

## CAUTION

Do not run engine for more than 15 seconds with hose disconnected, in next step, as internal damage to engine and exhaust system may result.

3. With assistance of another person, start engine and adjust speed to exactly 1000 RPM while holding unclamped end of hose on connection on engine. Remove hose from connection on engine and direct water flow into container for exactly 15 seconds. At the end of 15 seconds, direct the water flow overboard, return engine to idle and stop engine. Reconnect hose to engine.
4. Measure quantity of water discharged into container and compare with specifications given in chart following.
5. Repeat test four times to check repeatability of results.

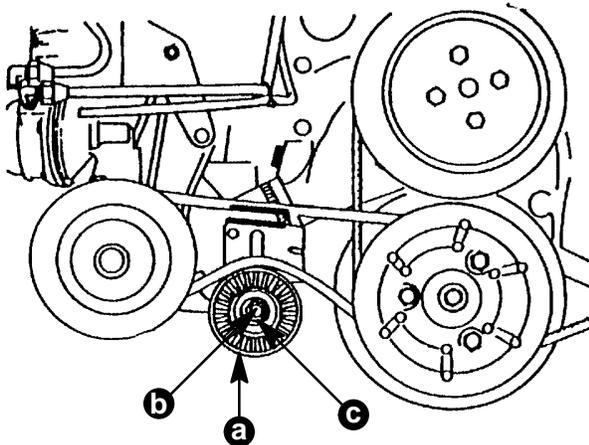
### Belt Driven Pump Output For a 15 Second Period

7.5 U.S. Qt. (7.1 L) Minimum

## Belt Driven Combination Seawater/Fuel Pump

### Removal

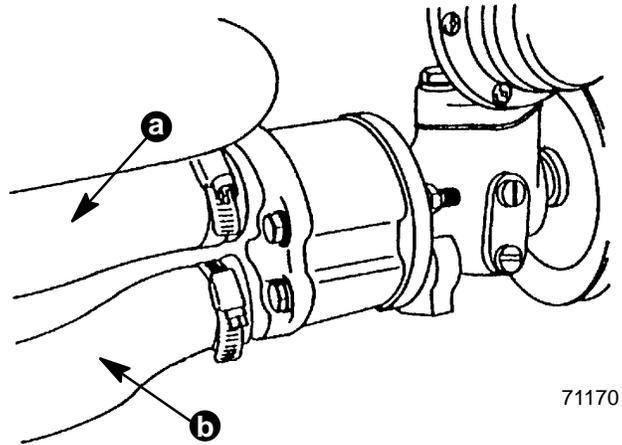
1. Remove drive belt by loosening idler pulley.



71167

- a - Idler Pulley
- b - Adjusting Bolt
- c - Locknut

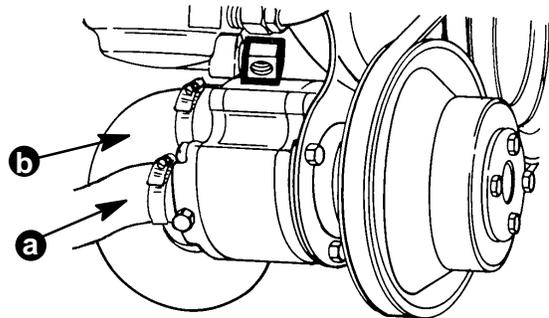
2. Disconnect water hoses from seawater pump.



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### Engines With Combination Seawater / Mechanical Fuel Pump

- a - Seawater Inlet Hose
- b - Hose To Cooler



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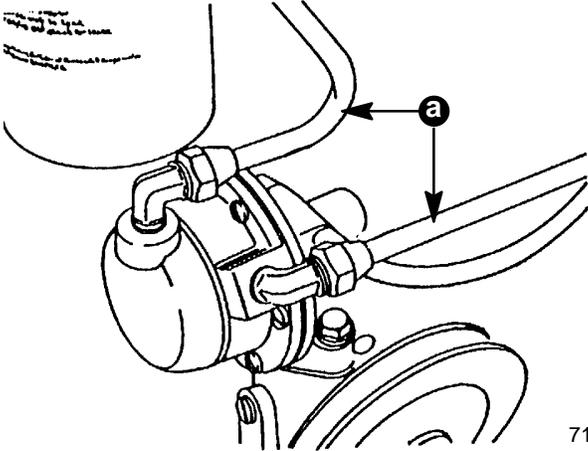
### Engines With Cool Fuel System

- a - Seawater Inlet Hose
- b - Hose To Cooler

## ⚠ WARNING

Be careful when working on fuel system components. Gasoline is extremely flammable under certain conditions. Be sure ignition key is OFF. Do not smoke or allow spark or open flame in area when working on fuel system components. Wipe up any spilled fuel immediately.

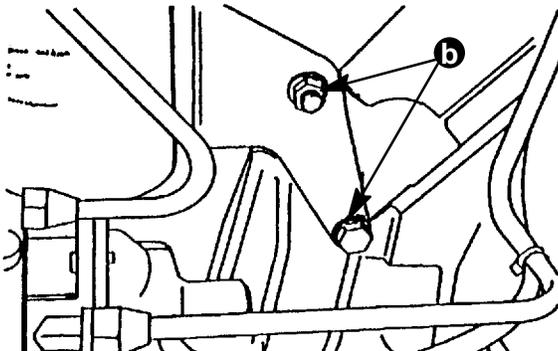
3. Disconnect fuel lines from fuel pump.



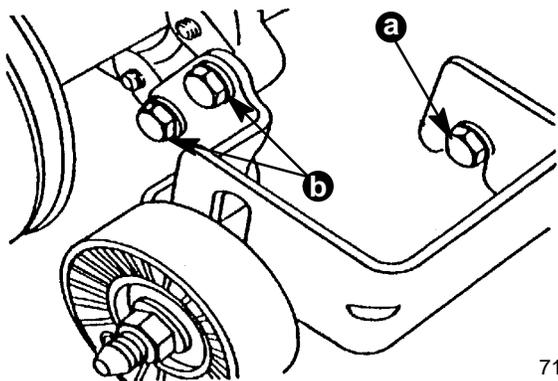
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a - Fuel Lines

4. Remove seawater/fuel pump assembly.



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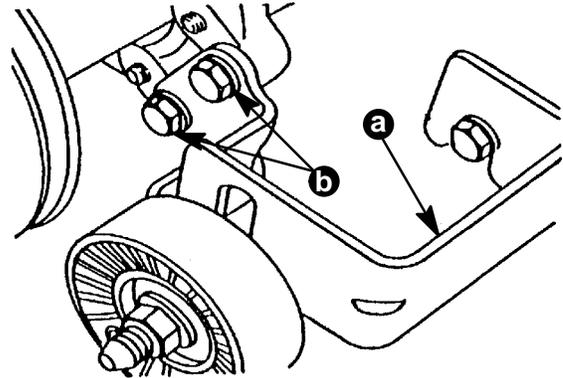
a - Idler Bracket Bolt  
b - Main Bracket Bolts (2)

## Disassembly

**NOTE:** Later models may be equipped with a one piece seawater pump body. Disassembly will be similar to two piece seawater pump body but reassembly will differ in certain areas.

### IDLER PULLEY ASSEMBLY

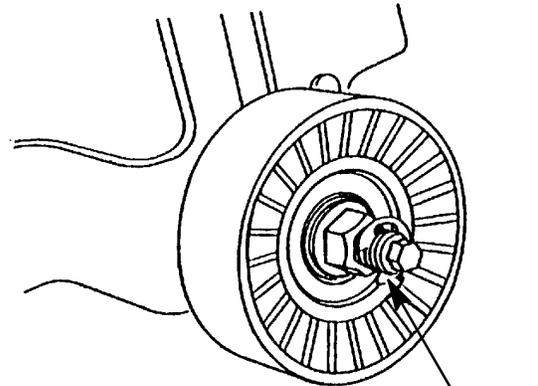
1. Remove idler pulley bracket from pump housing.



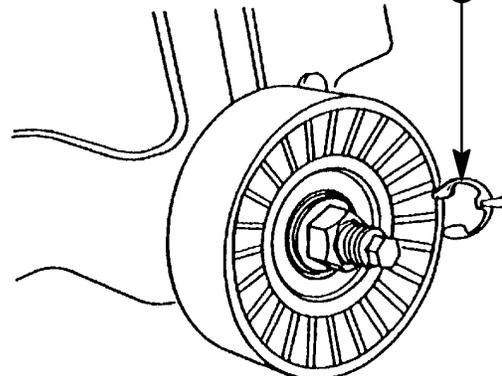
71102

a - Bracket  
b - Main Bracket Bolts (2)

2. Remove retaining clip from adjusting bolt.



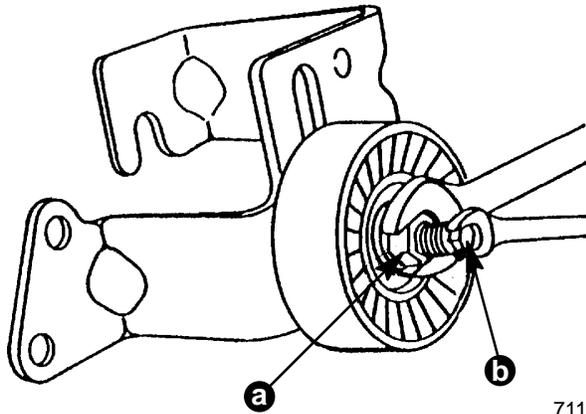
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a - Retaining Clip

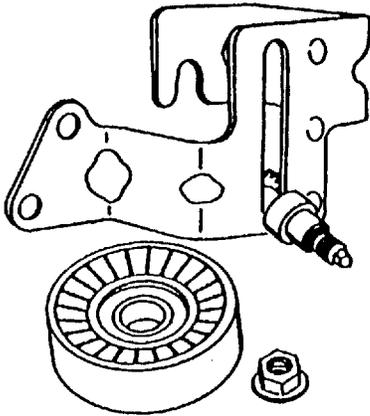
3. Loosen locknut while holding adjusting bolt.



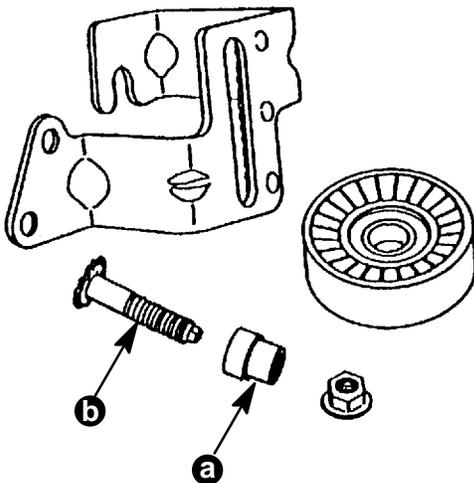
71105

a - Locknut  
b - Adjusting Bolt

4. Remove idler pulley, bushing and adjusting bolt.



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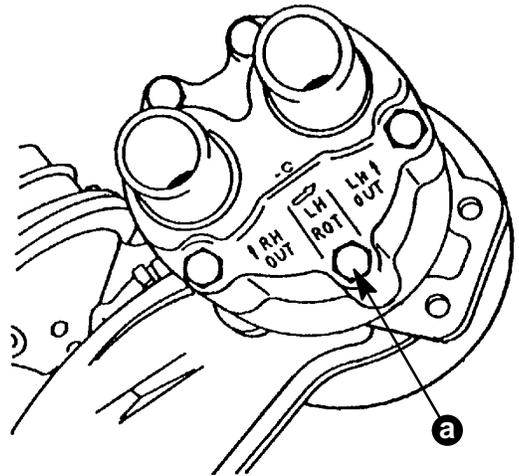
71107

a - Bushing  
b - Adjusting Bolt

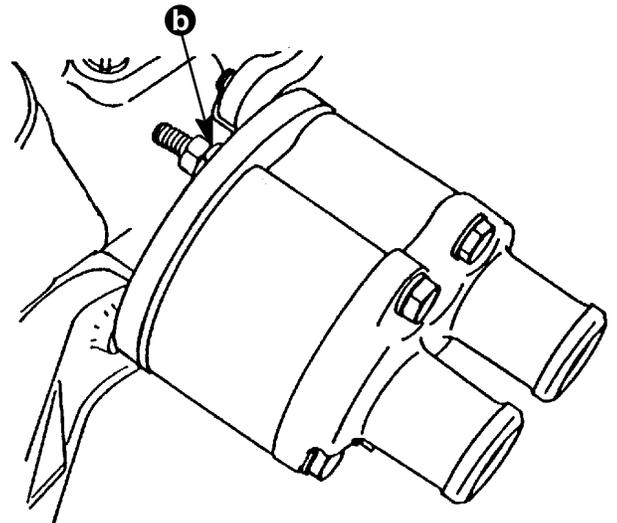
### SEAWATER PUMP DISASSEMBLY (TWO PIECE BODY)

1. Loosen bolts that secure water pump to housing.

**NOTE:** One of these bolts is secured with a nut and lockwasher.



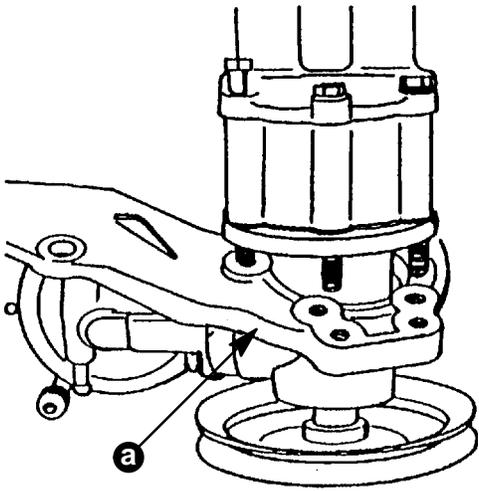
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a - Bolts (5)  
b - Nut and Lockwasher

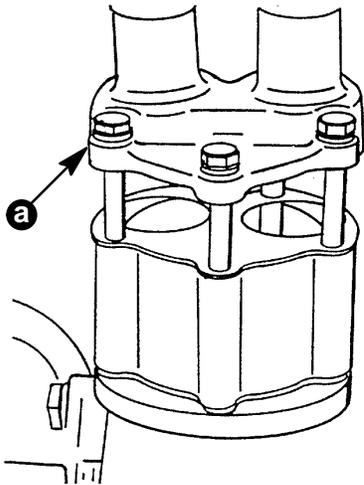
2. Remove bracket from pump housing.



