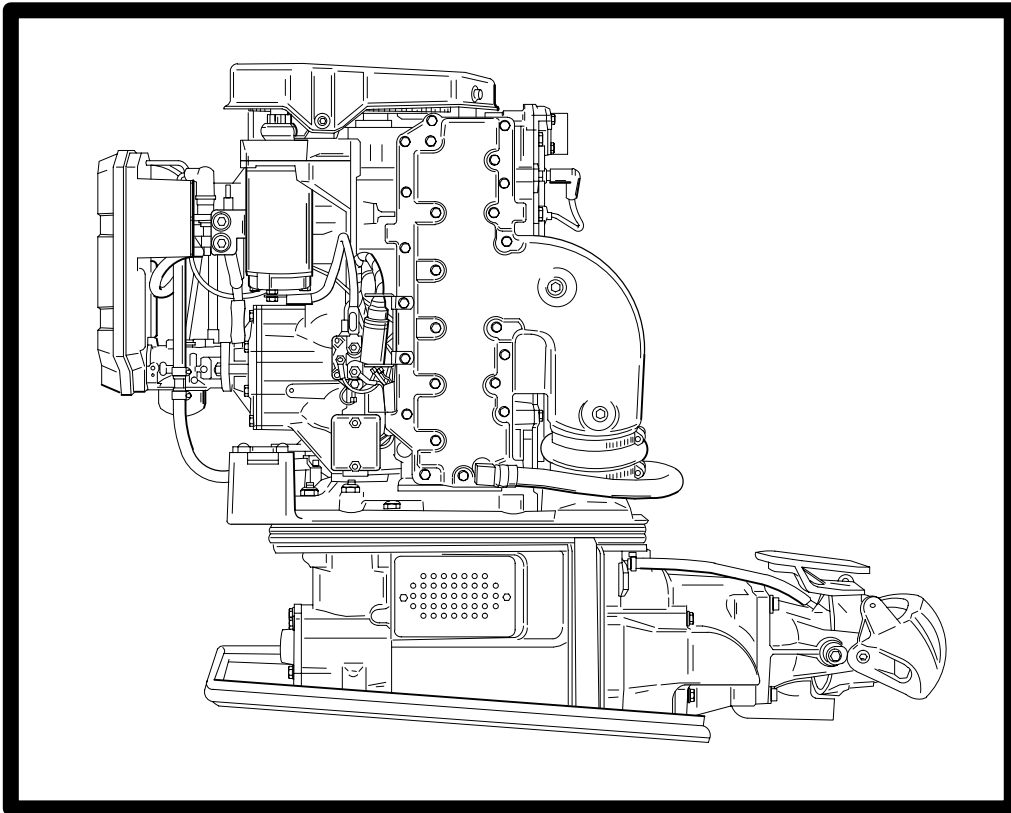




# JET PUMP





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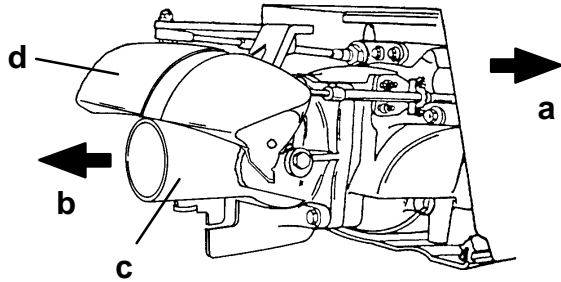


# General Information

**NOTE:** Due to running changes, some illustrations may not be exactly the same as your drive unit. Service procedures remain the same unless otherwise noted.

## Principles of Operation

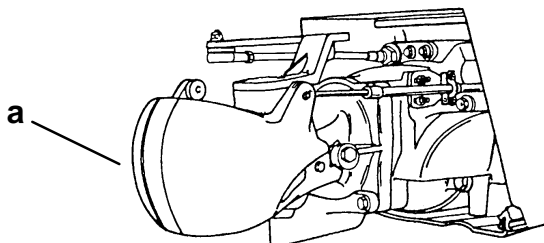
The jet pump operates by drawing water into a housing forward of the impeller. The water is pressurized within the specially designed housing and then directed to the rear to provide thrust and motion.



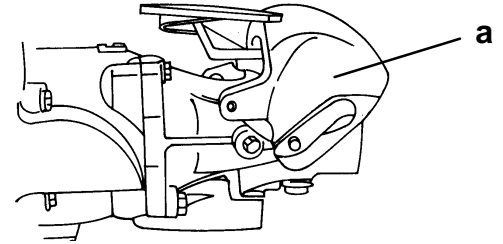
- a - Forward Motion
- b - Water Thrust
- c - Nozzle (Rudder)
- d - Reverse Gate (Shown In the Forward Position)

The jet pump is equipped with a steerable nozzle (rudder) at the aft end of the pump housing that directs the thrust of water. The jet of water can be directed right or left when the operator turns the steering wheel in the respective direction. When the operator turns the steering wheel to the right, for example, the nozzle turns to the right and the jet force from the nozzle pushes the stern of the boat to the left causing the bow of the boat to turn right.

Forward and reverse drive and the neutral position are achieved by the position of a reverse gate located just aft of the nozzle. Forward drive has the reverse gate clearing the nozzle to allow all the thrust to be directed straight back. Reverse drive has the reverse gate covering the entire opening enough to divert the thrust forward. Neutral position has the reverse gate covering 75 percent of the nozzle to direct the water stream forward and downward, as well as backward. The shift position is controlled at the control box in the boat.



a - Reverse Gate (Shown In the Reverse Position)

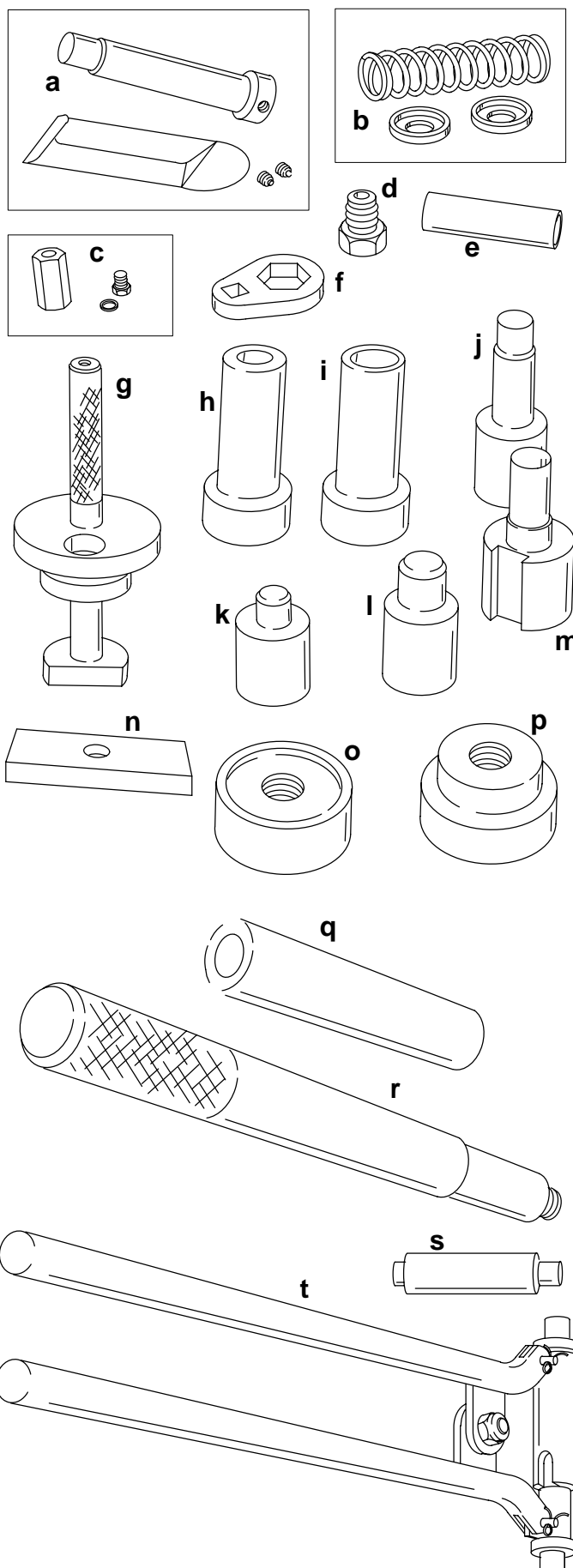


a - Reverse Gate (Shown In the Forward Position)



