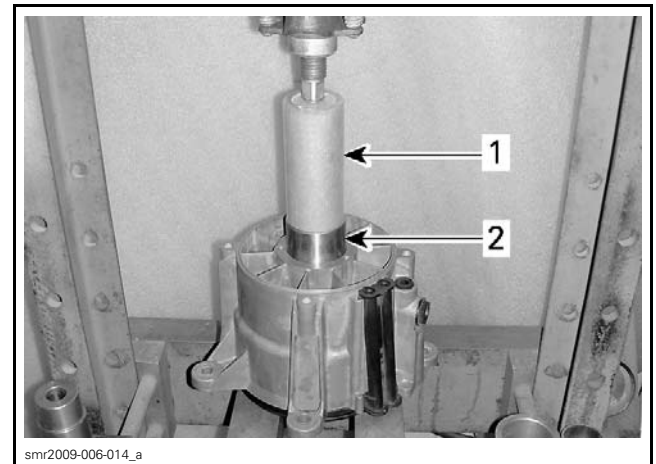
1. Impeller shaft bearing tool on INNER race
2. Impeller shaft and bearing
3. Impeller shaft installer/pusher tool

3. Press bearing until it bottoms.

Installing the Impeller Shaft and Seals

NOTE: Ensure there is no O-ring in pump housing on the cover side.

1. From the outlet side of pump, press impeller shaft assembly into housing using the IMPELLER SHAFT BEARING TOOL (P/N 529 036 168).



TYPICAL

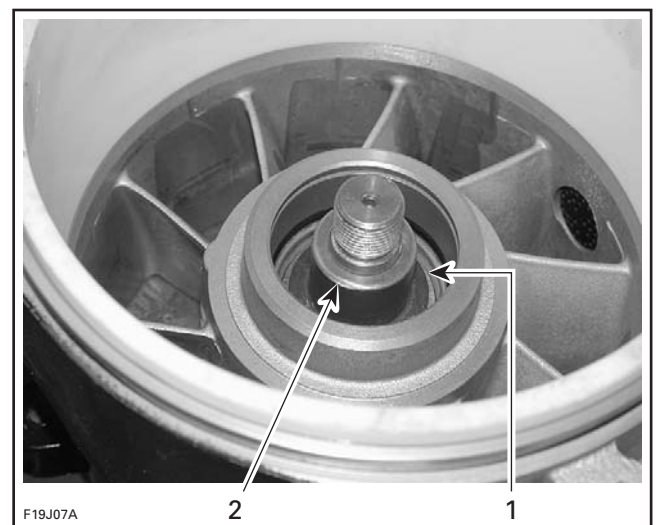
1. Bearing tool
2. Impeller shaft and bearing

2. Press bearing until it bottoms.

NOTE: Ensure impeller shaft turns freely and smoothly.

3. Turn pump upside down.

4. Coat shaft surface with JET PUMP BEARING GREASE (P/N 293 550 032).

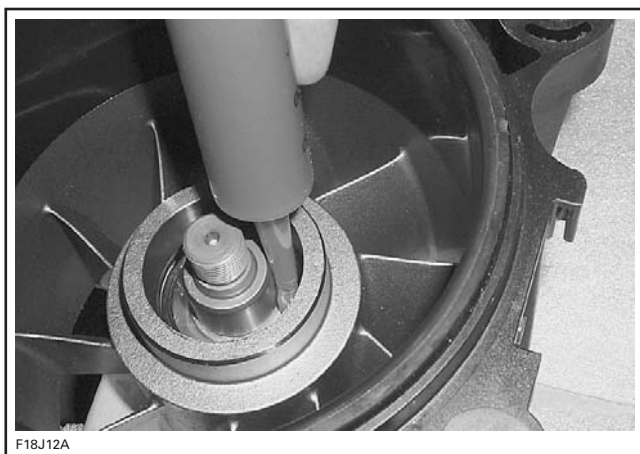


TYPICAL

1. Bottom
2. Coat surface

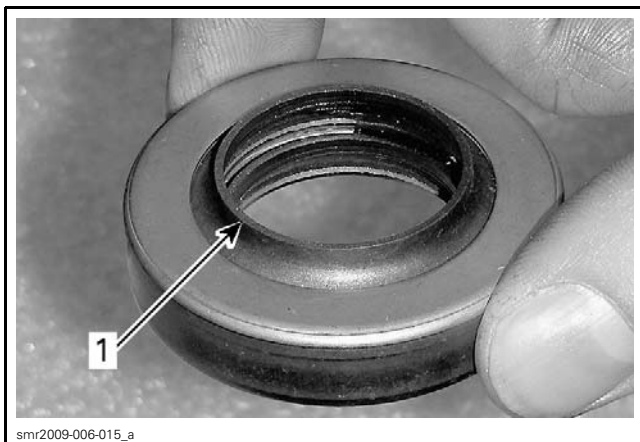
5. Apply 4 ml (.1 U.S. oz) of JET PUMP BEARING GREASE (P/N 293 550 032) on bearing.

