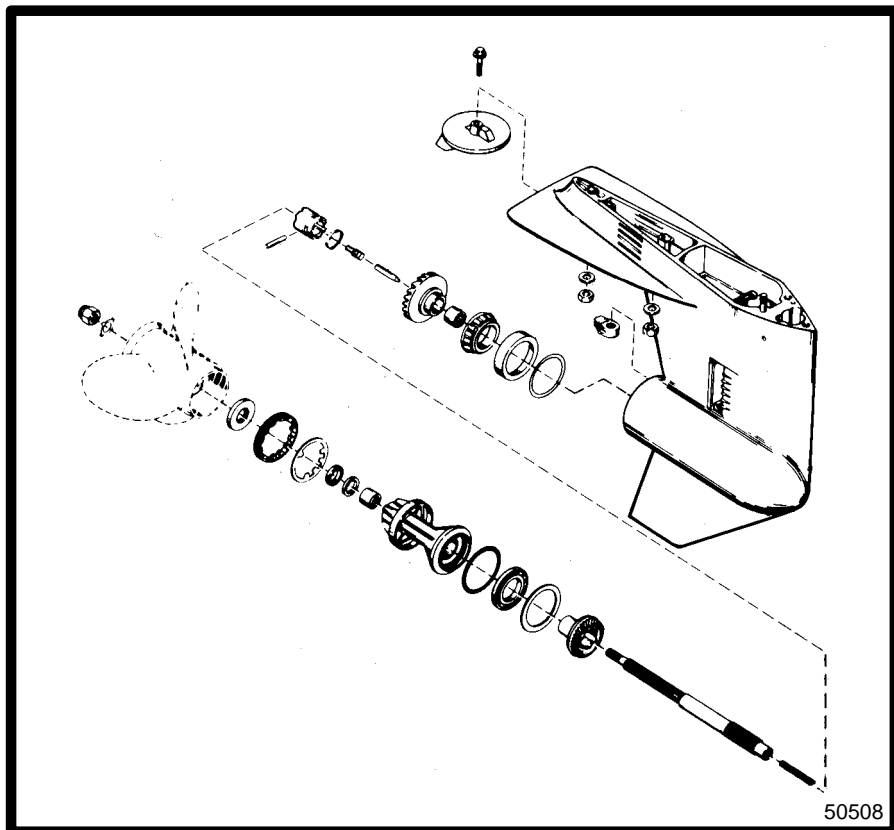




# LOWER UNIT



6

A

## GEAR HOUSING



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## Special Tools

Description	Part No.
Cover Nut Tool	91-91947
Slide Hammer	91-34568A1
Puller Jaws	91-46086A1
Puller	91-27780
Universal Puller Plate	91-37241
Mandrel	91-24273
Shift Shaft Bushing Tool	91-23033
Shimming Tool	91-89670
Dial Indicator Gauge	91-58222A1
Dial Indicator Adaptor	91-83155
Backlash Indicator Rod	91-78473
Puller Bolt	91-85716
Mandrel*	91-37312
Mandrel*	91-37311
Mandrel*	91-38628
Mandrel*	91-36569
Driver Rod*	91-37323
Mandrel	91-31361
Mandrel	91-86290

\*From Bearing Puller & Installation Kit  
(P/N 91-31229A5)

## Quicksilver Lubricants and Service Aids

Description	Part No.
Special Lubricant 101	92-13872A1
Loctite Grade "A" (271)	92-32609-1
Needle Bearing Assembly Lubricant	92-42649A-1
Gear Lube	*
2-4-C Marine Lubricant	*

\* See Quicksilver Accessories Guide for part numbers.

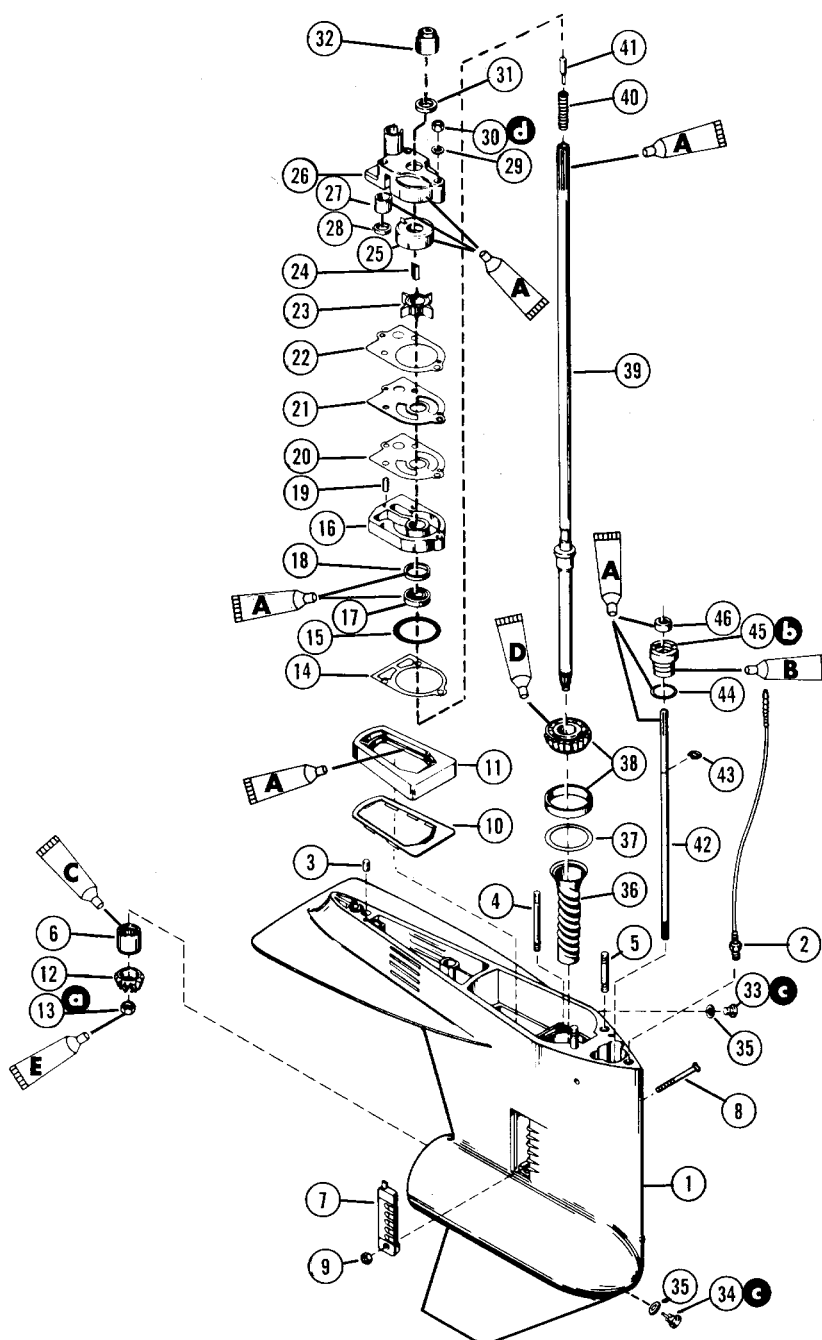


# Gear Housing Assembly - Drive Shaft Components

- 1 - Gear Housing
- 2 - Speedometer Hose
- 3 - Dowel Pin (2)
- 4 - Stud (3)
- 5 - Stud (2)
- 6 - Needle Bearing
- 7 - Water Inlet
- 8 - Screw
- 9 - Locknut
- 10- Plate, Nylon
- 11- Seal
- 12- Pinion Gear
- 13- Pinion Nut
- 14- Gasket
- 15- O-ring
- 16- Water Pump Base
- 17- Oil Seal
- 18- Oil Seal
- 19- Dowel Pin (2)
- 20- Gasket
- 21- Face Plate
- 22- Gasket
- 23- Impeller
- 24- Drive Key
- 25- Insert
- 26- Water Pump Body
- 27- Seal
- 28- Washer, Nylon
- 29- Washer
- 30- Nut
- 31- Centrifugal Slinger, Rubber
- 32- Seal, Rubber
- 33- Vent Screw
- 34- Fill Screw
- 35- Gasket (2)
- 36- Lubrication Sleeve
- 37- Shim(s)
- 38- Tapered Bearing
- 39- Drive Shaft
- 40- Spring
- 41- Pin
- 42- Shift Shaft
- 43- "E" Clip
- 44- O-ring
- 45- Bushing
- 46- Oil Seal

## Lubrication/Sealant Application Points

- A** 2-4-C Marine Lubricant (P/N 92-90018A12)
- B** Special Lubricant 101 (P/N 92-13872A1)
- C** Needle Bearing Assembly Lubricant (P/N 92-42649A-1)
- D** Quicksilver Gear Lubricant (P/N 92-13783A24)
- E** Loctite Grade A "271" (P/N 92-32609-1)



## Torque Specifications

- a** 50 lb. ft. (67.8 N·m)
- b** 17 lb. ft. (23 N·m)
- c** 60 lb. in. (6.8 N·m)
- d** 30 lb. in. (3.4 N·m)

50506



# Gear Housing Assembly - Propeller Shaft Components

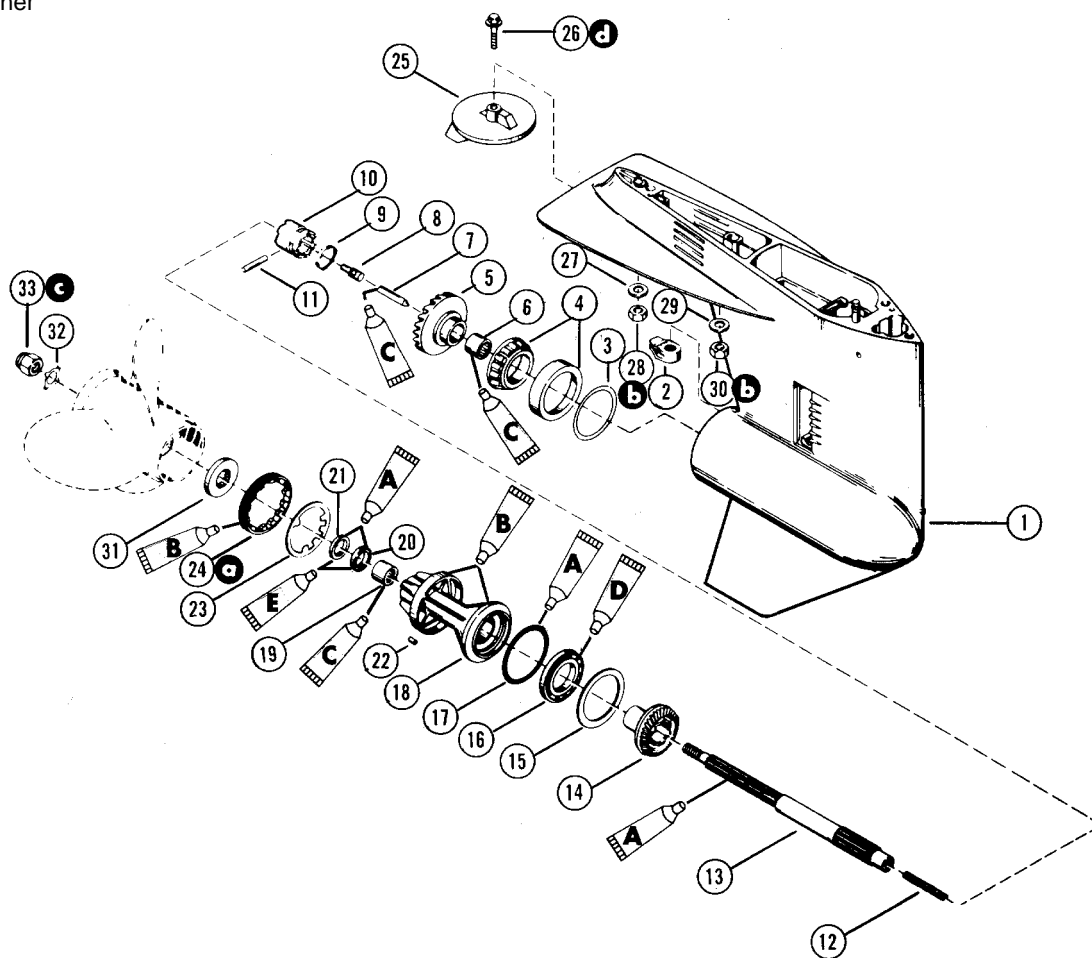
- 1 - Gear Housing
- 2 - Shift Cam (Number Side Toward Top of Gear Case)
- 3 - Shim(s)
- 4 - Bearing and Race
- 5 - Forward Gear
- 6 - Needle Bearing
- 7 - Cam Follower
- 8 - Guide Block
- 9 - Spring
- 10 - Sliding Clutch
- 11 - Cross Pin
- 12 - Spring
- 13 - Propeller Shaft
- 14 - Reverse Gear
- 15 - Thrust Washer
- 16 - Ball Bearing
- 17 - O-ring
- 18 - Bearing Carrier
- 19 - Needle Bearing
- 20 - Oil Seal
- 21 - Oil Seal
- 22 - Alignment Key
- 23 - Tab Washer
- 24 - Cover Nut
- 25 - Trim Tab
- 26 - Bolt
- 27 - Washer
- 28 - Locknut
- 29 - Washer
- 30 - Locknut
- 31 - Thrust Hub
- 32 - Locking Washer

## Torque Specifications

- a** 100 lb. ft. (135.6 N·m)
- b** 60 lb. ft. (81.4 N·m)
- c** 55 lb. ft. (74.6 N·m)
- d** 20 lb. ft. (27.1 N·m)

## Lubrication/Sealant Application Points

- A** 2-4-C Marine Lubricant (P/N 92-90018A12)
- B** Special Lubricant 101 (P/N 92-13872A1)
- C** Needle Bearing Assembly Lubricant (P/N 92-42649A-1)
- D** Quicksilver Gear Lubricant (P/N 92-13783A24)
- E** Loctite Grade A "271" (P/N 92-32609-1)



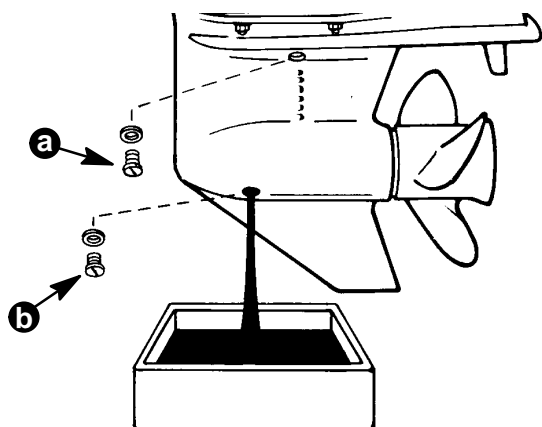


## Draining and Inspecting Gear Housing Lubricant

### ⚠ WARNING

If gear housing is installed on outboard, disconnect (and isolate) spark plug leads to avoid accidental starting when working near propeller.

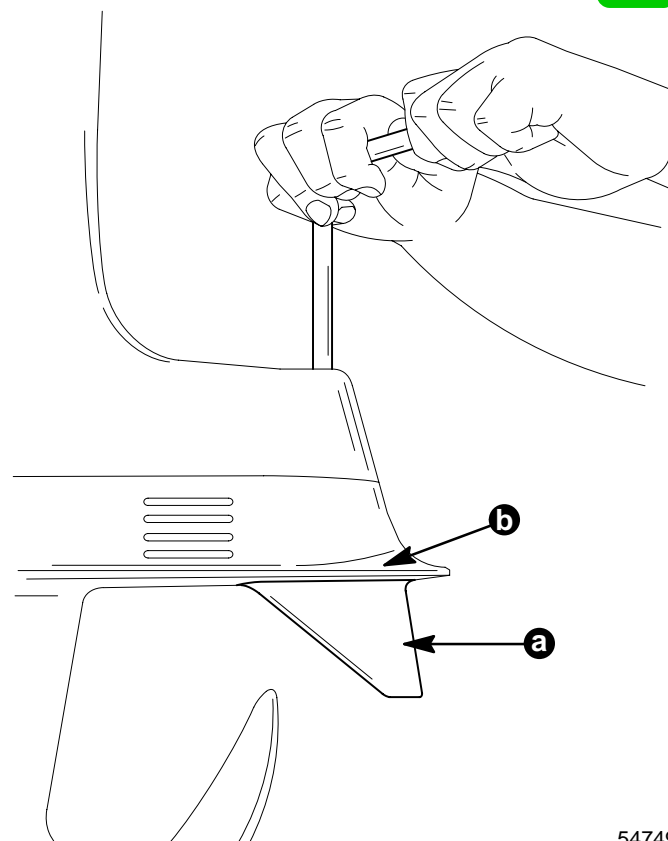
1. With gear housing in normal running position, place a clean pan under housing and remove vent screw and gasket (a) and fill/drain screw and gasket (b).



26473

## Trim Tab/Propeller Removal

1. Place reference mark on trim tab (a) and anti-ventilation plate (b) to allow trim tab to be reinstalled at the same angle.
2. Remove nylon plug from drive shaft housing and remove bolt securing trim tab to gear housing.

