

## Chapter Seventeen

# Bell Housing, Gimbal Bearing and Gimbal Ring

This chapter covers removal, overhaul and installation of the **MerCruiser I** (includes Models I-R and I-MR) and II-TR Drive bell housing, and the I (includes Models I-R and I-MR), II, II-TR and II-TRS Drive gimbal bearing and gimbal ring.

**MerCruiser** has used a considerable number of slightly different bell housing and gimbal arrangements over the years. The following procedures show typical arrangements.

**Figure 1** shows the components of a typical bell housing.

**Table 1** is at the end of the chapter.

### I-DRIVE BELL HOUSING

#### Removal

1. Remove stern drive unit. See Chapter Fourteen.
2. Remove inner core of shift cable as described in this chapter.

#### NOTE

*When a new bellows is to be installed, cut the old bellows and its interior support wire to assist in bell housing removal.*

3. Loosen rear clamp on shift cable bellows (**Figure 1**).

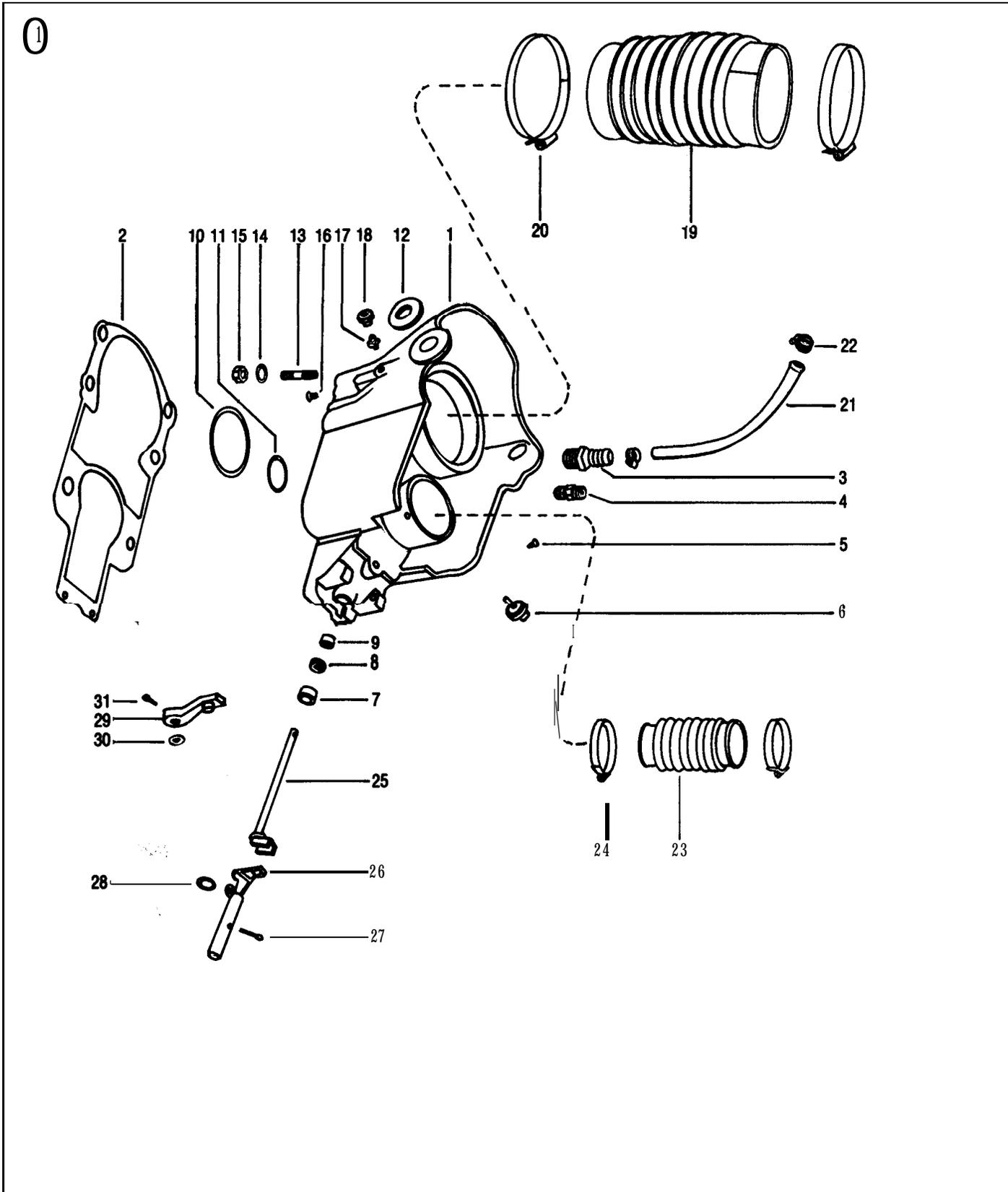
#### NOTE

*If the boat has no trim indicator installed, the starboard side of the gimbal ring will have an empty sender housing which must be removed in Step 4.*

4. Remove screws holding trim limit and trim position switches on side of gimbal ring, if so equipped. **Figure 2** shows one side. Remove switches from gimbal ring and position out of the way.
5. Remove the 2 screws holding the water tube cover to the front of the gimbal housing (inside the boat). Remove cover and rubber bushing. Push water tube through gimbal housing.

