TRANSOM ASSEMBLY

SERVICE PROCEDURES REQUIRING MAJOR DISASSEMBLY
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<td>92-34227-1</td>
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<td>Anti-Corrosion Grease</td>
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<td>3M Brand Bellows Adhesive</td>
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<td>Locotite RC 680</td>
<td>92-809833</td>
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<td>92-809820</td>
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<td>91-33492</td>
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<td>Driver Head</td>
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<td>Driver Rod</td>
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<td>Drive Shaft Nut Wrench</td>
<td>91-56775</td>
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<td>Engine Alignment Shaft</td>
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<td>Washer</td>
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<td>Bushing Installation Tool</td>
<td>91-805057A2</td>
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Special Information

Trim Limit Switch

Transom assembly serial number 6271054 and above.

The newer style trim limit switch has a new sealing system for improved water resistance and durability. The trim limit switch leads are connected internally on the newer style switch to help ensure good electrical integrity.

**NOTE:** Insulator used with older style switch is not required when using newer style switch.

The newer style trim limit switch is used as a replacement part for all MerCruiser I-MR and Alpha One models. Trim limit switch leads are provided with the newer switch and are pre-connected at the factory.

Newer Style Trim Limit Switch

Older Style Trim Limit Switch
New Trim Position Sender
Transom assembly serial number OC566037 and above.

The newer style trim position sender has a new sealing system for improved water resistance and durability. The sender leads are connected internally on the newer style sender to help ensure good electrical integrity.

NOTE: Insulator used on older style sender is not required when using newer style sender.

The newer style trim position sender is used as a replacement part for all MerCruiser I-MR and Alpha One models. Trim position sender leads are provided with the newer sender and are pre-connected at the factory.

Shift Cable
Transom assembly serial number 6376504 and above.

A new style drive unit shift cable attaches to the bell housing from the aft end (rather than the front end as did the old style cable) for easier removal and installation. With the exception of the cable attaching method, the installation and adjustment procedure is the same as the old style cable. A Drive Unit Shift Cable Removal and Installation Tool 91-12037 is required for cable removal and installation.

New Style Shift Cable
a - Shift Cable Retaining Nut

Old Style Shift Cable
a - Shift Cable Retaining Nut
The new style cable can be used on all MerCruiser models.
Transom assembly serial number 0C698141 and above.

A new style drive unit shift cable is being used. Following is a list of the major differences from the earlier cable.

**IMPORTANT:** The new style shift cable will be pre-cut to proper length and should be replaced as an assembly only. **DO NOT** mix parts between old and new style.

1. Larger Diameter Armor Wrapped Core Wire.
2. Larger Diameter Hole in Shift Cable Anchor.
3. Larger Diameter Hole Inside of Shift Slide.
4. Larger Diameter Shift Cable Conduit (To Accommodate Larger Diameter Core Wire).

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**Core Wires**

- New Pre-Cut Core Wire Dimension 72-1/8 in. (1832 mm)
- Front Edge of Anchor

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**Shift Cable Conduit**

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**Cable Anchors**

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**Gimbal Housing Water Tube**

Transom assembly serial number 6665169 and above will be equipped with a 3/4 in. (19 mm) I.D. gimbal housing water tube and hose for increased cooling capacity. Older sterndrives were fitted with a 5/8 in. (16 mm) water tube and hose. New tube and hose can not be used on older sterndrives.  

The following transom assembly components also were changed to accommodate the new tube and hose:

- Bell Housing
- Bell Housing Hose Fitting
- Gimbal Housing
- Water Tube Bushing
- Water Tube Cover

To further increase water flow, the cross-drilled water passage in the drive unit drive shaft housing was enlarged.

**Replacement Bell Housing**

A new MerCruiser bell housing is being used as the replacement part for all MerCruiser I models with trim limit switch on the side of the gimbal ring. Bell housing is shipped with hose fitting for a 3/4 in. I.D. hose preinstalled. When using this bell housing on an older model (with 5/8 in. I.D. hose), it will be necessary to remove the 3/4 in. fitting and install the special 5/8 in. fitting provided.

**Drive Screws Removal**

To improve corrosion resistance, the drive screws have been removed from the gimbal housing and bell housing on MerCruiser IR/IMR/Alpha One.