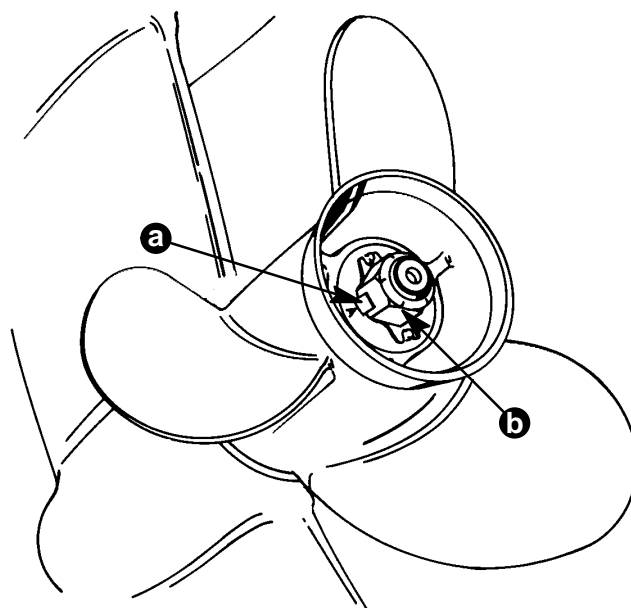


54749

### ⚠ WARNING

If gear housing is not removed before attempting to remove or install the propeller, remove (and isolate) spark plug leads from spark plugs to prevent outboard from starting accidentally.

3. Bend tabs (a) away from propeller nut (b).

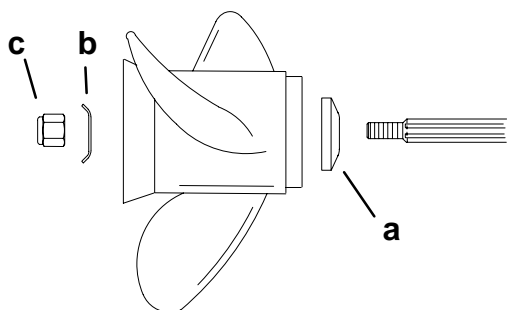


51119



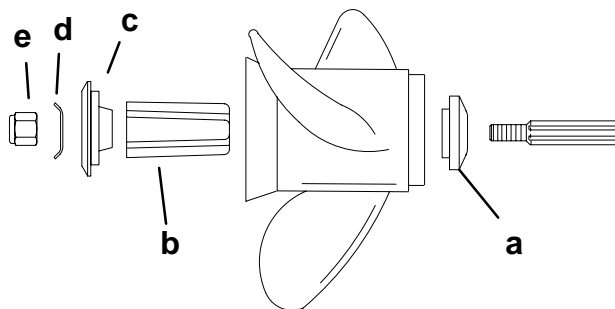
4. Place a block of wood between gear case and propeller to hold propeller and remove propeller nut.
5. Remove propeller and components from shaft.

#### Flo-Torq I Drive Hub Propellers



- a - Forward Thrust Hub
- b - Propeller Nut Retainer
- c - Propeller Nut

#### Flo-Torq II Drive Hub Propellers



- a - Forward Thrust Hub
- b - Replaceable Drive Sleeve
- c - Rear Thrust Hub
- d - Propeller Nut Retainer
- e - Propeller Nut

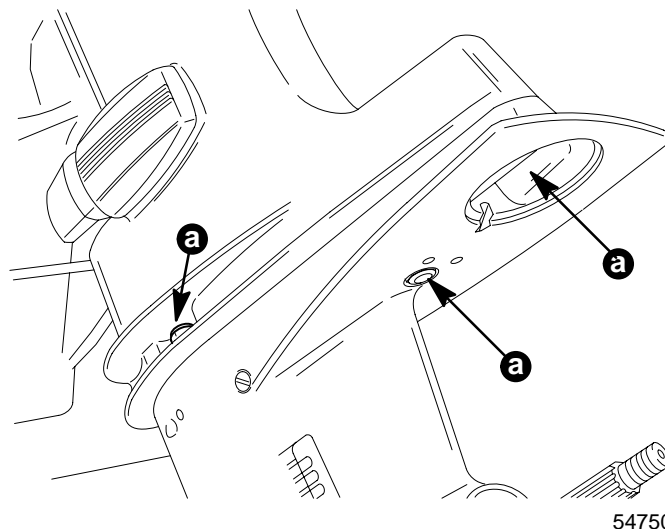
## Gear Housing Removal

### **⚠ WARNING**

To prevent outboard from accidentally starting, remove (and isolate) spark plug leads from spark plugs prior to removing gear housing.

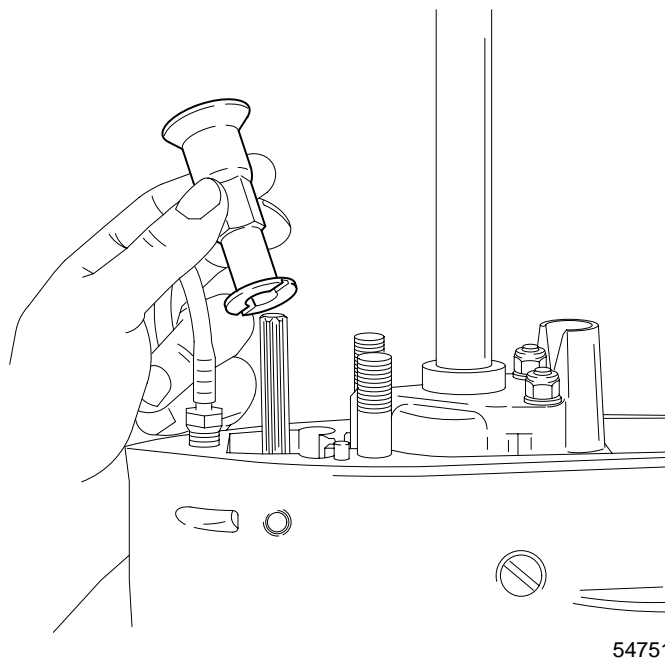
1. Remove and isolate spark plug leads.
2. Shift outboard into forward gear.
3. Tilt outboard to full "UP" position.

4. Remove four lock nuts (a) securing gear housing to drive shaft housing (one not shown).
5. Remove gear housing.



## Gear Housing Disassembly

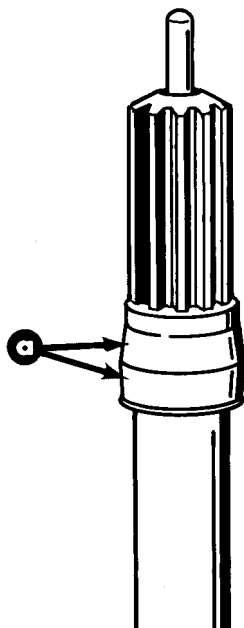
1. Place gear housing in soft jawed vise.
2. Remove shift shaft guide from shift shaft.





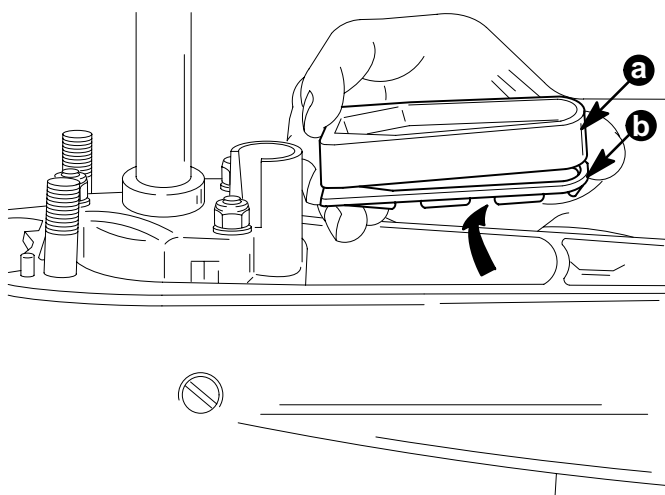
3. Remove seal (a) from drive shaft.

**NOTE:** Outboard S/N 0C245675 and above will not have seal on drive shaft due to improved lower end cap design.



51188

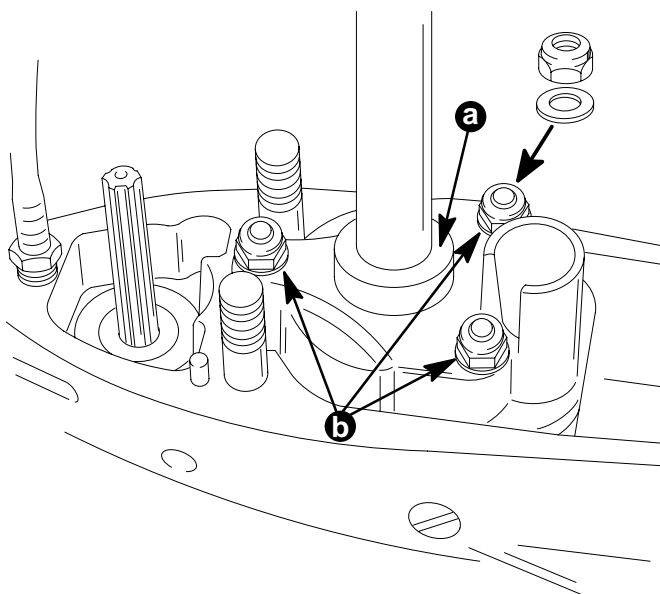
4. Remove seal (a) and plate (b) from gear housing.



54752

## Water Pump Removal

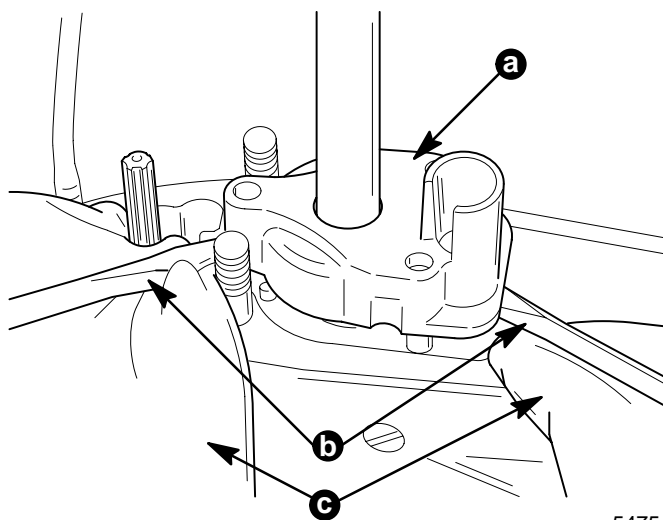
1. Remove centrifugal slinger (a) and three lock nuts and washers (b).



54753

2. Remove water pump body.

3. Inspect body for cracks, distortion or melting. Replace if necessary.



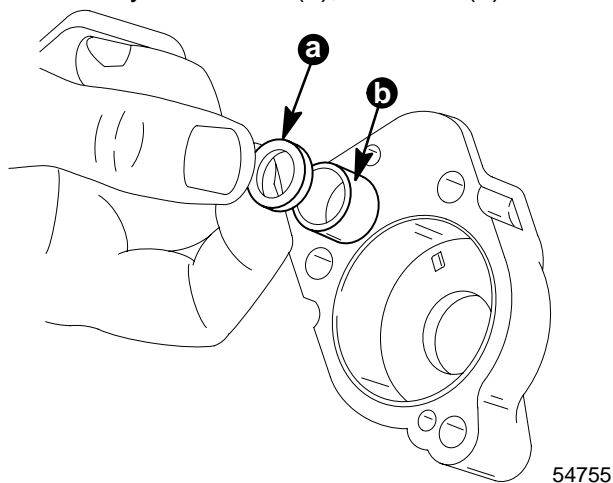
54754

- a - Water Pump Body
- b - Screwdrivers
- c - Shop Cloths

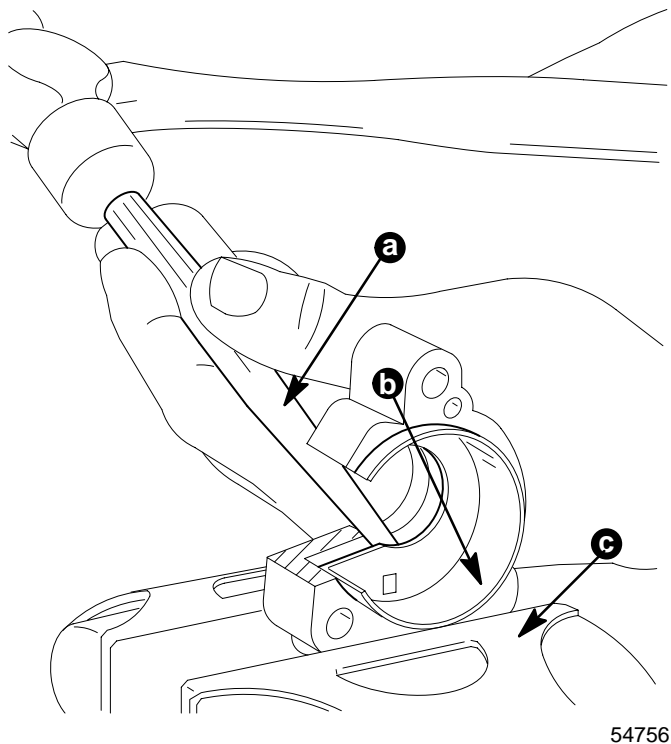




4. Remove nylon washer (a), and seal (b).



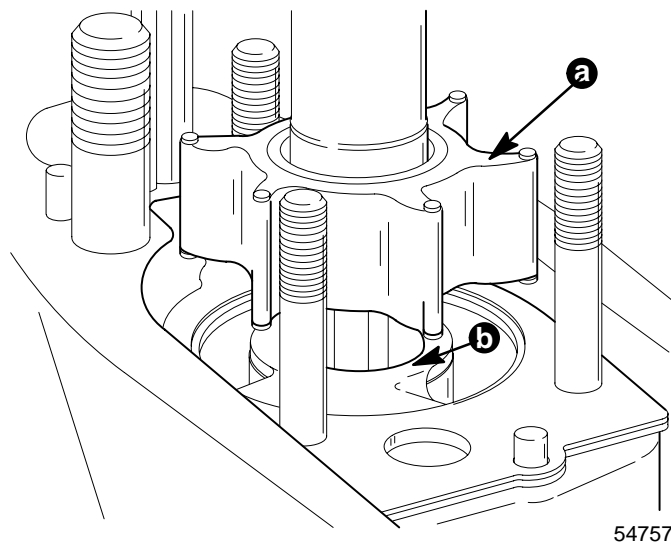
5. Inspect water pump for grooves; if grooved, replace insert.



a - Punch  
b - Insert  
c - Vise

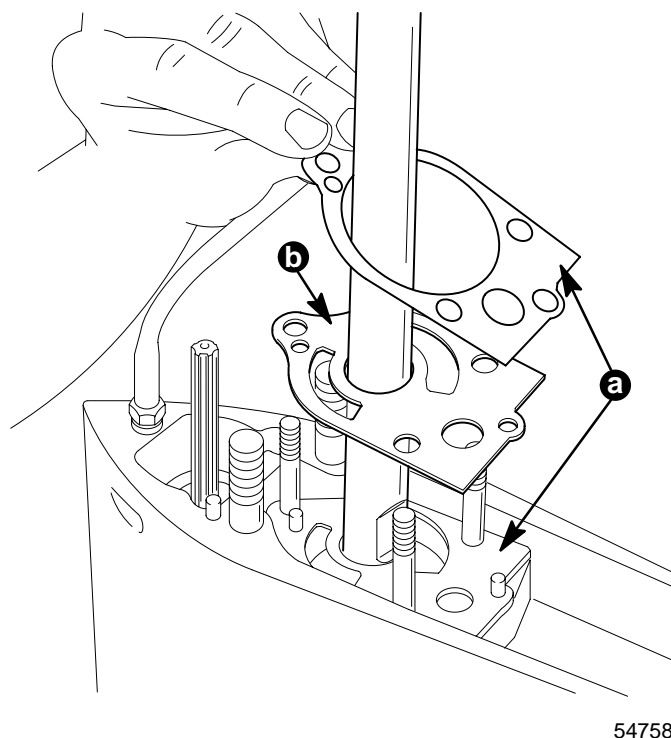
**IMPORTANT:** When performing gear housing repairs that require water pump impeller removal, it is recommended that the impeller be replaced. If impeller must be reused DO NOT install in reverse to original rotation or premature impeller failure will occur. Original rotation is clockwise.

6. Remove impeller (a) and drive key (b) from drive shaft. If necessary use a punch and hammer to drive impeller upward off drive shaft. In extreme instances, the impeller center hub must be split with chisel. Take care not to damage drive shaft.



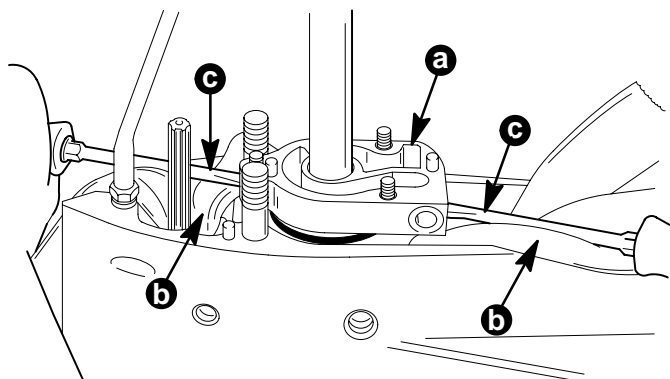
7. Remove gaskets (a) and face plate (b).