#### NOTE

*Older units were fitted with hinge pin lock screws which are pinned in place or retained by cotter pins. Use a slide hammer and puller adaptor (part No. C-91-36060) to remove the hinge pins on such models in Step 6 after removing the lockpin or lock screw.*



**I-DRIVE** BELL HOUSING (TYPICAL)

- |                          |                          |
|--------------------------|--------------------------|
| 1. Bell housing assembly | 17. Grease fitting       |
| 2. Gasket                | 18. Lubricap             |
| 3. Connector             | 19. Bellows assembly     |
| 4. Connector             | 20. Clamp                |
| 5. Drive screw           | 21. Water hose           |
| 6. Bumper                | 22. Clamp                |
| 7. Bushing               | 23. Exhaust bellows      |
| 8. Oil seal              | 24. Clamp                |
| 9. Bushing               | 25. Shift shaft assembly |
| 10. Rubber gasket        | 26. Shift shaft          |
| 11. O-ring               | 27. Cotter pin           |
| 12. Washer               | 28. Washer               |
| 13. Stud                 | 29. Lever assembly       |
| 14. Washer               | 30. Washer               |
| 15. Nut                  | 31. Screw                |
| 16. Plug screw           |                          |

6. Remove gimbal ring-to-bell housing hinge pins (Figure 3) with hinge pin tool (part No. C-91-78310).

#### CAUTION

*Loctite is used in assembling the hinge pins. If necessary to heat the hinge pin to aid in pin removal, use care not to damage anti-friction washers between bell housing and gimbal ring.*

7. Separate bell housing from gimbal ring as much as possible. Loosen front clamp and remove universal-joint bellows at gimbal housing end.
8. Loosen exhaust bellows rear clamp, if so equipped, and remove end from bell housing.
9. Remove bell housing assembly.

#### Disassembly

Refer to Figure 4 for this procedure.

1. Loosen clamps holding universal joint bellows and water hose to bell housing. Remove bellows and hose.
2. Turn shift cable retainer nut and cable and remove from bell housing.
3. If rubber bumper requires replacement, remove it. If in satisfactory condition, leave intact on bell housing.

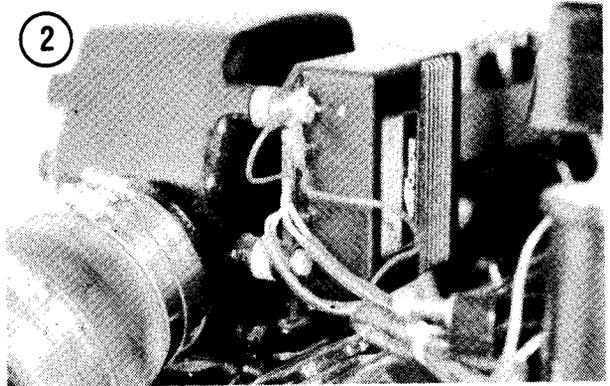
#### CAUTION

*Loctite is used in assembly of shift lever to shift shaft. IF necessary to heat shift lever to aid in screw removal during Step 4, do so carefully to avoid heat damage to the shift shaft oil seal.*

4. Rotate shift lever to one side. Remove shift lever screw and shift lever, then remove the washer and shift shaft.
5. Remove O-ring and rubber gasket. Remove shift shaft seal and bushing *only* if replacement is required.

#### Cleaning and Inspection

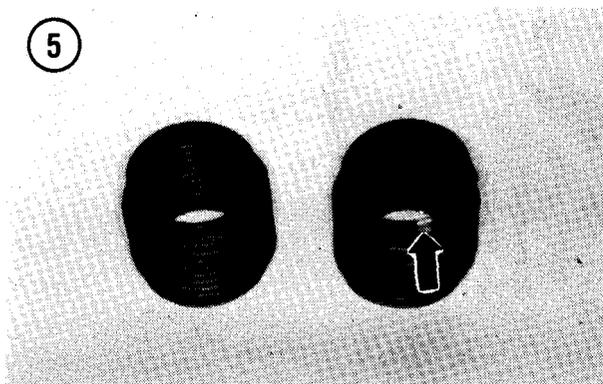
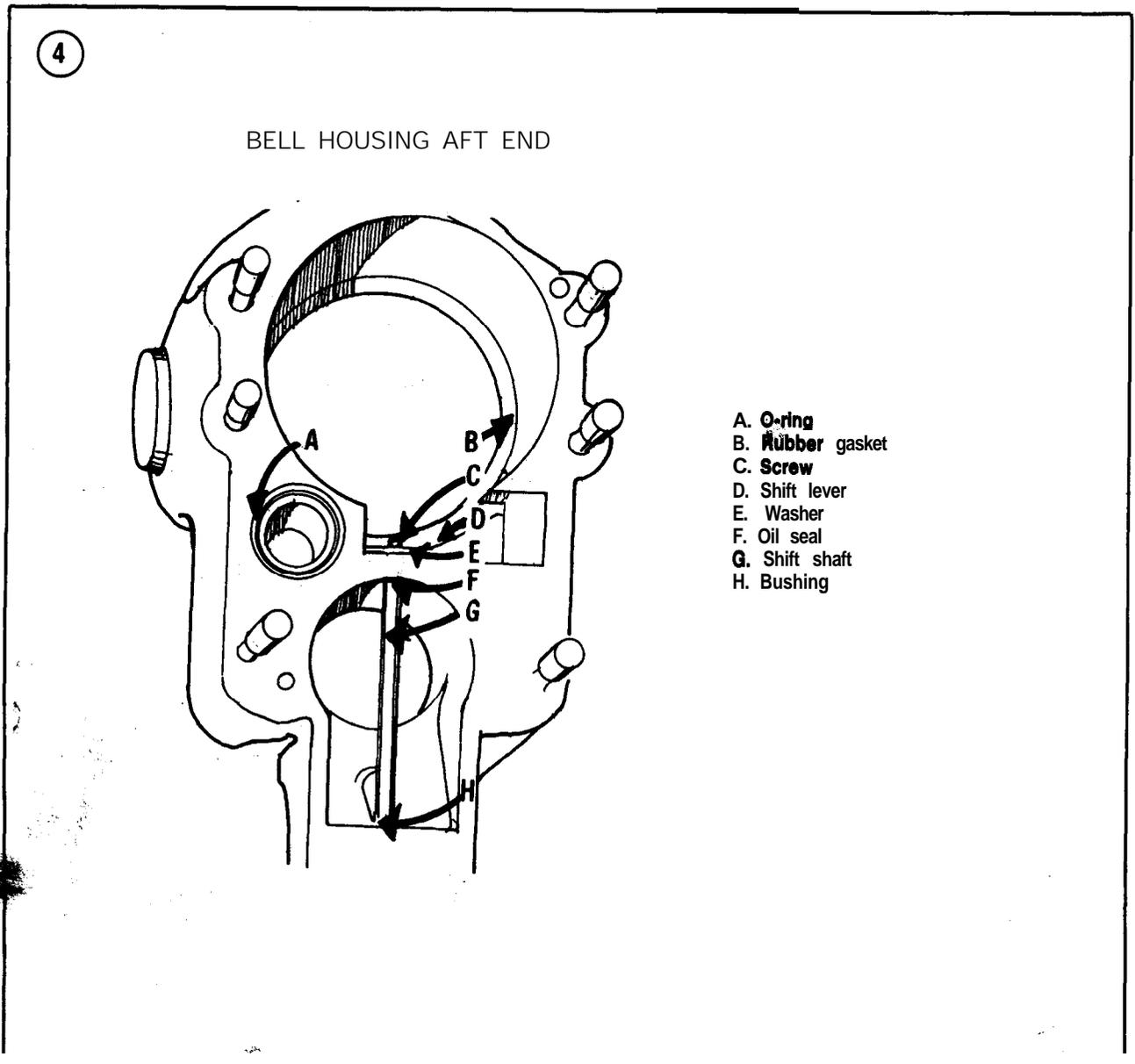
1. Clean all metal parts in solvent. Blow dry with compressed air.
2. If bellows will be reinstalled, remove bellows adhesive from inside diameter with lacquer thinner.