## Special Tools

Jet Pump Tool Kit 91-820619A2		
Description		Part Number
a	Pre-Load Kit Pinion Shaft	91-824827A1
b	Pre-Load Kit Impeller Shaft	91-824871A1
c	Thread Extender Kit used w/ Backlash Kit	91-824869A1
d	Flushing Adaptor	22-820573
e	Seal Protector Impeller Shaft	91-830103
f	Impeller Nut Wrench	91-824872
g	Pinion Gear Location Tool	91-824890
h	Bearing Installer press ball bearing into pinion shaft housing	91-820552 small O.D. shaft
i	Bearing Installer press ball bearing into pinion shaft housing	91-820552-1 large O.D. shaft
j	Bushing Installer stator bushings	91-820558
k	Seal Installer stator seals	91-820554
l	Seal Installer pinion shaft seals in drive housing	91-820559
m	Bearing Installer impeller shaft ball bearing in drive housing	91-820557
n	Puller Bar used for pulling drive housing seals	91-824870
o	Ring Guide Installer installs ring guide on drive housing cover	91-820555
p	Bearing Cup Installer pinion shaft housing and drive housing front cover	91-820556
q	Bearing Installer taper roller bearing on pinion shaft	91-827983
r	Handle Driver	91-824892
s	Bushing Installer installs reverse gate pivot bushings	91-824886
t	Bushing Press installs rudder pivot bushings	91-824883



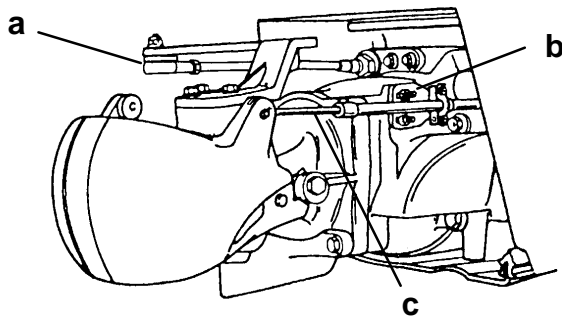


Special Tools (Continued)	Part Number
Backlash Indicator Flag use MCII line	91-53459
Impeller Shaft Holder	91-820657
Dial Indicator Kit	91-58222A1
Dial Indicator Adapter Kit	91-83155
Slide Hammer	91-34569A1
Bearing Puller Kit	91-83165M
Retaining Ring Pliers	91-25081
Lubricants/Adhesives	Part Number
Loctite, #271	92-823089--1
Loctite, #242	Obtain Locally
Perfect Seal	92-342271-1
2-4-C Lubricant w/ Teflon	92-90018A1

## Servicing Impeller

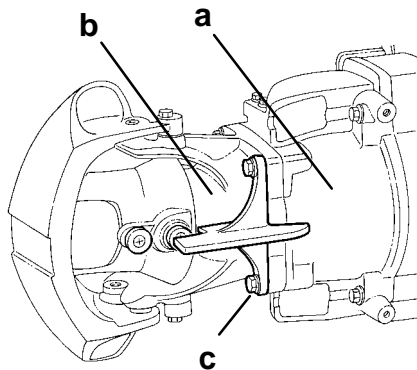
### Removing Impeller

1. Disconnect spark plug leads from spark plugs.
2. Disconnect shift and steering cables. Remove shift cable bracket.



a - Steering Cable                      c - Shift Cable  
b - Shift Cable Bracket

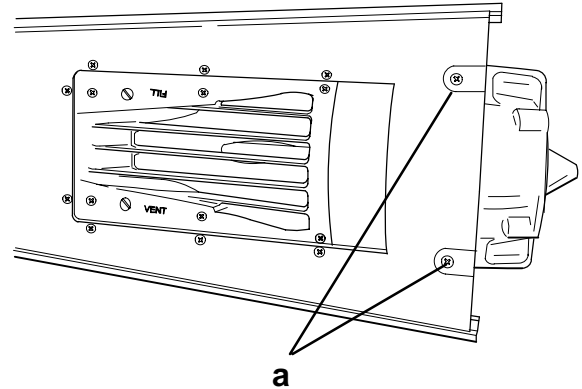
3. Remove four screws securing nozzle assembly to stator. Remove nozzle assembly.



a - Stator Assembly                      c - Screws (4)  
b - Nozzle Assembly

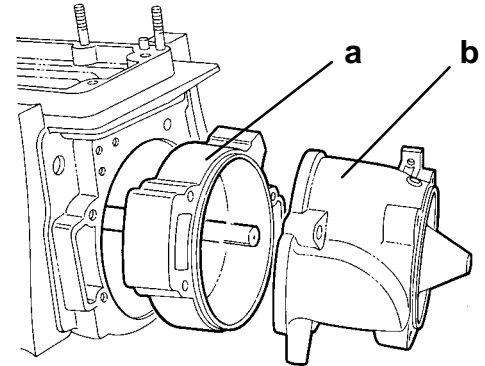
4. Remove two screws securing stator assembly to ride plate.

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a - Screws (2) to Stator Assembly

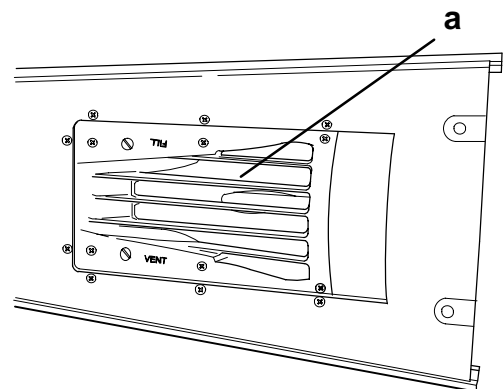
5. Remove four screws securing stator assembly to drive housing. Remove stator assembly and wear ring.



a - Wear Ring                              b - Stator Assembly

**NOTE:** Tilt stator back to prevent oil from running out.

6. Remove inlet screen on bottom of drive housing to allow access to machined flats on impeller shaft. If using Special Tool 91-820657 to hold impeller shaft, inlet screen does not need to be removed.

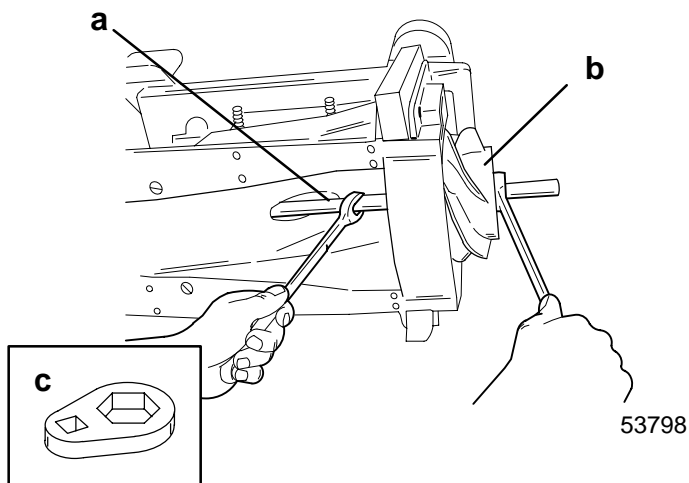


a - Inlet Screen

7. Straighten tabs on impeller tab washer.



8. Hold impeller shaft with a wrench on machined flats.
9. Remove impeller nut using Special Tool or appropriate size wrench. Remove impeller. Impeller nut is a left hand thread: turn clockwise to loosen.

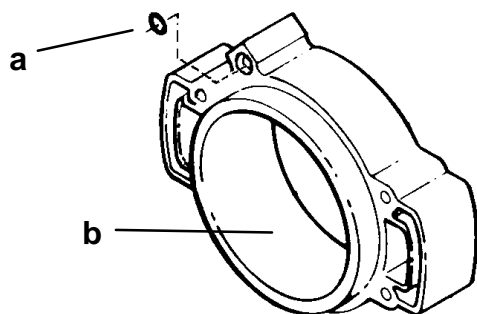


a - Impeller Shaft  
Machined Flats

b - Impeller  
c - Special Tool 91-824872

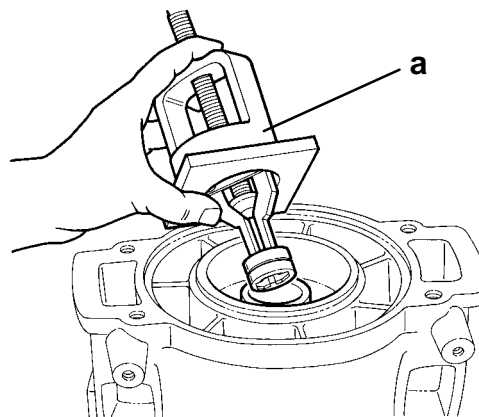
## Inspecting Components

1. Inspect wear ring for excessive scoring and/or grooves. Replace wear ring if deep grooves are present or severe scoring has taken place.
2. Insure O-ring is in counterbore before installing wear ring to drive housing.