71110

a - Bracket

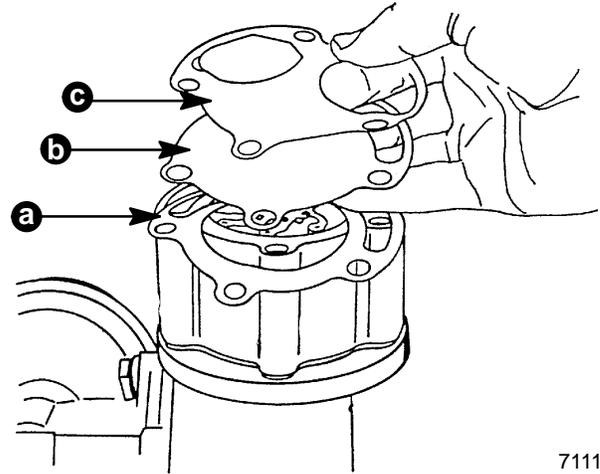
3. Remove water pump end cover from housing.



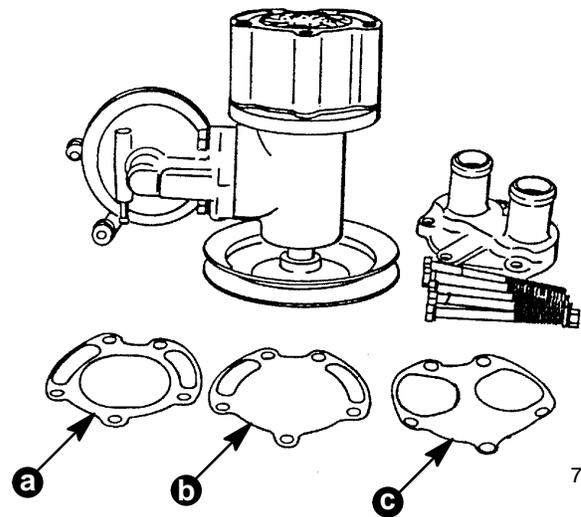
71112

a - End Cover

4. Remove gaskets and separator plate.



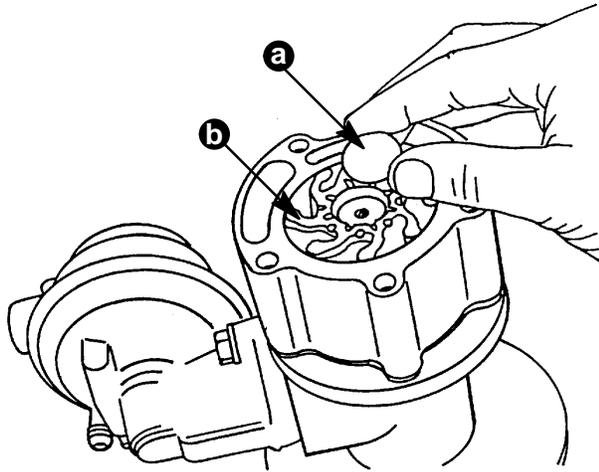
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a - Gasket (With Large Opening)  
b - Separator Plate  
c - Gasket (With Two Opening)

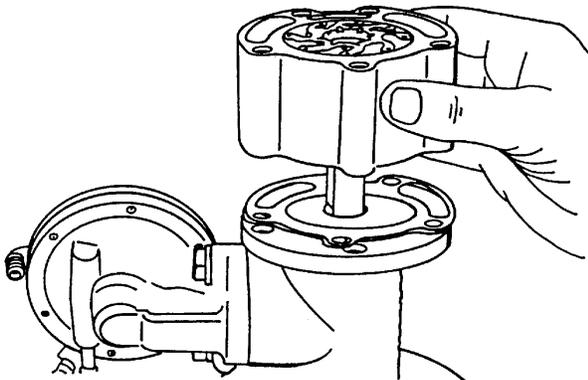
5. Remove rubber plug from end of impeller.



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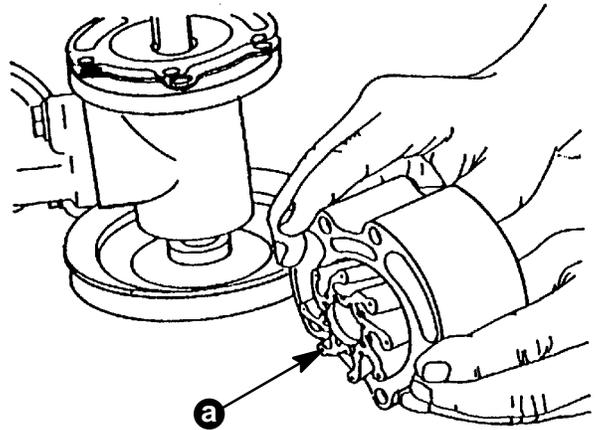
a - Rubber Plug  
b - Impeller

6. Lift pump housing off of pump base.

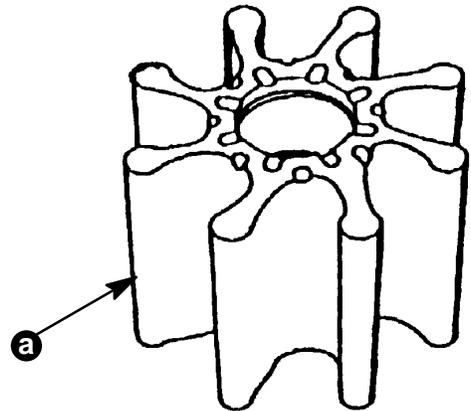


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7. Remove impeller from housing.



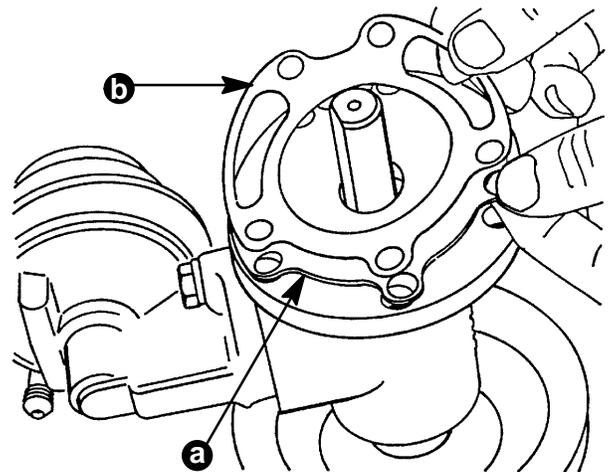
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a - Impeller

8. Remove end plate and gasket from pump base.

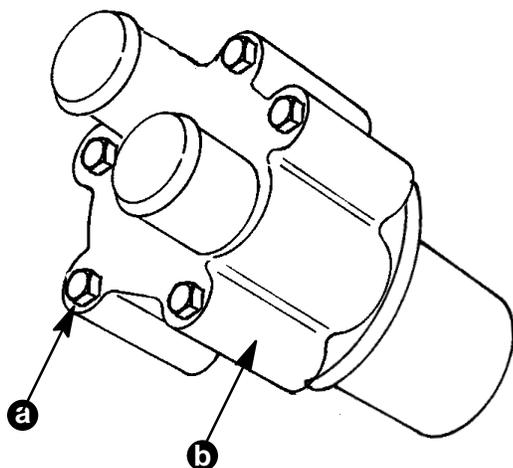


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a - End Plate  
b - Gasket

## SEAWATER PUMP DISASSEMBLY (ONE PIECE BODY)

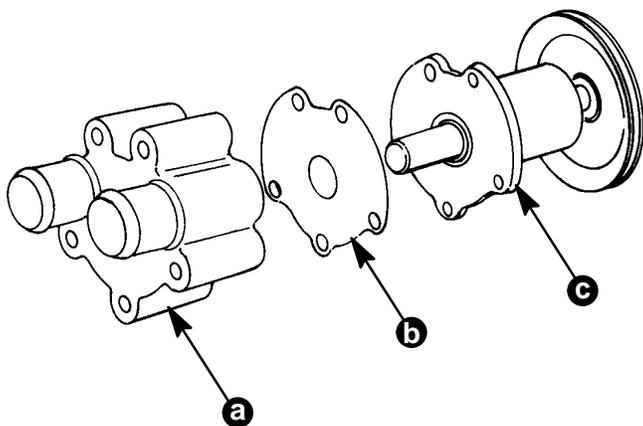
1. Remove the five screws from the seawater pump body.



75277

- a - Screws (5)
- b - Seawater Pump Body

2. Remove seawater pump body and wear plate from bearing housing.



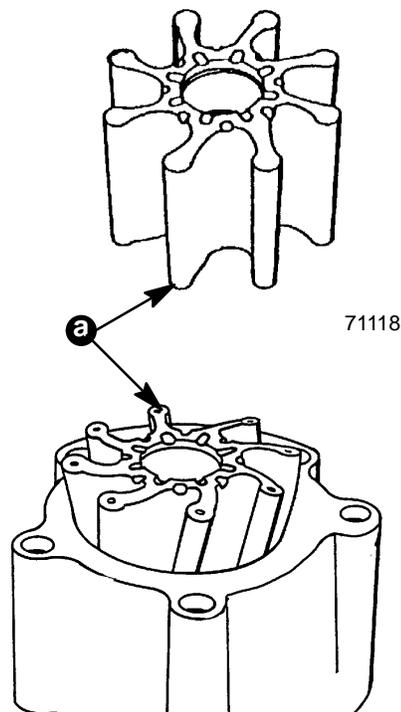
75275

- a - Seawater Pump Body
- b - Wear Plate
- c - Bearing Housing

3. Remove the impeller from seawater pump body.

## SEAWATER PUMP REASSEMBLY (ONE PIECE BODY)

1. Lubricate seawater pump impeller with a water and soap solution. Install impeller into housing by rotating and pushing it into place. Push it down until flush with housing.



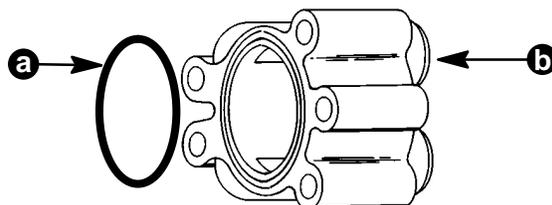
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71150

- a - Impeller

2. Place wear plate over bearing housing shaft.

3. Place quad ring in groove in seawater pump body.

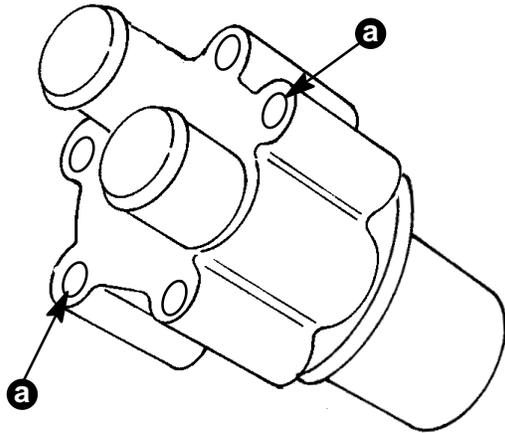


- a - Quad Ring
- b - Seawater Pump

4. Align flats on impeller and bearing housing shaft, slide seawater pump body on shaft.

**NOTE:** Reassembly for the combination mechanical fuel pump requires the mounting bracket to be installed while performing the following step.

5. Install two screws in seawater pump body holes as shown. Use these two screws to align pump, then install the remaining screws.