#### NOTE

*Figure 5 shows old (left) and new (right) replacement universal joint bellows. Note use of ground clip (arrow) on new bellows. These clips should be installed on each end of bellows so they will contact the bellows clamp when it is tightened. If your unit is not so equipped, see your MerCruiser dealer for parts.*

3. Check bellows and water hose carefully for cracks, cuts, punctures, pinholes and general flexibility. Replace bellows or water hose if there are any doubts about serviceability.
4. Clean bellows mounting flanges on bell housing with a wire brush and wipe with lacquer thinner.
5. Check shift cable for damage caused by a pinched cable or one that is too short.
6. Check shift shaft and shaft bushings for excessive wear. Replace as required.
7. Check shift lever roller. If worn, replace entire shift lever assembly.



8. If heat was necessary to remove shift lever screw, check washer located under lever for damage. Replace as **required**.

**Assembly**

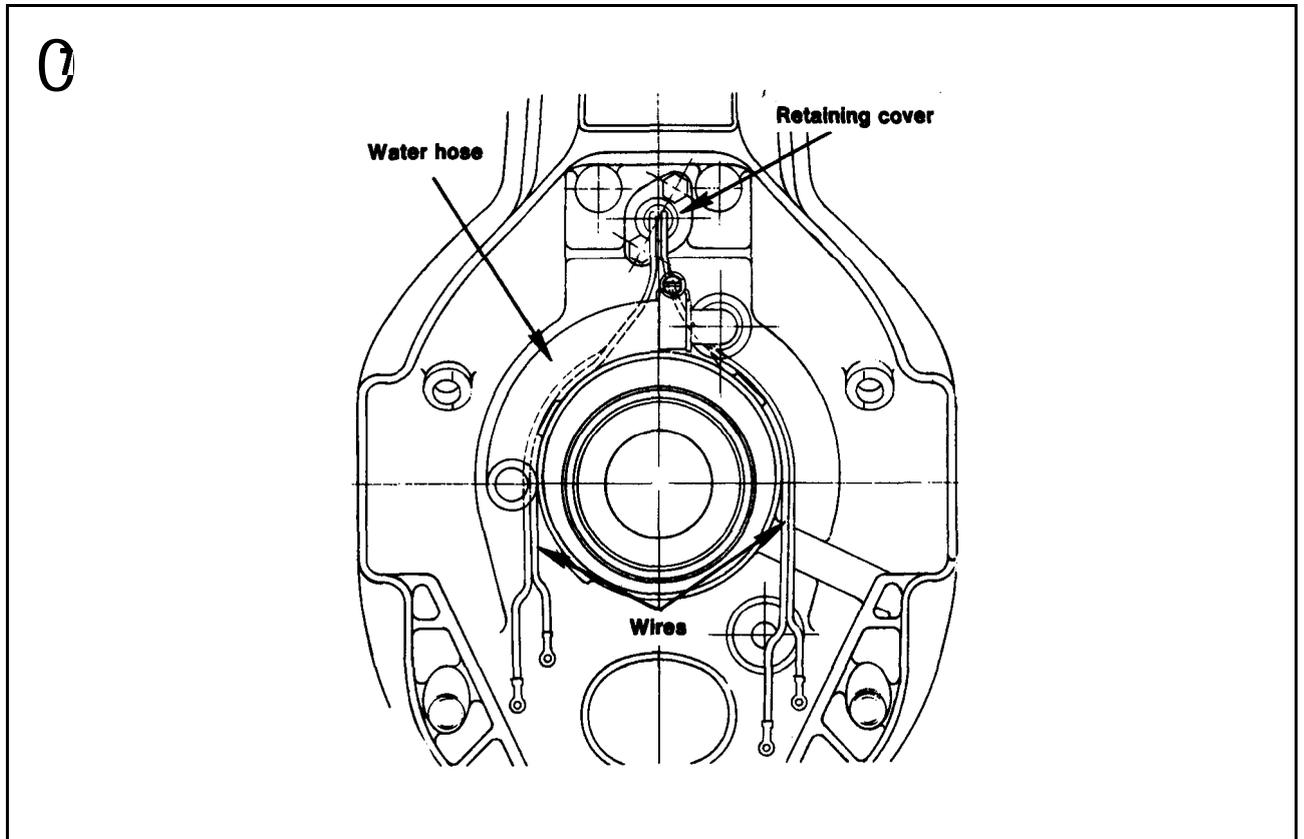
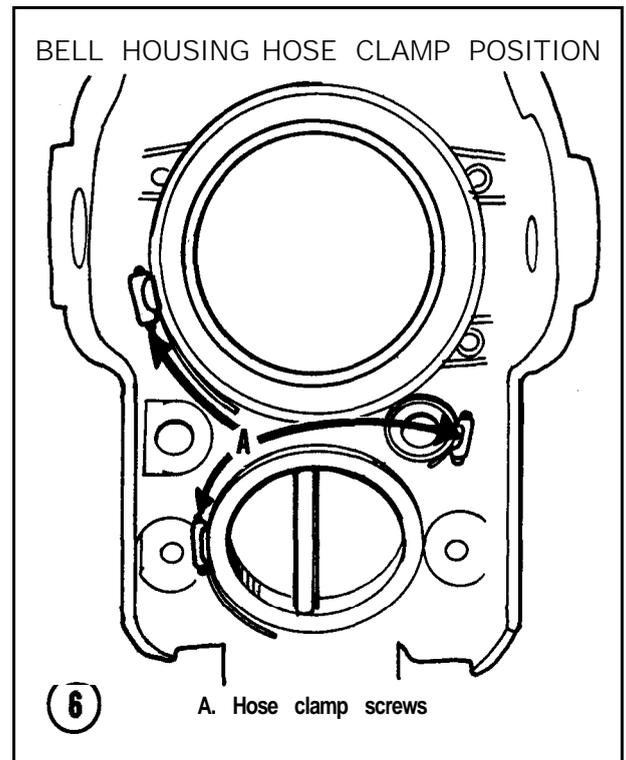
- Refer to Figure 4 for this procedure.
1. If the shift shaft bushing was removed, install a new one until flush with the bottom housing.
  2. If the shift shaft oil seal was removed, install a new one with its lip facing down.
  3. If rubber bumper was removed, install a new one after wiping its threads with Loctite Type A.

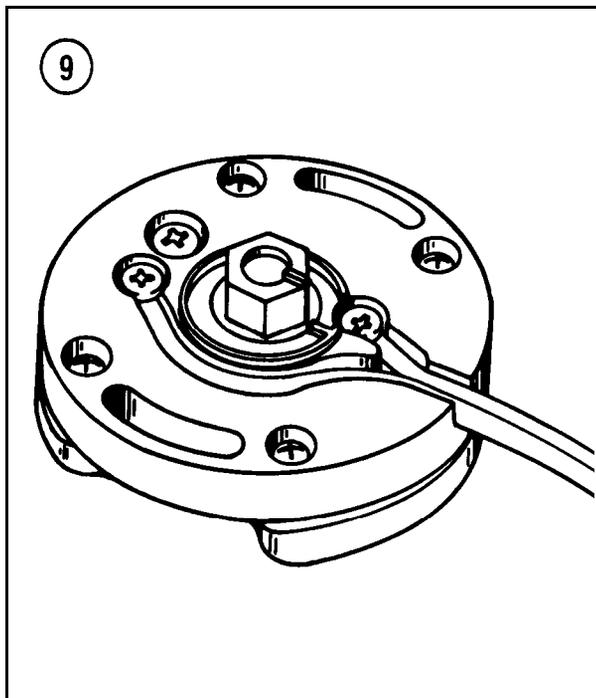
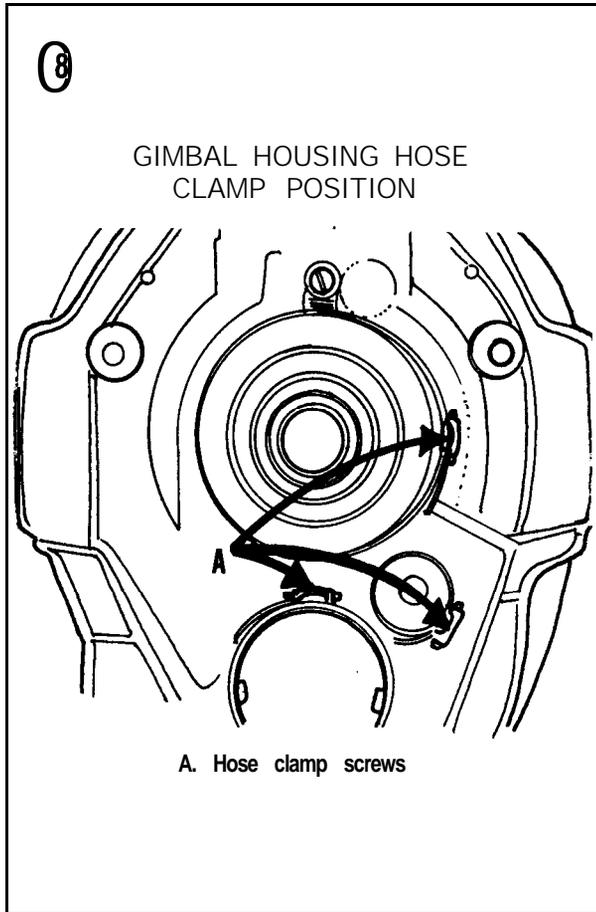
4. Install shift shaft, washer and shift lever in bell housing. Apply a drop of Loctite Type A on screw threads and tighten screw securely.
5. Install a new O-ring around the water passage.
6. Install a new rubber gasket in the universal joint passage.
7. Wipe threads of shift cable retainer nut or adaptor with Loctite Type A and install cable to bell housing.
8. Install water hose to bell housing.