8. Inspect face plate for grooves. If grooved, replace face plate.





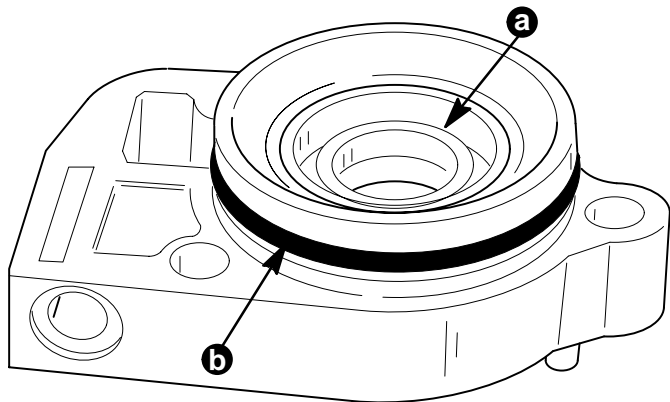
9. Remove water pump base and gasket.
10. Inspect base and replace if cracked, distorted, or melted.



54759

- a - Water Pump Base  
b - Shop Cloths  
c - Screwdrivers

11. Remove (and discard) seals (a) and O-ring (b).

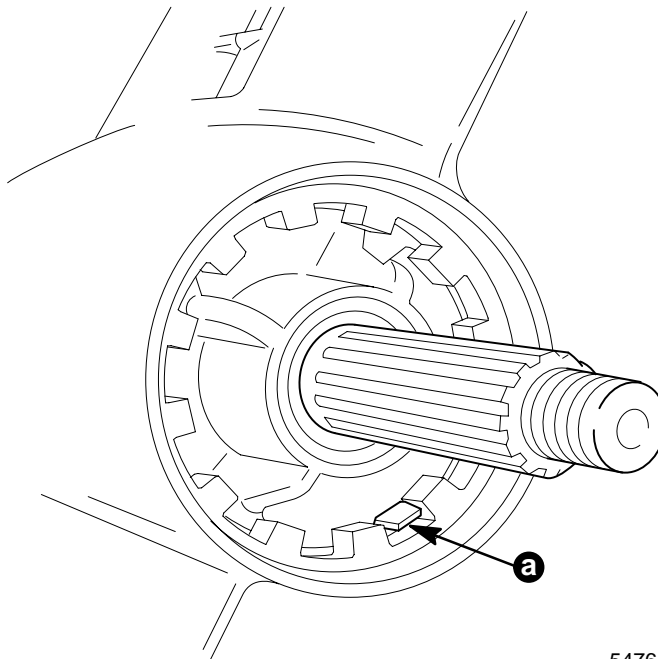


54760

## Bearing Carrier and Propeller Shaft Removal

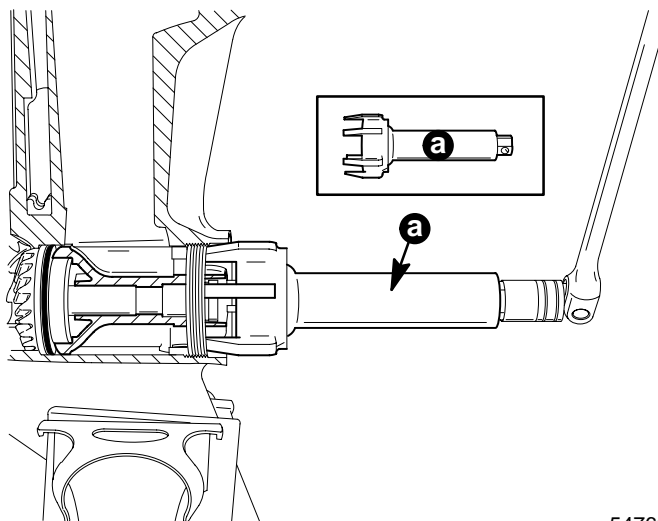
**IMPORTANT:** For proper retention between housing and cover nut, it is recommended that **PLASTIC** cover nut **NOT** be reused. Replace as required.

1. Bend lock tab (a) away from cover nut slot.



54761

2. Remove cover nut using cover nut tool.

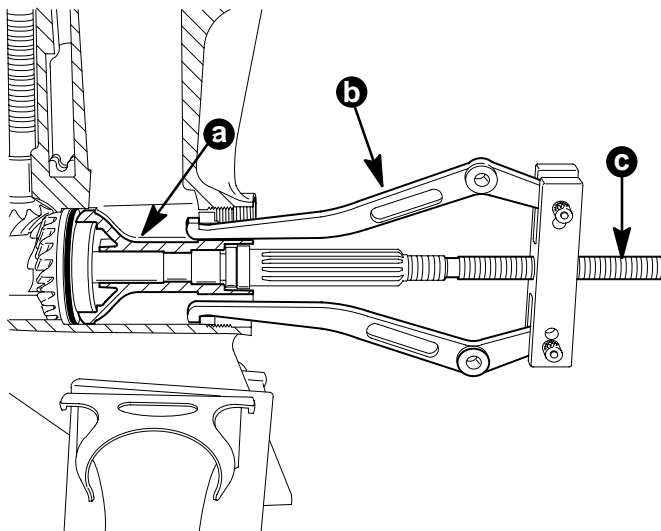


54762

- a - Cover Nut Tool (91-91947)



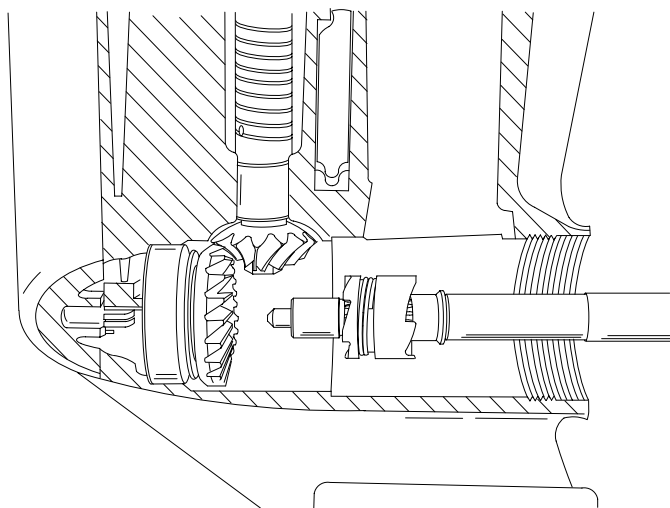
3. Remove bearing carrier from gear housing using puller jaws and bolt.



54763

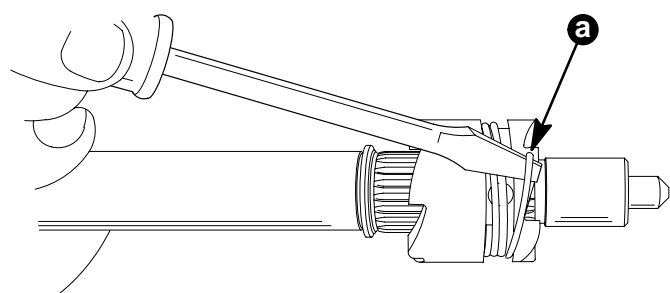
- a - Bearing Carrier  
b - Puller Jaws (19-46086A1)  
c - Puller Bolt (91-85716)

4. Remove propeller shaft from gear housing.



54764

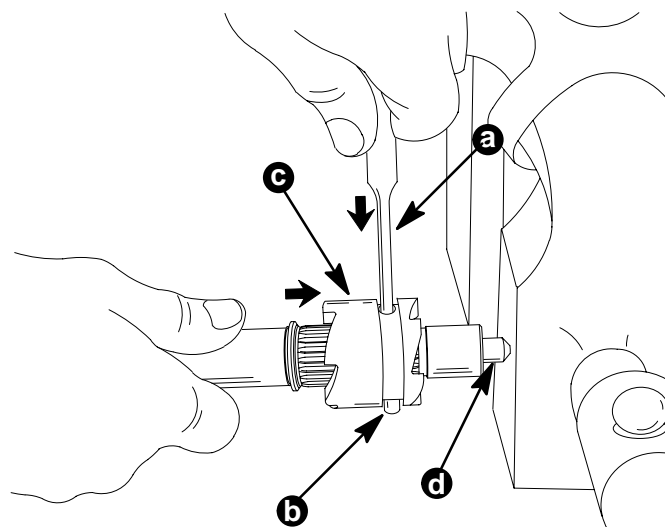
5. Remove spring (a) from sliding clutch.



54765

6. Remove cross pin.

7. Remove remaining components from propeller shaft.

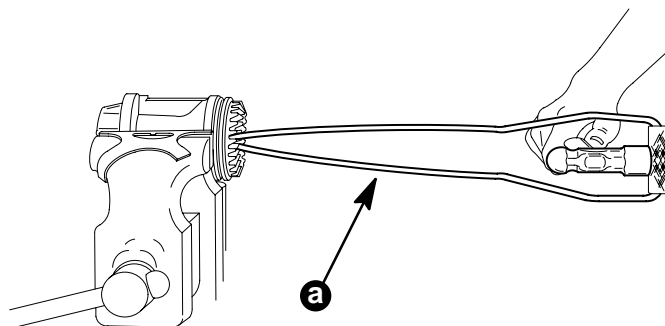


54766

- a - Punch  
b - Cross Pin  
c - Sliding Clutch  
d - Cam Follower

8. Inspect cam follower for pitting, scoring or rough surface. replace cam follower AND shift cam if damage to cam follower has occurred.

9. Remove reverse gear using puller.

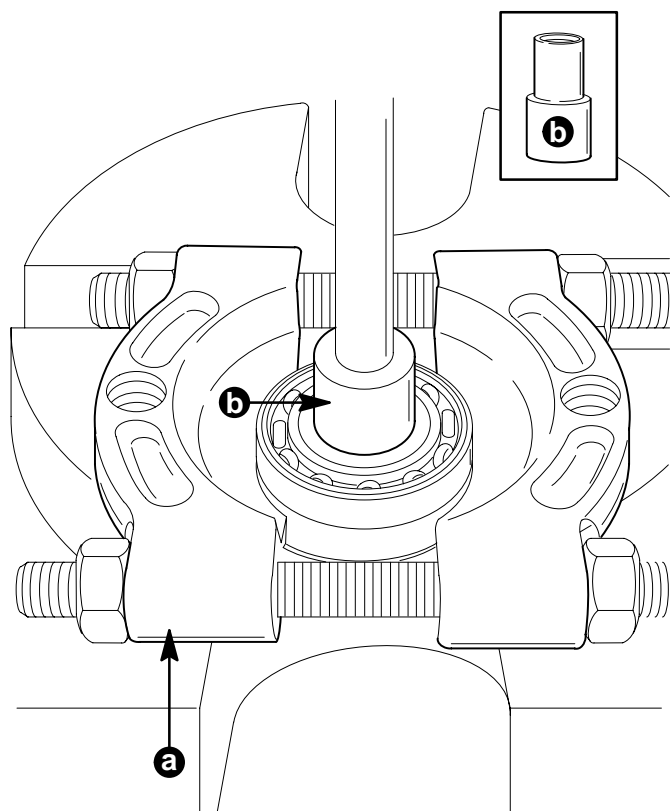


54767

- a - Puller (91-27780)



10. Inspect reverse gear ball bearing. If bearing is rusted or does not roll freely, replace bearing.

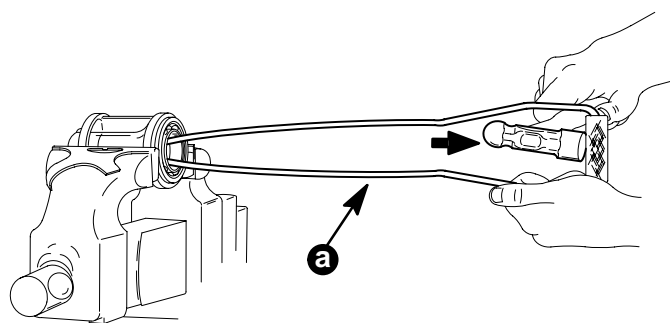


54768

a - Universal Puller Plate (91-37241)

b - Mandrel (91-37312)

### Bearing on Reverse Gear

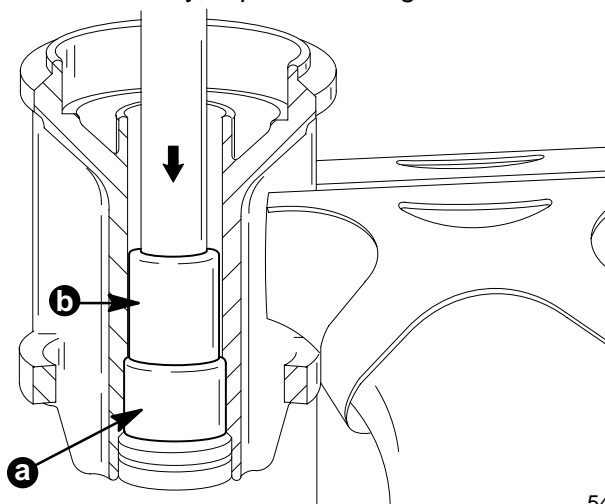


54769

a - Puller (91-27780)

### Bearing in Bearing Carrier

11. Inspect bearing (a). If bearing is rusted or does not roll freely, replace bearing.



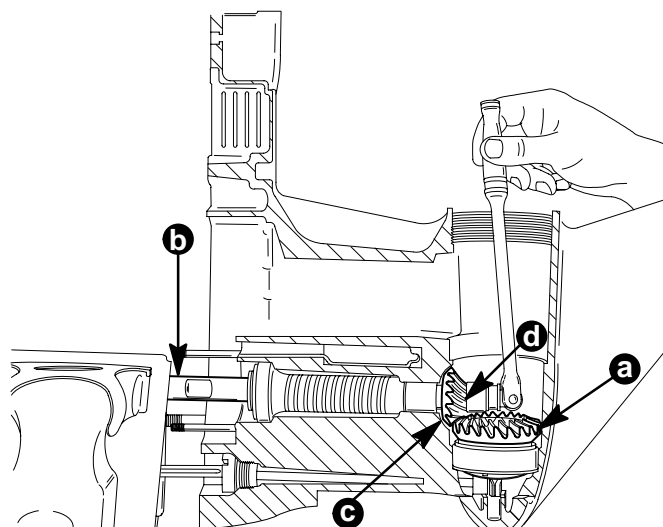
54770

a - Bearing

b - Mandrel (91-24273)

## Drive Shaft and Pinion Gear Removal

1. Place gear housing assembly in to padded vise as shown.
2. Remove pinion nut.
3. Remove drive shaft from gear housing.



54771

a - Forward Gear

b - Drive Shaft

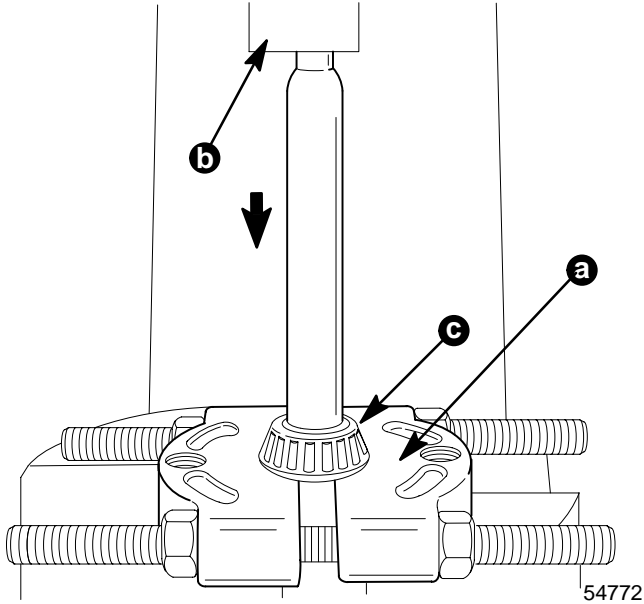
c - Pinion Gear

d - Pinion Nut (Hidden; Flat Side Away from Pinion Gear)

4. Remove pinion gear and forward gear assembly from housing.

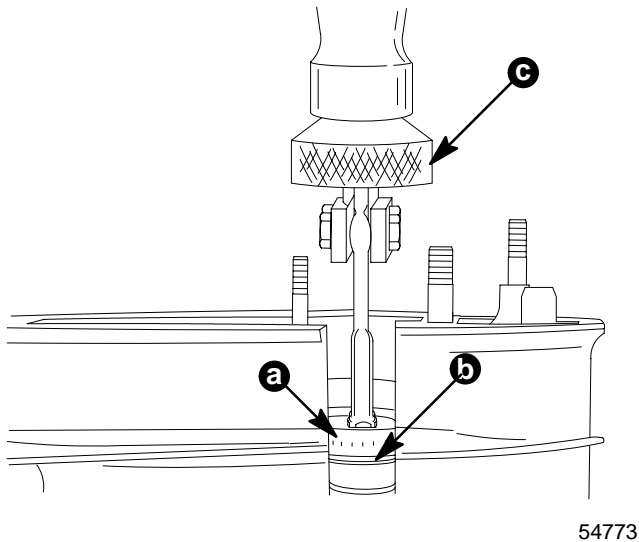


5. If tapered drive shaft bearing is rusted or does not roll freely, or if race is damaged, replace bearing and race as an assembly.



