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<td>Shift Spool End Play</td>
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<td>Gimbal Ring and Steering Lever Components</td>
<td>2-41</td>
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</table>
Installation Specifications

Torque Specifications

NOTE: Securely tighten all fasteners not listed below.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>TORQUE</th>
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<tbody>
<tr>
<td></td>
<td>lb. in</td>
</tr>
<tr>
<td>Exhaust Pipe to Gimbal Housing Screws</td>
<td>23</td>
</tr>
<tr>
<td>Propeller Nut ¹</td>
<td>55</td>
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<tr>
<td>Steering Cable Coupler Nut</td>
<td></td>
</tr>
<tr>
<td>Tighten Nut Until It Bottoms Out Against Flat Washer, then Loosen 1/2 Turn</td>
<td></td>
</tr>
<tr>
<td>Steering Cable Coupler Nut</td>
<td>35</td>
</tr>
<tr>
<td>Steering system Pivot Bolts</td>
<td>50</td>
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<tr>
<td>Transom Assembly Attaching Screws and Nuts</td>
<td>23</td>
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<tr>
<td>Power Steering Hydraulic Hose Fittings</td>
<td>23</td>
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<tr>
<td>Stern Drive Unit to Bell Housing Attaching Nuts</td>
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¹: Amount specified is MINIMUM.

Lubricants, Sealers, and Adhesives

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
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<tbody>
<tr>
<td>Quicksilver 2-4-C Marine Lubricant with Teflon</td>
<td>92–825407A3</td>
</tr>
<tr>
<td>Quicksilver Special Lubricant 101</td>
<td>92-13872A1</td>
</tr>
<tr>
<td>Perfect Seal</td>
<td>92-34227-1</td>
</tr>
<tr>
<td>Liquid Neoprene</td>
<td>92-25711--2</td>
</tr>
<tr>
<td>Quicksilver Engine Coupler Spline Grease</td>
<td>92-816391A4</td>
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Special Tools

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment Tool Assembly</td>
<td>91-805475A1</td>
</tr>
</tbody>
</table>
Installation Procedures

Transom Assembly Installation

CAUTION
Steering lever ground wire MUST be positioned as shown or wire may fatigue.

Torque Specification
a 23 lb. ft. (31 N·m)
b 70-90 lb.in. (8-10 N·m)
Power Steering Control Valve and Cable Installation

1 - Steering Cable
2 - Grease Fitting
3 - Cable Coupler Nut
4 - Cable Guide Tube
5 - Cable End
6 - Clevis
7 - Clevis Pin
8 - Cotter Pin
9 - Flats on Guide Tube MUST Be Vertical
10 - Pivot Bolt

Lubricants, Sealers, and Adhesives

A - Quicksilver Special
Lubricant 101 ................. 92-13872A1

Torque Specification

A 35 lb. ft. (47 N·m)
B 50 lb. ft. (68 N·m)
Power Steering Hose Connections

Typical Hose Routing
a - Hose Fittings - Torque Both Fittings to 23 lb. ft. (31 N·m).

Stern Drive Unit Installation

USING THE ALIGNMENT TOOL

**CAUTION**
Forcing the alignment tool into position may damage the Gimbal Bearing or Engine Coupler. Do not attempt to force the alignment tool!
Raise or lower the engine as necessary until alignment tool moves freely.

STERN DRIVE TO BELL HOUSING CONNECTION

a - Locknut and Flat Washers - Torque to 50 lb. ft. (68 N·m)
b - Locknut and Continuity Circuit Washer - Torque to 50 lb. ft. (68 N·m)

Trim Cylinder Connection

a - Aft Anchor Pin
b - Bushings
c - Flat Washers (2)
d - E-ring Clips (2)
e - Plastic Caps (2)
Propeller Installation

Typical Propeller
- a - Propeller Shaft
- b - Forward Thrust Hub
- c - Propeller
- d - Continuity Washer
- e - Spline Washer
- f - Tab Washer
- g - Propeller Nut-Torque to 55 lb. ft. (75 N·m)

Propeller With Flo-Torque Hub
- a - Propeller Shaft
- b - Forward Thrust Hub
- c - Drive Sleeve
- d - Propeller
- e - Drive Sleeve Adapter
- f - Tab Washer
- g - Propeller Nut-Torque to 55 lb. ft. (75 N·m)
**Drive Shaft Housing Specifications**

**Torque Specifications**

*NOTE: Securely tighten all fasteners not listed below.*

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>LB. IN.</th>
<th>LB. FT.</th>
<th>N-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Cover Screws</td>
<td>17-23</td>
<td>23-31</td>
<td></td>
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<tr>
<td>U-joint Retainer Nut</td>
<td>200</td>
<td>271</td>
<td></td>
</tr>
<tr>
<td>Oil Vent Screw</td>
<td>30-50</td>
<td></td>
<td>3.4-5.6</td>
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**Upper Drive Shaft Bearing Preload**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>LB. IN.</th>
<th>N-M</th>
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</thead>
<tbody>
<tr>
<td>New Bearings</td>
<td>6-15</td>
<td>0.7-1.7</td>
</tr>
<tr>
<td>Used Bearings*</td>
<td>3-7.5</td>
<td>0.3-0.8</td>
</tr>
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*Bearings are considered used if spun under load once.*

**U-joint Bearing Preload**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>LB. IN.</th>
<th>N-M</th>
</tr>
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<tbody>
<tr>
<td>New Bearings</td>
<td>6-10</td>
<td>0.7-1.1</td>
</tr>
<tr>
<td>Used Bearings*</td>
<td>3-7.5</td>
<td>0.3-0.8</td>
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*Bearings are considered used if spun under load once.*

**Gear Shimming Specifications**

<table>
<thead>
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<th>DESCRIPTION</th>
<th>GEAR LOCATION</th>
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<tr>
<td>Drive Gear</td>
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<tr>
<td>Driven Gear</td>
<td>.025</td>
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**Lubricants, Sealers, and Adhesives**