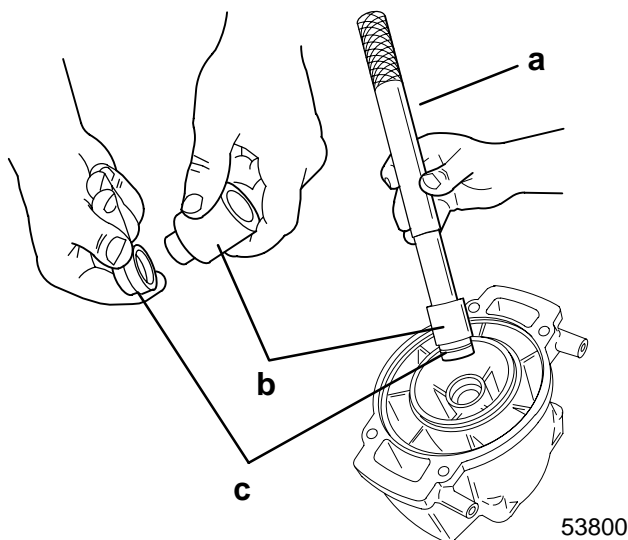
a - O-ring  
b - Inspect Surface for Grooves/Scoring

3. Inspect seals in stator for wear/damage.
4. If replacement is required, remove stator seals using Puller 91-83165M shown below.



a - Puller 91-83165M

5. Install new stator seals using Special Tool 91-820554. Outer seal: lip faces out. Inner seal: lip faces in.

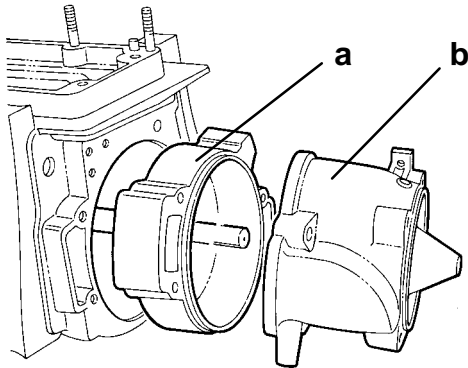


a - Handle Driver 91-824892  
b - Seal Installer 91-820554  
c - Seals (Top Seal Faces UP, Bottom Seal Faces Down)



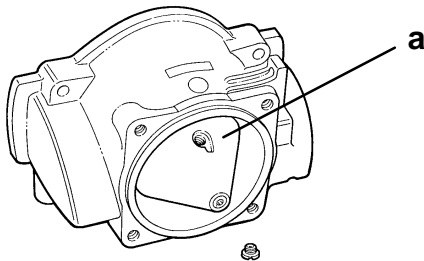
## Installing Impeller

1. Lubricate splines of impeller shaft with 2-4-C w/ teflon grease.
2. Install thrust washer, impeller, tab washer and nut on impeller shaft. Torque impeller nut to 70 lb. ft. (95 N-m). Bend both tabs of tab washer against flats on nut.
3. Install inlet screen. Apply Loctite 242 to threads of screws. Torque screws to 75 lb. in. (8.5 N-m).
4. Install wear ring and stator. Apply Perfect Seal to threads of four screws. Torque screws to 30 lb. ft. (40.7 N-m).



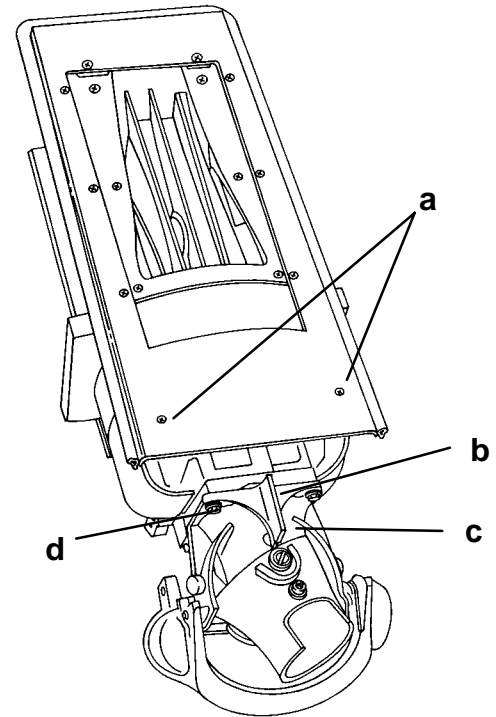
- a - Wear Ring
- b - Stator Assembly

5. Remove stator fill screw with washer and fill stator with High Performance Gear Lube. Capacity is 3.4 oz. (100 cc). Install fill screw and washer.



- a - Fill Hole

6. Apply Loctite 242 to screws (2) securing stator to the ride plate. Torque screws to 75 lb. in. (8.5 N-m).



- a - Screws (2) to Stator Assembly
- b - Anode
- c - Nozzle Assembly
- d - Screws (4) to Nozzle Assembly

7. Install nozzle assembly and anode. Apply Loctite #271 to threads of screws. Torque all four (4) screws to 30 lb. ft. (40.7 N-m).

8. Attach shift and steering cables.

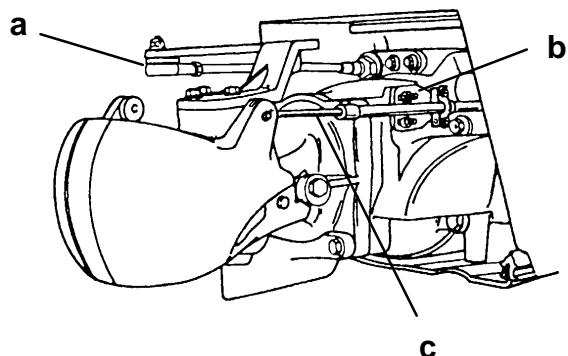
REFER TO SECTION 6: SPORT JET INSTALLATION FOR SHIFT AND STEERING INSTALLATION AND ADJUSTMENT.



# Removing Jet Drive From Boat

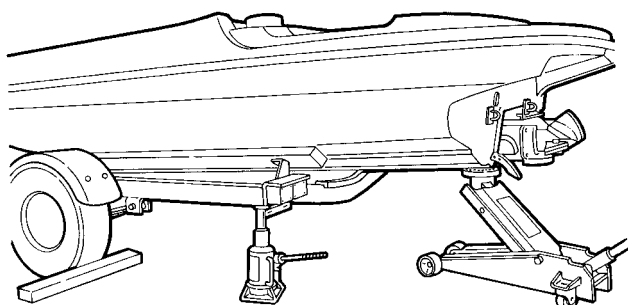
REMOVE POWERHEAD AS OUTLINED IN SECTION 4.

1. Disconnect shift and steering cables. Remove shift cable bracket.



- a - Steering Cable
- b - Shift Cable Bracket
- c - Shift Cable

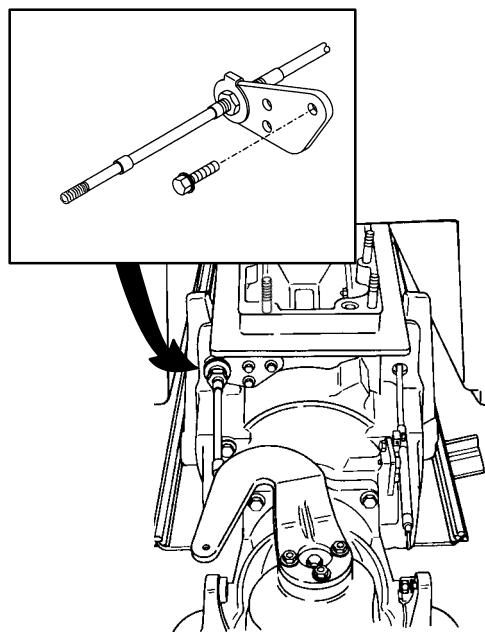
2. Loosen shift and steering cable thru hull fittings.
3. Support pump.