**WARNING**

*Step 9 involves the use of Bellows Adhesive, which is extremely flammable. Do not use near fire, flame, electric motors in operation or any other sources of ignition. Make sure the area is well ventilated and that the container is promptly closed after use. Avoid prolonged contact with skin or breathing of vapors.*

9. Apply Bellows Adhesive (part No. C-92-36340A1) to the ID of each end of universal joint bellows. Let adhesive dry about 10 minutes or until it is no longer tacky.





10. Install ground clip (**Figure 5**) and clamp over the bellows end marked "Aft-Top" and fit bellows to bell housing. Position clamp screw as shown in **Figure 6** and tighten to specifications (**Table 1**).

11. If installing new bellows, install shift and exhaust bellows (or exhaust tube) to gimbal housing. Use ground clips as described in Step 10 and position clamp screws as shown in **Figure 6**. Tighten screws to specifications (**Table 1**).

12. Wait 3-4 hours, then retighten all clamp screws to specifications.

#### Installation

1. Wipe metal end of shift cable with Multipurpose Lubricant (part No. C-92-63250) and insert through shift cable bellows.

2. Fit water hose tube (with hose attached) through gimbal housing. Tube end should face up and tilt slightly to port for V8 engines. On **inline** engines, tube end should face starboard and tilt slightly upward.

3. Position trim sender and limit switch wires as shown in **Figure 7**.

4. Wipe hinge pin threads with Locquic Primer T (part No. C-92-59327). Follow container instructions and apply Loctite No. 35 (part No. C-92-59328) to threads. Install pins and tighten to specifications (**Table 1**).

#### NOTE

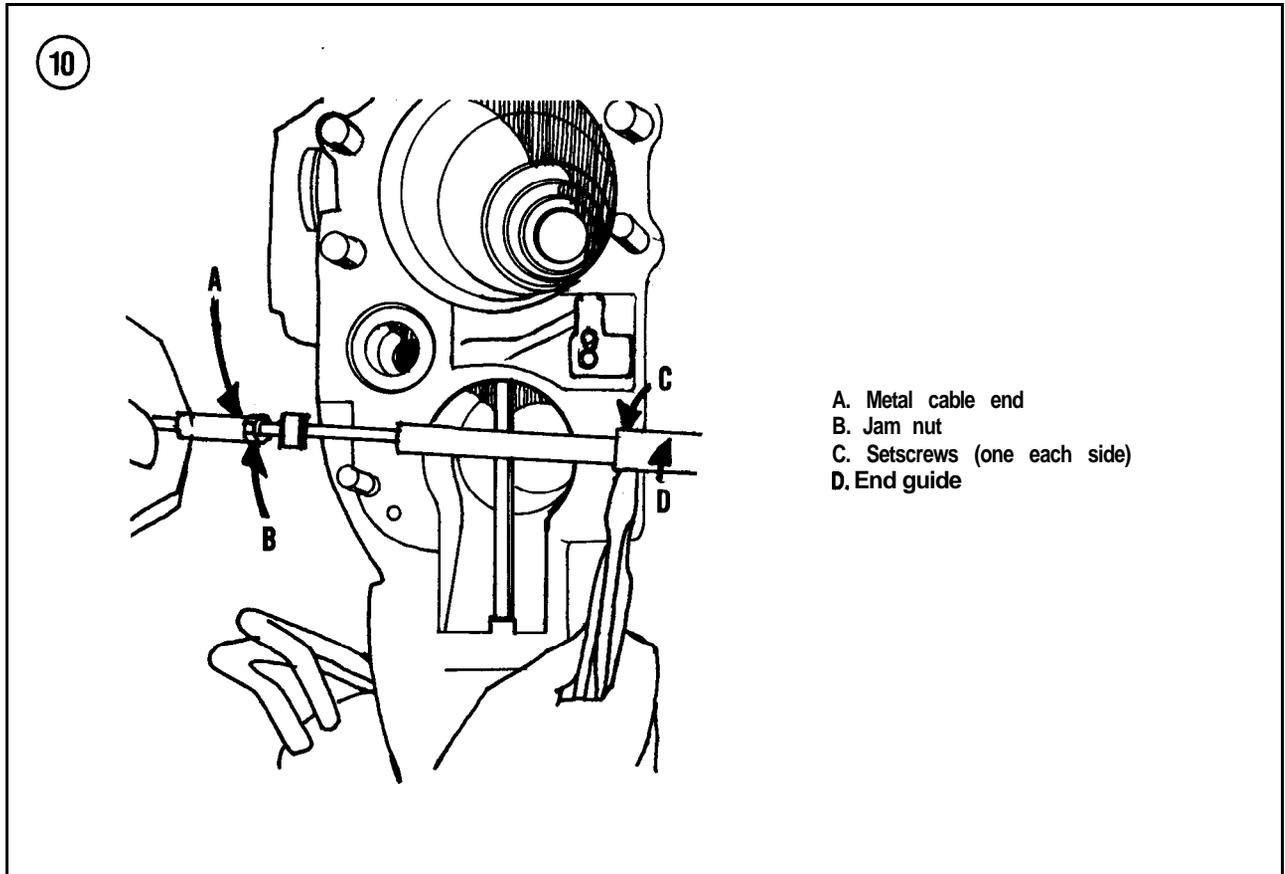
*Some gimbal housings have a hole in the port side (**Figure 7**). This allows a screwdriver to be inserted to tighten the bellows clamp in Step 5.*