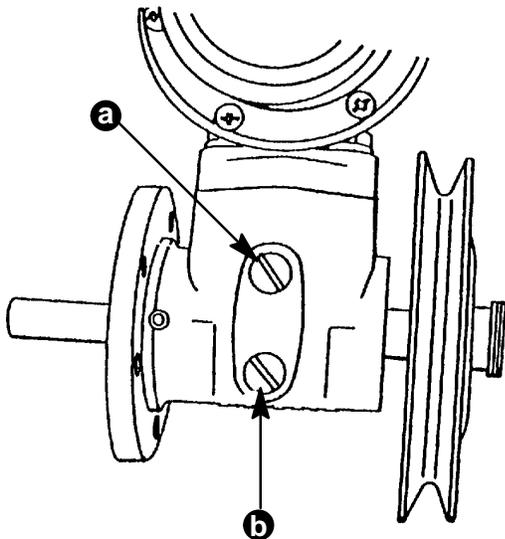


75277

a - Bolt Holes For Alignment

### FUEL PUMP ASSEMBLY

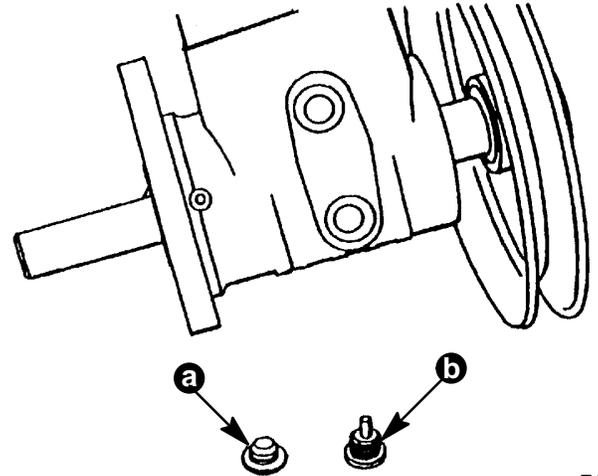
1. Remove fill and drain screws with sealing washers from pump housing and drain lubricant.



71120

a - Fill Screw  
b - Drain Screw

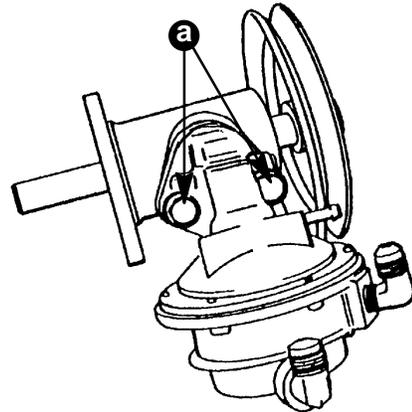
**IMPORTANT:** Drain screw is equipped with a magnet to attract metallic particles from inside of housing. A small amount will be present as a result of normal wear. Larger amounts of metallic particles may indicate abnormal wear.



71121

a - Fill Screw  
b - Drain Screw (Magnet)

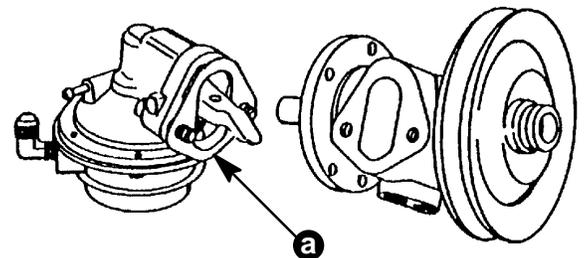
2. Remove fuel pump from housing.



71122

a - Bolts and Lockwashers (2)

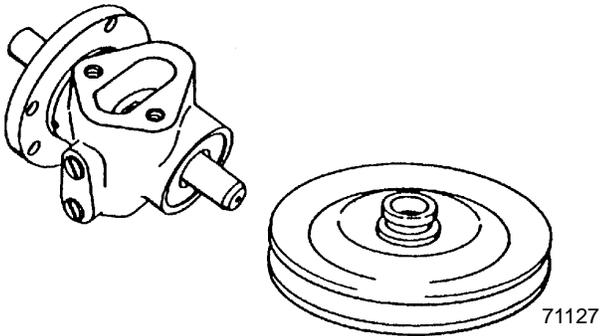
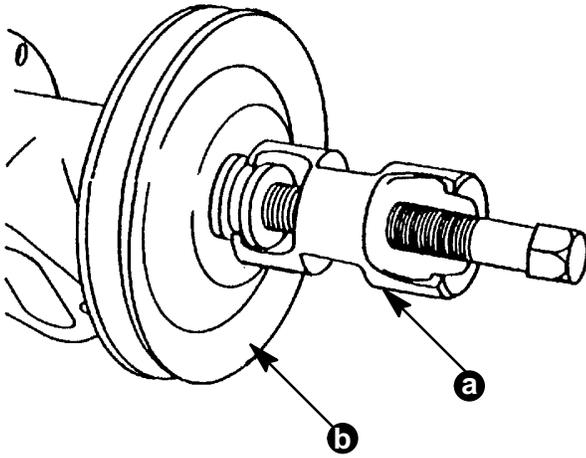
3. Remove fuel pump from housing and remove gasket.



71123

a - Gasket

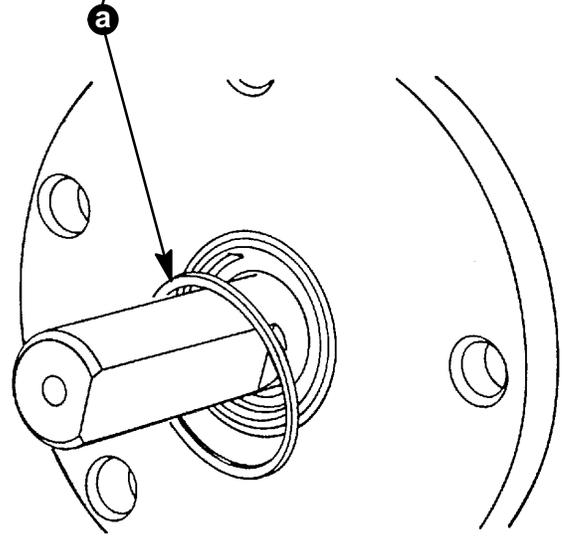
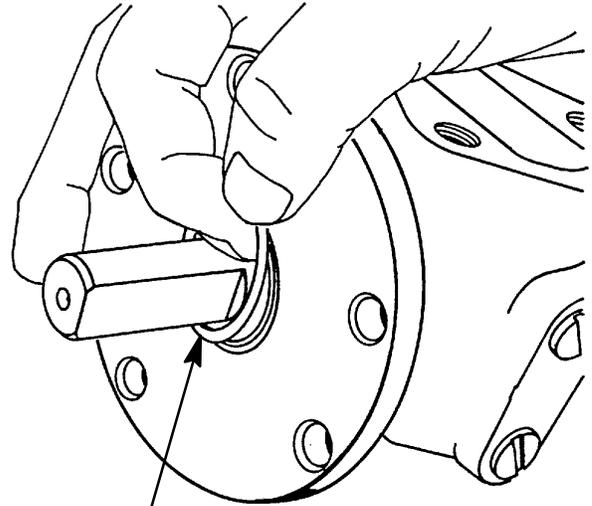
4. Remove pulley using appropriate puller.



a - Puller  
b - Pulley

## SEAWATER/FUEL PUMP HOUSING

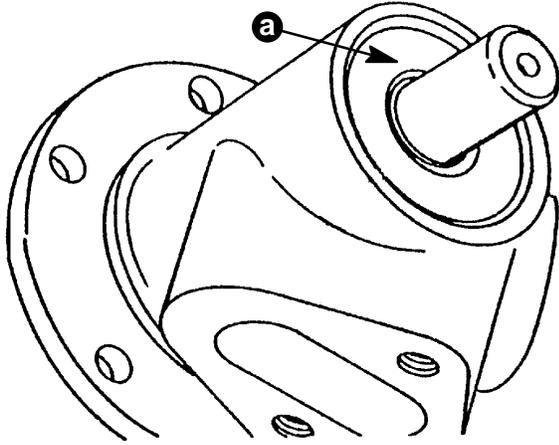
1. Remove quad ring seal from water pump end of housing.



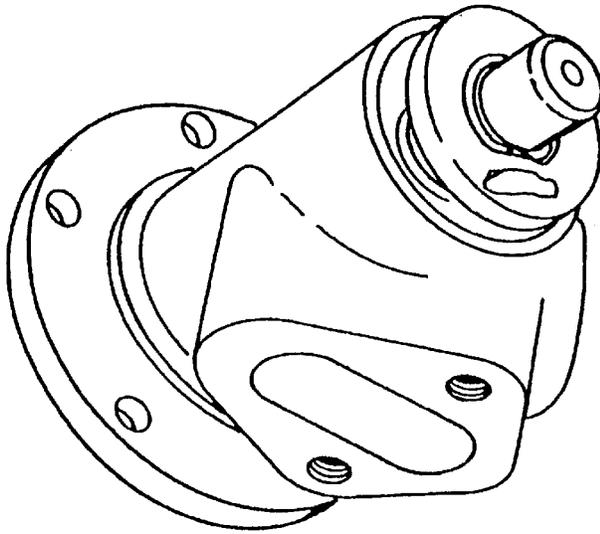
a - Quad Ring Seal

**IMPORTANT: Oil seal on pulley end of housing will be damaged during removal. Do not attempt to reuse seal.**

2. Remove oil seal by prying out with a screwdriver. Be careful not to damage bore.



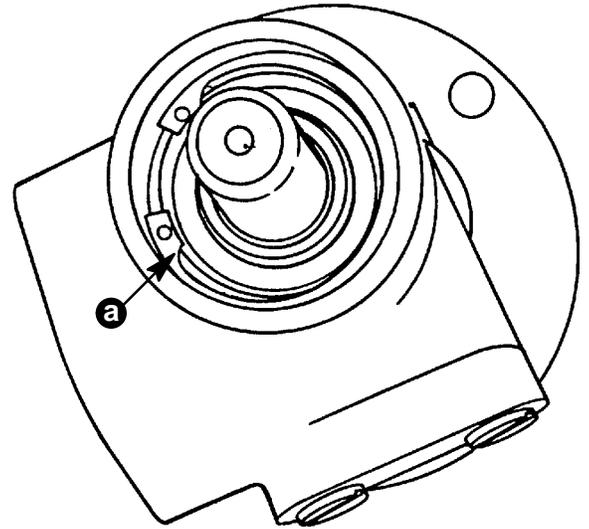
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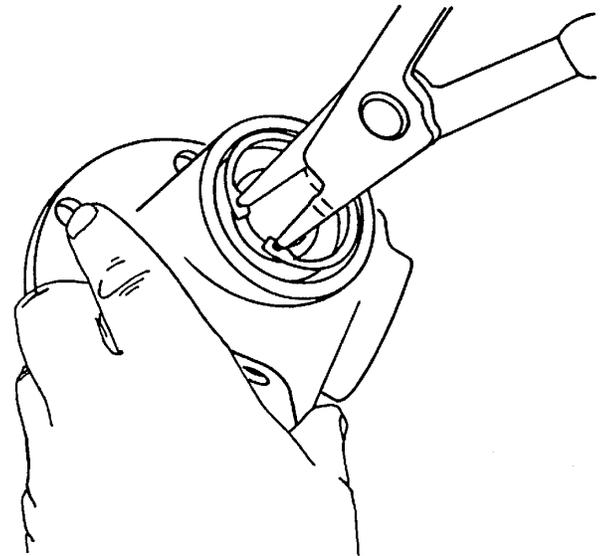
71131

a - Oil Seal

3. Remove the snap ring that secures the shaft and bearing assembly.



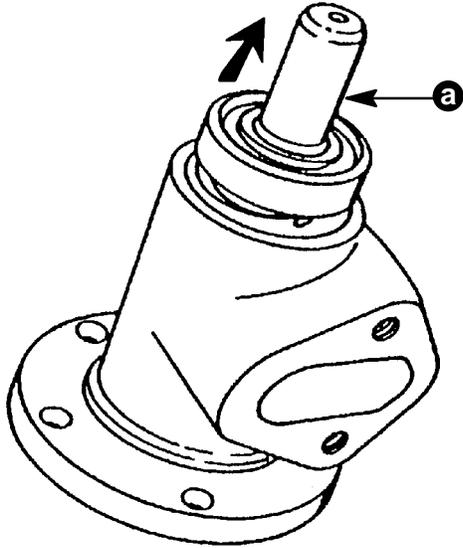
71132



71133

a - Snap Ring

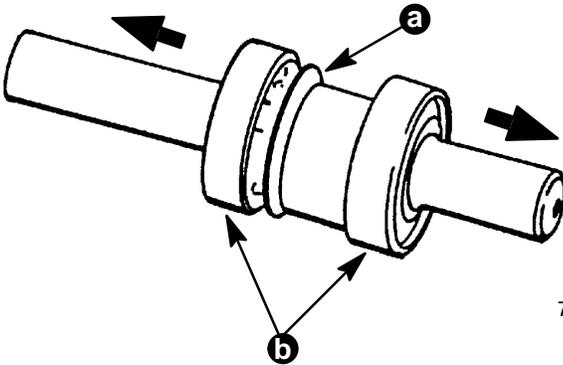
4. Lift shaft and bearing assembly from housing.