<table>
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<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<tr>
<td>Quicksilver 2-4-C Marine Lubricant with Teflon</td>
<td>92-825407A3</td>
</tr>
<tr>
<td>Quicksilver U-Joint and Gimbal Bearing Grease</td>
<td>92-828052A2</td>
</tr>
<tr>
<td>3M Brand Adhesive</td>
<td>92-25234-1</td>
</tr>
<tr>
<td>Quicksilver Bellows Adhesive</td>
<td>92-86166</td>
</tr>
<tr>
<td>Quicksilver Needle Bearing Assembly Lubricant</td>
<td>92-825265A1</td>
</tr>
<tr>
<td>Quicksilver Perfect Seal</td>
<td>92-34227-1</td>
</tr>
<tr>
<td>Permatex Ultra Blue Silicone Sealant</td>
<td>Obtain Locally</td>
</tr>
<tr>
<td>Quicksilver Special Lubricant 101</td>
<td>92-13872A1</td>
</tr>
<tr>
<td>Quicksilver High Performance Gear Lube</td>
<td>92-816026A4</td>
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**Special Tools**

<table>
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<th>DESCRIPTION</th>
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<tr>
<td>Adaptor</td>
<td>91-38756</td>
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<tr>
<td>Bearing Cup Driver</td>
<td>91-38918</td>
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<tr>
<td>Bearing Driver Cup</td>
<td>91-33493</td>
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<tr>
<td>Driver Cup</td>
<td>91-36577</td>
</tr>
<tr>
<td>Driver Rod</td>
<td>91-37323</td>
</tr>
<tr>
<td>Driver Tool</td>
<td>91-90774</td>
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<tr>
<td>Oil Seal Driver</td>
<td>91-817570</td>
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<tr>
<td>Shimming Tool (Driven Gear)</td>
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<tr>
<td>Shimming Tool (Drive Gear)</td>
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<tr>
<td>Slide Hammer Puller</td>
<td>91-34569A1</td>
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<tr>
<td>Torque Wrench (lb. in.)</td>
<td>91-66274</td>
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<tr>
<td>U-joint Bearing Retainer Wrench</td>
<td>91-17256</td>
</tr>
<tr>
<td>Universal Puller Plate</td>
<td>91-37241</td>
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TORQUE CONVERSION CHART

Use the following table to torque the u-joint retainer to 200 lb. ft. (271 N·m).

<table>
<thead>
<tr>
<th>Torque Wrench Length in Inches (cm)</th>
<th>Torque Wrench Reading in lb. ft. (N·m) to Achieve 200 lb. ft. (271 N·m) of Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (38)</td>
<td>111 (151)</td>
</tr>
<tr>
<td>16 (41)</td>
<td>114 (155)</td>
</tr>
<tr>
<td>17 (43)</td>
<td>117 (159)</td>
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<tr>
<td>18 (46)</td>
<td>120 (163)</td>
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<tr>
<td>19 (48)</td>
<td>123 (167)</td>
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<tr>
<td>20 (51)</td>
<td>125 (170)</td>
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<td>21 (53)</td>
<td>127 (172)</td>
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<td>22 (56)</td>
<td>129 (175)</td>
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<td>23 (58)</td>
<td>131 (178)</td>
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<td>24 (61)</td>
<td>133 (180)</td>
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<td>25 (64)</td>
<td>135 (183)</td>
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<tr>
<td>26 (66)</td>
<td>136 (184)</td>
</tr>
<tr>
<td>27 (69)</td>
<td>138 (187)</td>
</tr>
<tr>
<td>28 (71)</td>
<td>140 (190)</td>
</tr>
<tr>
<td>29 (74)</td>
<td>141 (191)</td>
</tr>
<tr>
<td>30 (76)</td>
<td>143 (194)</td>
</tr>
<tr>
<td>31 (79)</td>
<td>144 (195)</td>
</tr>
<tr>
<td>32 (81)</td>
<td>145 (197)</td>
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<td>33 (84)</td>
<td>147 (200)</td>
</tr>
<tr>
<td>34 (86)</td>
<td>148 (201)</td>
</tr>
<tr>
<td>35 (89)</td>
<td>149 (202)</td>
</tr>
<tr>
<td>36 (91)</td>
<td>150 (203)</td>
</tr>
</tbody>
</table>

![Diagram of torque wrench length](image)

a - Torque Wrench Length
Drive Shaft Housing Exploded Parts View
U-Joint and Driven Gear Components
1 - Drive Shaft Housing
2 - Screw
3 - O-ring
4 - Spring Assembly
5 - Oil Seal
6 - Wear Pad
7 - Plug
8 - Universal Joint
9 - Yoke, Universal Joint - Gear End
10 - Socket, Center - Universal Joint
11 - Cross and Bearing
12 - Yoke Assembly, Universal Joint - Coupling End
13 - O-ring
14 - Retainer
15 - Ring
16 - O-ring
17 - Carrier Assembly
18 - Oil Seal
19 - Roller Bearing and Cups
20 - Cup Spacer
21 - Shim
22 - Shim
23 - Drive Gear Assembly
24 - Roller Bearing and Cup
25 - Washer
26 - Nut
27 - Shims
28 - Ground Plate
29 - Screw

Lubricants, Sealers, and Adhesives

A - 2-4-C Marine Lubricant with Teflon ............... 92-825407A12
B - Quicksilver High Performance Gear Lube ............. 92-816025A4
C - Quicksilver Special Lubricant 101 ................. 92-13872A1
D - Quicksilver Engine Coupler Spline Grease .... 92-816391A4

Torque Specification

200 lb. ft. (271 N·m) - See Chart on Page 7

Rolling Preload

Tighten in Small Increments Until 6-10 lb. in. (.07-1.1 N·m) of Rolling Preload
Drive Shaft Components

Lubricants, Sealers, and Adhesives
A - Quicksilver 2-4-C Marine
  Lubricant with Teflon ... 92-825407A12
B - Quicksilver High
  Performance Gear Lube . 92-816026A4