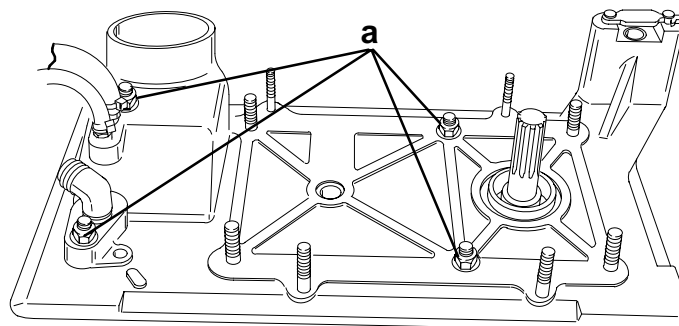
## **⚠ WARNING**

The pump unit must be supported to prevent it from dropping through the opening when the remaining fasteners are removed.

4. Remove three screws securing steering cable bracket to drive housing.



5. Remove bracket from steering cable.
6. Remove remaining four nuts from drive housing cover. Remove drive housing cover and gasket.



- a - Nuts

7. Lower drive housing and place on bench or suitable work stand for disassembly/repair.

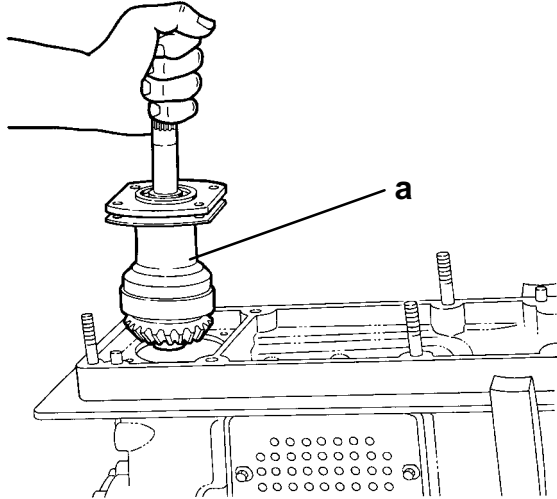




# Drive Housing Disassembly

## Pinion Shaft Removal

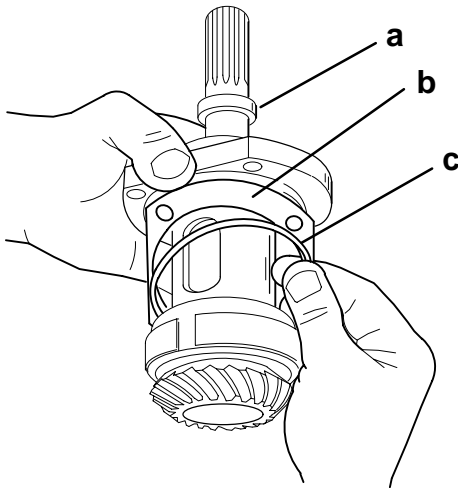
1. Remove four screws securing pinion shaft housing to drive housing. Remove pinion shaft assembly.



a - Pinion Shaft Assembly

**NOTE:** Take care not to damage or misplace colored shims.

2. Remove rubber ring, O-ring and shims.

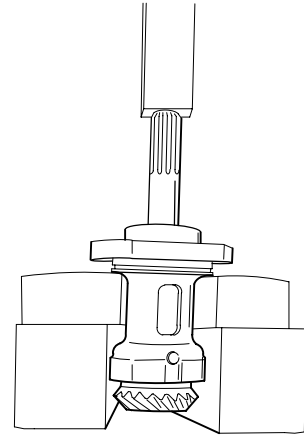


a - Rubber Ring  
b - Shims

c - O-ring

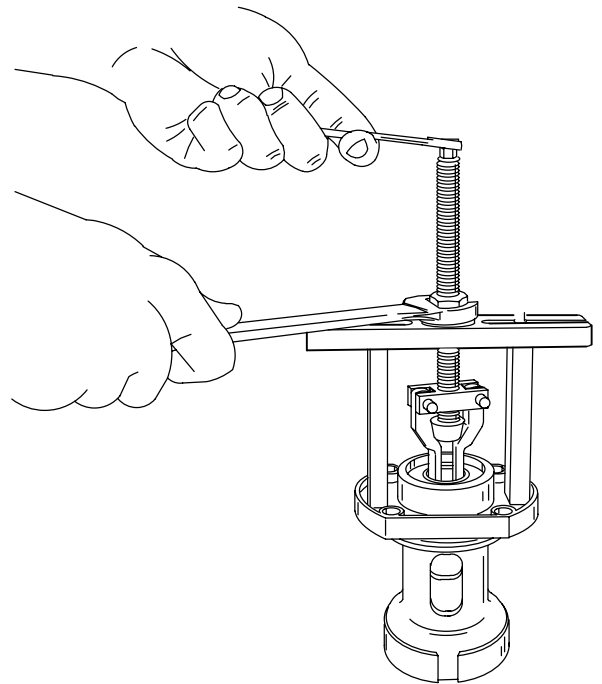
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3. Press pinion shaft out of pinion shaft housing.

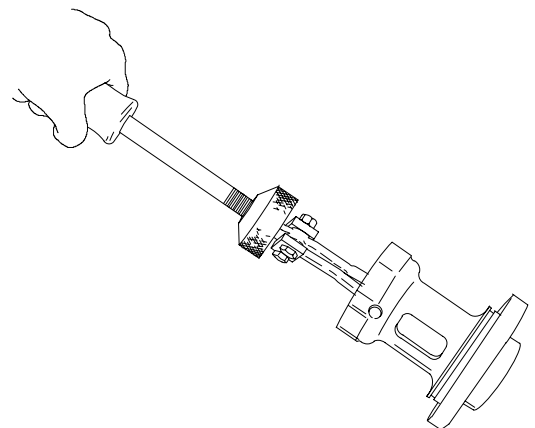


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4. Remove pinion shaft ball bearing and two seals using Puller 91-83165M.

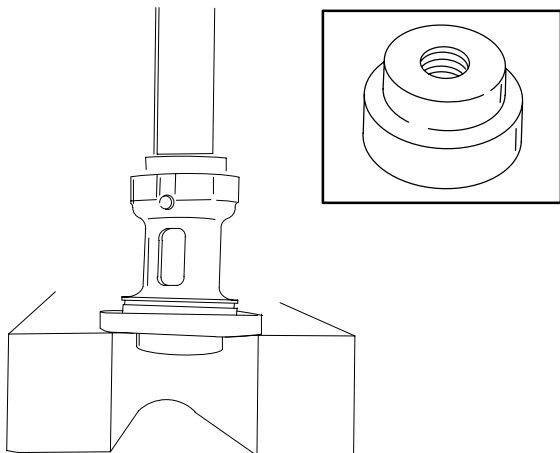


5. Remove pinion shaft outer race from pinion shaft housing using slide hammer 91-34569A1.

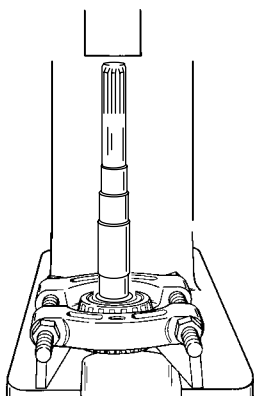




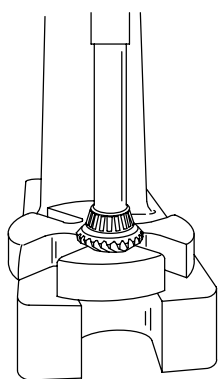
6. Press new outer race into pinion shaft housing using mandrel 91-820556.



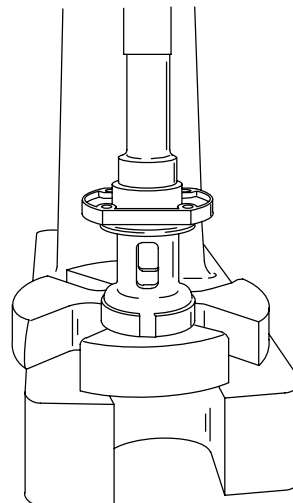
7. Remove tapered roller bearing from pinion shaft using universal puller plate 91-37241.