5. Position clamp screw on front of universal joint bellows as shown in **Figure 8**. Install bellows to gimbal housing and tighten clamp screw to specifications (**Table 1**).

6. If equipped with exhaust bellows, install bellows to bell housing with expander tool (part No. C-91-45497A1). Make sure ground clip contacts clamp and that clamp screw is positioned as shown in **Figure 6**. Tighten clamp screw to specifications (**Table 1**).

7. Align trim limit switch rotor mark with index mark on rear of switch housing. See **Figure 9**. Install switch to gimbal ring and tighten screws securely. Repeat procedure to install trim position switch or empty sender housing.

8. Adjust switches as required. See Chapter Eighteen.



9. Install drive unit shift cable inner core as described in this chapter.
10. Install drive unit. See Chapter Fourteen.
11. Lubricate hinge pins with Universal Joint Lubricant (part No. C-92-74057A1).

#### Shift Cable Inner Core Removal

Refer to **Figure 10** for this procedure.

1. Remove shift cable ends from anchor points on shift plate.
2. Loosen cable end guide setscrews and remove end guide.
3. Loosen metal cable end **jamnut**. Rotate metal end and remove from cable.
4. **Cut core wire** at a point below the support tube as shown in **Figure 11**.
5. **Put lockwire on end** of shift cable slide (**Figure 12**). Remove setscrew, inner core wire and shift cable slide.

#### Installation

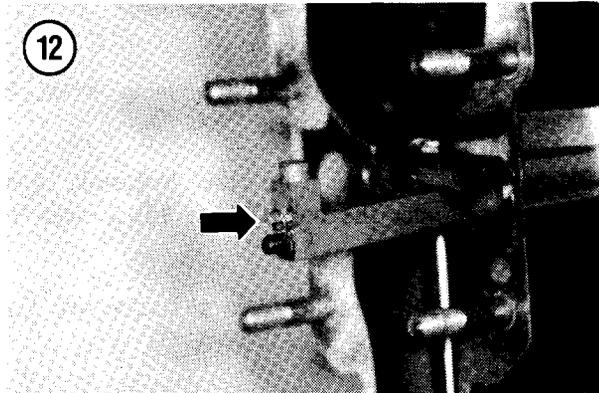
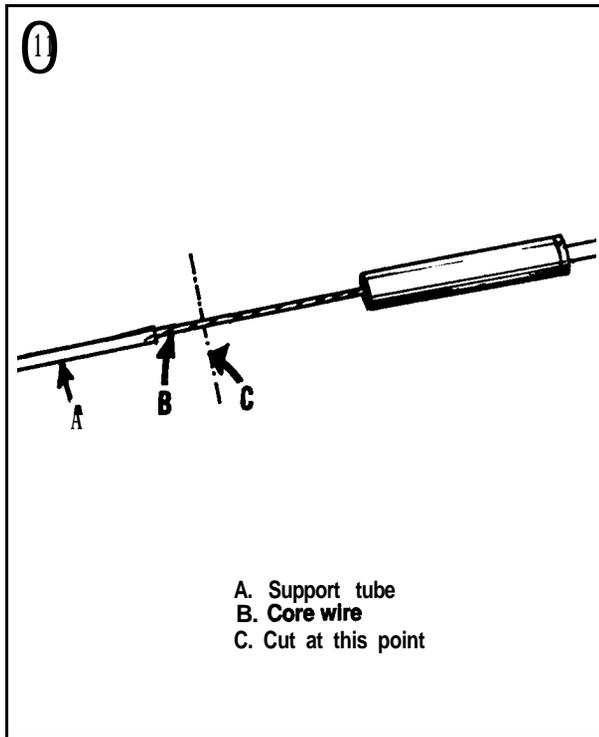
Refer to **Figure 10** for this procedure.

1. Apply Perfect Seal (part No. C-92-34227) to brass retainer nut threads. Rotate cable and retainer nut as an assembly into bell housing. Tighten retainer nut securely.
2. Turn cable end into outer cable until it bottoms, then tighten **jamnut**.
3. Insert inner core wire through cable slide and into outer cable.
4. Install cable slide setscrew securely, then back off about 1/4 turn. Leave screw loose enough to allow core wire to rotate freely but tight enough to keep end play between cable and slide at a minimum. Secure screw with lockwire.
5. Adjust shift cable as described in Chapter Fourteen.

#### II-TRS BELL HOUSING

##### Removal

1. Remove drive unit from boat. See Chapter Fourteen.
2. Remove trim limit and trim position sender units from gimbal ring.



3. Remove hinge pin on each side of gimbal ring with a 9/16 in. Allen wrench.
4. Loosen bellows clamps. Separate bellows from bell housing.
5. Remove oil hoses and oil check valve, if so equipped.