Torque Specifications
a  20 lb. ft. (27 N·m)
b  35 lb. ft. (47.5 N·m)
Drive Shaft Housing Shimming

Gear Distance, Driven Gear

<table>
<thead>
<tr>
<th>SHIMMING TOOL 91-60526</th>
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<tbody>
<tr>
<td>Overall Drive Unit Gear Ratio</td>
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<tr>
<td>1.47:1</td>
</tr>
<tr>
<td>1.62:1</td>
</tr>
<tr>
<td>1.81:1</td>
</tr>
<tr>
<td>1.94:1</td>
</tr>
<tr>
<td>2.40:1</td>
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</tbody>
</table>

Gear Distance, Drive Gear

**SHIMMING TOOL 91-60523**

<table>
<thead>
<tr>
<th>Overall Drive Unit Gear Ratio</th>
<th>Tool Position</th>
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<tbody>
<tr>
<td>1.47:1</td>
<td>Z</td>
</tr>
<tr>
<td>1.62:1</td>
<td>Y</td>
</tr>
<tr>
<td>1.81:1</td>
<td>Y</td>
</tr>
<tr>
<td>1.94:1</td>
<td>Y</td>
</tr>
<tr>
<td>2.40:1</td>
<td>Y</td>
</tr>
</tbody>
</table>

- Feeler Gauge - .025 in. (0.635mm)
Drive Shaft Housing
Special Information

Top Cover Bearing Cup
The later style bearing cup is thinner than the earlier style cup.

a - Earlier Style Bearing Cup 1.938 in. Diameter
(Prior to S/N OF680000)
b - Later Style Bearing Cup 1.781 in. Diameter
(S/N OF680000 and Above)

Top Cover Bearing Cup Drivers
Use the appropriate driver for installation of the bearing cup.

a - Shims
b - Bearing Cup
c - Bearing Cup Driver (91-38918) used with 31-61100 A1 Bearing OR Bearing Cup Driver (91-808053) used with 31-32575 A1 Bearing
d - Driver Rod (91-37323)
e - Top Cover
Standard Rotation Gear Housing Specifications

Torque Specifications

**NOTE:** Securely tighten all fasteners not listed below.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Pump Body Screws</td>
<td>60</td>
</tr>
<tr>
<td>Pinion Gear Nut</td>
<td>70</td>
</tr>
<tr>
<td>Gear Housing to Drive Shaft Housing Screws</td>
<td>28</td>
</tr>
<tr>
<td>Gear Housing to Drive Shaft Housing Nuts</td>
<td>35</td>
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<tr>
<td>Trim Tab Screw</td>
<td>23</td>
</tr>
<tr>
<td>Shift Shaft Bushing Screws</td>
<td>60</td>
</tr>
<tr>
<td>Drive Shaft Retainer</td>
<td>100</td>
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<tr>
<td>Bear Carrier Retainer</td>
<td>210</td>
</tr>
<tr>
<td>Oil Fill/Drain Screw</td>
<td>30-50</td>
</tr>
<tr>
<td>Propeller Nut ¹</td>
<td>55</td>
</tr>
</tbody>
</table>

¹: Amount specified is MINIMUM.

Shimming Specifications

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>GEAR LOCATION</th>
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<tbody>
<tr>
<td>Pinion Gear Height</td>
<td>.025</td>
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<tr>
<td>Forward Gear Backlash</td>
<td>.017-.028</td>
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<td>Reverse Gear Backlash</td>
<td>.034-.054</td>
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Lubricants, Sealers, and Adhesives

<table>
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<tr>
<th>DESCRIPTION</th>
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<tr>
<td>Quicksilver 2-4-C Marine Lubricant with Teflon</td>
<td>92-825407A3</td>
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<tr>
<td>3M Brand Adhesive</td>
<td>92-25234-1</td>
</tr>
<tr>
<td>Quicksilver Bellows Adhesive</td>
<td>92-86166</td>
</tr>
<tr>
<td>Quicksilver Needle Bearing Assembly Lubricant</td>
<td>92-825265A1</td>
</tr>
<tr>
<td>Quicksilver Perfect Seal</td>
<td>92-34227-1</td>
</tr>
<tr>
<td>Permatex Ultra Blue Silicone Sealant</td>
<td>Obtain Locally</td>
</tr>
<tr>
<td>Quicksilver Special Lubricant 101</td>
<td>92-13872A1</td>
</tr>
<tr>
<td>Loctite 8831</td>
<td>92-823089-1</td>
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<tr>
<td>Quicksilver High Performance Gear Lube</td>
<td>92-816026A4</td>
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## Special Tools