**New Gimbal Housing Water Tube, Hose and Related Parts**

- a - Cover
- b - Bushing
- c - Tube
- d - Gimbal Housing
- e - Water Hose
- f - Hose Fitting
- g - Bell Housing

**Bell Housing and Gimbal Housing Drive Screws**

- a - Drive Screws (8)
Upper Swivel Shaft

Transom assembly serial number 6666130 and above.

A new square swivel shaft steering lever provides a square connection at both the steering lever and gimbal ring for improved durability. In the past, a splined connection was used between the steering lever and swivel shaft. To facilitate this change, a new swivel shaft seal and two (2) new bushings were required. The gimbal housing also is machined differently. The new swivel shaft and steering lever components can not be used on older models.

Square-Square Swivel Shaft, Steering Lever and Related Components
a - Square - Square Swivel Shaft
b - Gimbal Housing
c - Seal
d - Bushing
e - Steering Lever
f - Bushing

Gimbal Housing Access Plug Kit

This kit, available for use on MerCruiser Transom assemblies, allows for removal and installation of gimbal ring without having to remove engine and transom assembly. A template also is included in this kit to locate access holes.

Increased Drive Unit Trim Range

MerCruiser I-MR and Alpha One models will have an additional 3° trim “IN” capability. This should help to get the boat bow down, thereby improving acceleration on some boats.

The additional trim capability was accomplished by the use of new trim cylinders and the gimbal ring.

New trim cylinders can be distinguished from the old ones by observing the casting number on the outer tube.

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<th>Later</th>
<th>Older</th>
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<td>14034-1</td>
<td>98703-1</td>
<td>98703</td>
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<tr>
<td>Starboard Trim Cylinder</td>
<td>14035-1</td>
<td>98704-1</td>
<td>98704</td>
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Trim Cylinder Casting Location
a - Part Number Location
The new trim cylinders will be used as a service replacement for older MerCruiser 120R through 260R and MR models. A new trim cylinder can be intermixed with an old trim cylinder on the same unit. If the additional 3° of trim “IN” is desired, both new trim cylinders must be used. In some cases, it also may be necessary to remove a small amount of metal from the gimbal ring (in the area shown in Figure 1) to provide clearance between bell housing and gimbal ring when unit is in the full “IN” position.

Gimbal Ring Modification
a - Remove Metal From This Area

New gimbal ring will be used as a service replacement part for all MerCruiser I models that have the trim limit switch on the side of the gimbal ring.

Exhaust Tube Use on V-8 Drive Shaft Extension Models

Early MerCruiser IR-IMR V-8 Drive Shaft Extension models were equipped with an exhaust bellows. Later V-8 drive shaft extension models utilize an exhaust tube. If servicing a unit equipped with an exhaust bellows, bellows should be replaced with a tube, as excessive exhaust gas back pressure will result if bellows are used. In addition to affecting performance, excessive pressure may cause exhaust bellows to balloon out and contact U-joint bellows, pushing them against U-joints. Eventually, the U-joint bellows may chafe through with a subsequent water leak resulting.
Component Disassembly

Bell Housing Removal

1. Remove sterndrive unit (Refer to Section 2A).
2. Remove trim position sender.
3. Remove trim limit switch.
4. Disconnect shift cable from shift plate and remove cable end guide.
5. Remove threaded tube.
6. Remove support tube from core wire (if equipped with support tube).
7. Remove set screw from shift slide.
8. Remove inner core wire and shift slide.

9. Remove and discard shift cable bellows crimp clamp.

**NOTE:** On units with old style shift cable, pull bellows away from bell housing after crimp clamp is loosened.

10. Remove shift cable wrapping from shift cable on inner transom.
11. Remove water tube cover and rubber grommet. Push water tube through gimbal housing.

12. Remove hinge pins. Apply heat to bell housing, if necessary, to soften Loctite.

13. Remove bell housing as follows:
   a. Disconnect port side continuity wire from bell housing.
b. Loosen U-joint bellows front hose clamp.
c. Loosen exhaust bellows rear hose clamp.
d. Pull bell housing away from gimbal housing.
e. Pull shift cable through shift cable bellows.