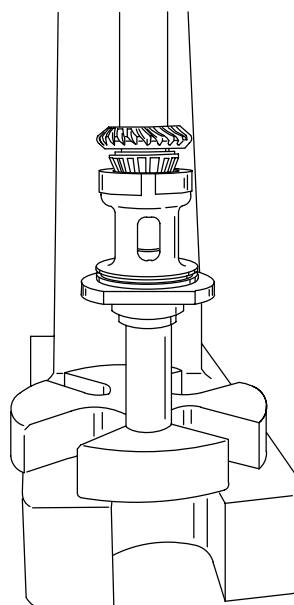
8. Press new tapered roller bearing onto pinion shaft using Special Tool 91-827983.



9. Press new ball bearing into pinion shaft housing using Special Tool 91-820552.

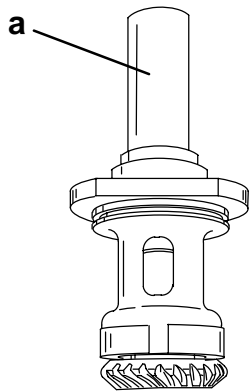


10. Press pinion shaft into pinion housing.





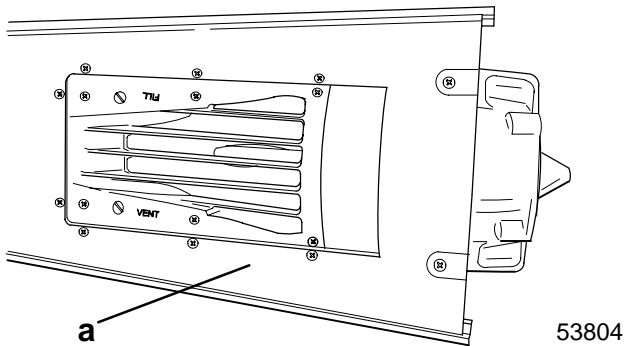
- Press new seals into pinion shaft housing, one at a time, using Special Tool 91-820552. Inner seal faces in, outer seal faces out.



a - Special Tool 91-820552

## Impeller Shaft Removal

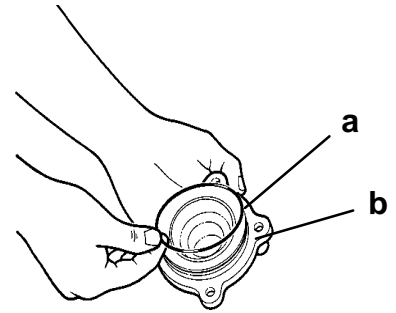
- Remove Stator, Wear Ring and Impeller as described in "Servicing Impeller".
- Remove fill and vent screws, drain oil into a suitable container.
- Remove ride plate.



a - Ride Plate

- Remove four screws securing impeller shaft cover to drive housing. Remove cover. Remove O-ring

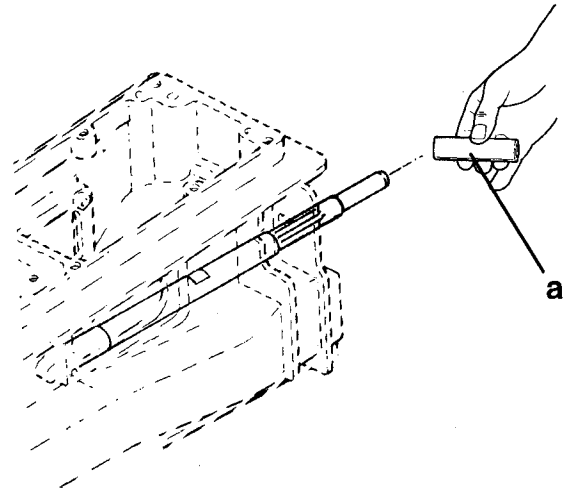
**NOTE:** Take care not to damage or misplace colored shims.



a - O-ring

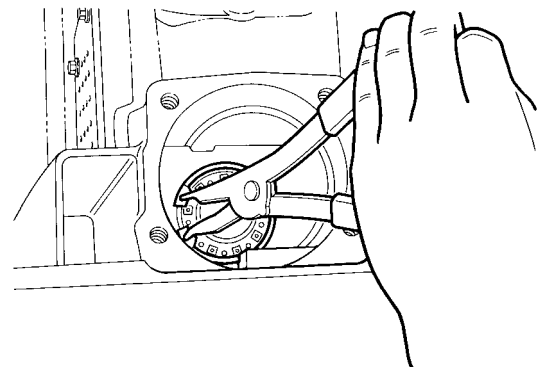
b - Shims

- Install seal protector on impeller shaft.



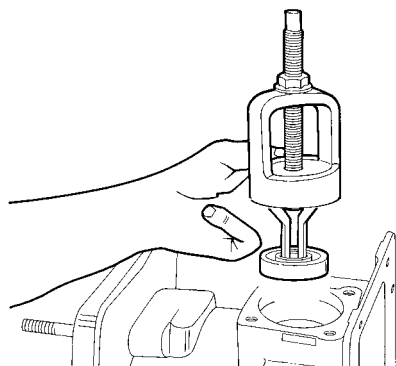
a - Seal Protector

- Push impeller shaft assembly out through front off drive housing.
- Remove bearing retaining ring from drive housing.



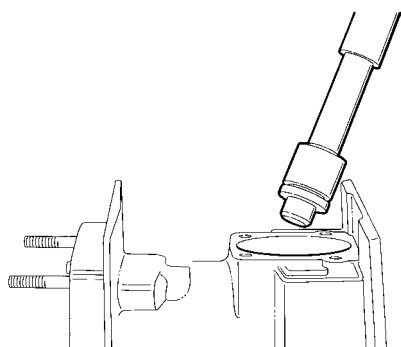


8. Remove bearing using Puller 91-83165M.

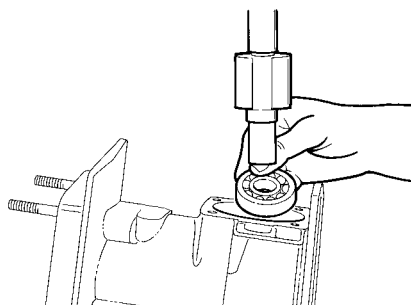


9. Remove impeller shaft seals using Slide Hammer 91-34569A1.

10. Install new seals using Special Tool 91-820559.

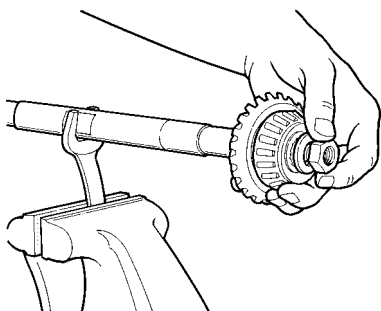


11. Install new bearing using Special Tool 91-820557.



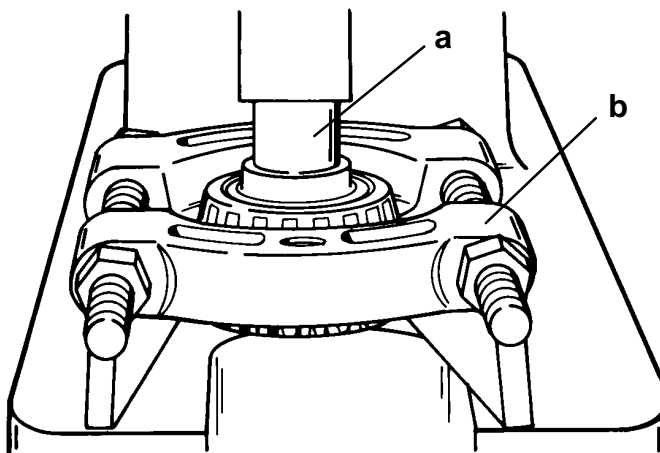
12. Install retaining ring in drive housing after bearing is installed.