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Backlash Indicator Rod</td>
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<tr>
<td>Bearing Carrier Retainer Wrench</td>
<td>91-61069</td>
</tr>
<tr>
<td>Bearing Preload Tool</td>
<td>91-14311A2</td>
</tr>
<tr>
<td>Belleville Washer</td>
<td>12-54048</td>
</tr>
<tr>
<td>Dial Indicator</td>
<td>91-58222A1</td>
</tr>
<tr>
<td>Dial Indicator Holding Tool</td>
<td>91-89897</td>
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<tr>
<td>Drive Shaft Nut Wrench</td>
<td>91-56775</td>
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<tr>
<td>Cup Driver</td>
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<td>Drive Shaft Bearing Wrench</td>
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<td>Needle Bearing Driver</td>
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<td>Needle Bearing Driver</td>
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<td>Oil Seal Driver</td>
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<td>Oil Seal Driver</td>
<td>91-817569</td>
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<td>Pinion Gear Shimming Tool</td>
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<td>Pinion Nut Adapter</td>
<td>91-61067A3</td>
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<tr>
<td>Drive Shaft Adapter</td>
<td>91-61077</td>
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<tr>
<td>Puller Bolt</td>
<td>91-85716</td>
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<tr>
<td>Puller Jaws</td>
<td>91-46086A1</td>
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<tr>
<td>Slide Hammer Puller</td>
<td>91-34569A1</td>
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<tr>
<td>Torque Wrench (Inch Pound)</td>
<td>91-66274</td>
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<tr>
<td>Water Pump Alignment Pins</td>
<td>91-821571A1</td>
</tr>
<tr>
<td>Universal Bearing Removal and Installation (Includes the Following Items)</td>
<td>91-31229A5</td>
</tr>
<tr>
<td>Bearing Adapter</td>
<td>91-37263</td>
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<tr>
<td>Bearing Installation Tool</td>
<td>91-38628</td>
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<table>
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<tr>
<th>DESCRIPTION</th>
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<tr>
<td>Collar</td>
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<td>Driver Head</td>
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<tr>
<td>Driver Head</td>
<td>91-37311</td>
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<tr>
<td>Driver Head</td>
<td>91-37312</td>
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<tr>
<td>Driver Head</td>
<td>91-52393</td>
</tr>
<tr>
<td>Driver Head Rod</td>
<td>91-37323</td>
</tr>
<tr>
<td>Nut</td>
<td>11-24156</td>
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<tr>
<td>Pilot Washer</td>
<td>91-36571</td>
</tr>
<tr>
<td>Pilot Washer</td>
<td>91-37324</td>
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<tr>
<td>Pilot Washer</td>
<td>91-37350</td>
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<td>Puller Plate</td>
<td>91-29310</td>
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<td>91-36379</td>
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<td>Puller Head</td>
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<td>Puller Head</td>
<td>91-38628</td>
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<tr>
<td>Puller Rod</td>
<td>91-52394</td>
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<td>Puller Shaft</td>
<td>91-31229</td>
</tr>
<tr>
<td>Roller Bearing Removal and Installation Tool</td>
<td>91-37292</td>
</tr>
<tr>
<td>Washer</td>
<td>12-34961</td>
</tr>
</tbody>
</table>

*The 91-14311A2 Bearing Preload Tool is also used on Mercury and Mariner V-6 gear cases. Check your inventory before buying.

**NOTE:** Water Pump Face Seal Tool is not available separately, 26-816575A2 is a kit part number which includes the tool and the face seal.
1 - Gear Housing
2 - Pin
3 - Stud
4 - Oil Fill/Drain Screw
5 - O-ring
6 - Seal
7 - Dowel Pin
8 - Roller Bearing
9 - Speedometer Fitting
10 - Drive Shaft
11 - Shim
12 - Bearing and Cup
13 - Nut
14 - Gear Drive
15 - Washer
16 - Nut
17 - Face Plate
18 - Carrier
19 - Oil Seal
20 - Oil Seal
21 - O-ring
22 - Water Pump
23 - Gasket
24 - Gasket
25 - Face Seal
26 - Screw
27 - Impeller
28 - Key
29 - Coupling
30 - O-rings
31 - Sleeve
32 - Shift Shaft
33 - Retaining Ring
34 - Sleeve
35 - Bushing Assembly
36 - Oil Seal
37 - O-rings
38 - Screw

Lubricants, Sealers, and Adhesives

A - Quicksilver 2-4-C Marine Lubricant with Teflon 92-825407A12
B - 3M Brand Adhesive 92-25234-1
C - Loctite 8831 92-823089-1
D - Quicksilver High Performance Gear Lube 92-816026A4
E - Quicksilver Needle Bearing Assembly Lubricant 92-825265A1

Torque Specifications

A 60 lb. in. (6.8 N·m)
B 70 lb. ft. (95 N·m)
C 28 lb. ft. (38 N·m)
D 35 lb. ft. (47 N·m)
E 23 lb. ft. (31 N·m)
F 100 lb. ft. (136 N·m)
G 210 lb. ft. (285 N·m)
H 30-50 lb. in. (3.4-5.6 N·m)
1. Gear Housing
2. Shift Crank
3. Shift Spool Assembly
4. Shim, Bearing Outer Race
5. Bearing and Cup
6. Forward Gear
7. Roller Bearing
8. Sliding Clutch
9. Cross Pin
10. Spring
11. Propeller Shaft
12. Reverse Gear
13. Thrust Washer
14. Thrust Hub
15. Ball Bearing
16. O-ring
17. Roller Bearing
18. Bearing Carrier Assembly
19. Anode
20. Screw
21. Star Washer
22. Oil Seal (Inside)
23. Oil Seal (Outside)
24. Tab Washer
25. Retainer
26. Thrust Hub
27. Continuity Washer
28. Spline Washer
29. Tab Washer
30. Locknut - Propeller
31. Anodic Trim Tab (Anodic Plate - Some Models)
32. Screw
33. Star Washer
34. Screw
35. Nut

Lubricants, Sealers, and Adhesives

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>A</td>
<td>Quicksilver 2-4-C Marine Lubricant with Teflon</td>
<td>92-825407A12</td>
</tr>
<tr>
<td>B</td>
<td>Loctite 8831</td>
<td>92-823089-1</td>
</tr>
<tr>
<td>C</td>
<td>Quicksilver High Performance Gear Lube</td>
<td>92-16026A4</td>
</tr>
<tr>
<td>D</td>
<td>Quicksilver Perfect Seal</td>
<td>92-34277-1</td>
</tr>
<tr>
<td>E</td>
<td>Permatex Ultra Blue Silicone Sealant</td>
<td>Obtain Locally</td>
</tr>
<tr>
<td>F</td>
<td>Quicksilver Special Lubricant 101</td>
<td>92-13872A1</td>
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Torque Specifications

<table>
<thead>
<tr>
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<th>Torque</th>
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<tbody>
<tr>
<td>a</td>
<td>60 lb. in. (6.8 N·m)</td>
</tr>
<tr>
<td>b</td>
<td>70 lb. ft. (95 N·m)</td>
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<tr>
<td>e</td>
<td>23 lb. ft. (31 N·m)</td>
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<tr>
<td>f</td>
<td>100 lb. ft. (136 N·m)</td>
</tr>
<tr>
<td>g</td>
<td>210 lb. ft. (285 N·m)</td>
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</table>
Special Information For Standard Rotation Gear Housing

**CAUTION**

Avoid damage to stern drive unit. Drive unit damage will occur if Later Style parts are intermixed with Earlier Style parts.