**Cleaning and Inspection**

1. Clean all metal parts in solvent. Blow dry with compressed air.
2. If bellows will be reinstalled, remove bellows adhesive from inside diameter with lacquer thinner.

**NOTE**

Figure 5 shows old (left) and new (right) replacement bellows. Note use of ground clip (arrow) on new bellows. These clips should be installed on each end of bellows so they will contact the bellows clamp when it is tightened. If your unit is not so equipped, see your MerCruiser dealer for parts.

3. Check bellows carefully for cracks, cuts, punctures, pinholes and general flexibility. Replace bellows if there are any doubts about serviceability.
4. Clean bellows mounting flanges on bell housing with a wire brush and wipe with lacquer thinner.
5. Check hinge pin threads for damage. Replace as required.

**Installation**

**WARNING**

Step 1 involves the use of Bellows Adhesive, which is extremely flammable. Do not use near fire, flame, electric motors in operation or any other sources of ignition. Make sure the area is well ventilated and that the container is promptly closed after use. Avoid prolonged contact with skin or breathing of vapors.

1. Apply Bellows Adhesive (part No. C-92-36340A1) to ID of each end of universal joint bellows. Note that bellows are marked "TOP," "FWD" and "AFT." Use these references to position bellows for reinstallation.
2. Install bellows and tighten clamp screws to specifications (Table 1). Wait 3-4 hours and retighten clamp screws.
3. Install exhaust bellows in the same manner, but without the use of bellows adhesive.
4. Reinstall oil check valve, if so equipped.
5. Wipe spacer washers with Multipurpose Lubricant (part No. C-92-63250) and install over hinge pin bushings. Install bell housing in gimbal ring.
6. Prime clean hinge pin threads in bell housing with Locquic primer T (part No. C-92-59328). Follow container instructions and wipe hinge pin threads with Loctite No. 35 (part No. C-92-59328).
7. Install hinge pins and tighten to specifications (Table 1).
8. Install oil hose between valve cover and gimbal fittings. Tighten hose clamp screws to specifications (Table 1).
9. Inspect universal joint bellows to make sure there are no kinks or uneven folds.

### GIMBAL BEARING

Whenever the drive unit is removed from the bell housing for any reason, it is a good idea to check the condition of the gimbal housing cartridge bearing (**Figure 13**). Reach into the bell housing and rotate the bearing to check for rough spots. Try pulling and pushing on the inner race as a check for side wear. If any excessive movement is noted, replace the bearing.

#### Replacement

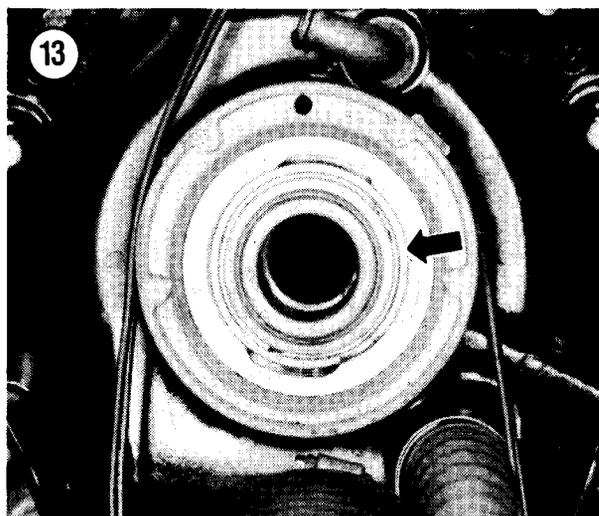
Gimbal bearing replacement requires the use of bearing tool kit (part No. C-91-3 1229A4) and a 3-jawed puller (part No. C-91-34569A1). Since removal destroys the cartridge bearing, be sure you have the correct replacement bearing on hand before attempting this procedure.

1. Assemble and install the puller as shown in **Figure 14**. Position the 2 plates between the top and middle bell housing studs.
2. Remove the bearing. If necessary, tap end of puller shaft with a mallet while turning the nut.
3. Lubricate the OD of the replacement gimbal bearing cartridge assembly with Multipurpose Lubricant (part No. C-963250).
4. Align grease holes in bearing cartridge and tolerance ring with grease cavity hole in gimbal housing.
5. Insert driver head (part No. C-91-32325) through mandrel (part No. C-91-30366) and into the ID of the bearing assembly. See **Figure 15**.
6. Align the bearing assembly with the gimbal housing stud. Position plate (part No. C-91-29310) between the top and middle bell housing studs.
7. Drive bearing assembly into gimbal housing cavity with a heavy hammer.

#### CAUTION

*Only Universal Joint Lubricant (part No. C-91-74057A1) should be used in Step 8.*

8. Lubricate bearing with 40 strokes from a pistoluber (part No. C-9 1-37299) using Universal Joint Lubricant (part No. C-9 1-74057A 1).
9. Check engine/bearing alignment with alignment shaft (part No. C-91-48247 or part No. C-91-57797A3).
10. Install drive unit. See Chapter Fourteen.



### GIMBAL RING

Three major gimbal ring designs have been used with recent MerCruiser units. Each requires a slightly different removal/installation procedure.