- a - Universal Puller Plate (91-37241)  
b - Press  
c - Tapered Bearing

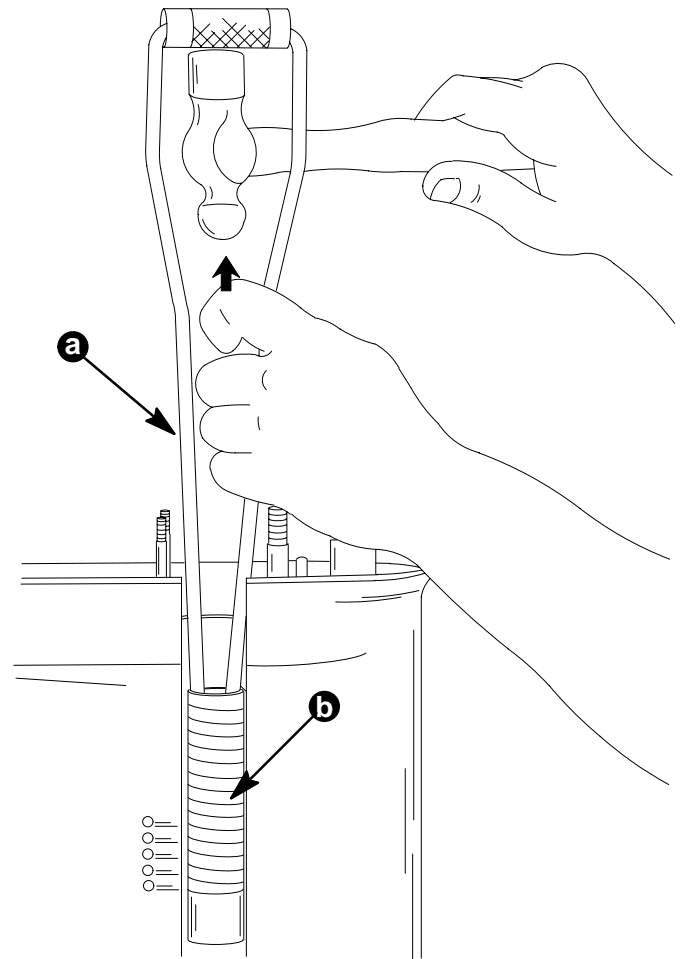
6. Remove bearing race using slide hammer.



- a - Race  
b - Shim(s)  
c - Slide Hammer (91-34569A1)

## Lubrication Sleeve Removal

1. Remove lubrication sleeve using puller.

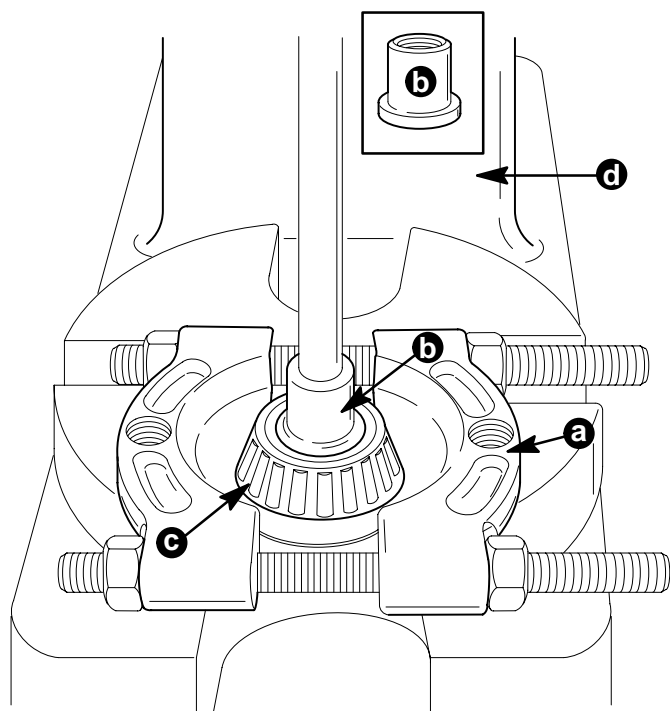


- a - Puller (91-27780)  
b - Lubrication Sleeve



## Forward Gear and Bearing Removal

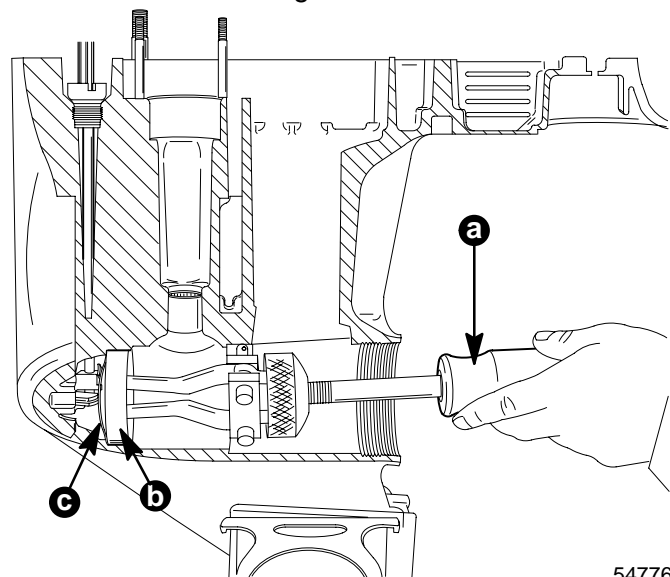
1. If tapered forward gear bearing is rusted or does not roll freely, or if race is damaged, replace bearing and race as an assembly.
2. Remove bearing as shown.



54775

- a - Universal Puller Plate (91-37241)
- b - Mandrel (36569)
- c - Bearing
- d - Press

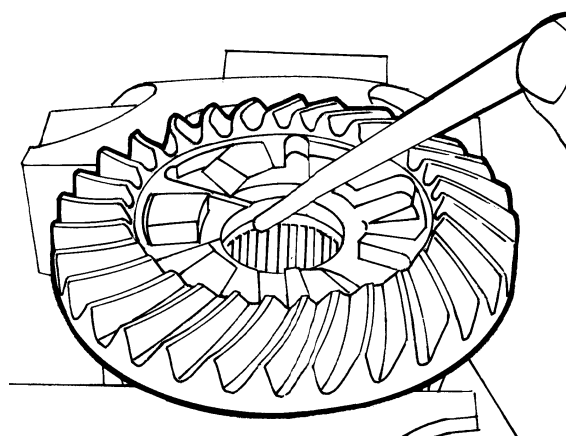
3. Remove race using slide hammer.



54776

- a - Slide Hammer (91-34569)
- b - Bearing Race
- c - Shim(s)

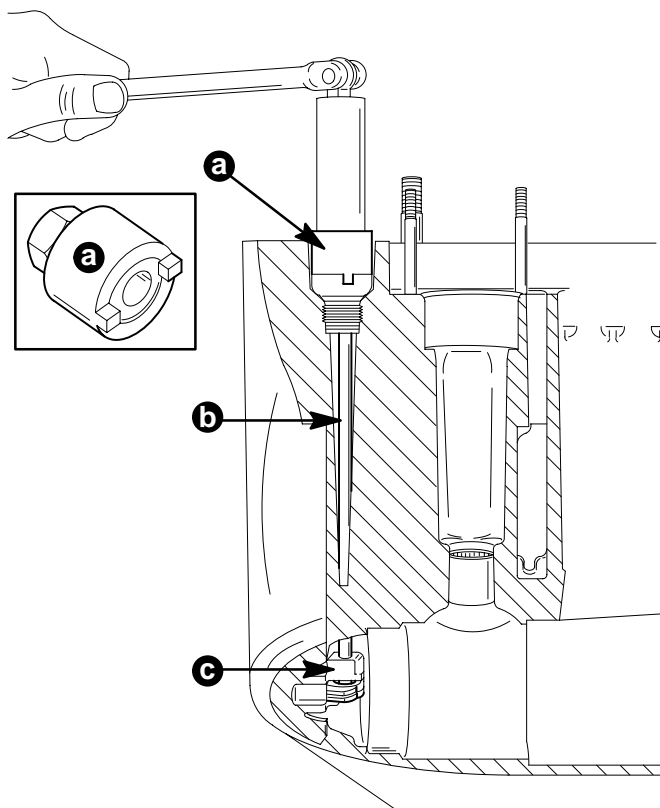
4. Replace bearing (a) if it is rusted or does not roll freely. Use punch and hammer to remove bearing.



19203

## Shift Shaft Removal

1. Remove shift shaft bushing.
2. Remove shift shaft (b) and shift cam (c) from gear housing.

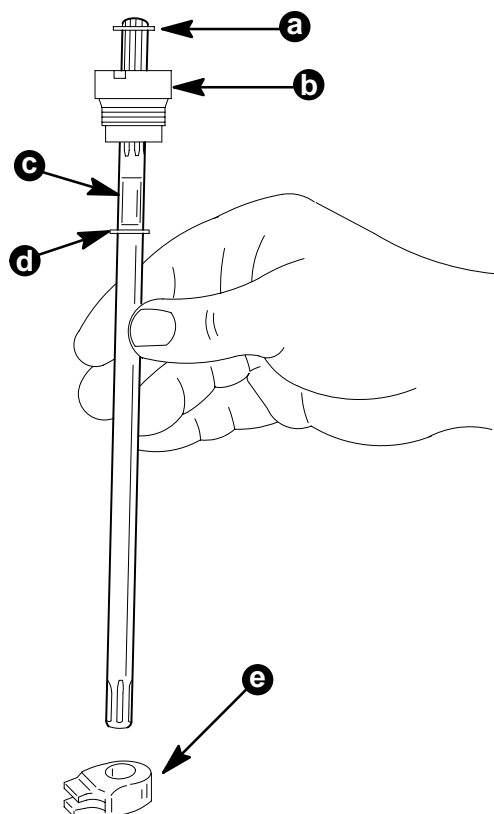


54777

- a - Shift Shaft Bushing Tool (91-23033)
- b - Shift Shaft
- c - Shift Cam

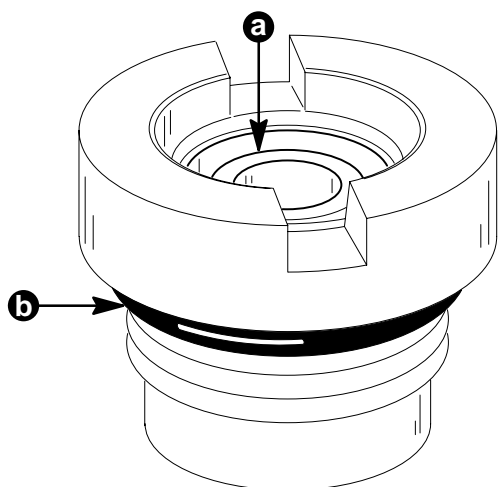


3. Remove components from shift shaft.



- a - Rubber Washer
- b - Bushing
- c - Seal Surface
- d - "E" Clip
- e - Shift Cam

4. Remove (and discard) seal (a) and O-ring (b).

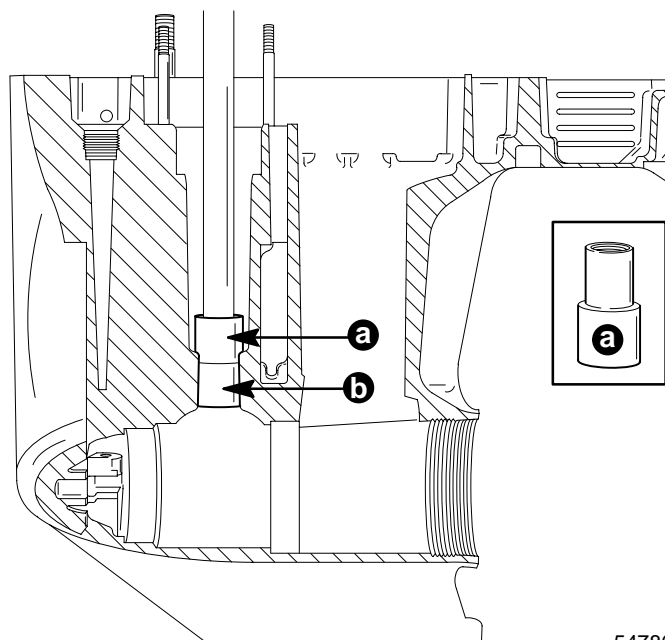


54778

54779

## Drive Shaft Needle Bearing Removal

1. If bearing is rusted or does not roll freely, replace bearing.



54780

- a - Mandrel (91-37312)
- b - Needle Bearing

## Cleaning and Inspection

### Gear Housing/Bearing Carrier Castings

1. Thoroughly clean gear housing/bearing carrier castings. Be sure all old gasket material is removed from mating surfaces and that carbon deposits have been removed from exhaust passages.
2. Inspect castings for cracks or fractures.
3. Check sealing surfaces for nicks, deep grooves and distortion which could cause leaks.
4. Check water passages for obstructions.

## Bearings

### BALL/ROLLER BEARINGS

#### ⚠ CAUTION

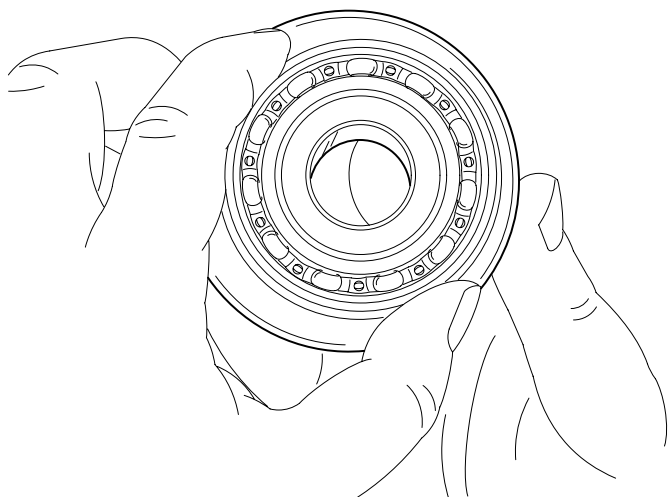
**DO NOT spin-dry ball/roller bearings with compressed air.**

1. Clean bearing in solvent and dry with compressed air.





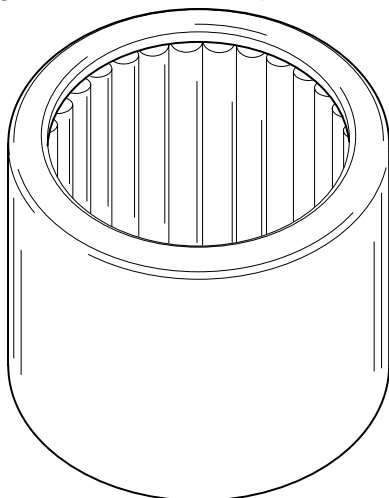
2. Bearing should be free of rust stains.
3. Attempt to work inner bearing race in-and-out. There should not be excessive play.
4. Lubricate bearing with Quicksilver Gear Lube. Rotate inner bearing race. Bearing should have smooth action. If ball bearing sounds or feels rough or has catches, remove and discard bearing. Refer to Disassembly preceding.



54781

## NEEDLE BEARING

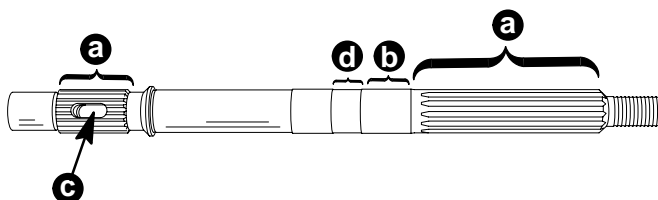
1. Clean needle bearings in solvent and dry with compressed air.
2. replace bearing if needles are rusted, fractured, worn, galled, discolored, or if area of shaft that bearing contact is worn or pitted.



54782

## Propeller Shaft

1. Replace propeller shaft if any of the following conditions exist:
  - a. Splines are twisted or worn.
  - b. Oil Seal surfaces are deeply grooved; allowing water to enter gear housing.
  - c. Sliding clutch slot worn.
  - d. Bearing surface is pitted, worn, rusted, or contain imbedded metal particles.



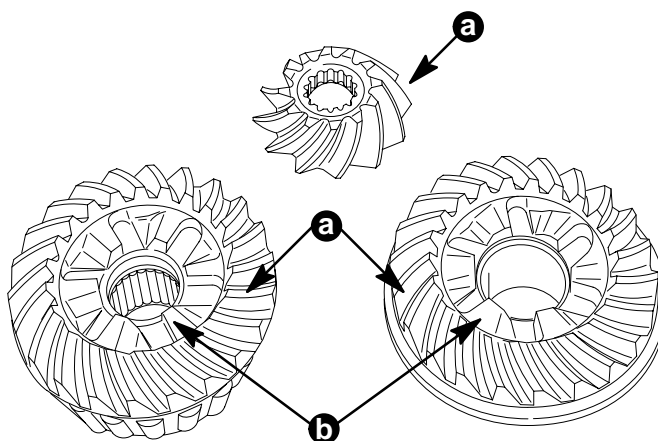
54783

2. Check propeller shaft for straightness. Place shaft on either balance wheels or "V" blocks and rotate shaft while observing spline area for bend (wobble).