**SHIFT SPOOL ASSEMBLY**

The later style shift spool assembly has a larger gap than the earlier style. This later style shift spool beginning with serial number 0K041000 is sold as a whole assembly and can be used when replacing the earlier style (Prior to S/N 0K041000). The end play for the spool will remain the same as the earlier models (.002-.010 in. .051-.254 mm).

![Diagram of Shift Spool Assembly]

- a - Earlier Style Shift Spool Assembly (Prior to S/N 0K041000)
- b - Later Style Shift Spool Assembly (S/N 0K041000 and Above)
- c - Measure End Play Here at Gap

**FORWARD GEAR BEARING BORE**

The later style forward gear bearing bore is smaller (3.2635 to 3.2650 in.) than the earlier style (3.4985 to 3.5000 in.) This slightly smaller bearing bore for the forward gear bearing adapter is approximately 1/4 in. (6.3 mm) smaller.

![Diagram of Forward Gear Bore Comparison]

- Earlier Style Forward Gear Bore (Prior to S/N OF680000)
- Later Style Forward Gear Bore (S/N OF680000 and Above)

The later style bearing cup is thinner and has a smaller diameter than the earlier style.

![Diagram of Gear Bearing Cup Comparison]

- a - Earlier Style Gear Bearing Cup 3.500 in. diameter (Prior to S/N OF680000)
- b - Later Style Gear Bearing Cup 3.265 in. diameter (S/N OF680000 and Above)
Standard Rotation Gear Housing Assembly Specifications

Pre-Disassembly Inspection

<table>
<thead>
<tr>
<th>Action</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td>Move propeller shaft from one side to another</td>
<td>Less than .003 in. (0.08 mm)</td>
</tr>
<tr>
<td>Rotate propeller shaft</td>
<td>.005 in. (.127 mm) or less</td>
</tr>
</tbody>
</table>

Pinion Gear Height

Check pinion height at four locations. **Average pinion gear height**: .025 in. (0.64 mm).

Shift Spool End Play

**NOTE**: The later style shift spool assembly has a larger gap than the earlier style. This later style shift spool beginning with serial number OK041000 is sold as a whole assembly and can be used when replacing the earlier style (Prior to S/N OK041000). The end play for the spool will remain the same as the earlier models (.002-.010 in. .051-.254 mm).

a - Earlier Style Shift Spool Assembly (Prior to S/N OK041000)  
b - Later Style Shift Spool Assembly (S/N OK041000 and Above)  
c - Measure End Play Here at Gap
Forward Gear Backlash

Apply forward pressure to the propeller shaft with puller jaws. Torque the puller bolt to 45 lb. in. (5 N·m).

Take readings at four different locations, 90° apart, and average them for the backlash reading.

**Backlash reading:** .017-.028 in. (0.43-0.71 mm)

Reverse Gear Backlash

Use the pinion nut adaptor to apply backward pressure on the propeller shaft. Torque Propeller nut to 45 lb. in. (5 N·m).

**Backlash reading:** .034-.054 in. (0.86-1.37 mm)
## Counter-Rotation Gear Housing Specifications

### Torque Specifications

*NOTE: Securely tighten all fasteners not listed below.*

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>TORQUE</th>
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<tr>
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<td>lb. in.</td>
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<tr>
<td>Water Pump Body Screws</td>
<td>60</td>
</tr>
<tr>
<td>Pinion Gear Nut</td>
<td>70</td>
</tr>
<tr>
<td>Gear Housing to Drive Shaft Housing Screws</td>
<td>28</td>
</tr>
<tr>
<td>Gear Housing to Drive Shaft Housing Nuts</td>
<td>35</td>
</tr>
<tr>
<td>Trim Tab Screw</td>
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</tr>
<tr>
<td>Shift Shaft Bushing Screws</td>
<td>60</td>
</tr>
<tr>
<td>Drive Shaft Retainer</td>
<td>100</td>
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<tr>
<td>Bear Carrier Retainer</td>
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<tr>
<td>Oil Fill/Drain Screw</td>
<td>30-50</td>
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<tr>
<td>Propeller Nut ¹</td>
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¹: Amount specified is MINIMUM.

### Shimming Specifications

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<th>DESCRIPTION</th>
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<tr>
<td>Pinion Gear Height</td>
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<td>Forward Gear Backlash</td>
<td>.017-.028</td>
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<tr>
<td>Reverse Gear Backlash</td>
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### Lubricants, Sealers, and Adhesives

<table>
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<tr>
<th>DESCRIPTION</th>
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<td>Quicksilver 2-4-C Marine Lubricant with Teflon</td>
<td>92-825407A3</td>
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<tr>
<td>3m Brand Adhesive</td>
<td>92-25234-1</td>
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<tr>
<td>Quicksilver Bellows Adhesive</td>
<td>92-86166</td>
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<tr>
<td>Quicksilver Needle Bearing Assembly Lubricant</td>
<td>92-825265A1</td>
</tr>
<tr>
<td>Quicksilver Perfect Seal</td>
<td>92-34227-1</td>
</tr>
<tr>
<td>Permatex Ultra Blue Silicone Sealant</td>
<td>Obtain Locally</td>
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<tr>
<td>Quicksilver Special Lubricant 101</td>
<td>92-13872A1</td>
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<tr>
<td>Loctite 8831</td>
<td>92-823089-1</td>
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<tr>
<td>Quicksilver High Performance Gear Lube</td>
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## Special Tools