Access Plug Kit Installation

NOTE: If steering lever cavity is not accessible, it will be necessary to drill access holes in the gimbal housing. This procedure requires the following:

Access Plug Kit 22-88847A1
1-1/8 in. Hole Saw (Obtain Locally)
1 in. Npt Pipe Tap (Obtain Locally)

1. Lubricate upper swivel shaft with a liberal amount of 2-4-C Marine Lubricant. This will help to prevent metal chips from getting into bearings when cutting holes.

2. Cut out template provided with Access Plug Kit.

CAUTION

Be sure to position template correctly when marking access hole drilling locations. If holes are not located properly, it will not be possible to remove upper swivel shaft without complete transom assembly removal.

3. Position templates on gimbal housing and mark drilling locations (port and starboard) using a center punch.
**CAUTION**

Be sure to drill holes and tap threads perpendicular to gimbal housing surfaces in the following steps.

4. Drill pilot holes (port and starboard) using a drill that is the same size as pilot rod being used with hole saw. (Approximately 1/4 in.).

5. Cut holes in gimbal housing (port and starboard) using 1-1/8 in. hole saw with pilot rod. Remove metal chips with compressed air.

6. Mark 1 in. pipe tap with a piece of tape, 1/2 in. (13 mm) from end of tap. Coat pipe tap with grease to aid in picking up metal chips. Cut threads in access hole 1/2 in. (13 mm) of tap.

7. Remove metal chips with compressed air or cloth.

8. Clean access hole threads with solvent. Dry with compressed air.
Gimbal Ring, Swivel Shaft and Steering Lever Removal

1. Loosen (not necessary to remove) screws and nuts.

   a - Screws (2)
   Washers (4)
   Nuts (2)
   b - Gimbal Ring

2. Remove cotter pin, lower swivel pin and washer. Disconnect continuity wire.

3. Loosen steering lever clamping screw and nut.

   a - Clamping Screw (Turn Through Access Hole)
   b - Nut

NOTE: It may be necessary to pull down on upper swivel shaft to completely unthread nut on swivel shaft.
4. Unthread nut from top of upper swivel shaft.

5. Remove upper swivel shaft, steering lever and hardware shown. Remove gimbal ring.

**With Engine and Transom Assembly Installed**
- a - Nut
- b - Pin Punch (Through Access Hole)

**With Engine and Transom Assembly Removed**
- a - Nut
- b - Washer (Small I.D.)
- c - Steering Lever
- d - Washer (Large I.D.)
- e - Upper Swivel Shaft
Component Servicing
Bell Housing

U-JOINT BELLOWS
1. Loosen hose clamp and remove U-joint bellows from bell housing.

2. Remove old adhesive from U-joint bellows mounting surface, using lacquer thinner.

3. Clean bell housing mounting flange with a wire brush or sandpaper. Wipe clean with lacquer thinner.

⚠️ WARNING
Be sure to read and follow package label directions when using bellows adhesive.
4. Apply bellows adhesive to U-joint bellows mounting surface. Allow to dry (approximately 10 minutes) until no longer tacky.

5. Position ground clips on U-joint bellows as shown. Then, position hose clamp on end of bellows marked “AFT-TOP”.

6. Install U-joint bellows on bell housing. Be sure to position bellows according to “AFT-TOP” marking on bellows. Position hose clamp screw as shown and tighten securely.

WATER HOSE
1. Loosen hose clamp and remove water hose from connector.
2. Loosen hose clamp and remove water tube from water hose.

3. Remove water hose connector from bell housing.

4. Apply Perfect Seal to threads of water hose connector and install in bell housing. Tighten securely.

5. Connect water hose to water tube and position hose clamp as shown. Tighten securely.
6. Connect water hose to connector on bell housing. Position hose and clamp as shown. Tighten securely.

SHIFT CABLE
1. Loosen shift cable retaining nut using shift cable removal and installation tool and remove shift cable.

Newer Style Shift Cable
a - Shift Cable
b - Retaining Nut - Use Tool (91-12037)

Older Style Shift Cable
a - Shift Cable
b - Retaining Nut - Use Tool (91-12037)
2. Apply Perfect Seal to threads of shift cable retainer and install shift cable. Tighten retainer securely using shift cable removal and installation tool (until no more than two threads of retainer are showing).