If movement recorded is more than .006 in. (.152mm), replace bent shaft.

## Forward, Reverse an Pinion Gears

1. Replace gear if gear teeth (a) or clutch teeth (b) are chipped or worn.



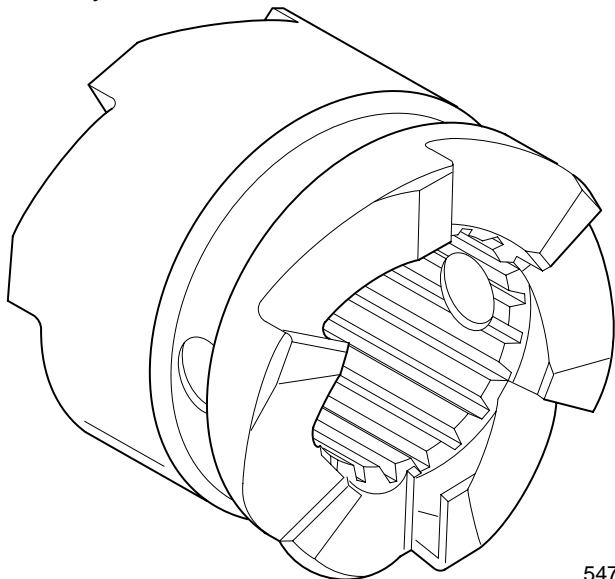
54784





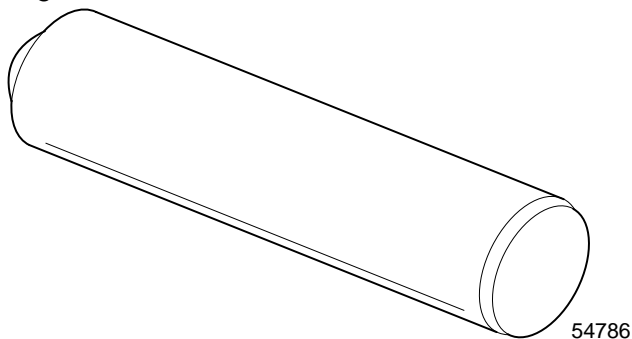
## Sliding Clutch

1. Inspect sliding clutch. Check reverse gear slide clutch jaws, if jaws are rounded replace as necessary. Rounded clutch jaws can be caused by the following:
  - Improper shift cable adjustment.
  - Engine idle speed (RPM) too high when shifting.
  - Shifting outboard from neutral to reverse too slowly.



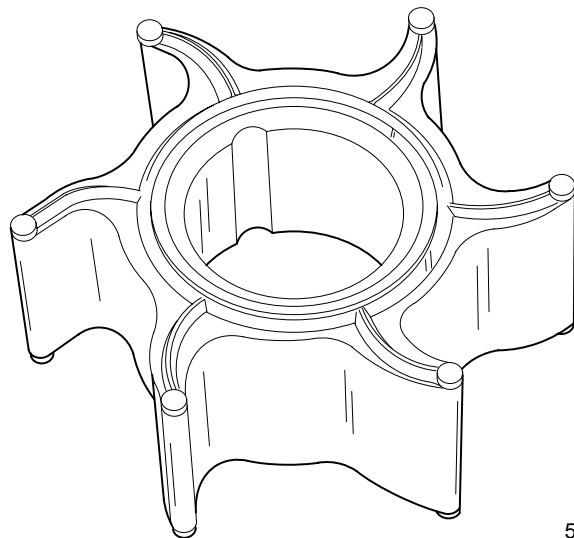
## Cam Follower

1. Replace cam follower if end of follower shows signs of wear.



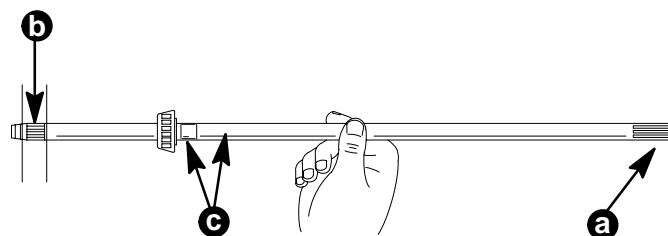
## Water Pump Components

1. Inspect impeller. Replace impeller if any of the following conditions exist:
  - Impeller blade(s) are cracked, torn, or worn.
  - Impeller is glazed or melted (caused by operation without sufficient water supply).
  - Rubber portion of impeller is not bonded to impeller hub.



## Drive Shaft

1. Inspect drive shaft. Replace drive shaft if any of the following exists:
  - Bent drive shaft.
  - Twisted splines
  - Damaged drive shaft oil seal/needle bearing surfaces.



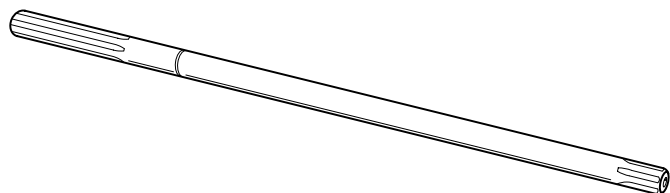
- a - Splines  
b - Needle Bearing Surface  
c - Oil Seal Surface



## Shift Shaft

1. Inspect shift shaft and cam. Replace components if any of the following exists:

- Corroded or worn shift shaft splines (both ends).
- Grooves in shift shaft seal surface.
- Worn shift cam.

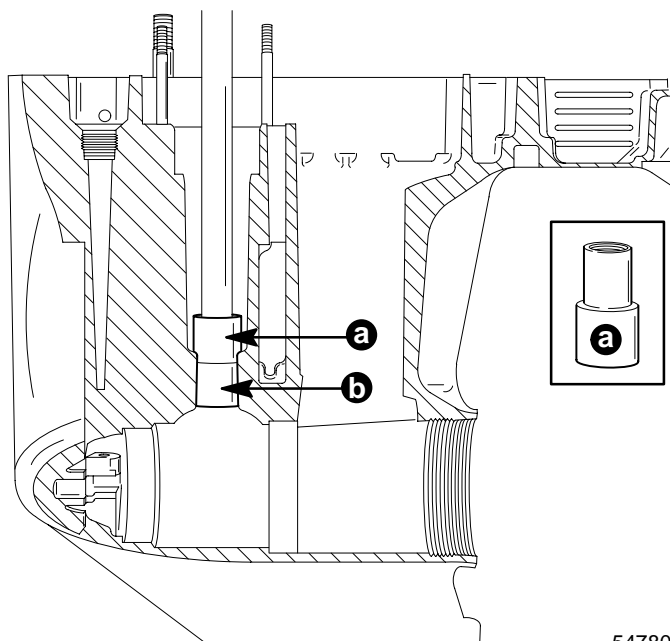


54789

## Gear Housing Reassembly

### Drive Shaft Needle Bearing Installation

1. Drive needle bearing into housing until approximately even with drive shaft cavity.

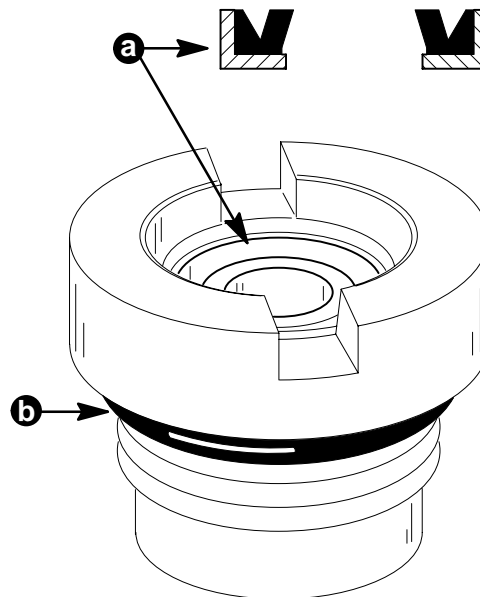


54780

a - Mandrel (91-37312)  
b - Needle Bearing (Numbered Side Up)

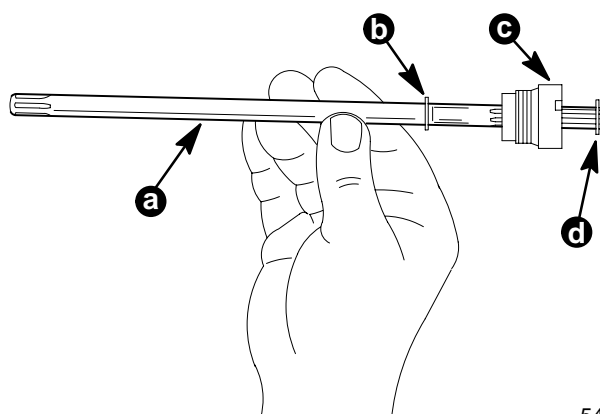
## Shift Shaft Bushing Reassembly and Installation

1. Press new oil seal (a) into bushing with lip of seal away from threaded end of bushing. Install new O-ring (b).
2. Lubricate lip of seal and O-ring with Quicksilver 2-4-C Marine Lubricant.



54779

3. Assemble shift shaft.
4. Apply Quicksilver Special Lubricant 101 to threads of shift shaft bushing.

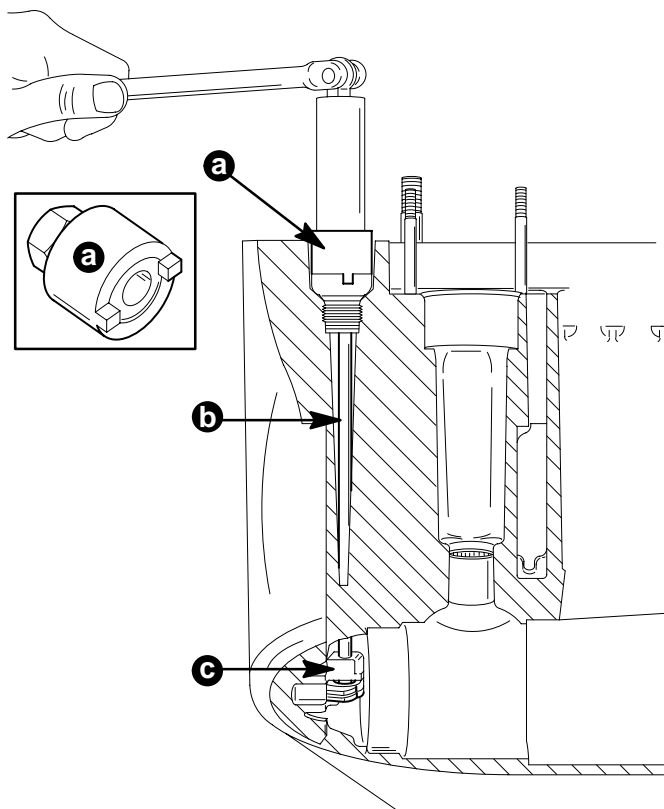


54790

a - Shift Shaft  
b - "E" Clip  
c - Bushing  
d - Rubber Washer



- Place shift cam (Number Side Up) into gear housing and install shift shaft assembly. Torque bushing to 17 lb. in. (23 N·m).



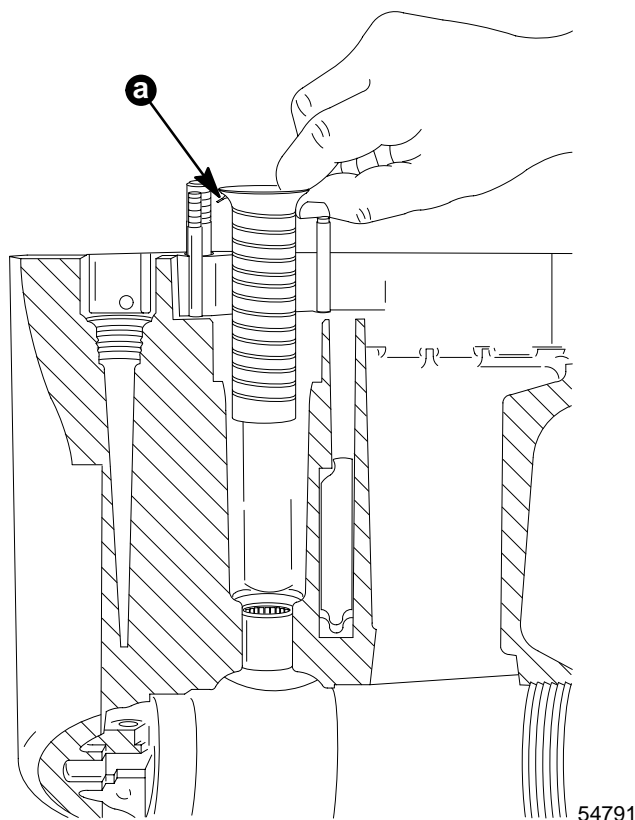
54777

- a - Shift Shaft Bushing Tool (91-23033)
- b - Shift Shaft
- c - Shift Cam (Numbered Side Up)

## Lubrication Sleeve Installation

- Install lubrication sleeve into gear housing.

**NOTE:** Lip of lubrication sleeve must be below drive shaft bearing race shim shoulder. If lip is above shoulder, the drive shaft needle bearing may not be seated deep enough.

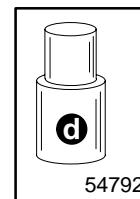


54791

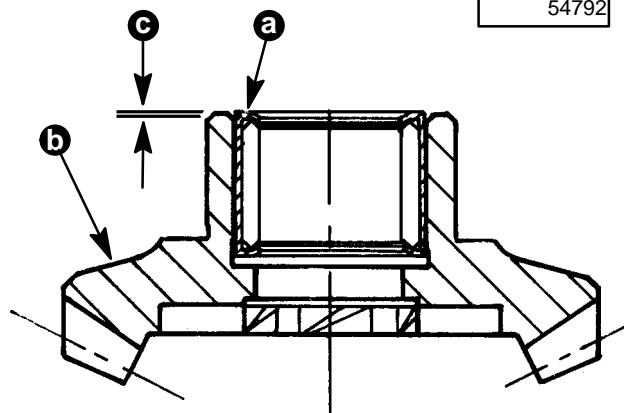
a - Tab (Position Towards Front of Gearcase)

## Forward Gear and Bearing Reassembly

- Press needle bearing (numbered side toward mandrel) into gear until dimensions (c) is obtained.



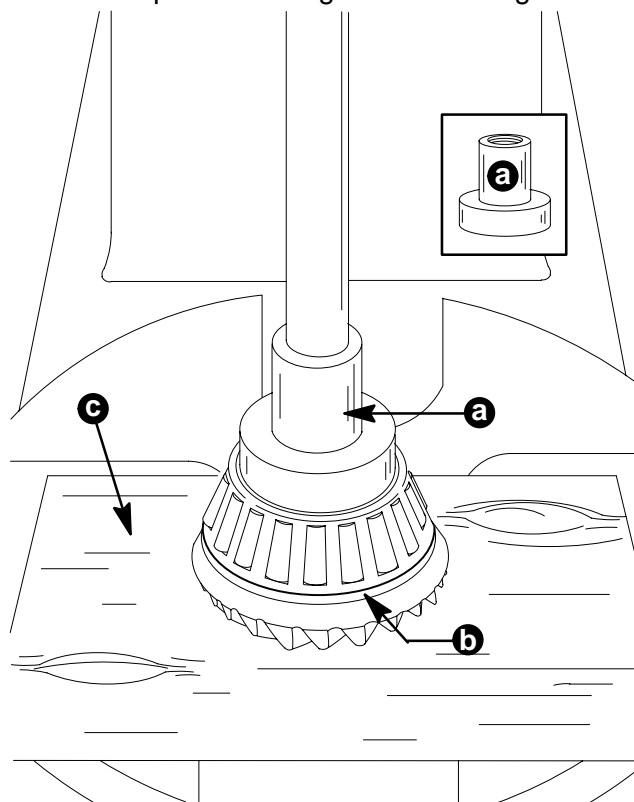
54792



- a - Needle Bearing
- b - Gear
- c - Bearing Flush with Shoulder to .020 in. (.508mm) Recessed
- d - Mandrel (91-37311)