<table>
<thead>
<tr>
<th>Description</th>
<th>Tool Part Number</th>
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<tr>
<td>Backlash Indicator Rod</td>
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<tr>
<td>Bearing Adaptor Installation Tool</td>
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<tr>
<td>Bearing Carrier Retainer Wrench</td>
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<td>Bearing Driver</td>
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<td>Bearing Preload Tool</td>
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<tr>
<td>Bearing Removal Tool</td>
<td>91-816245</td>
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<td>Belleville Washer</td>
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<td>Dial Indicator Holding Tool</td>
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<td>Drive Shaft Bearing Retainer Wrench</td>
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## Special Tools (continued)

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<th>Tool Part Number</th>
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<tr>
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<td>Puller Shaft</td>
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<td>Puller Jaws</td>
<td>91-46086 A1</td>
</tr>
<tr>
<td>Puller Jaws</td>
<td>91-816242</td>
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<tr>
<td>Slide Hammer Puller</td>
<td>91-34569 A1</td>
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<tr>
<td>Forward Gear Installation Tool</td>
<td>91-815850</td>
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<tr>
<td>Torque Wrench (Inch Pound)</td>
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<tr>
<td>Universal Puller Plate</td>
<td>91-37241</td>
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<td>Water Pump Alignment Pins</td>
<td>91-821571 A1</td>
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<td>Universal Bearing Removal and Installation Tool</td>
<td>91-31229 A5</td>
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<td>Driver Head Rod</td>
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<td>Nut</td>
<td>11-24156</td>
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<tr>
<td>Pilot Washer</td>
<td>91-36571</td>
</tr>
<tr>
<td>Puller Plate</td>
<td>91-29310</td>
</tr>
<tr>
<td>Puller/Driver Head</td>
<td>91-38628</td>
</tr>
</tbody>
</table>

*The 91-14311A2 Bearing Preload Tool is also used on Mercury and Mariner V-6 gear cases. Check your inventory before buying.

**NOTE:** Water Pump Face Seal Tool is not available separately, 26-816575A2 is a kit part number which includes the tool and the face seal.
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Counter-Rotation Gear Housing Exploded Parts View

Drive Shaft Components
1. Gear Housing
2. Pin
3. Stud
4. Screw
5. Oil Fill/Drain Screw
   O-ring
6. Seal
7. Dowel Pin
8. Roller Bearing
9. Speedometer Fitting
10. Drive Shaft
11. Shim
12. Bearing and Cup
13. Nut
14. Gear Drive
15. Washer
16. Nut
17. Face Plate
18. Carrier
19. Oil Seal
20. Oil Seal
21. O-ring
22. Water Pump
23. Gasket
24. Gasket
25. Face Seal
26. Screw
27. Impeller
28. Key
29. Coupling
30. O-rings
31. Sleeve
32. Shift Shaft
33. Retaining Ring
34. Sleeve
35. Bushing Assembly
36. Oil Seal
37. O-rings
38. Screw
39. Stuffer Plug

Lubricants, Sealers, and Adhesives

A - Quicksilver 2-4-C Marine
   Lubricant with Teflon ... 92-825407A12
B - 3M Brand Adhesive ....... 92–25234-1
C - Loctite 8831 ............. 92-823089-1
D - Quicksilver High
   Performance Gear Lube . 92-816026A4
E - Quicksilver Needle Bearing
   Assembly Lubricant ..... 92-825265A1

Torque Specifications

a 60 lb. in. (6.8 N·m)
b 70 lb. ft. (95 N·m)
c 28 lb. ft. (38 N·m)
d 35 lb. ft. (47 N·m)
e 23 lb. ft. (31 N·m)
f 100 lb. ft. (136 N·m)
g 210 lb. ft. (285 N·m)
h 30-50 lb. in. (3.4-5.6 N·m)
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- 35 lb. ft. (47 N·m)
- 23 lb. ft. (31 N·m)
- 100 lb. ft. (136 N·m)
- 210 lb. ft. (285 N·m)
Special Information For Counter-Rotation Gear Housing

CAUTION
Avoid damage to stern drive unit. Drive unit damage will occur if Later Style parts are intermixed with Earlier Style parts.

SHIFT SPOOL ASSEMBLY
The later style shift spool assembly for the counter rotation has a larger gap than the earlier style. This later style shift spool beginning with serial number OF726586 is sold as a whole assembly and must be used when replacing the earlier style (Prior to S/N OF726586).

d - Earlier Style Shift Spool Assembly (Prior to S/N OF726586)
e - Later Style Shift Spool Assembly (S/N OF726586 and Above)
f - Measure End Play Here at Gap.

PROPELLER SHAFT
The later style propeller shaft has a groove on the shaft where the clutch slides onto the shaft. The keeper slot is also moved toward the forward end of the shaft.

a - Earlier Style Propeller Shaft (Prior to S/N OF680000)
b - Later Style Propeller Shaft (S/N OF680000 and Above)

FORWARD GEAR BEARING BORE
The later style forward gear bearing bore is smaller (3.2635 to 3.2650 in.) than the earlier style (3.4985 to 3.5000 in.) This slightly smaller bearing bore for the forward gear bearing adaptor is approximately 1/4 in. (6.3 mm) smaller.

Earlier Style Forward Gear Bore (Prior to S/N OF680000)

Later Style Forward Gear Bore (S/N OF680000 and Above)
BEARING CARRIER

The later style bearing carrier is somewhat slimmer and about an 1/8 of an inch taller than the earlier style bearing carrier.

![BEARING CARRIER Diagram](image)

a - Earlier Style Bearing Carrier (Prior to S/N OF680000)
b - Later Style Bearing Carrier (S/N OF680000 and Above)

THRUST COLLAR

The later style thrust collar is thinner than the earlier style, but still maintains the same diameter.

![THRUST COLLAR Diagram](image)

a - Earlier Style Thrust Collar (Prior to S/N OF680000)
b - Later Style Thrust Collar (S/N OF680000 and after)

REVERSE GEAR BEARING ADAPTOR

The later style reverse gear bearing adaptor has a smaller diameter than the earlier style adaptor and is designed to fit into the smaller bore gear housing.