**Newer Style Shift Cable**
- a - Shift Cable
- b - Retaining Nut - Use Tool (91-12037)

**Older Style Shift Cable**
- a - Shift Cable
- b - Retaining Nut - Use Tool (91-12037)

**SHIFT SHAFT**
All units built after serial number 0D644650 will have the following bushing installed. The seals were previously installed into the bell housing upper bore. They now are already installed in the bushing and can be installed with one procedure using Bushing Tool 91-805057A2.

**NOTE:** It may be necessary to apply heat to shift shaft lever screw to aid in removing.

1. Remove upper shift shaft lever and shift shaft.
2. Remove shift shaft oil seal and upper bushing.

3. Remove shift shaft lower bushing.

4. Apply a small amount of Special Lubricant 101 to O.D. of shift shaft lower bushing. Install bushing flush with bottom of the bore in bell housing.

5. Apply Lubricant 101 to O.D. of bushing and install shift shaft upper bushing in bore from bottom using bushing installation tool.
6. Install upper shift shaft lever and shift shaft. Apply Loctite 27131 to screw threads. Tighten securely.

2. Install rubber gasket in U-joint bore. Install O-ring in groove at water passage opening.

**GASKET AND O-RING**

1. Remove U-joint bore rubber gasket and water passage O-ring.

**Gimbal Ring**

**BEARING AND SEALS (EARLIER STYLE)**

1. Remove bearing, seals and spacer using bearing and seal driver.
2. If replacing seal(s) only, pry seals and spacer from gimbal ring.

3. Install bearing and seals from bottom side of gimbal ring using bearing and seal driver. Ensure lips of both seals are facing up.

4. Install spacer beneath lower seal. Stake in place using a flat punch.

**IMPORTANT:** Ensure grease hole in bearing aligns with grease hole in gimbal ring, when installing bearing in the following step.

**BUSHING (LATER STYLE)**

**IMPORTANT:** Later style gimbal ring lower swivel pin bushing can not be used on earlier style gimbal ring which used a needle bearing and two seals. Earlier style gimbal ring can be identified by the presence of a grease fitting.

1. Remove bushing from gimbal ring using a suitable mandrel.

2. Install bushing as follows:
   a. Apply Epoxy (92-65150-1) to O.D. of bushing and position bushing on bearing and seal driver.
b. Install bushing in gimbal ring by tapping in place with a hammer.

**SYNTHANE WASHERS**

1. If synthane washers are worn, remove and replace using Epoxy (92-65150-1).

**Gimbal Housing**

**BEARINGS OR BUSHINGS AND SEALS**

1. Remove larger bearing and oil seal or bushing and oil seal, by driving them up into steering lever cavity, using Bearing Driver (91-33491).

**Transom Assembly with Spline-Square Upper Swivel Shaft**

a - Bearing  
b - Oil Seal

**Transom Assembly with Square-Square Upper Swivel Shaft**

a - Bushing  
b - Oil Seal
2. Remove smaller bearing and seal or bushing, by pulling down with appropriate puller.

3. Install small bearing or bushing until it bottoms, using Driver (91-33489).

4. On Spline-Square Swivel Shaft Units Only, install small oil seal, with lip up, until flush with gimbal housing.

Transom Assembly with Spline-Square Upper Swivel Shaft
a - Bearing
b - Oil Seal

Transom Assembly with Square-Square Upper Swivel Shaft
a - Bushing
5. Install large bearing or bushing and oil seal, using Driver (91-33491).

**EXHAUST BELLOWS**

1. Loosen exhaust bellows clamp and remove bellows.

2. Clean old adhesive from exhaust bellows mounting surface using lacquer thinner.

3. Position grounding clips on exhaust bellows as shown. Apply 3M Bellows Adhesive to both ends and let dry for 20-30 minutes before installing bellows.

**Transom Assembly with Spline-Square Upper Swivel Shaft**

- Large Bearing
- Oil Seal

**Transom Assembly with Square-Upper Swivel Shaft**

- Large Bushing
- Oil Seal

**IMPORTANT:** Later model units may not have upper swivel grease fitting and do not require lubrication.
4. Clean exhaust bellows mounting flange with a wire brush or sandpaper. Wipe clean with lacquer thinner.