2. Press tapered bearing onto forward gear.



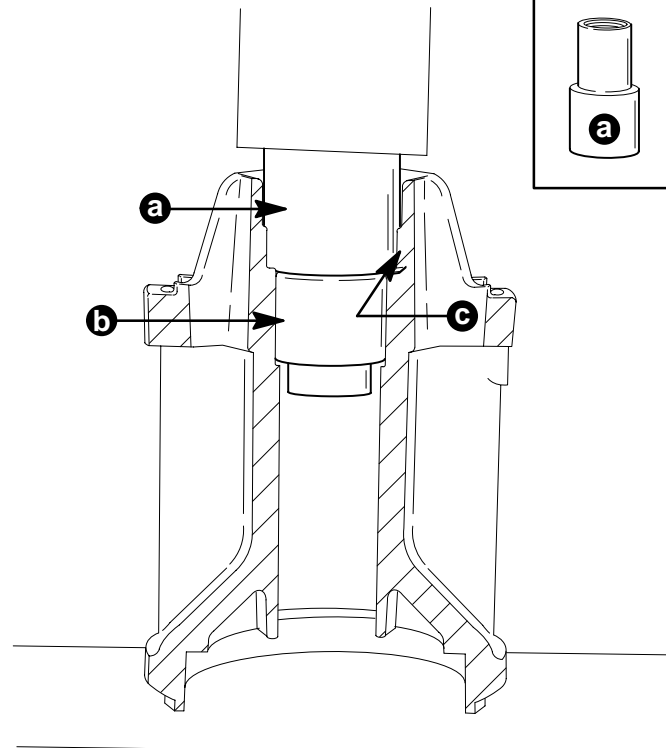
54793

- a - Mandrel (MUST Contact Inner Bearing Race Only) (91-38628)
- b - Inner Bearing Race MUST BE Tight Against Shoulder of Gear
- c - Wood

## Bearing Carrier Reassembly

**IMPORTANT: Do not force bearing into carrier or damage may occur to bearing.**

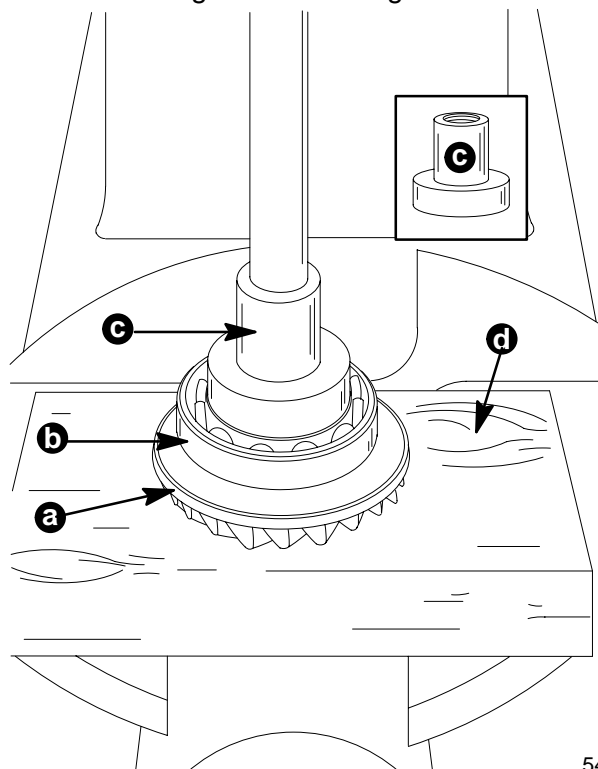
1. Press needle bearing into bearing carrier until bearing edge is just below bearing carrier seal edge.



54794

- a - Mandrel (91-37321)
- b - Needle Bearing
- c - Seal Edge

2. Press bearing onto reverse gear until seated.

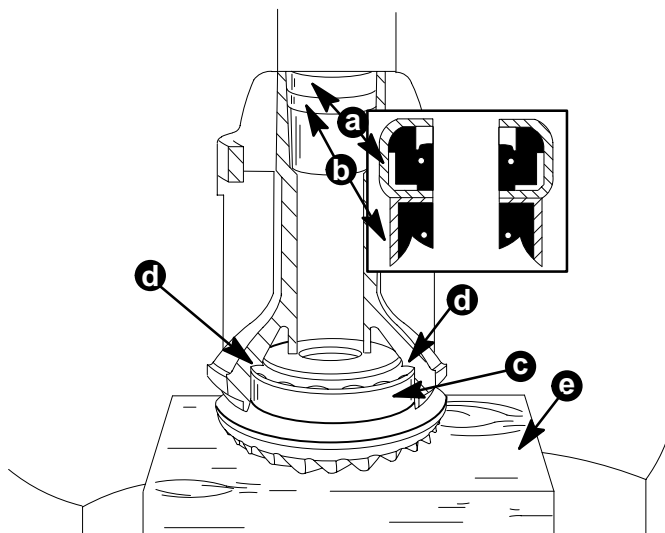


54795

- a - Thrust Washer (Beveled Side Toward Gear)
- b - Bearing
- c - Mandrel (91-38628)
- d - Wood



3. Apply Loctite Grade "A" onto O.D. of seals and press into bearing carrier.
4. Apply 2-4-C Marine Lubricant onto I.D. of seals
5. Lubricate O.D. of ball bearing with Quicksilver Needle Bearing Lubricant and press into bearing carrier.

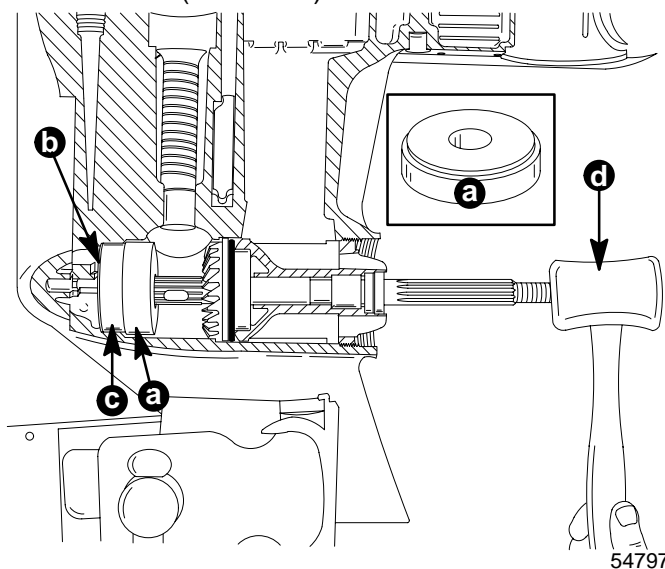


54796

- a - Fish Line Cutter Seal (Cutter Seal Sharp Edge Towards Propeller)
- b - Seal (Lip or Seal Towards Reverse Gear)
- c - Ball Bearing
- d - Flush
- e - Wood

## Forward Gear Race Installation

1. Install shim(s).
2. carefully drive bearing race into gear housing until seated (as shown).

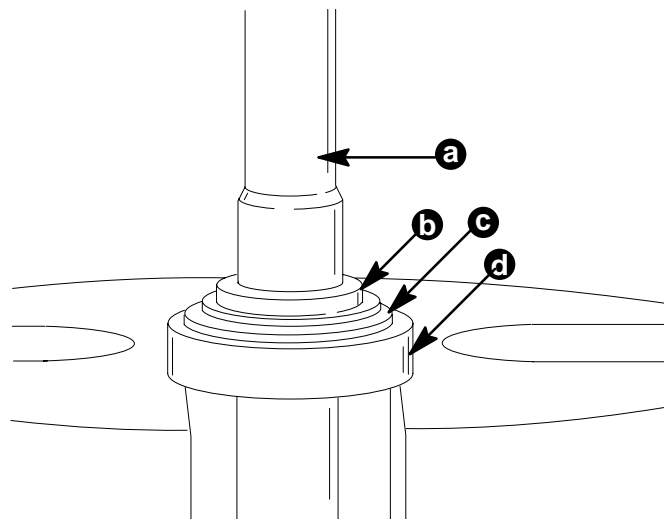


54797

- a - Mandrel (91-31361)
- b - Shim(s)
- c - Bearing Race
- d - Lead Hammer

## Drive Shaft Reassembly and Installation

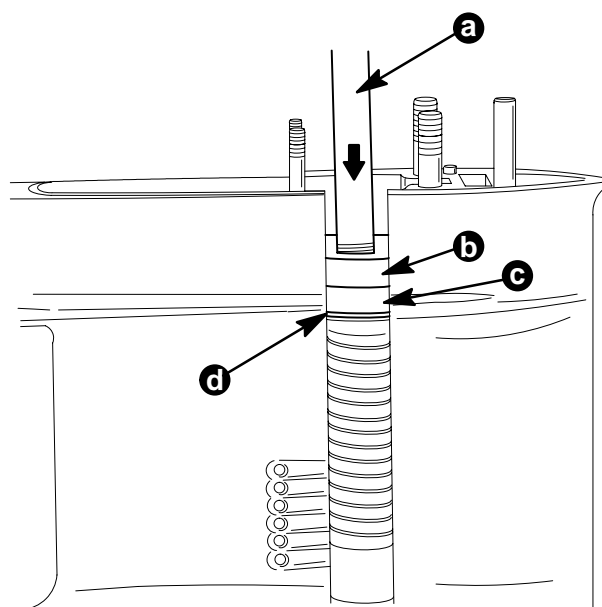
1. Press tapered bearing onto drive shaft until inner bearing race bottoms on shoulder.



54798

- a - Power Head End of Drive Shaft
- b - Shoulder
- c - Tapered Bearing
- d - Outer Race

2. Install shim(s).
3. Drive bearing into gear housing until seated.

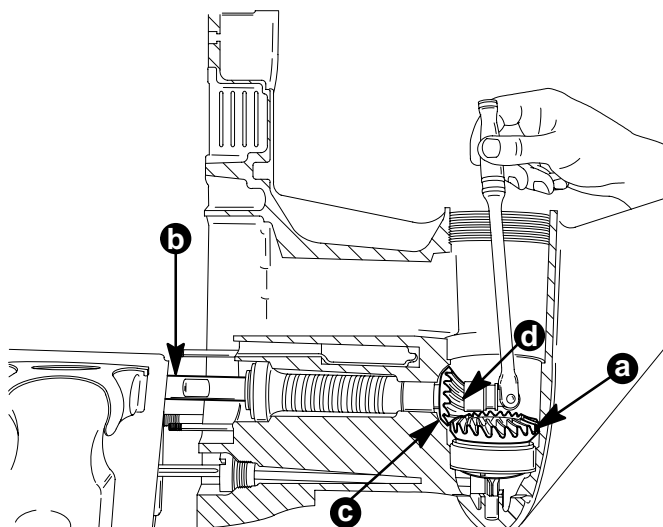


54799

- a - Driver Rod
- b - Mandrel (91-86290)
- c - Bearing Race
- d - Shim(s)



4. Apply Loctite Grade "A" onto threads of new pinion nut and install components.
5. Clamp drive shaft in soft jawed vise and torque pinion nut to 50 lb. ft. (67.8 N·m).



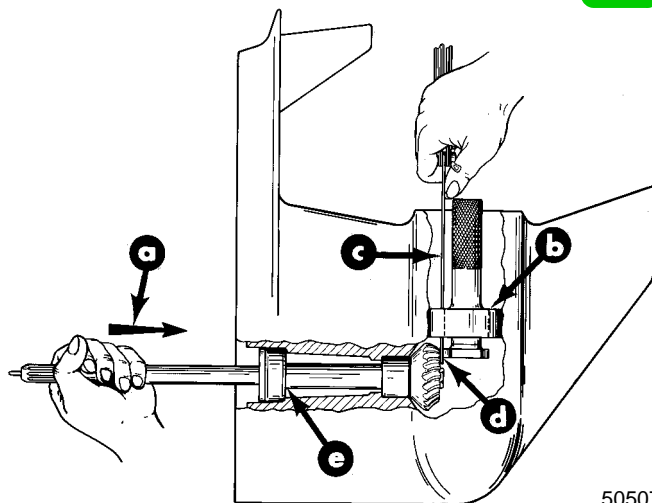
54771

- a - Forward Gear Assembly
- b - Drive Shaft
- c - Pinion Gear
- d - Pinion Nut (Hidden; Flat Side Away from Pinion Gear)

## Checking Pinion Gear Depth

**IMPORTANT:** Read entire shimming procedure before attempting any change in shim thickness.

1. Clean reverse gear shoulder and diameter of propeller shaft cavity.
2. Insert shimming tool (91-89670) into gear housing until it bottoms out.
3. Align access hole in shimming tool with pinion gear.
4. Rotate drive shaft several times with down pressure applied to seat drive shaft tapered bearing.
5. With down pressure applied, determine pinion gear depth by inserting a feeler gauge through access hole in shimming tool.
6. The correct clearance between pinion gear and shimming tool is .025 in. (0.64mm).
7. If clearance is incorrect, add or subtract shim(s) under drive shaft tapered bearing race to raise or lower pinion gear.
8. Add Loctite Grade "A" to threads of pinion nut when reinstalling.

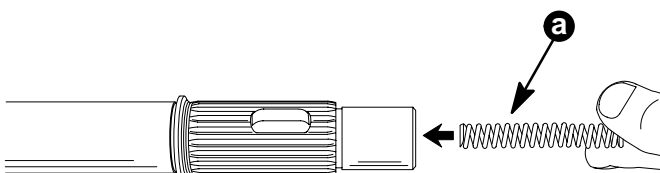


50507

- a - Apply Pressure in Direction of Arrow
- b - Shimming Tool
- c - Feeler Gauge
- d - Obtain .025 in. (0.64mm) Clearance Between Shimming Tool and Pinion Gear

## Propeller Shaft Reassembly and Installation

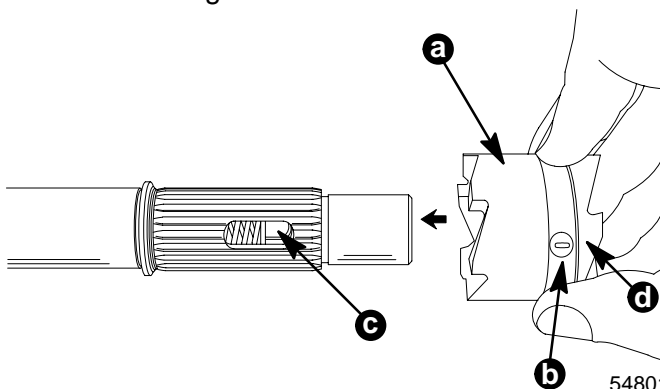
1. Insert spring into propeller shaft.



54800

- a - Spring

2. Install sliding clutch.

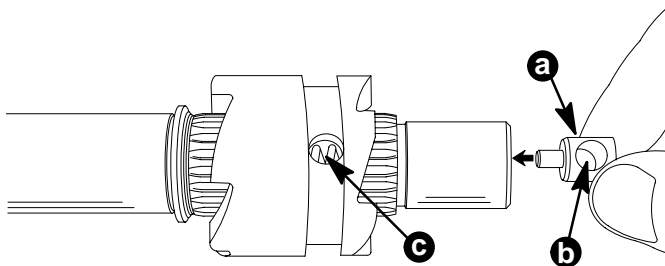


54801

- a - Sliding Clutch
- b - Hole [Must Align with Slot (c)]
- c - Slot
- d - Short Side

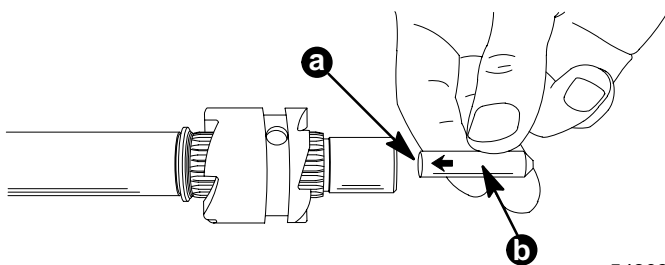


3. Insert guide block (a) into propeller shaft. Cross pin hole (b) MUST align with hole (c).



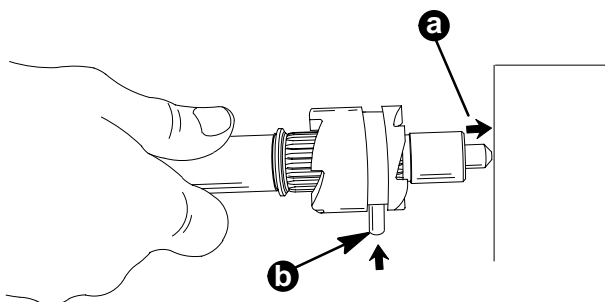
54802

4. Apply thin coat of Quicksilver Needle Bearing Assembly Lubricant on flat side (a) of cam follower (b), and install cam follower.