![REVERSE GEAR BEARING ADAPTOR Diagram](image)

a - Earlier Style Reverse Gear Bearing Adaptor (Prior to S/N OF680000)
b - Later Style Reverse Gear Bearing Adaptor (S/N OF680000 and Above)

d - Earlier Style Thrust Washer

c - Later Style Forward Gear Bearing Adaptor Needle Bearing

FORWARD GEAR BEARING ADAPTOR

The forward gear bearing adaptor has the needle bearing pressed into the adaptor. For future reference, the needle bearing inside the bearing adapter does not require a special driver. The needle bearing is pressed into the adaptor until the bearing is flush with the edge of the adaptor bore.

![FORWARD GEAR BEARING ADAPTOR Diagram](image)

a - Earlier Style Forward Gear Bearing Adaptor (Prior to S/N OF680000)
b - Later Style Forward Gear Bearing Adaptor (S/N OF680000 and Above)
c - Later Style Forward Gear Bearing Adaptor Needle Bearing
d - Earlier Style Thrust Washer
Counter-Rotation Gear Housing Assembly Specifications

Pre-Disassembly Inspection

<table>
<thead>
<tr>
<th>ACTION</th>
<th>READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move propeller shaft from one side to another</td>
<td>Less than .003 in. (.08 mm)</td>
</tr>
<tr>
<td>Rotate propeller shaft</td>
<td>.005 in. (.127 mm) or less</td>
</tr>
</tbody>
</table>

Forward and Reverse Gear Identification

IMPORTANT: The forward and reverse gears look almost identical. There are two ways to distinguish between the reverse and forward gears. The reverse gear has a shorter hub and it has a groove cut into the back of the gear just inside the thrust bearing race.

![Diagram of gears]

Pinion Gear Height

Take readings in three locations, 120° apart.

Readings: .025 in. (0.64 mm).

Shift Spool End Play

![Diagram of shift spool]

h - End Play Measurement: .002 in. (.05mm) to .010 in. (.25mm)

a - Washers (2)
b - Spring
c - Retainer
d - Spool
e - Shift Shaft
f - Castle Nut
g - Cotter Pin
Forward Gear Backlash

Apply a slight preload on forward gear using tools as shown.

- Torque Wrench (91-66274)
- Propeller Nut [Torque to 45 lb. in. (5 N·m)]
- Washer (91-54048)
- Pinion Nut Adaptor (91-61067A3)

Check Backlash in four places. Rotate the drive shaft 90° after each check.

**Backlash Reading:** .017-.028 in (0.43-0.71mm).

Reverse Gear Backlash

Apply a slight preload on reverse gear using tools as shown.

- Torque Wrench (91-66274)
- Driver Bolt [Torque to 45 lb. in. (5N·m)]
- Bearing Adaptor Installation Tool (91-18605A1)
- Reverse Gear

Check Backlash in four places. Rotate the drive shaft 90° after each check.

**Backlash Reading:** .050-.060 in. (1.27-1.52 mm).
## Transom Assembly Specifications

### Torque Specifications

**NOTE:** Securely tighten all fasteners not listed below.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>LB. IN.</th>
<th>LB. FT.</th>
<th>N·M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shift Cable Core Wire Anchor Screws</td>
<td>20</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Bellows Hose Clamps</td>
<td>35</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Gimbal Ring to Bell Housing Hinge Pins</td>
<td>102</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>Gimbal Ring Screws</td>
<td>55</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Steering Screw and Nut</td>
<td>60</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Transom Assembly Attaching Screws, Nut</td>
<td>20-25</td>
<td>27-34</td>
<td></td>
</tr>
<tr>
<td>90° Fitting Nut</td>
<td>10-14</td>
<td>14-19</td>
<td></td>
</tr>
<tr>
<td>90° Fitting</td>
<td>70-90</td>
<td>8-10</td>
<td></td>
</tr>
<tr>
<td>Oil Fill/Drain Screw</td>
<td>23</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

### Special Tools

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearing Removal and Installation Tool</td>
<td>91-31229A5</td>
</tr>
<tr>
<td>Bellows Expander Tool</td>
<td>91-45497A1</td>
</tr>
<tr>
<td>Slide Hammer Puller</td>
<td>91-34569A1</td>
</tr>
<tr>
<td>Shift Cable Removal and Installation Tool</td>
<td>91-12037</td>
</tr>
<tr>
<td>Driver</td>
<td>91-33492</td>
</tr>
<tr>
<td>Driver</td>
<td>91-33491</td>
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<tr>
<td>Driver</td>
<td>91-33489</td>
</tr>
<tr>
<td>Driver Head</td>
<td>91-32325</td>
</tr>
<tr>
<td>Driver Rod</td>
<td>91-37323</td>
</tr>
<tr>
<td>Drive Shaft Nut Wrench</td>
<td>91-56775</td>
</tr>
<tr>
<td>Alignment Tool Assembly</td>
<td>91-805475A1</td>
</tr>
<tr>
<td>Expander Tool</td>
<td>91-45497A1</td>
</tr>
<tr>
<td>Hinge Pin Tool</td>
<td>91-78310</td>
</tr>
<tr>
<td>Mandrel</td>
<td>91-30366</td>
</tr>
<tr>
<td>Nut</td>
<td>11-24156</td>
</tr>
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</table>

### Special Tools (continued)

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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</thead>
<tbody>
<tr>
<td>Plate (2)</td>
<td>91-29310</td>
</tr>
<tr>
<td>Puller</td>
<td>91-63616</td>
</tr>
<tr>
<td>Puller Head</td>
<td>91-38919</td>
</tr>
<tr>
<td>Puller Shaft</td>
<td>91-31229</td>
</tr>
<tr>
<td>Washer</td>
<td>12-34961</td>
</tr>
<tr>
<td>Bushing Installation Tool</td>
<td>91-806928T</td>
</tr>
<tr>
<td>Sleeve Installation Tool</td>
<td>91-818169</td>
</tr>
<tr>
<td>Sleeve Removal Tool</td>
<td>91-818162</td>
</tr>
</tbody>
</table>