5. Install exhaust bellows on gimbal housing and position hose clamp as shown. Tighten securely.

SHIFT CABLE BELLOWS
1. Loosen hose clamp and remove shift cable bellows.

2. Clean old adhesive from shift cable bellows mounting surface, using lacquer thinner.

3. Apply 3M Bellows Adhesive to bellows and let dry for 20-30 minutes before installing bellows.

4. Clean shift cable bellows mounting flange with a wire brush or sandpaper and wipe clean with lacquer thinner.

5. Install shift cable bellows on gimbal housing. Position hose clamp as shown. Tighten securely.
TRIM POSITION SENDER AND TRIM LIMIT SWITCH WIRE REPLACEMENT

1. Remove trim limit switch wires and trim position sender wires.

2. Install trim limit switch wires and trim position sender wires. DO NOT pinch wires.

3. Apply Perfect Seal to threads of screw and install trim harness clamp and screw.

Component Reassembly

Gimbal Ring, Swivel Shaft and Steering Lever Installation

NOTE: Older models are equipped with a square/spline swivel shaft. Later models are equipped with a square/square swivel shaft.

IMPORTANT: Square/Spline Swivel Shaft must be installed with flat on splines forward.

1. If removed, install gimbal ring screws with hardware shown. Do not tighten.
2. Coat upper swivel shaft with Special Lubricant 101. Check that upper swivel shaft fits all the way into gimbal ring. Shoulder on shaft must bottom out against ring. If necessary, clean up mating surfaces with a file.

3. Install lower swivel pin and washer and secure with cotter pin. Spread both ends.

4. **Earlier Style Swivel Pin Bearing**, Lubricate with 2-4-C Marine Lubricant.

5. Connect continuity wire from gimbal housing to gimbal ring.
6. If removed, install clamping screw and nut on steering lever.

7. Thread new, grooved nut all the way onto swivel shaft (to cut threads). Remove nut.

8. Place steering lever, new nut and washers in position in steering cavity.

9. Install swivel shaft through gimbal rings and up through steering lever. Start nut on swivel shaft.

IMPORTANT: When installing upper swivel shaft through gimbal ring and steering lever, be sure that gimbal ring is straight and steering lever is pointed straight forward.

10. Tighten nut until a clearance of .002 - .010 in. (0.05 - 0.25 mm) exists between lower swivel pin washer and gimbal housing mount.

Engine and Transom Assembly Installed

a - Nut (From Kit)
b - Pin Punch
11. Strike down on gimbal ring flanges using a rawhide mallet. Recheck clearance and tighten swivel shaft nut as necessary.

12. Torque gimbal ring screws to 55 lb. ft. (74.6 N·m).

13. Tighten steering lever clamping screw and nut. Torque to 60 lb. ft. (81 N·m).
Engine and Transom Assembly Removed

a - Wrench
b - Wrench

14. Lubricate upper swivel shaft (through grease fitting) with 2-4-C Marine Lubricant on models equipped with grease fitting.

15. Install steering lever ground wire. Wire must be positioned exactly as shown.

16. Install trim cylinders on gimbal ring.

17. Coat forward anchor pin with 2-4-C Marine Lubricant.

18. Tighten nuts until bottomed on anchor pin shoulder.

a - Grease Fitting (Not Present On Later Models)

a - Ground Wire
b - Screws

a - Forward Anchor Pin (Longer) - Coat with 2-4-C Marine Lubricant
b - Washers (2) - Large I.D.
c - Rubber Bushings (4)
d - Washers (2) - Small I.D.
e - Nuts
f - Plastic Caps (2)
19. Coat threads of plastic plugs (if used) with Perfect Seal and thread into access holes until 3/8 in. (9 mm) of plug protrudes from gimbal housing as shown.

20. Touch up any bare metal spots with primer and appropriate spray paint.

**Bell Housing Installation**

1. Prepare U-joint bellows for installation as follows:
   a. Clean gimbal housing mounting flange with sandpaper and wipe clean with lacquer thinner.
   b. Apply bellows adhesive to mounting surface on inside of bellows.
   c. Position grounding clip and hose clamp over bellows end.