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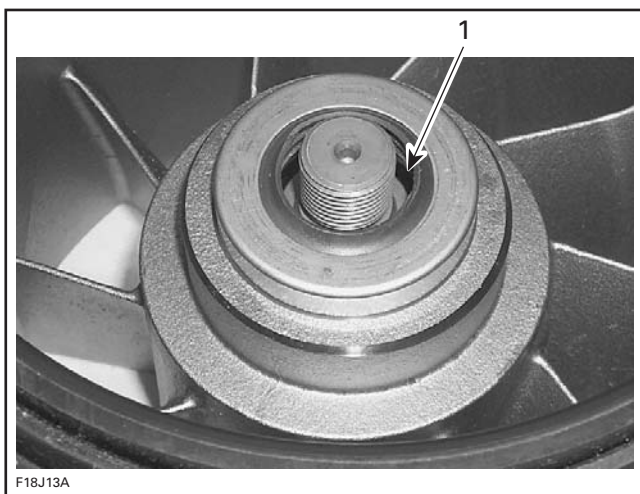


TYPICAL

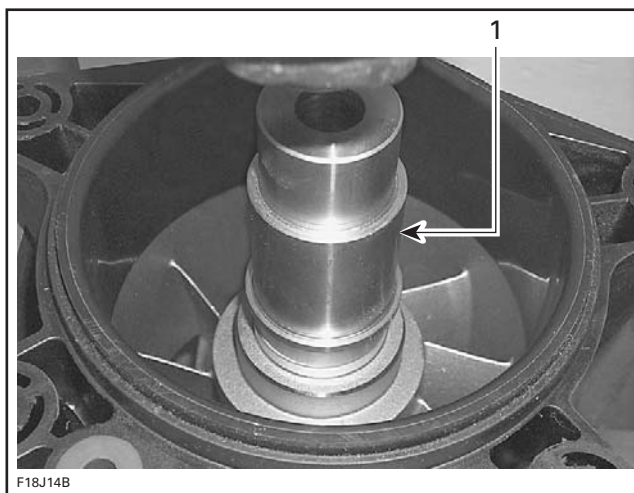
6. Press a **NEW** double lip seal using the SEAL/BEARING PUSHER (P/N 529 035 819) until seal bottoms. Make sure seal lip are facing upwards.