13. Clamp an open end wrench in a vise. Place flats of impeller shaft in wrench.



14. Remove nut, washer and gear/bearing assembly.

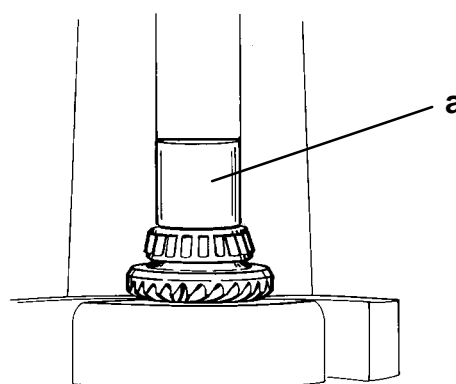
15. If replacing bearing, remove using universal plate.



a - Mandrel (15/16 in. socket)

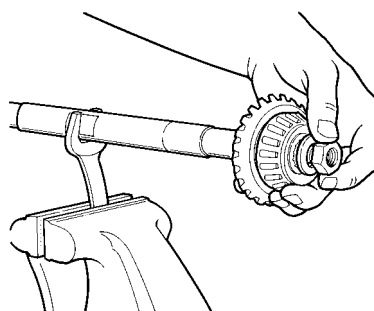
b - Universal Puller Plate (91-37241)

16. Press new bearing on gear using an appropriate size mandrel.



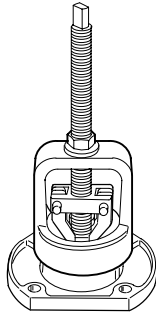
a - Mandrel (1-1/8 in. socket)

17. Install gear/bearing assembly and washer on impeller shaft. Apply Loctite 271 to threads of impeller shaft. Install nut and torque to 90 lb. ft. (122 N·m).





18. Do not install impeller shaft if shimming is required (See next section). Install seal protector (90-820553) on impeller shaft. Install impeller shaft in drive housing using a twisting motion.
19. Remove outer race from front cover using Puller 91-83165M.



20. Press new outer race into front cover using Special Tool 91-820556.

### Shimming Procedures

**NOTE:** Pinion gear shimming and backlash procedures must be performed when any of the following components have been replaced:

- a. Jet Drive Housing
- b. Pinion Gear
- c. Pinion Gear Bearing Assembly
- d. Pinion Shaft Housing
- e. Impeller Gear
- f. Impeller Gear Bearing Assembly
- g. Impeller Shaft Front Cover

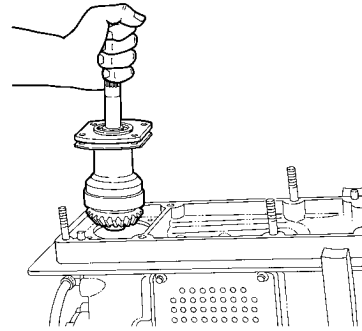
**NOTE:** Shims are color coded to represent different thicknesses. These color codes apply to both pinion housing shims and impeller cover shims.

<b>Red</b>	<b>.002 in. (.05 mm)</b>
<b>Beige</b>	<b>.004 in. (.10 mm)</b>
<b>Blue</b>	<b>.005 in. (.127 mm)</b>
<b>Frost (Clear)</b>	<b>.0075 in. (.19 mm)</b>
<b>Brown</b>	<b>.010 in. (.25 mm)</b>
<b>Yellow</b>	<b>.020 in. (.51 mm)</b>

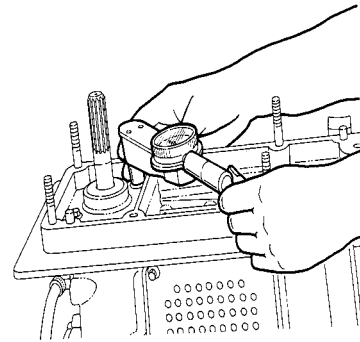
1. Install original shims on pinion shaft housing. Install O-ring on pinion shaft housing.

**NOTE:** If original shims are not available, start with .030 in. (.76 mm) shims (three brown colored shims).

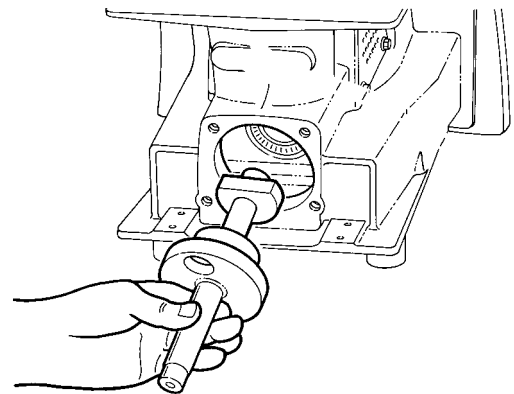
2. Install pinion shaft assembly into drive housing bore.



3. Torque screws to 180 lb. in. (20.3 N-m).



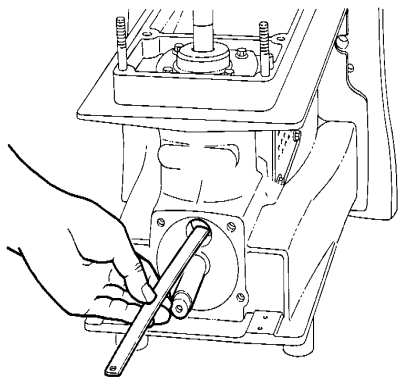
4. Rotate pinion shaft ten revolutions to properly seat roller bearings.
5. Insert Pinion Location Tool (Special Tool 91-824890) in drive housing.



**NOTE:** Carefully inspect location tool to make sure it is seated in drive housing bearing.



6. Insert feeler gauge through hole in pinion location tool between gauging surface of tool and flats on bottom of pinion gear teeth.

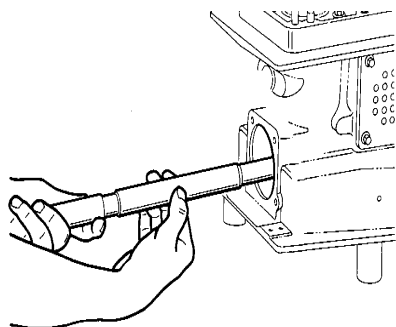


**IMPORTANT:** The correct clearance is .025 inch (0.64 mm).

7. Use .025 inch (.064 mm) feeler gauge as a starting thickness. Adjust thickness of feeler gauge until a slight drag is felt as gauge is drawn out between gauging surface of tool and pinion gear.

**NOTE:** Once the thickness is determined, the difference between feeler gauge thickness and .025 inch (0.64mm) required clearance must be either added or subtracted from the total thickness of shims between pinion shaft housing and drive housing.

- Remove the screws securing the pinion shaft housing assembly to the drive housing. Lift assembly out of the drive housing.
  - Adjust shim thickness as required.
8. Install Impeller Shaft Seal Protector (Special Tool 91-820553) over impeller threads of impeller shaft assembly.
  9. Using a twisting motion install impeller shaft assembly in drive housing.

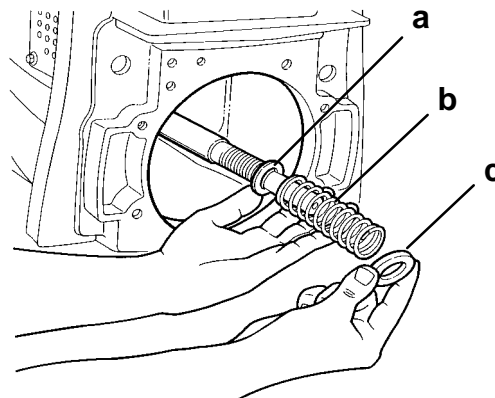


10. Install original shims on impeller shaft cover. Install O-ring on impeller shaft cover.

**NOTE:** If original shims are not available, start with .030 in. (.76 mm) shims (three brown colored shims).

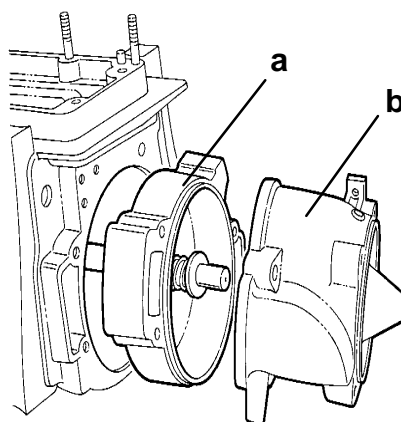
- Lubricate O-ring and bore with Quicksilver lubricant 2-4-C.

- Lubricate cone bearing with gearcase lubricant.
11. Install impeller shaft cover. Torque screws to 180 lb. in. (20.3 N·m).
  - Rotate impeller shaft ten revolutions to properly seat roller bearings.
  12. Install impeller shaft pre-load tool (91-824871A1).
  - Remove seal protector from impeller shaft.
  - Install impeller thrust washer, spring, and spring seat on impeller shaft.