⚠️ **WARNING**

Be sure to read and follow package label directions when using bellows adhesive.

2. Install bell housing between gimbal ring. Push on bell housing and guide U-joint bellows onto gimbal housing mounting flange.

3. Position U-joint bellows hose clamp as shown and tighten securely.
4. Apply Locquic Primer “T” to hinge pin threads and allow to dry. Apply Loctite No. 35 to threads. Install hinge pins and torque to 95 lb. ft. (129 N·m).

5. Install exhaust bellows on bell housing as follows:
   a. Clean bell housing mounting flange with sandpaper and wipe clean with lacquer thinner.
   b. Apply bellows adhesive to mounting surface on inside of bellows.
   c. Position grounding clip on bellows.
   d. Place hose clamp over bellows end.
   e. Place expander tool (91-45497A1) into first bellows convolution.
   f. Pull tool until tool touches the mounting flange on bell housing (bellows starts to slip onto flange). Release tool.
   g. Reposition tool into the third bellows convolution.
   h. Pull bellows onto bell housing flange.
i. Position hose clamp as shown and tighten securely. Remove tool.

**IMPORTANT:** Ensure shift cable bellows crimp clamp is not flattened out when compressing in the following step. Crimp clamp must be compressed evenly around bellows and shift cable to prevent water leakage.

6. Insert shift cable through shift cable bellows and compress crimp clamp.

7. Install shift cable wrapping on shift cable from inner transom.
8. Install water tube through gimbal housing and install rubber grommet over tube. Push grommet into cavity.

9. Install water tube cover and tighten screws securely.

10. Install core wire through shift slide.

**CAUTION**

Refer to “Special Information” in the front of this section for special notes on different style shift cables.

11. Install inner core wire through shift cable. Be sure and position shift lever roller between slot on shift slide.
12. Install set screw. Tighten until contact with core wire. Back off 1/8 to 1/4 turn. Safety wire set screw to shift slide, using a figure 8 pattern.

13. Install threaded tube until it bottoms; tighten finger tight only. Secure jam nut.

14. Install sterndrive unit. (Refer to Section 2A).

15. Shift drive unit into forward gear by pushing in on core wire with a pair of pliers, while rotating propeller shaft counterclockwise. Ensure clutch is fully engaged.

16. Measure core wire from edge of threaded tube, 1-3/8 in. (35 mm) and cut core wire at this point.

17. After cutting core wire to proper dimension in previous step, use a file to round off any sharp edges.

18. (If using older style shift cable that has core wire with support tube). Position support tube so that 1/2 in. (13 mm) of core wire extends from edge of support tube. Crimp end of support tube.

19. Install shift cable end guide over core wire and insert core wire through cable anchor. Tighten screws securely.
20. Push in on drive unit shift cable while simultaneously turning propeller shaft counterclockwise until shaft stops, to ensure drive unit is completely in forward gear. Maintain pressure on propeller shaft with a suitable device (elastic strap).

21. Measure distance between center of hole in shift cable end guide and center of brass barrel. Measurement should be 6 in. (153 mm). Turn brass barrel in direction necessary to obtain this dimension.

22. If old shift cable was equipped with an end guide stop clip, remove clip from old shift cable. Once brass barrel adjustment is correct, install end guide stop clip on threaded tube. Position as shown, with tang touching brass barrel.

23. Connect shift cable to shift plate and adjust. (Refer to Section 2A).

24. Install trim limit switch as follows:
   a. Align index marks on switch.
   b. Install trim limit switch.

25. Adjust trim limit switch (Refer to Section 4A).
26. Install trim position sender as follows:
   a. **Models with older style sender**, install insulator.
   b. Align index marks.

27. Adjust trim position sender (Refer to Section 4A).

28. Connect continuity wire to port side of bell housing.

**Older Style Sender**

- a - Index Marks
- b - Insulator

**Newer Style Sender**

- a - Index Marks
  
  c. Install trim position sender. Ensure insulator slots align with slot in sender.

- a - Trim Position Sender
- b - Screws (2)
- c - Retainer (2)
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