71134

a - Shaft and Bearing Assembly

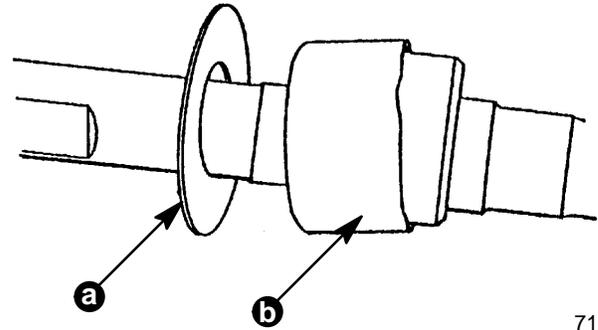
5. Remove bearings from shaft using a universal puller plate.



71139

a - Washer  
b - Bearings

6. Slide washer and slip ring off of shaft.

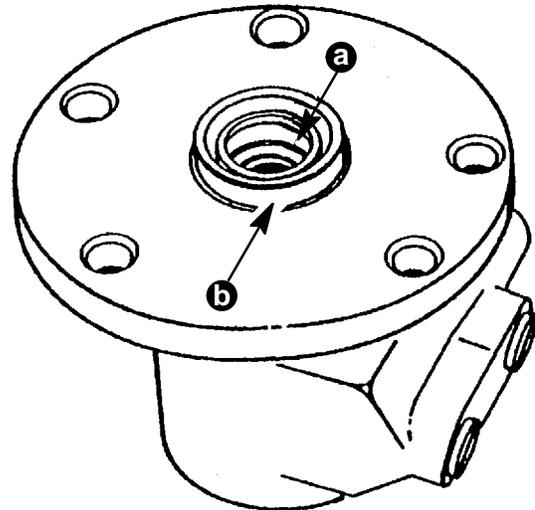


71141

a - Washer  
b - Slip Ring

**IMPORTANT: Oil and water seals on water pump end of housing will be damaged during removal. Do not attempt to reuse these seals.**

7. Remove outer (water) seal and inner (oil) seal by prying out or by tapping out using a suitable mandrel. Be careful not to damage bore.



71142

a - Inner Oil Seal  
b - Outer Water Seal

## Cleaning and Inspection

### ⚠ CAUTION

Always wear safety glasses when using compressed air.

1. Clean metal parts in solvent and blow dry with compressed air.

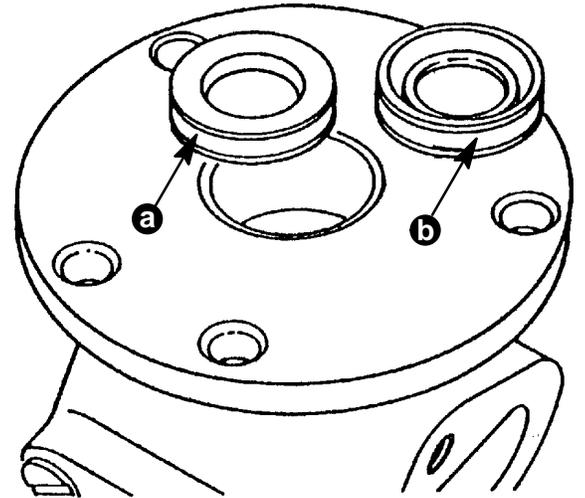
**IMPORTANT:** Do not spin bearings at high speed when drying with compressed air, as bearings may be scored.

2. After cleaning, apply a coat of light engine oil to shaft and bearings to prevent rust.
3. Clean all gasket material and sealer from sealing surfaces.
4. Inspect bearing housing. Examine surfaces (where bearings contact housing) for evidence of bearing outer races turning in housing.
5. Inspect seals in bearing housing.
6. Inspect pump shaft bearings.
7. Inspect pump shaft for grooves in surface where seals contact shaft. Inspect keyway in shaft. Also, inspect surface, where bearings contact shaft, for evidence of inner races turning on shaft.
8. Inspect impeller drive key.
9. Inspect pump body.
10. Inspect inner and outer wear plate.

## Reassembly

### SEAWATER/FUEL PUMP HOUSING

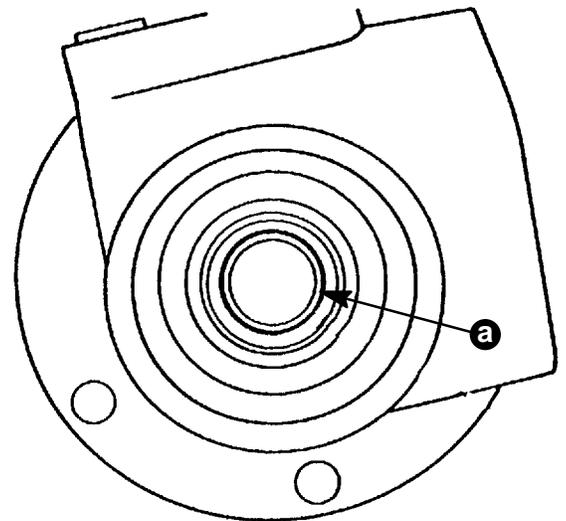
**IMPORTANT:** Seals in water pump end of housing must be facing in the proper direction. The lip on inner (oil) seal must be facing inward toward oil pump. The lip on outer (water) seal must be facing outward toward the water pump.



71143

- a - Inner Oil Seal - Lip Inward Toward Oil Pump
- b - Outer Water Seal - Lip Outward Toward Water Pump

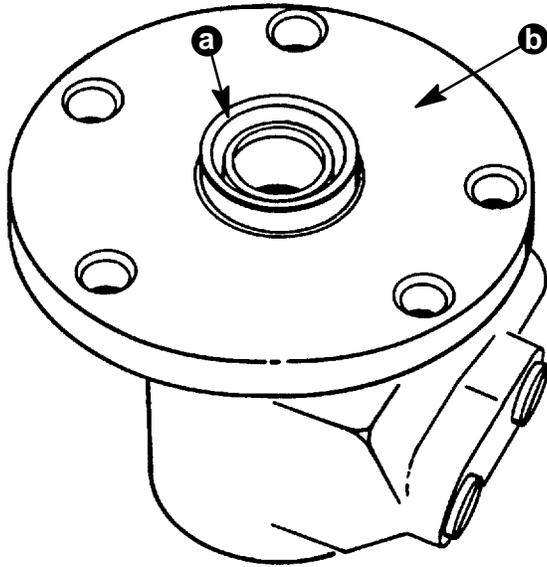
1. Apply a light coat of Loctite 514 to O.D. of seal and install inner (oil) seal using a suitable mandrel. Seal is properly positioned when edge of seal is even with edge of bore.



71144

- a - Inner Oil Seal

2. Apply a light coat of Loctite 514 to O.D. of seal and install outer (water) seal using a suitable mandrel. Seal is properly positioned when edge of seal is flush with face of housing. Do not install seal deeper. Fill cavity between the two seals with Quicksilver Special Lubricant 101.



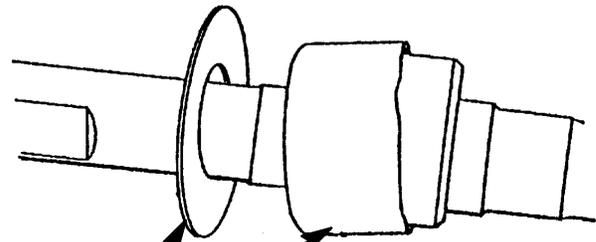
71145

- a - Outer Water Seal
- b - Face Of Housing

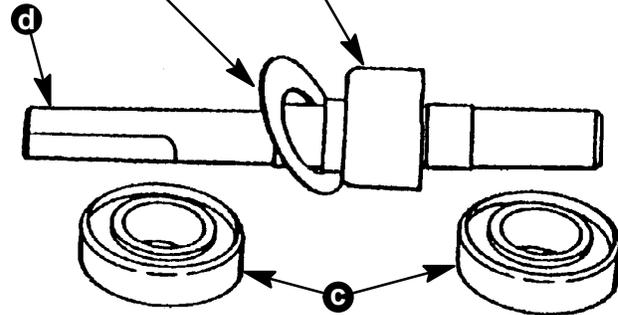
3. Reassemble shaft and bearing assembly as follows:

- a. Lubricate all shaft components and bearings with Quicksilver High Performance Gear Lube.

- b. Place slip ring and washer over shaft from water pump impeller end.



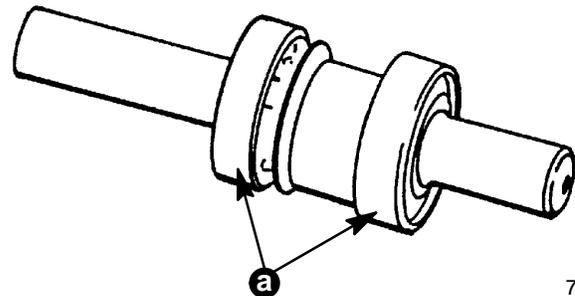
71141



71140

- a - Slip Ring
- b - Washer
- c - Bearings
- d - Water Pump Impeller End

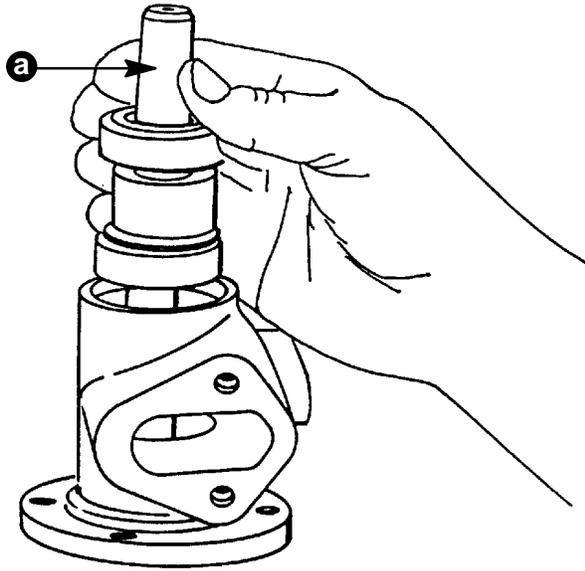
- c. Press bearings onto shaft until seated.



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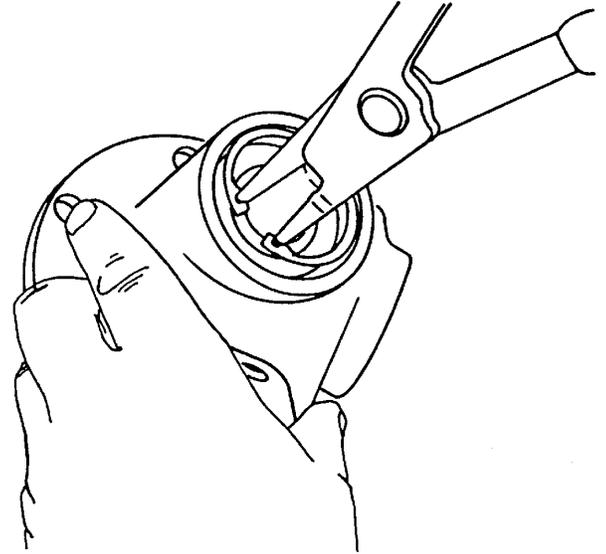
- a - Bearings

- Lower shaft and bearing assembly onto housing. Use care when guiding shaft through oil and water seals to avoid turning over seal lips. To avoid this, rotate shaft as it is lowered through seals.

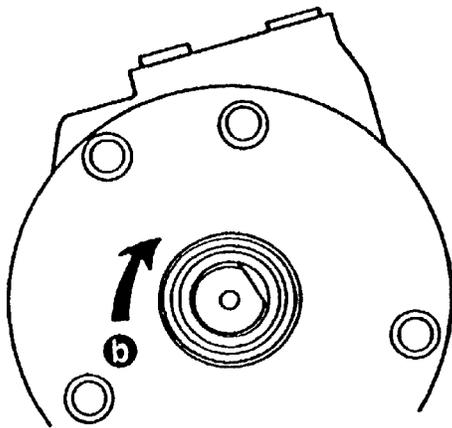


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- Push shaft and bearing assembly down until seated. Shaft is properly seated when the snap ring groove is visible above the outer bearing.
- Install snap ring to secure shaft and bearing assembly.