### Lubricants, Sealers, and Adhesives

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quicksilver Bellows Adhesive</td>
<td>92-86166</td>
</tr>
<tr>
<td>Quicksilver 2-4-C Marine Lubricant with Teflon</td>
<td>92-825407A12</td>
</tr>
<tr>
<td>Quicksilver U-Joint and Gimbal Bearing Grease</td>
<td>92-828052A2</td>
</tr>
<tr>
<td>Perfect Seal</td>
<td>92-34227-1</td>
</tr>
<tr>
<td>Anti-Corrosion Grease</td>
<td>92-78376-12</td>
</tr>
<tr>
<td>Locquic Primer “T”</td>
<td>92-59327-1</td>
</tr>
<tr>
<td>Locitite 8831</td>
<td>92-823089-1</td>
</tr>
<tr>
<td>Quicksilver Special Lubricant 101</td>
<td>92-13872A1</td>
</tr>
</tbody>
</table>
1 - Bell Housing Assembly
2 - Gasket
3 - Connector
4 - Pipe Plug
5 - Bushing
6 - Bushing
7 - Gasket (Rubber)
8 - O-ring
9 - Washer (Synthane)
10 - Stud
11 - Washer
12 - Nut
13 - Universal Joint Bellows
14 - Ground Clip
15 - Clamp
16 - Sleeve
17 - Hose
18 - Clamp
19 - Exhaust Bellows
20 - Seals
21 - Clamp
22 - Lever Assembly
23 - Washer
24 - Screw
25 - Shift Shaft (Upper)
26 - Coupling Assembly
27 - Tubing
28 - Clip
29 - Clamp
30 - Fitting Assembly
31 - Connector
32 - Clamp
33 - Hose
34 - Clamp
35 - Connector
36 - O-ring
37 - Valve Assembly
38 - O-ring

Lubricants, Sealers, and Adhesives

- Quicksilver Bellows Adhesive 92-86166
- Loctite 8831 92-823089-1
- Perfect Seal 92-34227-1
- Special Lubricant 101 92-13872A1
- Quicksilver High Performance Gear Lube 92-816026A4
- 3M Brand Adhesive 92-25234-1

Torque Specifications

1. Tighten Securely
   Approximately 35 lb. in. (4 N·m)

2. 50 lb. ft. (68 N·m)

3. 8 lb. ft. (11 N·m)
Gimbal Housing Components
1 - Gimbal Housing
2 - Stud
3 - Lower Bushing
4 - Oil Seal
5 - Upper Bushing
6 - Grease Fitting
7 - Lubricap
8 - Grease Seal
9 - Bearing Assembly
10 - Tolerance Ring
11 - O-Ring
12 - Stud
13 - Seal
14 - Pipe Plug
15 - Water Tube
16 - Bushing
17 - Cover
18 - Screw
19 - Lower Swivel Pin
20 - Cotter Pin
21 - Washer
22 - Bolt
23 - Washer
24 - Washer
25 - Nut
26 - Bolt
27 - Clamp
28 - Clamp
29 - Washer
30 - Nut
31 - Gasket
32 - Connector
33 - Lockwasher
34 - Nut
35 - Anodic Plate
36 - Seal
37 - Gasket
38 - Screw
39 - Lockwasher
40 - Hose
41 - Clamp
42 - 90° Fitting
43 - Nut
44 - Washer
45 - O-ring
46 - Connector
47 - Continuity Wire
48 - Continuity Wire Connection
49 - Hose Clamp

Lubricants, Sealers, and Adhesives

\[\text{A} \quad \text{- Quicksilver Bellows Adhesive } \quad 92-86166\]
\[\text{B} \quad \text{- Quicksilver Perfect Seal } \quad 92-34227-1\]
\[\text{C} \quad \text{- Loctite 8831 } \quad 92-823089-1\]
\[\text{D} \quad \text{- Quicksilver U-Joint and Gimbal Bearing Grease } \quad 92-828052A2\]

Torque Specifications

\[\text{a} \quad 70-90 \text{ lb. in. (8-10 N·m)}\]
\[\text{b} \quad 10-14 \text{ lb. ft. (14-19 N·m)}\]
\[\text{c} \quad 35-42 \text{ lb. in. (3.96-4.75 N·m)}\]
\[\text{d} \quad 25 \text{ lb. ft. (34 N·m)}\]
Inner Transom Plate Components

1 - Transom Plate Assembly
2 - Pivot Bolts
3 - Tab Washers
4 - Screw Engine Mounting
5 - Washer
6 - Spacer
7 - Washer - Fiber
8 - Lockwasher - Double Wound
9 - Locknut
10- Washer
11- Locknut
12- Shift Cable Outer Casing
13- End Guide
14- Core Wire Anchor

15- Anchor Screws
16- Core Wire
17- Shift Slide
18- Screw - Core Wire Cavity
19- Gimbal Housing Eyelet
20- Cable Wrapping

Torque Specifications

- **a** 25 lb. ft. (34 N·m)
- **b** 23 lb. ft. (30 N·m)
- **c** 37 lb. ft. (50 N·m)
Gimbal Ring and Steering Lever Components

1 - Gimbal Ring
2 - Bushing
3 - Grease Fitting
4 - Lubricap
5 - Hinge Pin
6 - Trim Limit Switch
7 - Washer
8 - Screw
9 - Lockwasher
10 - Retainer
11 - Trim Wire Clamp
12 - Screw
13 - Steering Lever
14 - Swivel Shaft
15 - Washer
16 - Washer
17 - Nut
18 - Screw
19 - Nut
20 - Screw
21 - Washer
22 - Washer
23 - Locknut
24 - Clevis Pin
25 - Cotter Pin
26 - Trim Position Sender

Lubricants, Sealers, and Adhesives
A - Resiweld Sealer ............ 92-65150-1

Torque Specifications
A 60 lb. ft. (81 N·m)
B 55 lb. ft. (74 N·m)
C 110 lb. ft. (148 N·m)
D 90-100 lb. in. (10-11 N·m)