1. Seal lip up



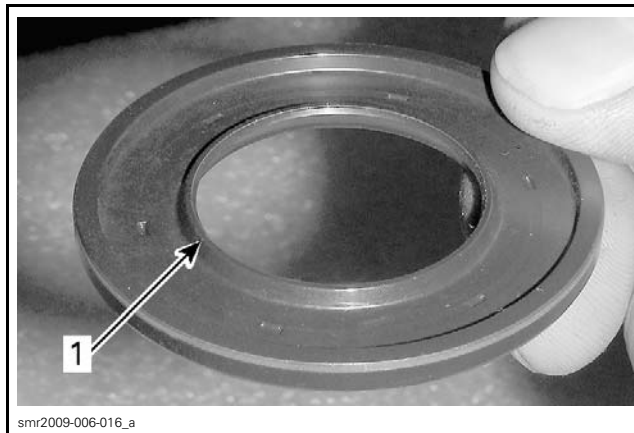
1. Seal lip facing up



TYPICAL

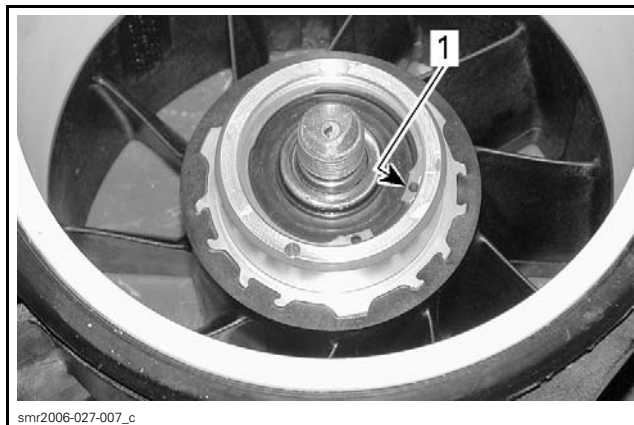
1. Seal/bearing pusher

7. Install spacer and then the other seal (thin). Ensure seal lip is facing up.



1. Seal lip facing up

8. Install circlip.



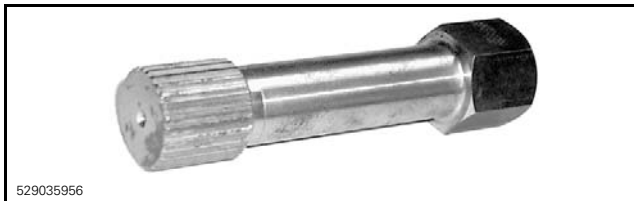
TYPICAL

1. Circlip

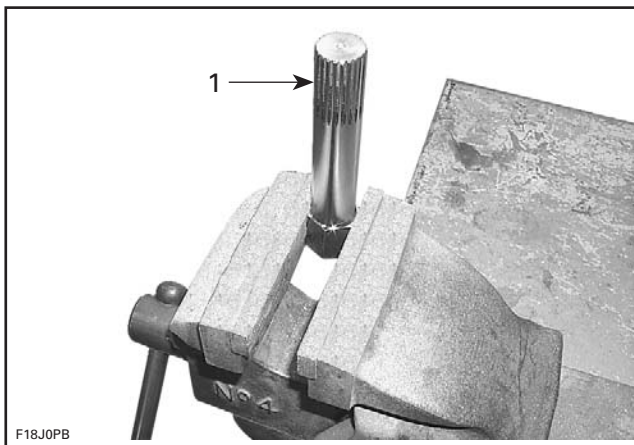
9. Turn pump upside down.

10. Before installing any other parts, pressurize jet pump to insure proper seal installation. Refer to *LEAK TEST* in this subsection.
11. Install impeller. Refer to *IMPELLER* in this subsection.
12. Mount in a vise the impeller remover/installer.

REQUIRED TOOL
IMPELLER REMOVER/INSTALLER (P/N 529 035 956)



TYPICAL



1. Impeller remover/installer tool

13. Install jet pump housing over this tool.

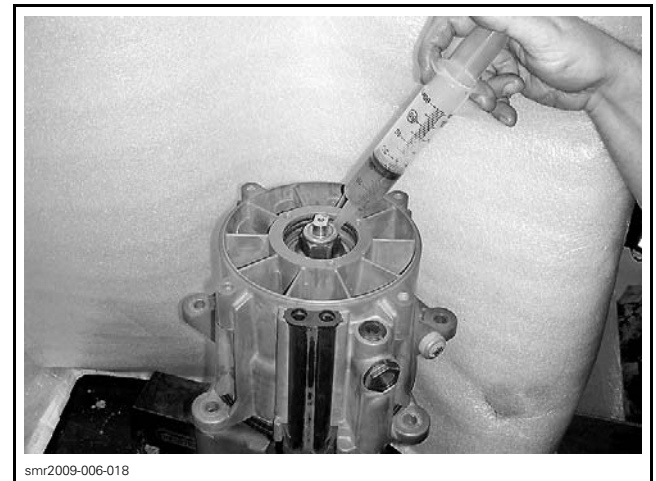


TYPICAL

14. Using a 30 mm socket, screw the impeller shaft nut on clockwise.
15. Torque nut as specified in exploded view.

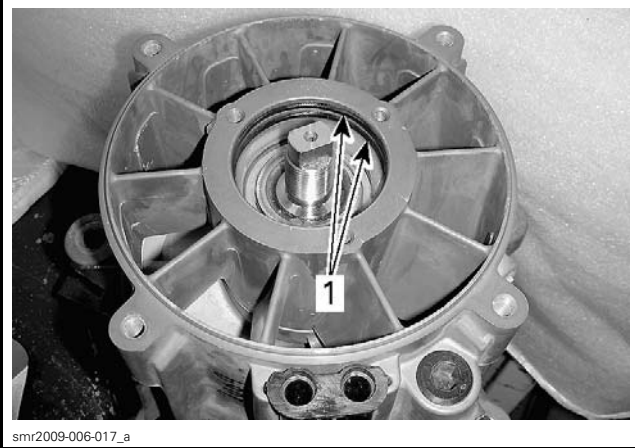


16. Apply 26 ml (.9 U.S. oz) of JET PUMP BEARING GREASE (P/N 293 550 032) on the bearing (nut side) and in O-ring grooves.



17. Install the two O-rings in pump housing and make sure they are properly lubricated..

Subsection XX (JET PUMP)



TYPICAL
1. O-rings

18. Install the impeller cover. Refer to *IMPELLER COVER* in this subsection.