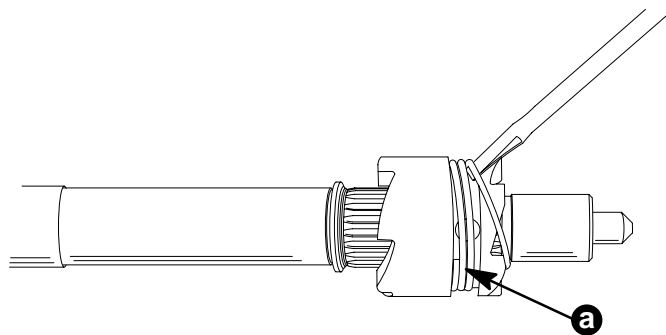
54803

5. Install cross pin.



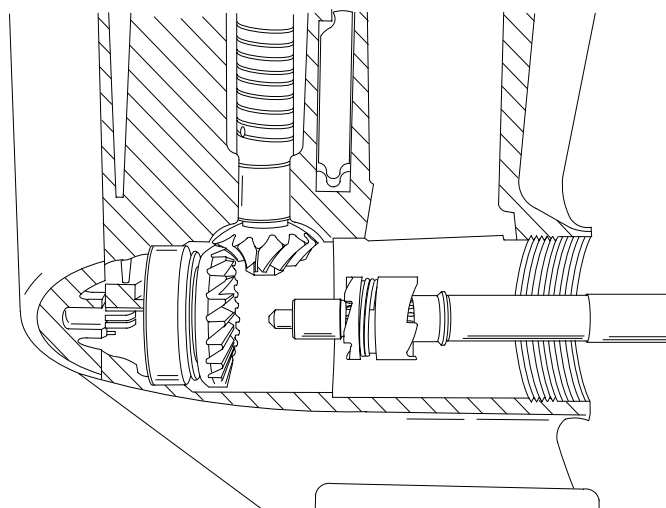
a - Apply Pressure in this Direction  
b - Cross Pin

6. Install spring (a).



54805

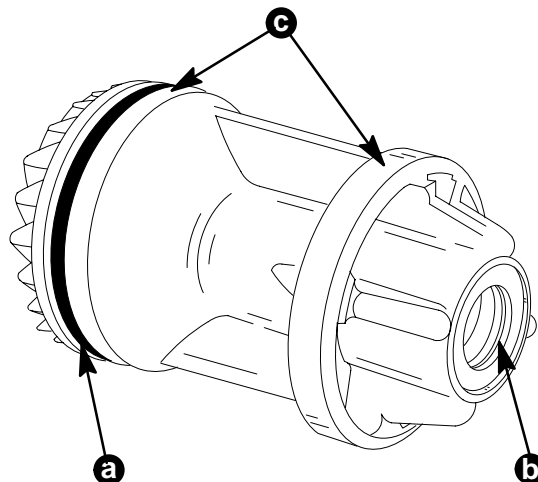
7. Place propeller shaft into forward gear.



54764

## Bearing Carrier Installation

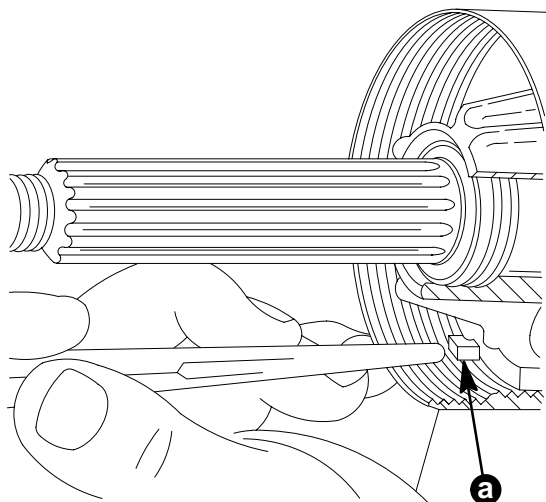
1. Install O-ring (a).
2. Apply 2-4-C Marine Lubricant on O-ring (a) and seal lips (b).
3. Coat surfaces (c) with Special Lubricant 101.



54806



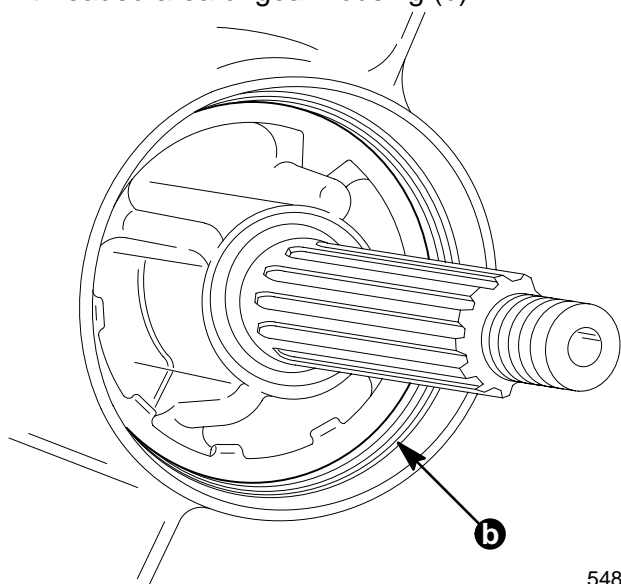
4. Push bearing carrier into gear housing while rotating drive shaft to engage pinion gear teeth with reverse gear teeth.
5. Install alignment key (a).



54807

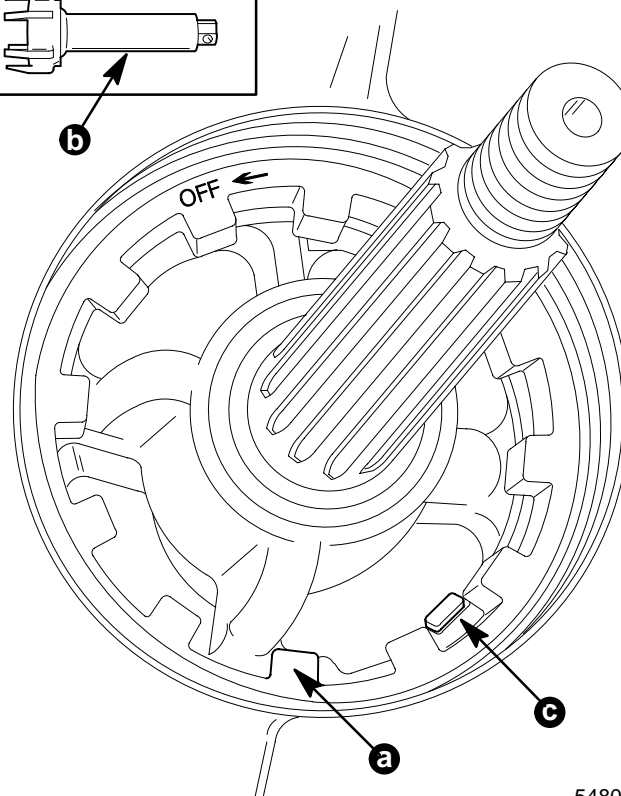
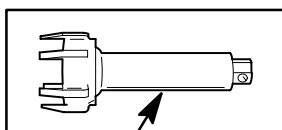
**IMPORTANT:** For proper retention between housing and cover nut, it is recommended that **PLASTIC** cover nut **NOT** be reused. Replace as required.

6. Apply Quicksilver Special Lubricant 101 onto threaded area of gear housing (b).



54808

7. Install cover nut (a) with the word "OFF" visible. Torque cover nut to 100 lb. ft. (136 N-m) using cover nut tool (91-91947) (b).
8. Bend one of lock tabs (c) into slot in cover nut.
9. Bend remaining tabs towards front of gear housing.



54809

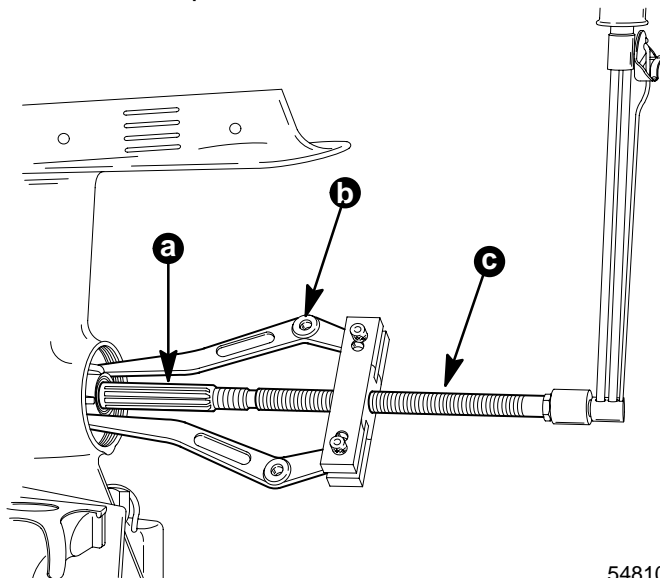




## Checking Forward Gear Backlash

**NOTE:** Read entire procedure before attempting any change in shim thickness.

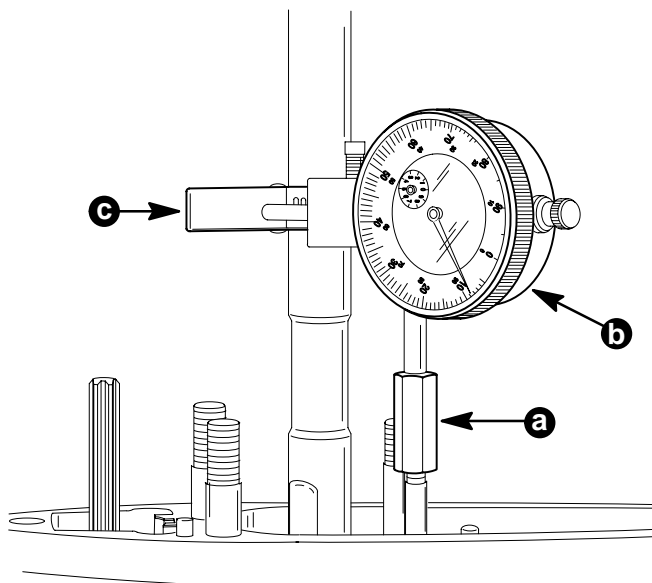
1. Obtain correct pinion gear depth. Refer to "Checking Pinion Gear Depth" preceding.
2. Install components as shown.



54810

- a - Propeller Shaft
- b - Puller Jaws (91-46086A1)
- c - Puller Bolt (91-85716) Torque to 45 lb. in. (5.1 N-m)

3. Rotate drive shaft 5 to 10 revolutions. This will properly seat forward gear tapered roller bearing.
4. Install components as shown.
5. Position dial indicator on line 4 of backlash indicator tool.



54811

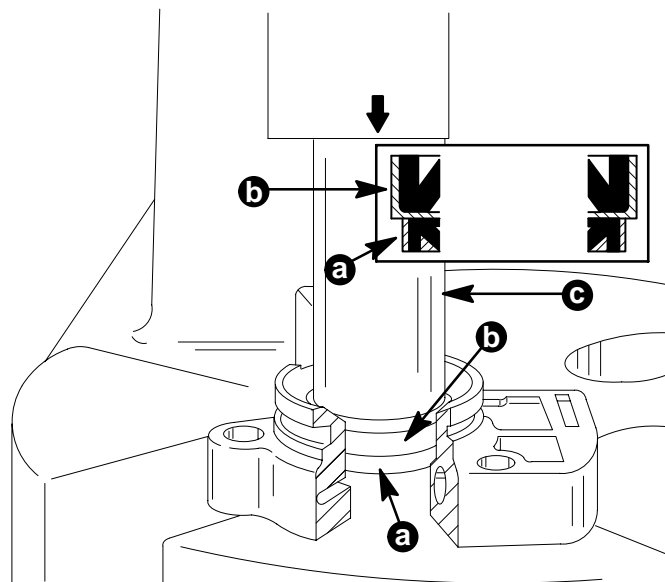
- a - Dial Indicator Adaptor Kit (91-83155)
- b - Dial Indicator (91-58222A1)
- c - Backlash Indicator Tool (91-78473)

6. Lightly turn drive shaft back-and-forth (no movement should be noticed at propeller shaft).
7. Dial indicator registers amount of backlash. Backlash should be between .007 in. and .010 in. (0.178mm to 0.254mm).
8. If backlash is less than minimum specification, remove shim(s)\* from front of forward gear bearing race to obtain correct backlash. When reinstalling pinion nut apply Loctite 271 on threads of nut.
9. If backlash is more than maximum specification, add shim(s)\* in front of forward gear bearing race to obtain correct backlash. When reinstalling pinion nut, apply Loctite 271 to threads of nut.

\*By adding or subtracting .001 in. (0.025mm) shim, the backlash will change approximately .00125 in. (0.032 mm).

## Water Pump Reassembly and Installation

1. Apply 2-4-C Marine Lubricant on I.D. of oil seals.
2. Press seals into water pump base.

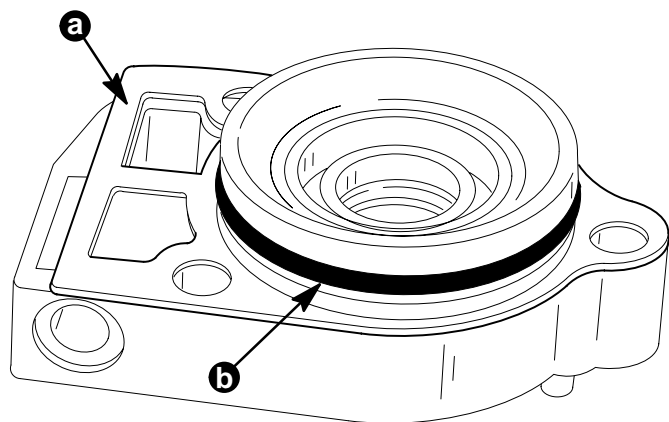


54812

- a - "Narrow" Seal (Lip Away from Mandrel)
- b - "Wide" Seal (Lip Toward Mandrel)
- c - Mandrel

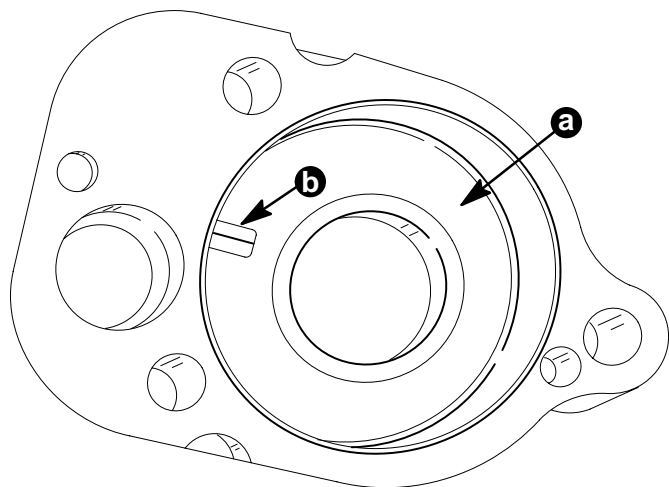


3. Install gasket (a) and O-ring (b).



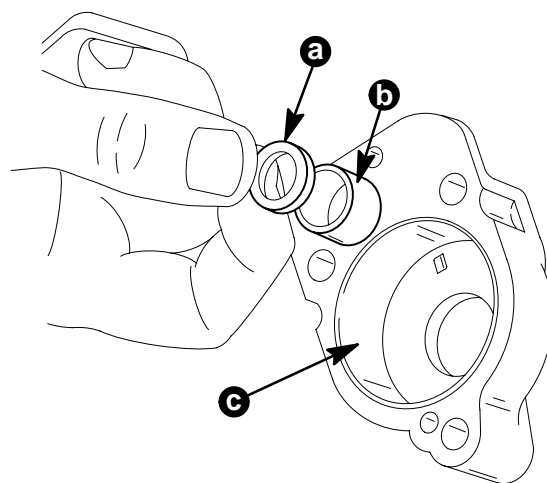
54813

4. Coat insert area of water pump body with Quicksilver 2-4-C Marine Lubricant and install insert (a) making sure locating tab (b) enters hole in body. Wipe off excess lubricant.



54814

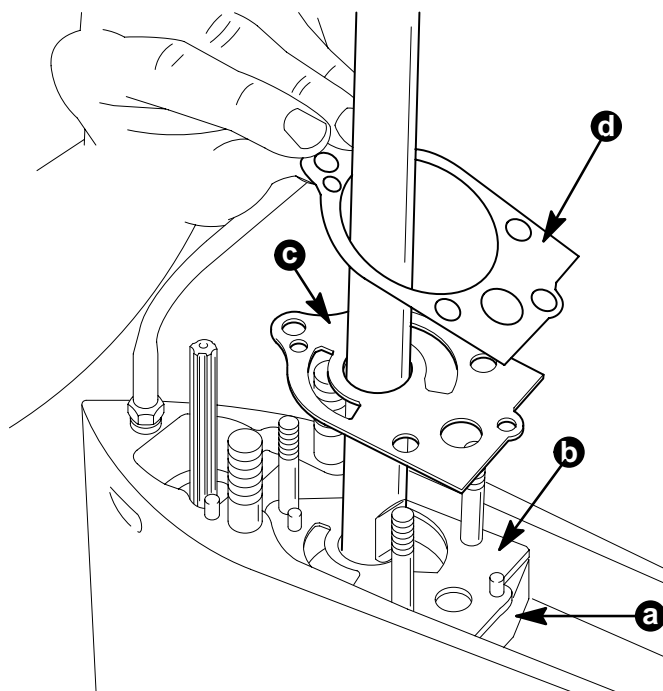
5. Install seal and washer. Apply Quicksilver 2-4-C Marine Lubricant to I.D. of insert and seal.



54755

- a - Cupped Nylon Washer (Cupped Side Towards Seal)  
b - Seal  
c - Insert

6. Install components as shown.



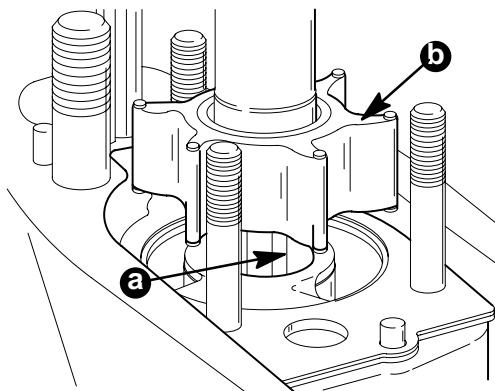
54758

- a - Water Pump Base  
b - Gasket  
c - Face Place  
d - Gasket



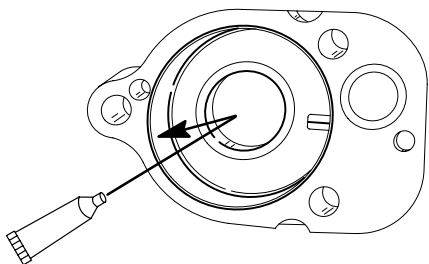
**IMPORTANT:** When performing gear housing repair that requires removal of water pump impeller, it is recommended that the impeller be replaced. If it is necessary, however, to re-use the impeller, **DO NOT** install in reverse to original rotation, or premature impeller failure will occur. Original rotation is clockwise.