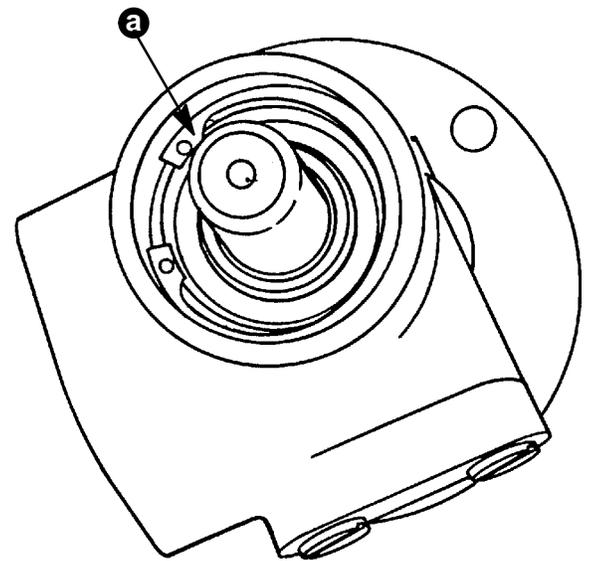


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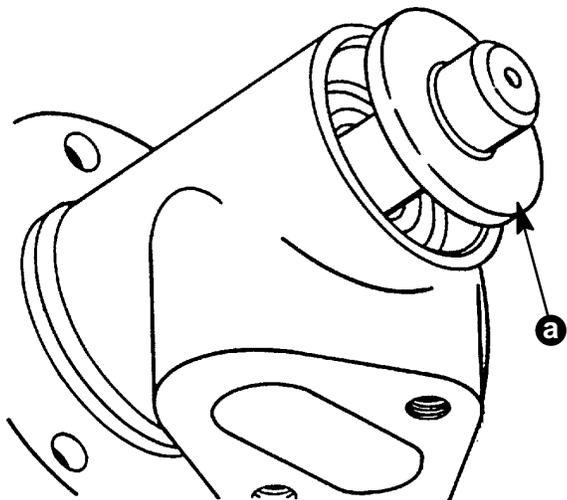
- a - Shaft and Bearing Assembly
- b - Rotate When Moving Through Seals



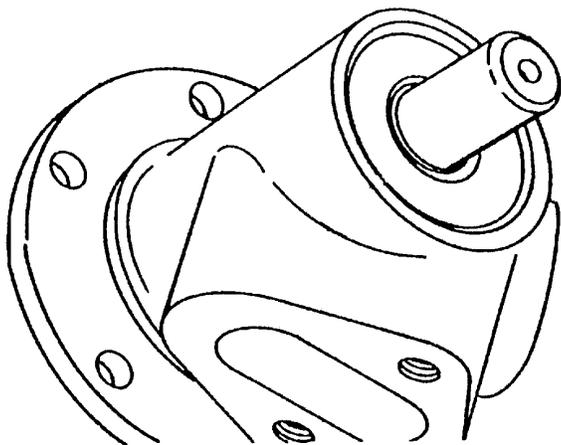
71132

- a - Snap Ring

7. Apply a light coat of Loctite 514 to O.D. of seal and install oil seal on pulley end of housing using a suitable mandrel. Seal lip should be facing inward toward snap ring. Lubricate lip of seal with Quicksilver Special Lubricant 101. Seal is properly positioned when it bottoms.



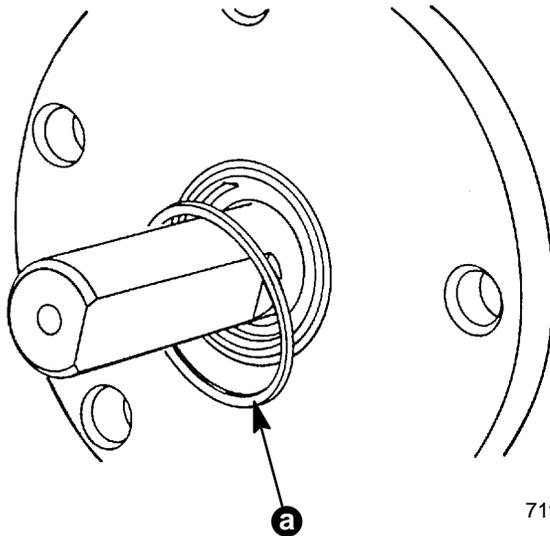
71148



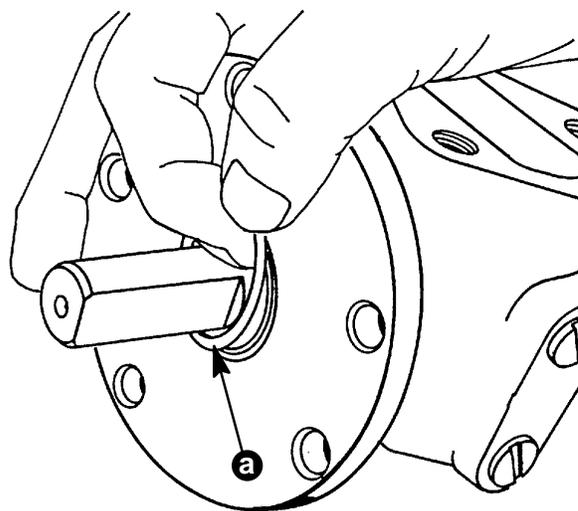
71130

a - Oil Seal - Lip Toward Snap Ring

8. Install quad ring seal on water pump end of housing.



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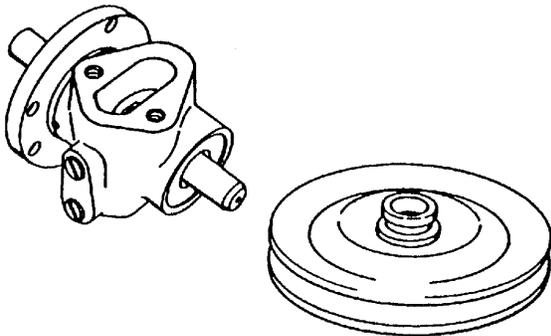
71128

a - Quad Ring Seal

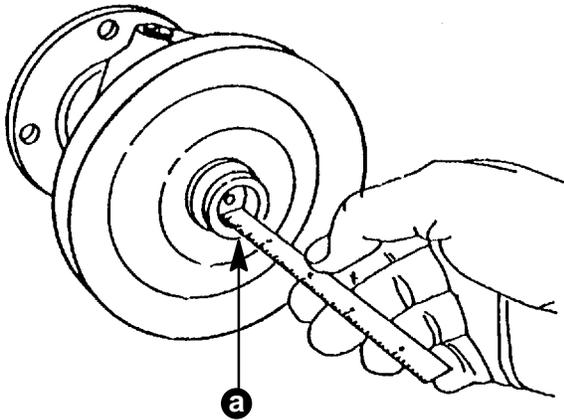
## FUEL PUMP ASSEMBLY

**IMPORTANT:** Pulley must be pressed on exactly as described in the following step to avoid rapid belt wear.

1. Carefully press pulley onto shaft. Pulley is properly positioned when end of shaft is located 1/2 in. (13 mm) from front edge of pulley.



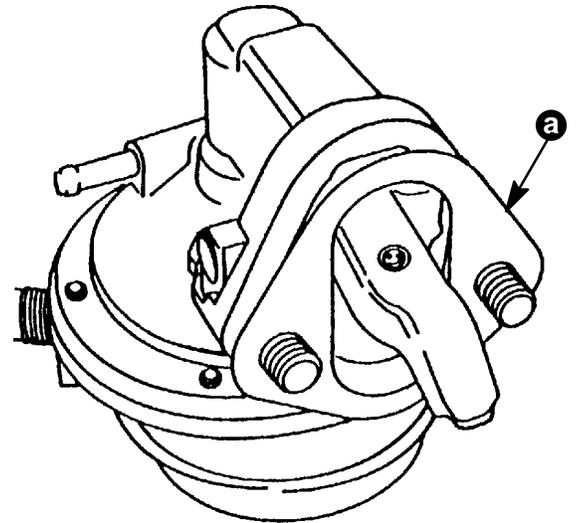
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71149

a - Pulley 1/2 In. (13 mm) Measurement

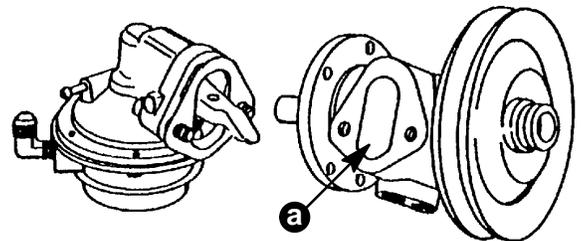
2. Apply a light coat of Quicksilver Perfect Seal to fuel pump gasket. Position gasket on fuel pump.



71124

a - Gasket

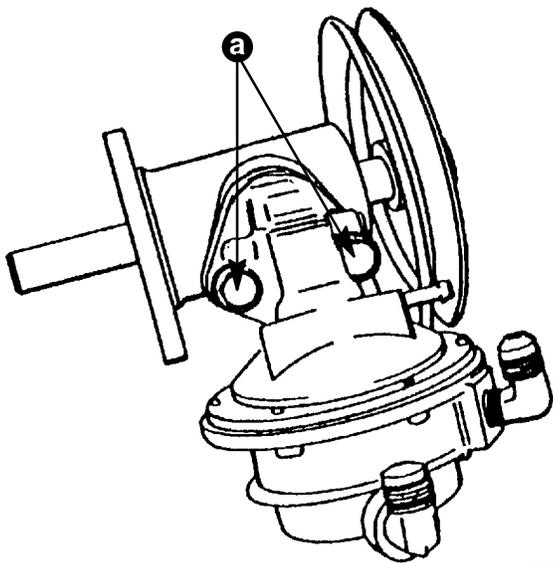
3. Turn on pulley to bring the low spot of fuel pump cam toward fuel pump lever.



71123

a - Fuel Pump Cam

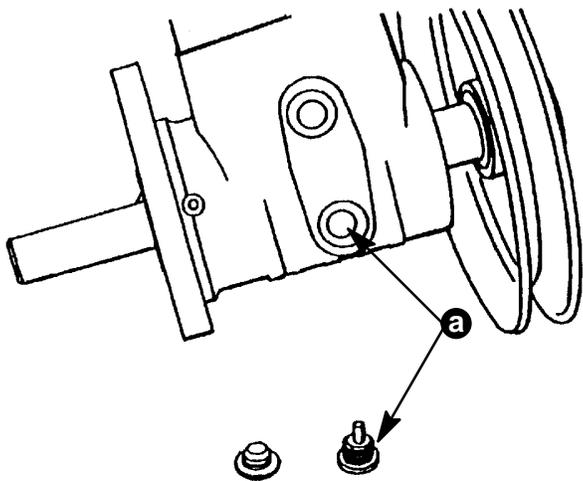
4. Install fuel pump on housing. Secure with bolts and lockwashers. Torque to 25-28 lb. ft. (34-38 N·m).



71122

a - Bolts and Lockwashers (2)

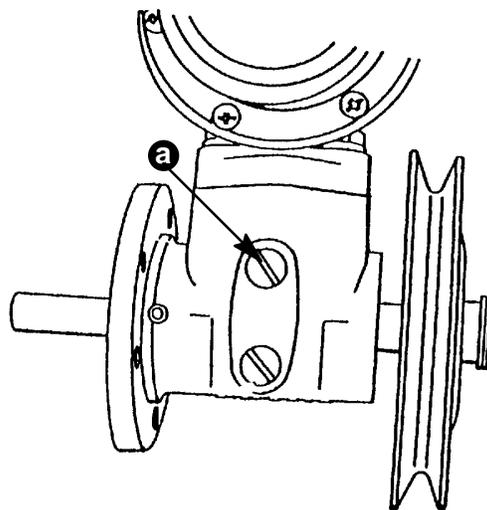
5. Install drain screw (with magnet) and sealing washer. Tighten securely [approximately 18 lb. in. (2 N·m)].



71121

a - Drain Screw (With Magnet)

6. Fill fuel pump housing with Quicksilver High Performance Gear Lube. Gear lube level should come up to bottom edge of top hole. Install fill screw with sealing washer and tighten securely [approximately 18 lb. in. (2 N·m)].

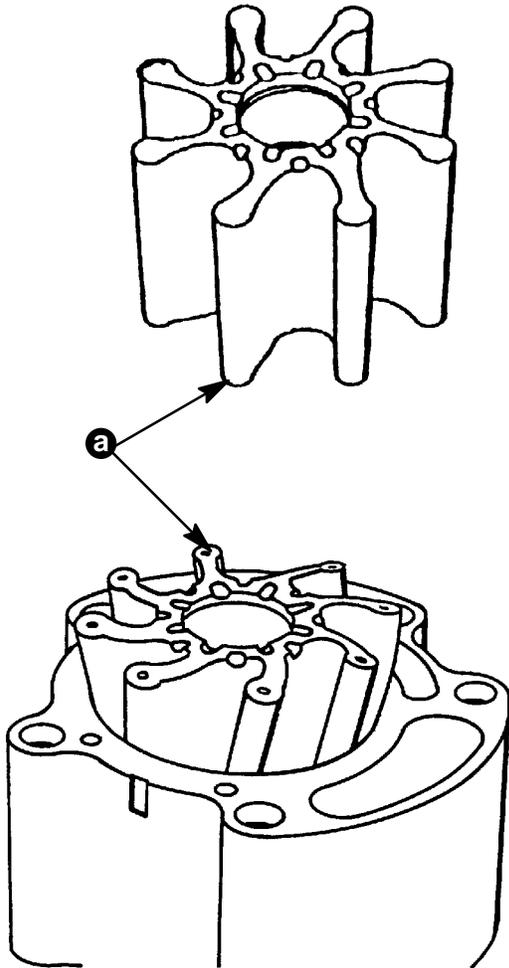


71120

a - Fill Screw

**SEAWATER PUMP ASSEMBLY (ONE PIECE BODY)**

1. Lubricate seawater pump impeller with a water and soap solution. Install impeller into housing by rotating and pushing it into place. Push it down until flush with housing.