- a - Thrust Washer
- b - Spring
- c - Spring Seat

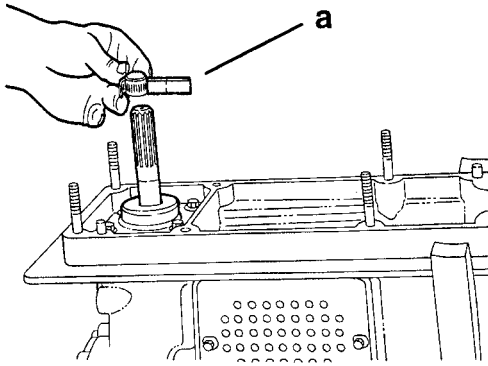
13. Install wear ring and stator on impeller shaft. Secure assembly with two bolts (opposite corners). Torque bolts to 30 lb. ft. (40.7 N·m).



- a - Wear Ring
- b - Stator

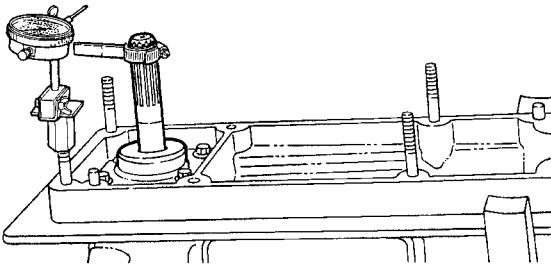


14. Install Backlash Indicator Rod (Special Tool No. 91-53459) on pinion shaft.



a - Backlash Indicator Rod 91-53459

15. Install Dial Indicator Kit, Adapter Kit and Thread Extender Kit.



- Position rod from dial indicator on the center mark "II" of the backlash indicator rod.

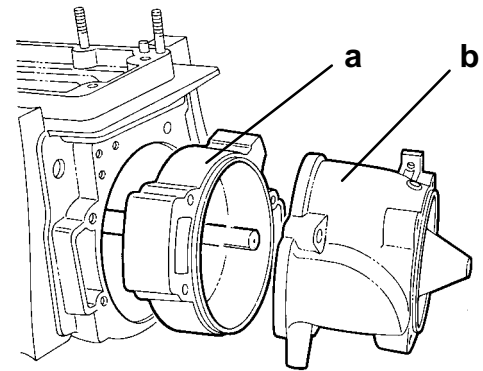
16. Rotate pinion shaft back and forth lightly to contact gear teeth in each direction.

**NOTE:** Average total amount of reading of indicator backlash specification is .007 inch (.18 mm) to .009 inch (.23 mm).

- If reading is less than minimum, add shims between impeller cover and drive housing.
- If reading is more than maximum remove shims between impeller cover and drive housing.
- Ratio of backlash reading to shims is 1:1.

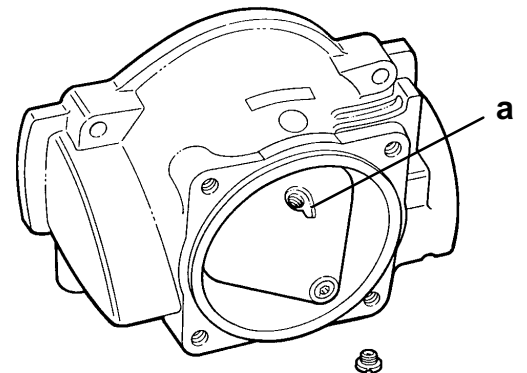
17. Install impeller as outlined in "Installing Impeller" in this section.

18. Install wear ring and stator. Apply Loctite 271 to four screws. Torque screws to 30 lb. ft. (40.7 N·m).



a - Wear Ring  
b - Stator Assembly

19. Remove stator fill screw with washer and fill stator with High Performance Gear Lube. Capacity is 3.4 oz. (100 cc). Install fill screw and washer.

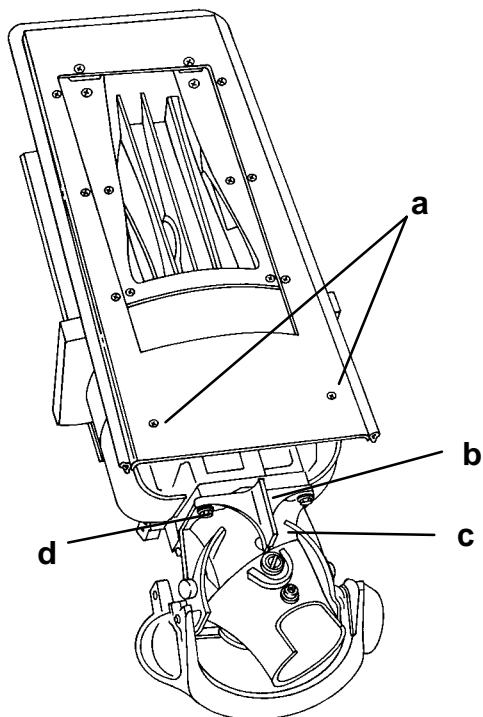


a - Fill Hole

20. Install rideplate. DO NOT reuse screws. Apply Loctite 242 to threads of new screws. Torque to 75 lb. in. (8.5 N·m).



21. Apply Loctite 242 to screws (2) securing stator to the ride plate. Torque screws to 75 lb. in. (8.5 N·m).



- a - Screws (2) to Stator Assembly
- b - Anode
- c - Nozzle Assembly
- d - Screws (4) to Nozzle Assembly

22. Install nozzle/reverse gate assembly and anode. Apply Loctite #271 to threads of screws. Torque all four (4) screws to 30 lb. ft. (40.7 N·m).

23. Remove fill and vent screws from bottom of drive housing. Fill drive housing with High Performance Gear Lube. Capacity is 18.6 oz. (550 cc).

**NOTE:** To obtain correct oil level pump housing must be level and upright.

24. Attach shift and steering cables.

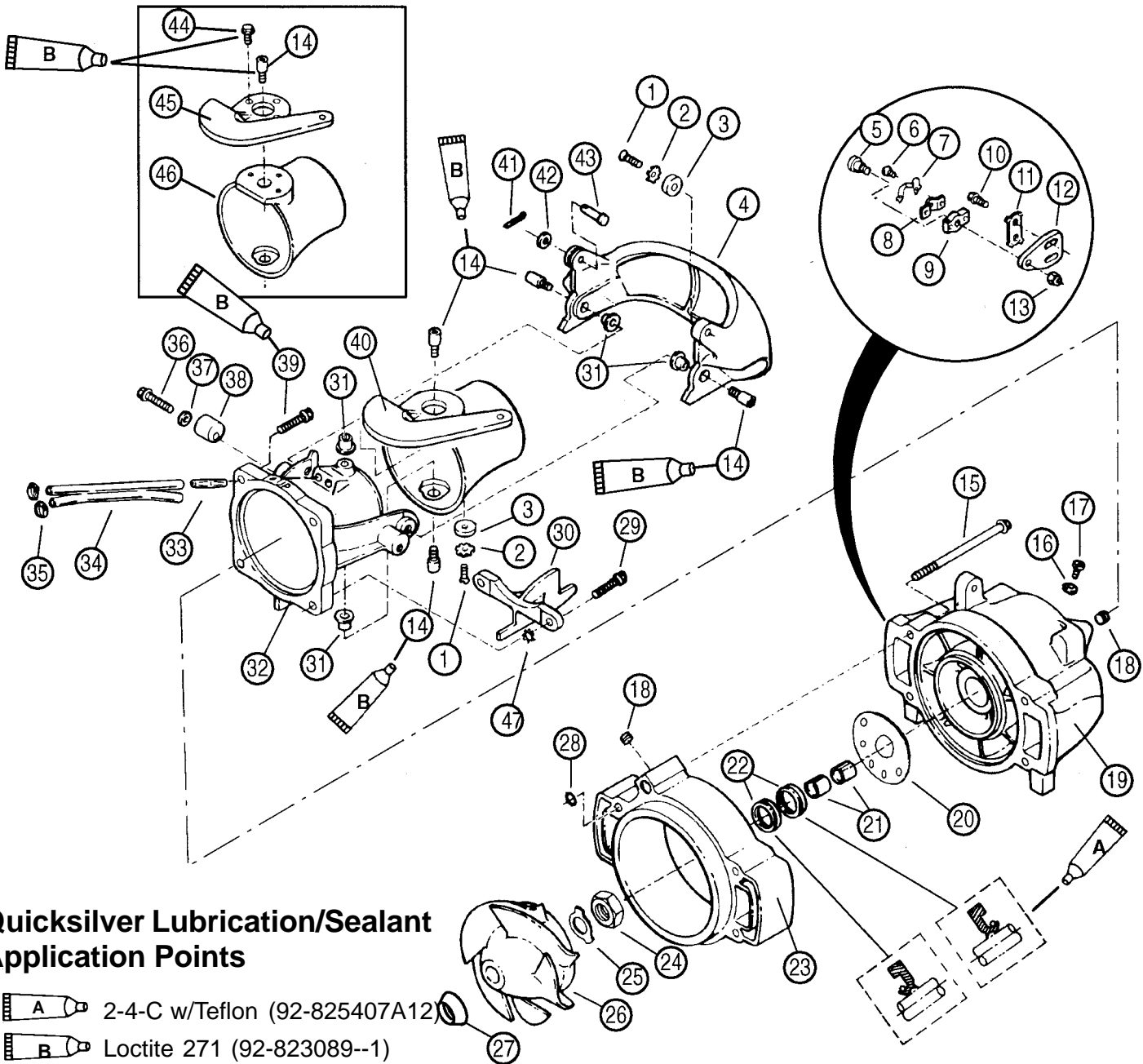
REFER TO SECTION 6: SPORT JET INSTALLATION FOR SHIFT AND STEERING INSTALLATION AND ADJUSTMENT.