7. Install impeller drive key (a) and impeller (b). Hold drive key in place using Quicksilver 2-4-C Marine Lubricant.

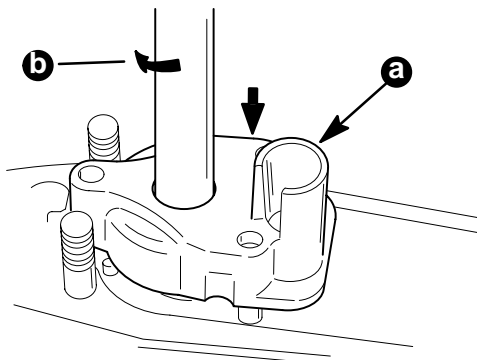


54757

8. Lubricate inside diameter of the water pump body with Quicksilver 2-4-C Marine Lubricant.

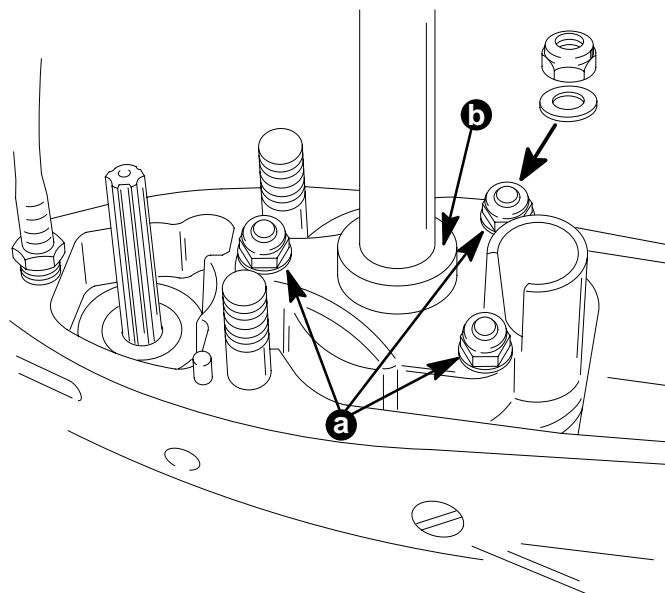


9. Rotate drive shaft clockwise while pushing water pump body down over impeller.



a - Water Pump Body  
b - Turn Drive Shaft Clockwise

10. Install locking nuts and washers (a) and centrifugal slinger (b).



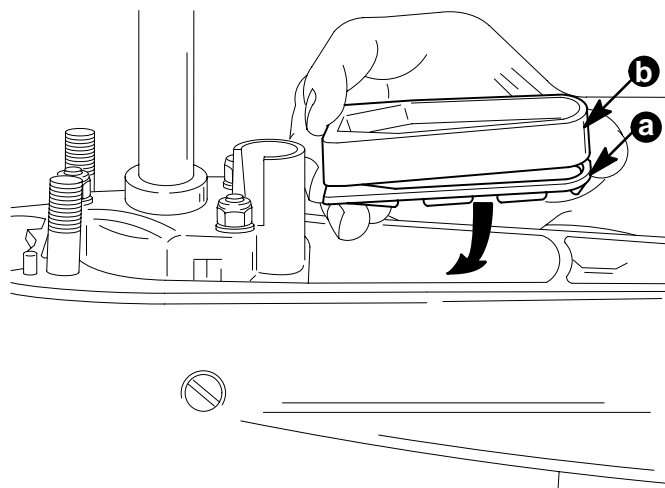
54753

## Gear Housing Installation

### **⚠ WARNING**

When installing gear housing, remove (and isolate) spark plug leads from spark plugs to avoid accidental outboard starting.

1. Remove and isolate spark plug leads.
2. Tilt outboard to full up position and engage tilt lock lever.
3. Install plate (a) "ribbed side down" and seal (b) "tapered side up" into gear housing. Lubricate inside of seal with Quicksilver 2-4-C Marine Lubricant.

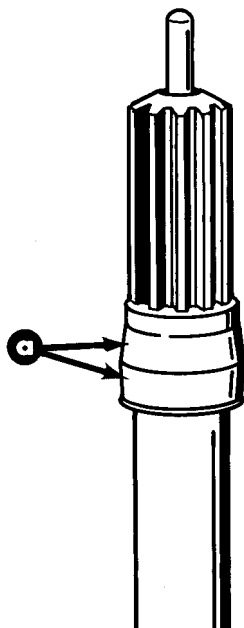


54752



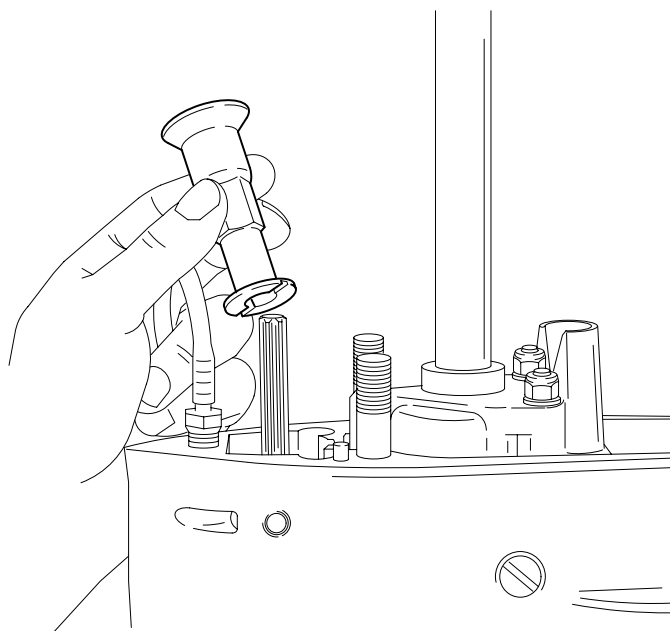
4. Install rubber seal (a) to drive shaft.

**NOTE:** Outboard S/N 0C295675 and above will not have seal on drive shaft due to improved lower end cap design.



51188

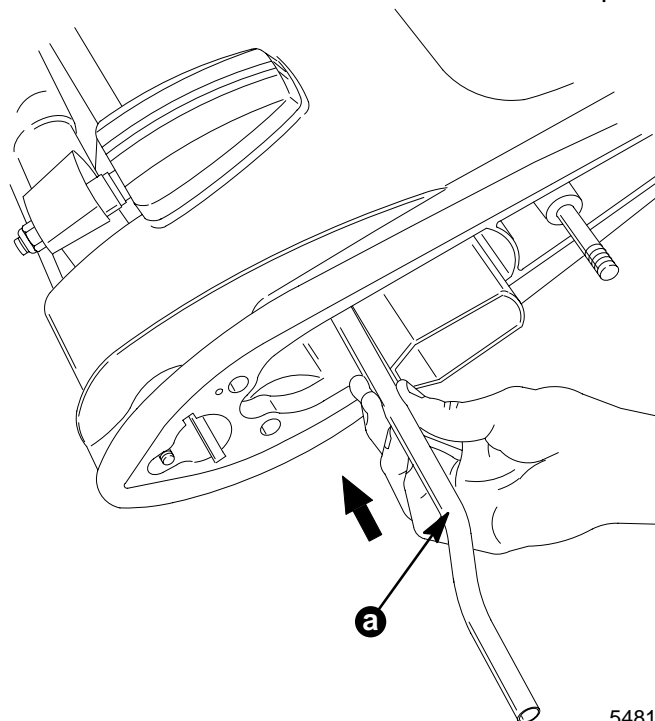
5. Shift gear housing to forward position; propeller shaft will not rotate counterclockwise.  
6. Install shift shaft guide.



54751

7. Apply Quicksilver 2-4-C Marine Lubricant to drive shaft splines, shift shaft splines and I.D. of water tube seal. DO NOT apply lubricant to top of shift shaft or drive shaft.

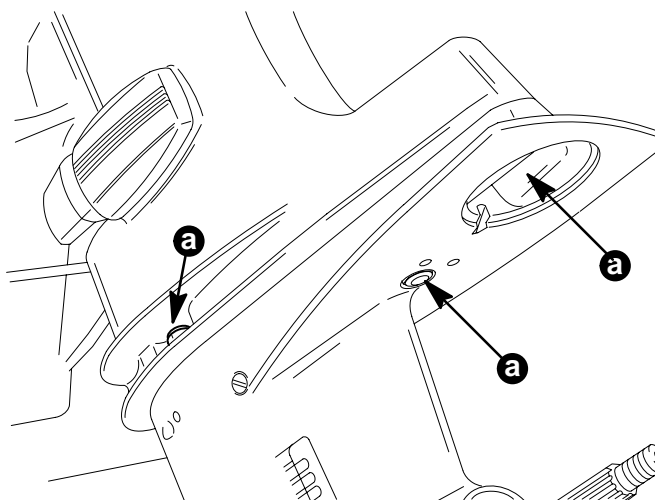
8. Install water tube (a) into drive shaft housing and insert into seal located at bottom of exhaust plate.



54816

**NOTE:** If drive shaft splines will not align with crankshaft splines (while performing step 10.), turn propeller shaft while gear housing is being pushed toward drive shaft housing.

9. Position gear housing so that the drive shaft is protruding into drive shaft housing.  
10. Move gear housing up toward drive shaft housing while aligning upper shift shaft splines with shift shaft coupler splines, water tube with water tube seal, and crankshaft splines with drive shaft splines.  
11. Install lock nuts and washer (4) securing gear housing to drive shaft housing.  
12. Torque lock nuts (a) to 40 lb. ft. (54 N·m).

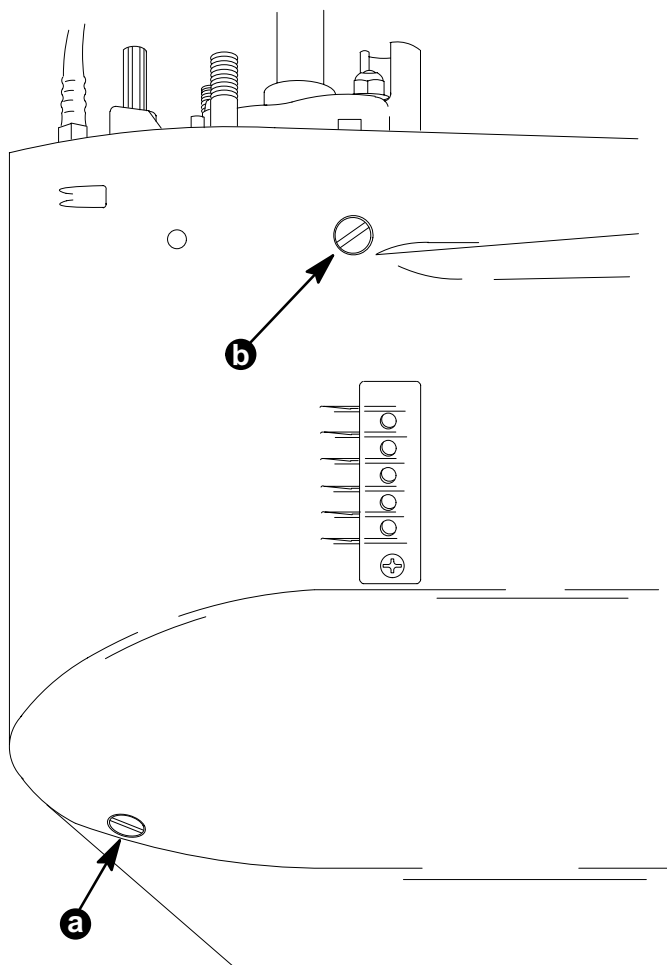


54750



## Filling Gear Housing with Lubricant

1. Install new gaskets on fill and vent screws.
2. With gear housing in vertical position, fill gear case thru "Fill" hole (a) using Quicksilver Gear Lube until lubricant flows thru "Vent" hole (b) and no air bubbles are visible.
3. Drain approximately one fluid ounce (30cc) of lubricant from gear housing to allow for lubricant expansion.
4. Install "vent" screw. Remove lubricant tube and quickly install "Fill" screw.



54817

- a - "Fill" Screw (with Gasket)  
b - "Vent" Screw (with Gasket)

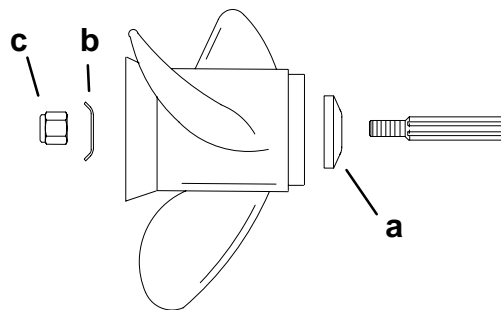
## Propeller/Trim Tab Installation

### **⚠ WARNING**

**Remove (and isolate) spark plug leads from spark plugs when installing propeller.**

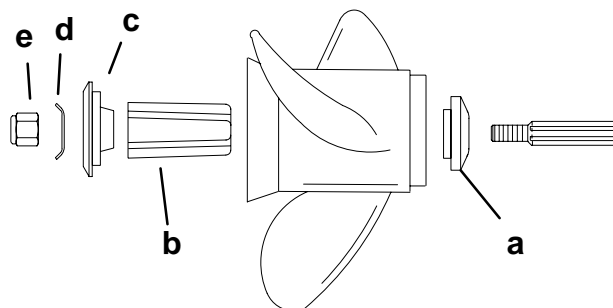
1. Remove (and isolate) spark plug leads from spark plugs.
2. Apply a thin coat of lubricant to propeller shaft splines with Quicksilver 2-4-C Marine Lubricant.
3. Install components as shown.

### Flo-Torq I Drive Hub Propellers



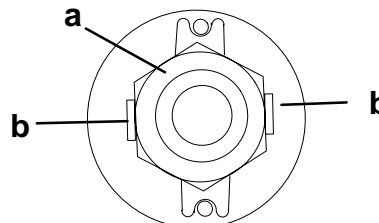
- a - Forward Thrust Hub  
b - Propeller Nut Retainer  
c - Propeller Nut

### Flo-Torq II Drive Hub Propellers



- a - Forward Thrust Hub  
b - Replaceable Drive Sleeve  
c - Rear Thrust Hub  
d - Propeller Nut Retainer  
e - Propeller Nut

4. Tighten propeller nut to 55 lb. ft. (75 N·m). Bend tabs against nut.

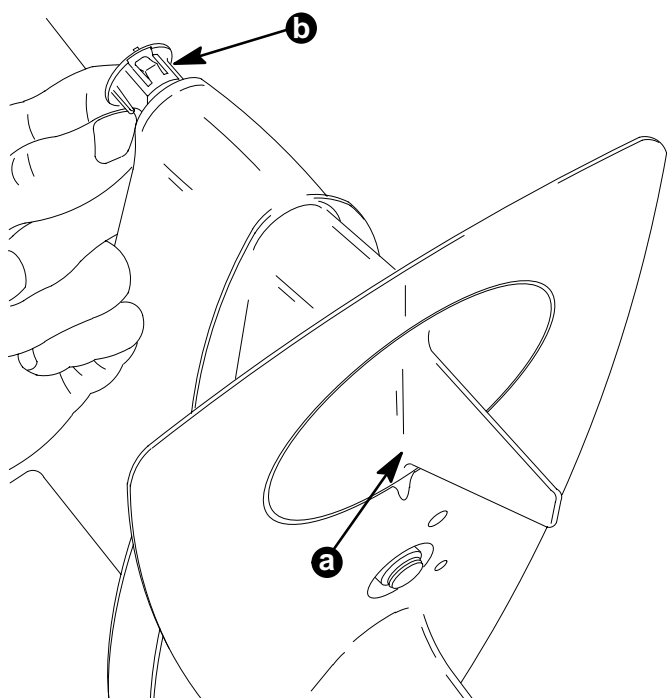


- a - Propeller Nut - Torque To 55 lb. ft. (75 N·m)  
b - Bend Tabs Against Nut



5. Install trim tab (a). Torque bolt to 20 lb. ft. (27.1 N·m).

6. Install nylon plug (b).



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7. Check shift operation as follows:

- a. Place shift lever in forward gear. Gear housing should ratchet when propeller shaft is turned clockwise and resistance should be felt when propeller shaft is turned counter-clockwise.
- b. Place shift lever in neutral. Propeller shaft should rotate freely in either direction.
- c. While rotating propeller shaft, place shift lever in reverse gear. Resistance should be felt when propeller shaft is rotated in either direction.

**IMPORTANT:** If shift operation is not as described, preceding, the gear housing must be removed and the cause corrected.