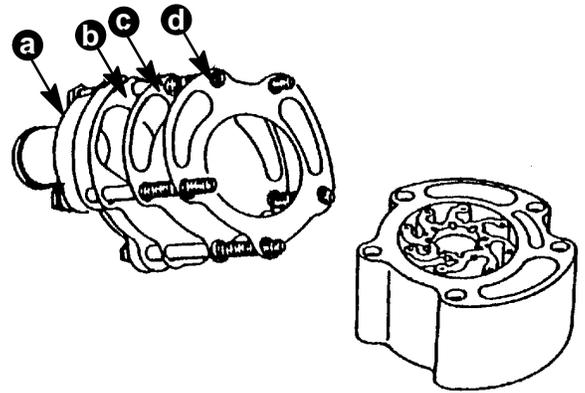


71118

7115C

a - Impeller

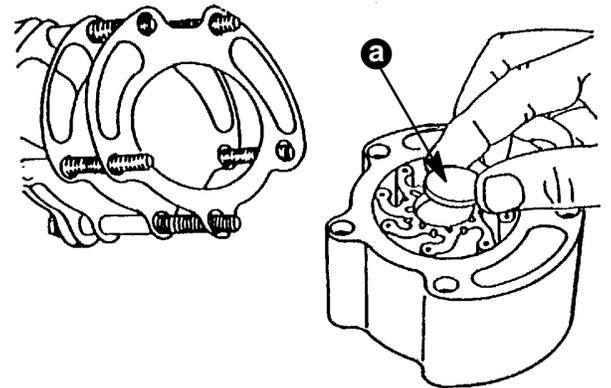
2. Install bolts with flat washers through water pump end cover. Position gaskets and wear plate as shown.



71151

- a - End Cover
- b - Gasket With Two Openings
- c - Wear Plate
- d - Gasket With Large Opening

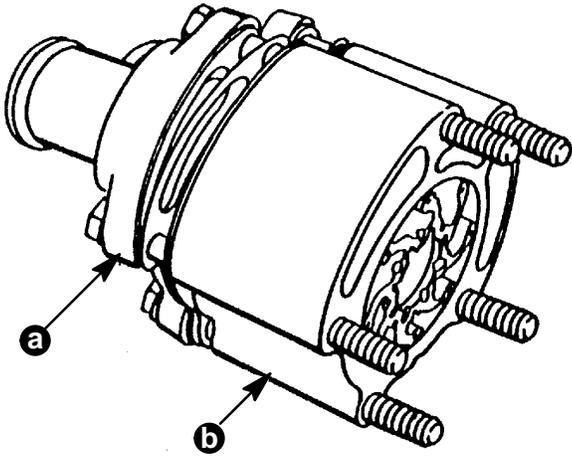
3. Place rubber plug in end of impeller that will be facing end cover.



71152

a - Rubber Plug

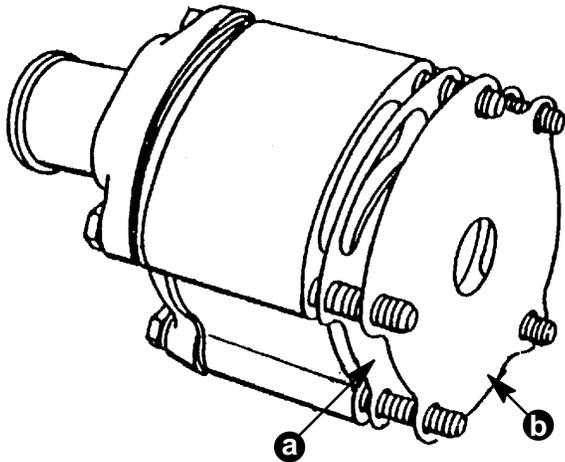
- a. Slide water pump housing over bolts and join to end cover.



71153

- a - End Cover  
b - Water Pump Housing

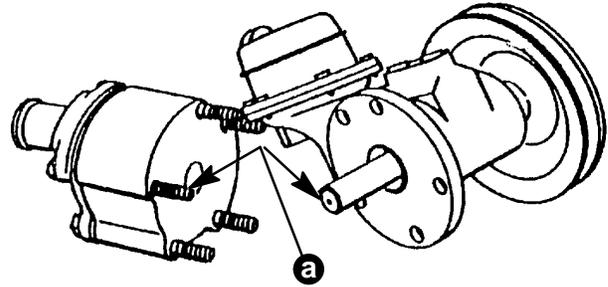
- (1) Place gasket and wear plate over bolts and slide up against housing.



71154

- a - Gasket (With Large Opening)  
b - Wear Plate

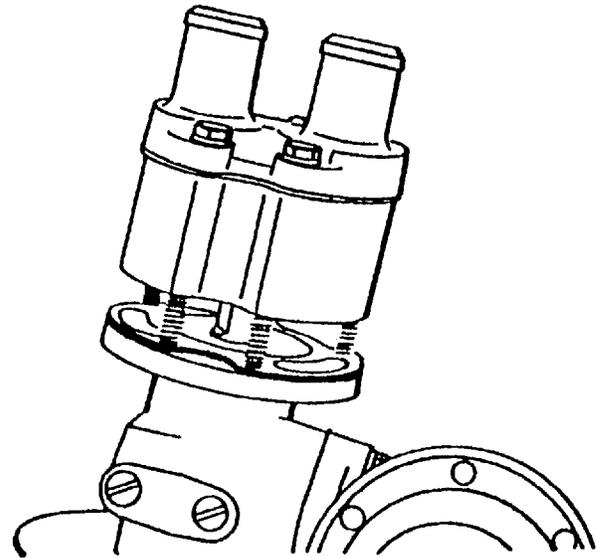
- (2) Rotate shaft so that flat spot on shaft will be in the approximate position to line up with flat spot inside impeller.



71155

- a - Flat Spot On Shaft

- (3) While holding wear plate and gasket up against housing, carefully lower water pump assembly down onto shaft. Rotate assembly from side to side to align shaft and impeller.

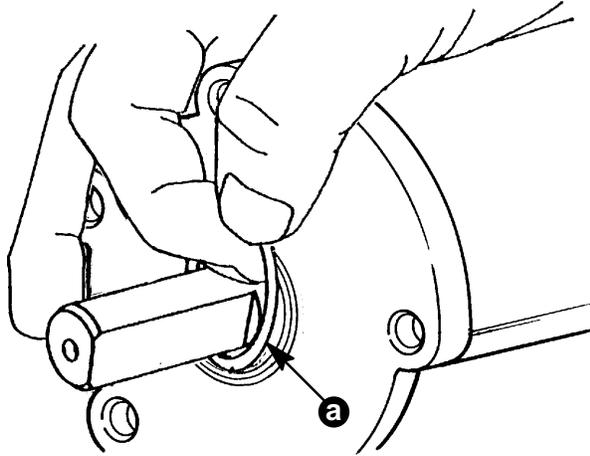


71156

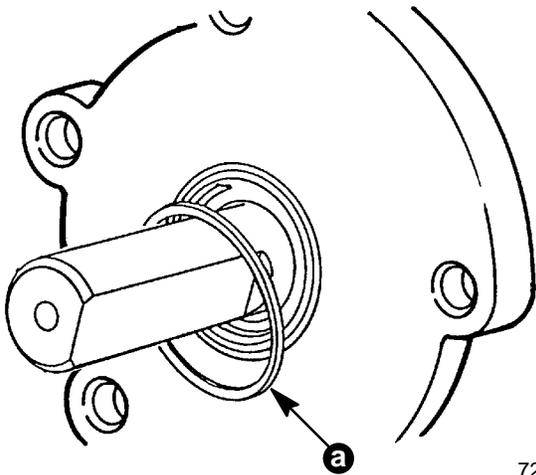
# Seawater Pump Bearing Housing

## Disassembly

1. Remove gasket, inner wear plate and quad ring seal. Discard gasket and quad ring seal.



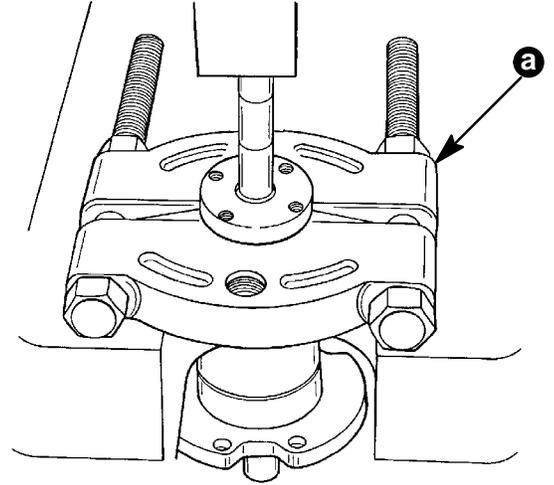
72655



72656

a - Quad Ring Seal

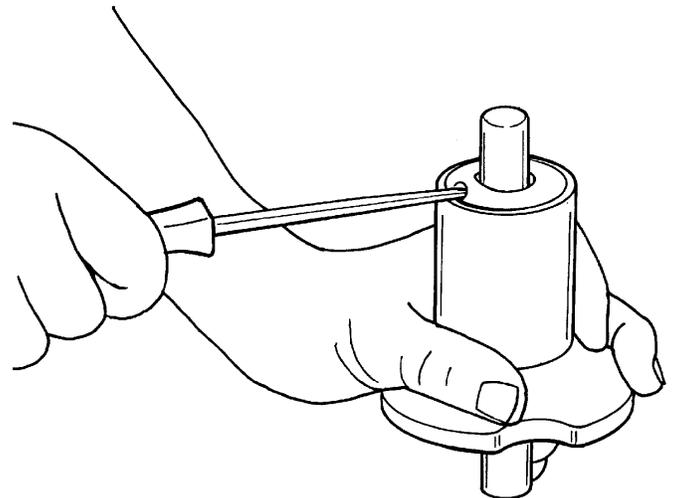
2. Press hub off shaft with Universal Puller Plate and an arbor press.



72648

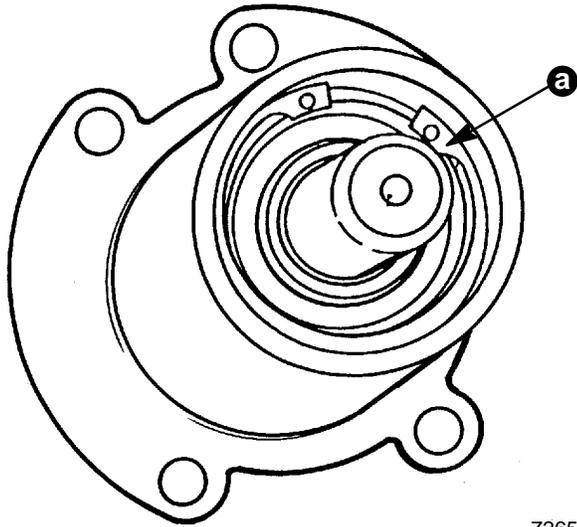
a - Universal Puller Plate (91-37241)

3. Puncture front oil seal with a tool and pry from bearing housing.

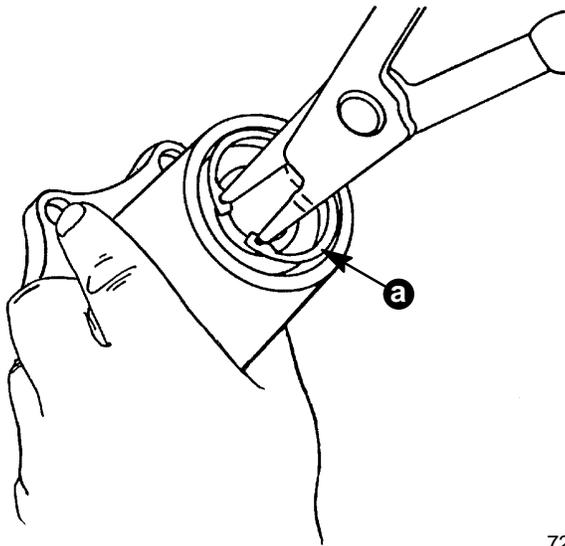


72649

4. Remove snap ring from bearing housing bore and press shaft and bearings out pulley end of housing. Bearings have a slip fit in housing; do not use excessive force.