# Nozzle/Rudder Components



## Quicksilver Lubrication/Sealant Application Points

2-4-C w/Teflon (92-825407A12)

Loctite 271 (92-823089--1)

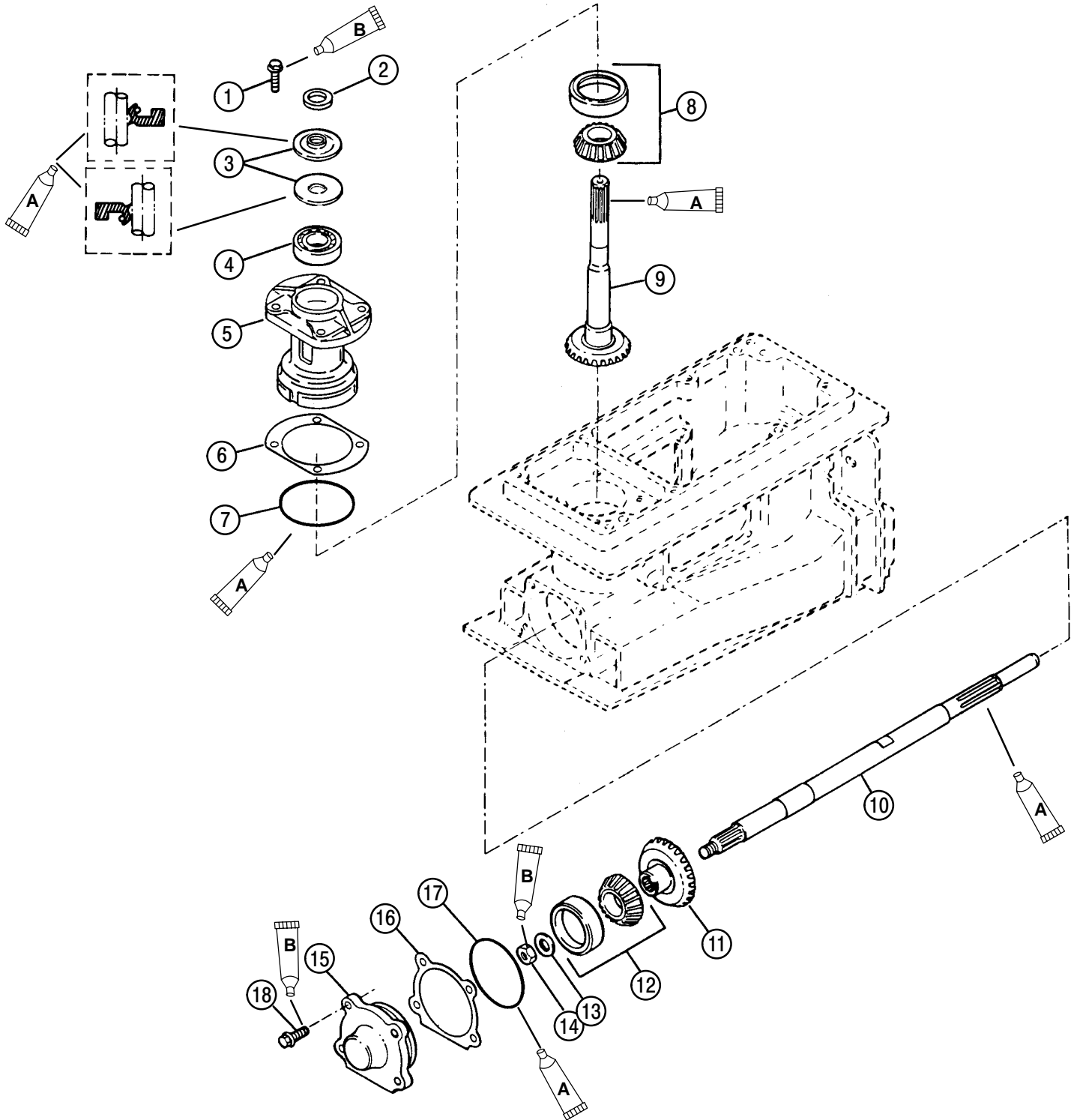
Item	Qty	Description	Torque		
			Lb. In.	Lb. Ft.	N-m
1	2	Screw M6 x 1 x 13			
2	1	Lockwasher, External			
3	1	Anode			
4	1	Gate			
5	1	Screw, Pivot			
6	2	Screw (10-24 x 3/8 in.)			
7	1	Tab Lock			
8	1	Bracket			
9	1	Swivel			



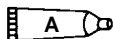
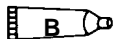
Item	Qty	Description	Torque		
			Lb. In.	Lb. Ft.	N-m
10	2	Screw 1/4-20 x 5/8 in.	50		5.6
11	1	Tab, Locking			
12	1	Bracket			
13	1	Nut 1/4-20	70		7.9
14	4	Bolt, Pivot		25	33.9
15	4	Screw M10 x 1.50 x 100		30	40.7
16	1	O-ring			
17	1	Screw Plug			
18	2	Plug, Pipe			
19	1	Stator			
20	1	Plug			
21	2	Bushing			
22	2	Seal			
23	1	Wear Ring			
24	1	Impeller Nut		70	95
25	1	Tab Lock Washer			
26	1	Impeller			
27	1	Washer			
28	1	O-ring			
29	2	Screw M10 x 1.50 x 45			
30	1	Anode			
31	4	Bushing			
32	1	Nozzle			
33	2	Fitting			
34	1	Syphon Hose			
35	2	Sta-strap			
36	2	Screw M8 x 1.25 x 30			
37	2	Washer			
38	2	Reverse Gate Stop			
39	2	Screw M10 x 1.50 x 35			
40	1	Rudder/Steering Lever (One Piece)			
41	1	Cotter Pin			
42	1	Washer			
43	1	Clevis Pin			
44	3	Screw M8 x 1.25 x 25			
45	1	Steering Lever			
46	1	Rudder			
47	2	Lockwasher, External			



# Pinion and Impeller Shaft Components



## Quicksilver Lubrication/Sealant Application Points

-  2-4-C w/Teflon (92-825407A12)
-  Loctite 271 (92-823089--1)



Item	Qty	Description	Torque		
			Lb. In.	Lb. Ft.	N-m
1	4	Bolt (M8 x 1.25 x 25)		15	20.3
2	1	Rubber Ring			
3	2	Seal			
4	1	Ball Bearing			
5	1	Housing Assy.			
6	AR	Shim			
7	1	O-ring			
8	1	Bearing Assy.			
9	1	Gear Shaft Assy			
10	1	Impeller Shaft			
11	1	Gear			
12	1	Bearing Assy.			
13	1	Washer			
14	1	Nut (M14 x 1.5)		90	122
15	1	Cover Assy.			
16	AR	Shim			
17	1	O-ring			
18	4	Bolt (M8 x 25)		15	20.3