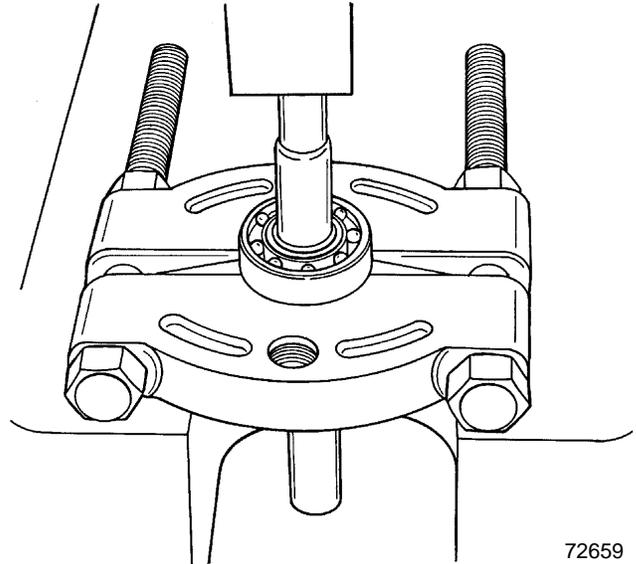
72657



72658

a - Snap Ring

5. If bearings require replacement, remove bearings from shaft with Universal Puller Plate and an arbor press. Bearings must be replaced, if removed.



72659

6. If rear seals require replacement, press seals from bearing housing with an appropriate tool.

## Cleaning and Inspection

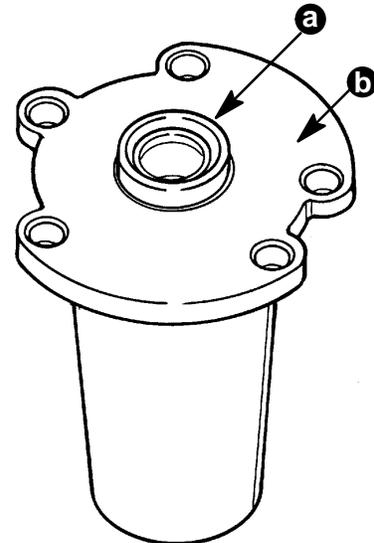
1. Clean metal parts in solvent and blow dry with compressed air.

**IMPORTANT: Do not spin bearings at high speed when drying with compressed air, as bearings may be scored.**

2. After cleaning, apply a coat of light engine oil to shaft and bearings to prevent rust.
3. Clean all gasket material and sealer from sealing surfaces.
4. Inspect bearing housing. Examine surfaces (where bearings contact housing) for evidence of bearing outer races turning in housing.
5. Inspect seals in bearing housing.
6. Inspect pump shaft bearings.
7. Inspect pump shaft for grooves in surface where seals contact shaft. Also inspect surface where bearings contact shaft for evidence of inner races turning on shaft.
8. Inspect pump body.
9. Inspect inner and outer wear plate.
10. Inspect pump impeller for wear on sides and tips of blades. Also inspect blades for cracks in area where blades flex. Replace impeller if blades have taken a set (remain in curved position).
11. Inspect pump pulley.
12. Check drive belt for excessive wear.

## Reassembly

1. Apply a thin coat of Quicksilver Loctite Type 8831 to outside diameter of two new bearing housing rear seals; then install seals in housing with seal lips facing impeller end. (Press first seal in until it bottoms out and second seal in until flush with housing.)

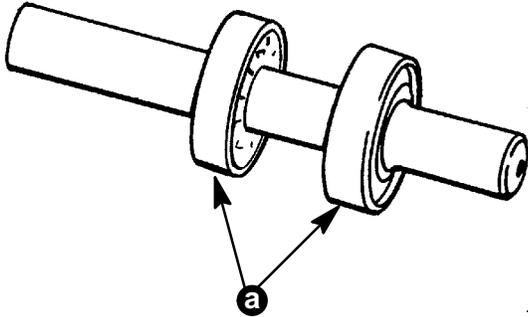


72660

- a - Outer (Water) Seal  
b - Face of Housing

**IMPORTANT: It is recommended that Shell Alvania No. 2 Grease be used when packing seal and bearings in the following steps. If Shell Alvania No. 2 Grease is not available, it is permissible to use Quicksilver 2-4-C With Teflon. However, Quicksilver 2-4-C Marine Lubricant With Teflon is not recommended for applications where continuous high speed heavy-duty operation will be encountered.**

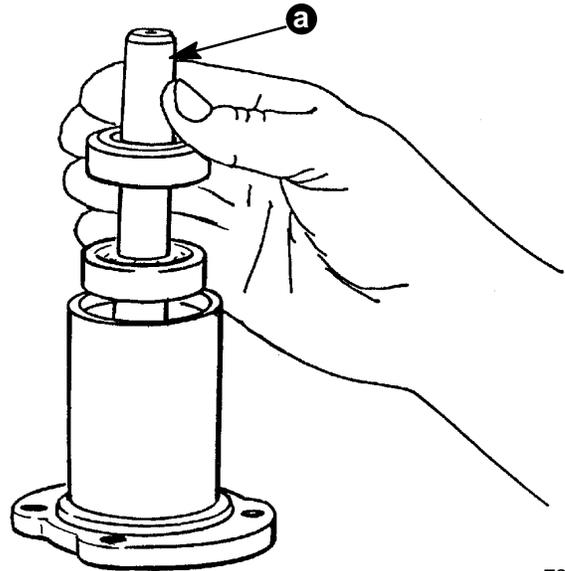
2. Pack cavity between seals with Shell Alvania No. 2 Grease or substitute.
3. Using an arbor press and suitable tool, press ball bearings onto shaft until they seat. Press on inner race of bearing only.



72663

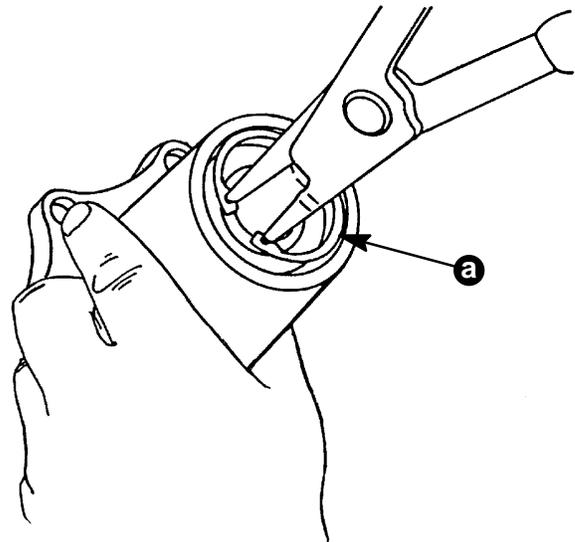
a - Bearings

4. Pack bearings and cavity between bearings with Shell Alvania No. 2 Grease or substitute. Slide bearings and shaft into bearing housing bore and install snap ring.



72661

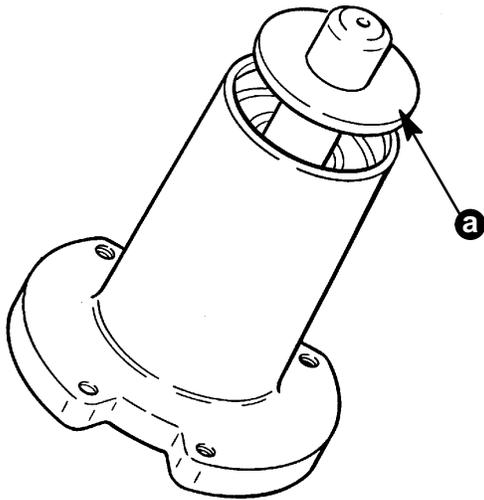
a - Shaft With Bearings



72658

a - Snap Ring

- Apply a thin coat of Quicksilver Loctite 8831 to outside diameter of new bearing housing front oil seal and press seal into housing (with seal lip facing inward) until it bottoms out.

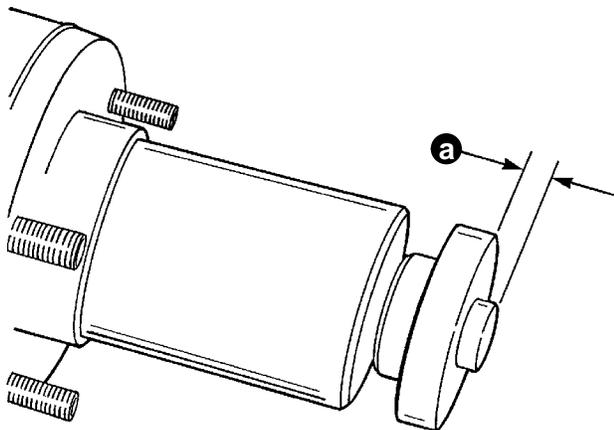


72662

a - Front Oil Seal

**IMPORTANT: Be sure to support impeller end of pump shaft when installing pulley hub in next step to prevent placing a load on bearings.**

- Apply Quicksilver Special Lubricant 101 to pump shaft. Using an arbor press and appropriate tool, press pulley hub onto pump shaft to dimension shown.

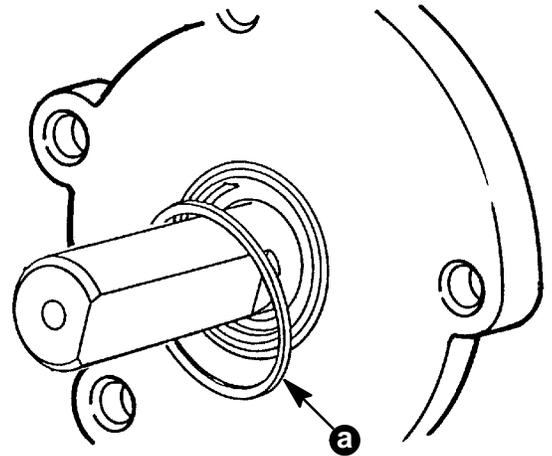


72664

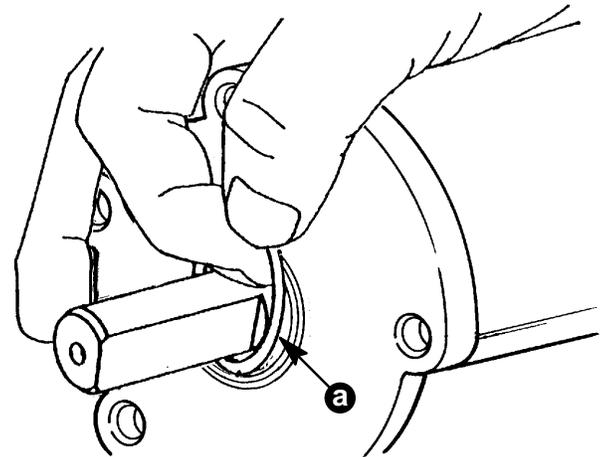
a - .260 Inch (6.6 mm)

**IMPORTANT: Pulley hub must be pressed onto shaft to exact dimension on pumps with stamped steel mounting bracket as this establishes proper drive belt alignment.**

- Clamp bearing housing in a soft jaw vise with flange end up.
- Coat quad ring seal with Quicksilver 2-4-C Marine Lubricant With Teflon and install into groove in housing.



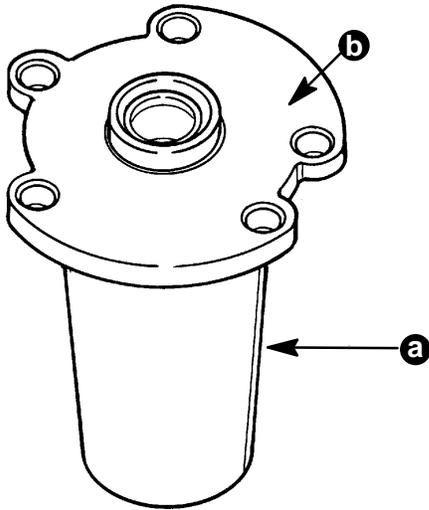
72656



72655

a - Quad Ring Seal

9. Place the wear plate over the bearing housing.

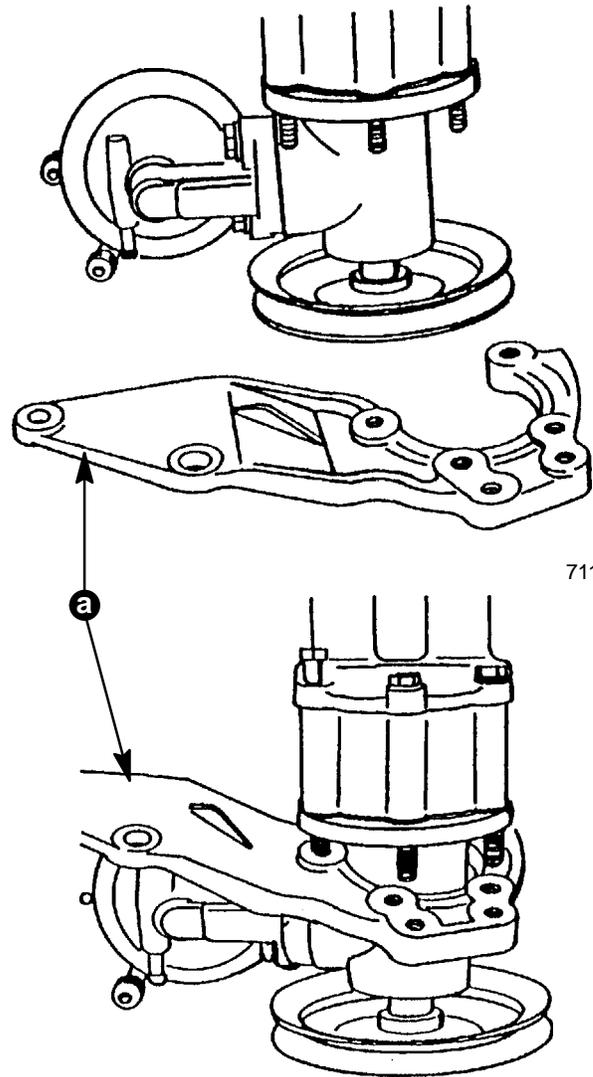


72660

a - Bearing Housing  
b - Wear Plate

## PUMP BRACKET ATTACHMENT

1. Position main bracket as shown and install. Secure the water pump assembly to the bracket with four of the five bolts.

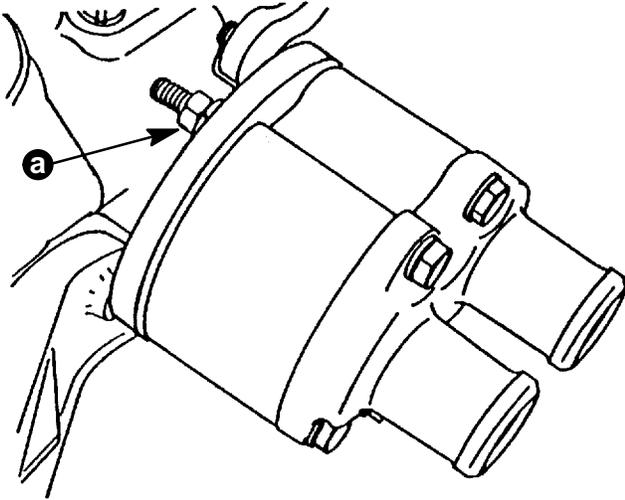


71111

71110

a - Bracket

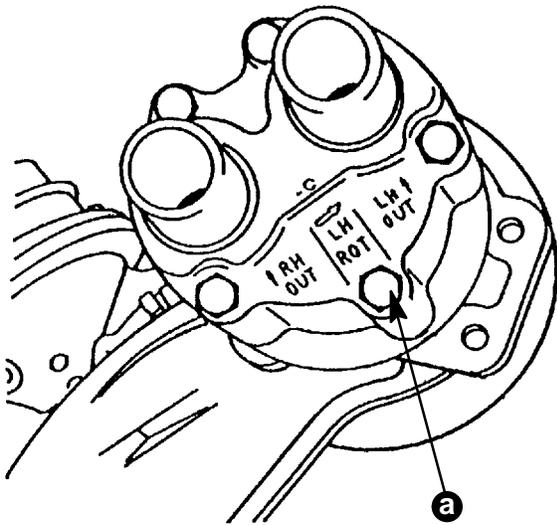
- Secure the fifth bolt with a nut and lockwasher.



71109

a - Nut and Lockwasher

- Torque all of these fasteners to 10-15 lb. ft. (14-20 N-m).

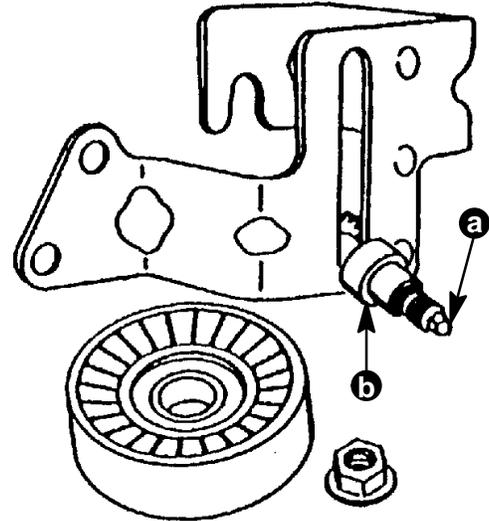


71108

a - Bolts

## IDLER PULLEY ASSEMBLY

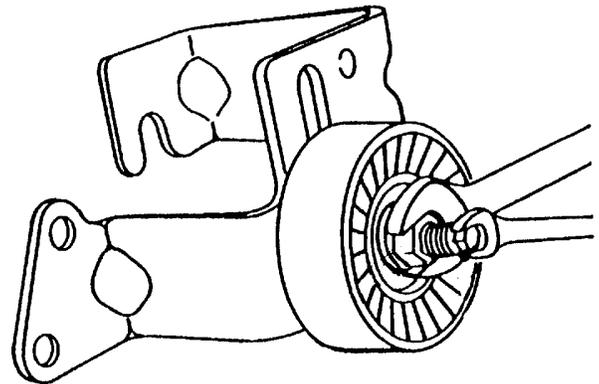
- Install idler pulley adjusting bolt and bushing.



71106

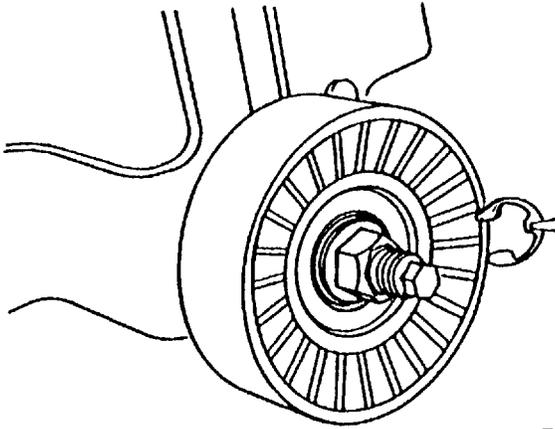
a - Adjusting Bolt  
b - Bushing

- Install idler pulley and secure with locknut. Tighten locknut while holding adjusting bolt. Do not tighten completely at this time as adjustment will be necessary when installing belt.

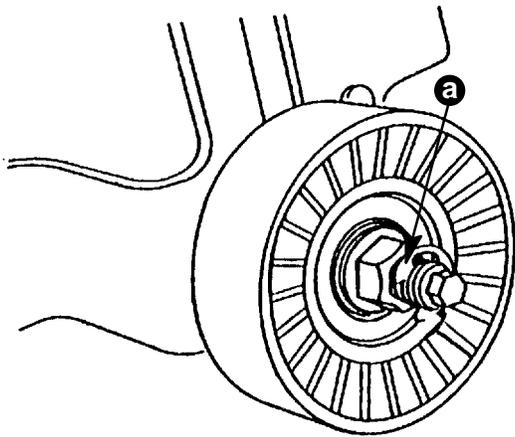


71105

3. Install retaining clip on adjusting bolt.



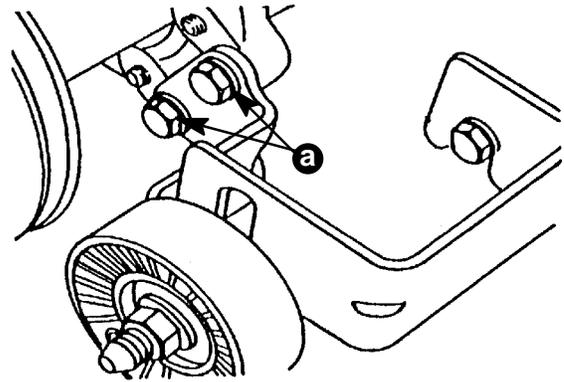
71104



71103

a - Retaining Clip

4. Install idler assembly bracket on pump housing. Secure with bolts and lockwashers. Torque to 30-35 lb. ft. (41-47 N-m).

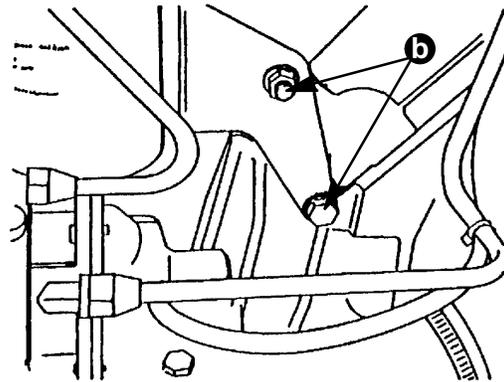


71102

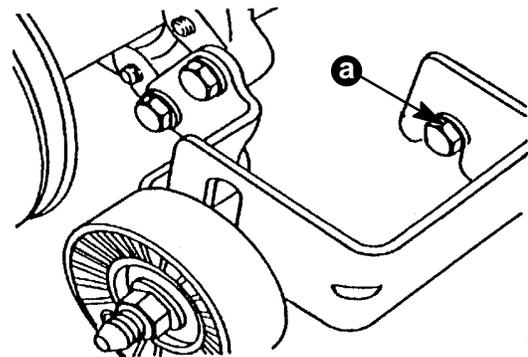
a - Bolts and Lockwashers (2)

## Installation

1. Install seawater/fuel pump assembly. Secure with bolts and lockwashers as shown. Torque to 30 lb. ft. (41 N-m).



71161



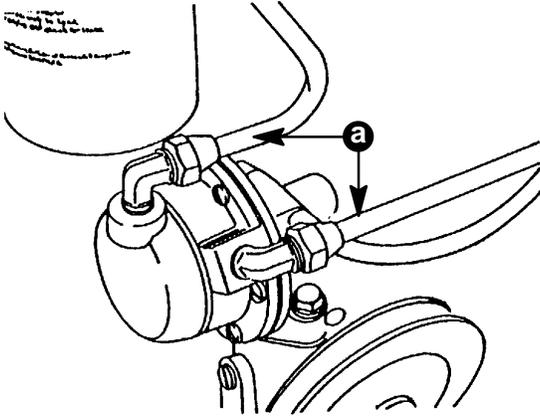
71102

a - Idler Bracket Bolt  
b - Main Bracket Bolts (2)

## ⚠ WARNING

Be careful when working on fuel system components. Gasoline is extremely flammable under certain conditions. Be sure ignition key is OFF. Do not smoke or allow spark or open flame in area when working on fuel system components. Wipe up any spilled fuel immediately.

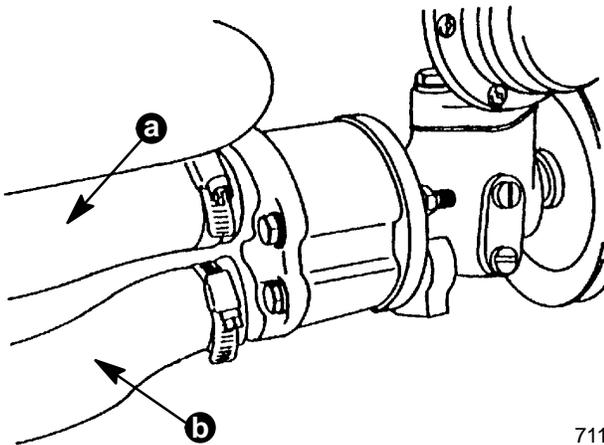
2. Connect fuel lines to fuel pump and tighten securely.



71169

a - Fuel Lines

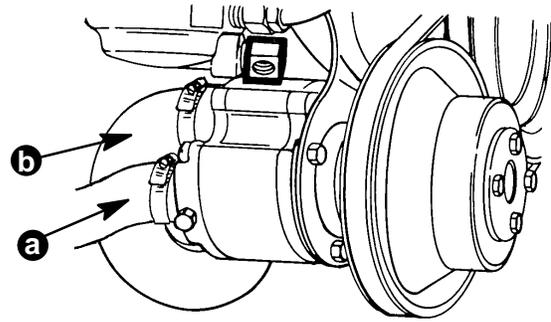
3. Connect water hoses to seawater pump.



71170

### Engines With Combination Seawater / Mechanical Fuel Pump

a - Seawater Inlet Hose  
b - Hose To Cooler

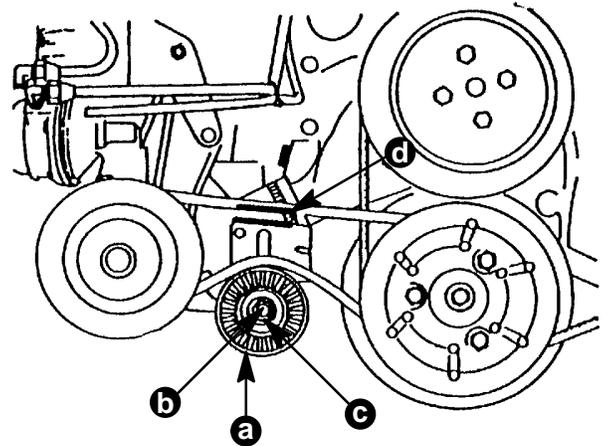


72352

### Engines With Cool Fuel System

a - Seawater Inlet Hose  
b - Hose To Cooler

4. Install drive belt. Adjust belt tension using the adjusting bolt and locknut. When adjustment is correct, torque locknut to 30 lb. ft. (41 N·m). Tension is checked by pushing on belt in area opposite the idler pulley. Belt should depress approximately 1/4 in. (6 mm).



71167

a - Idler Pulley  
b - Adjusting Bolt  
c - Locknut  
d - Belt Deflection Measurement

## Water Circulating Pump Replacement

### Removal

1. Drain water from cylinder block.
2. Break loose circulating pump pulley attaching bolts. Do not remove bolts at this time.