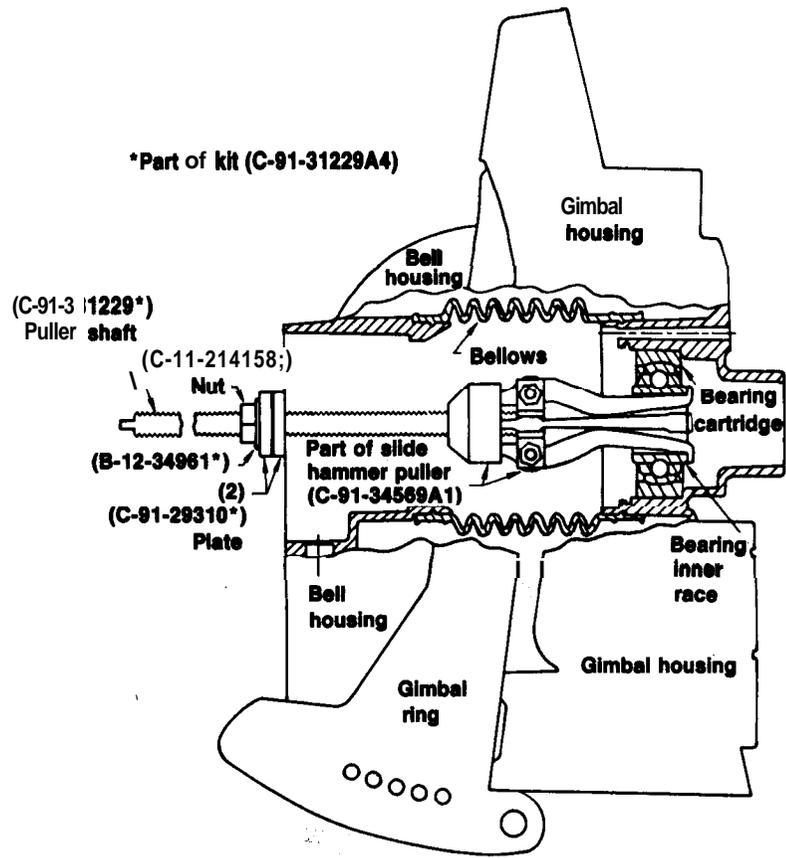
#### Without Side-Mounted Rotary Trim Switch

##### Removal

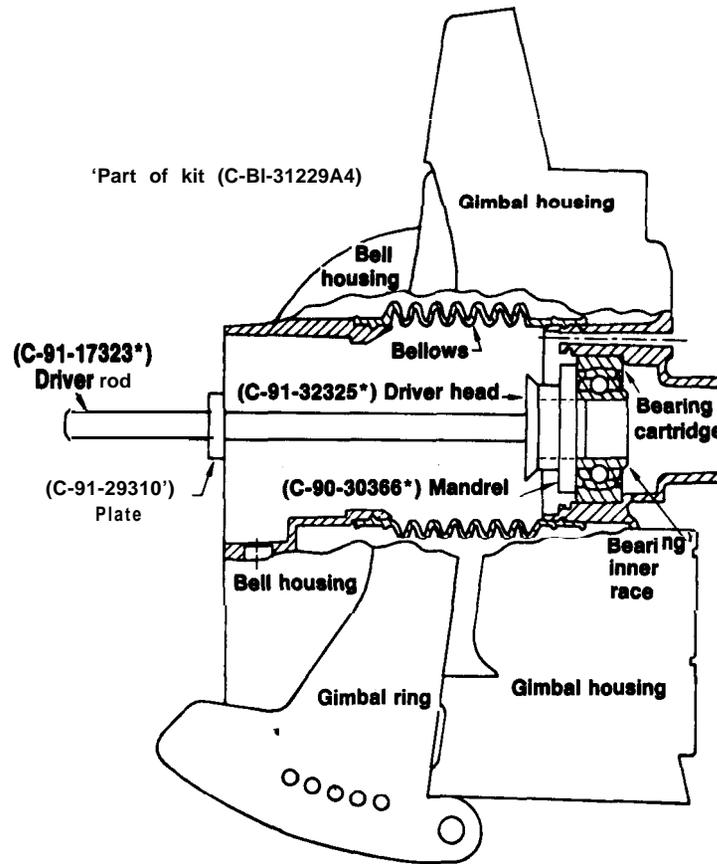
The drive unit and bell housing must be removed for this procedure.

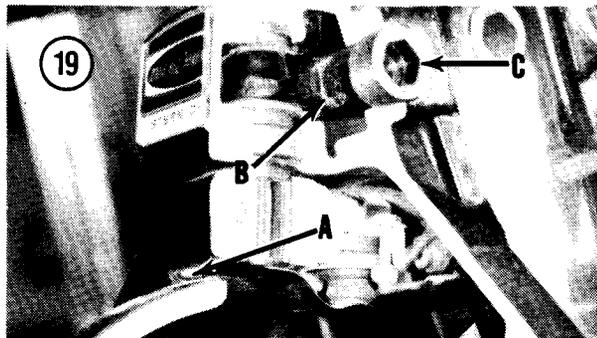
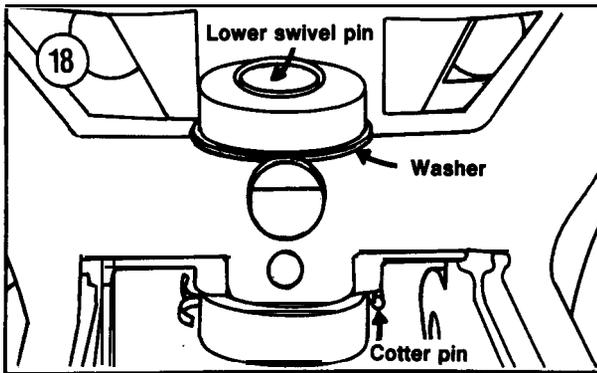
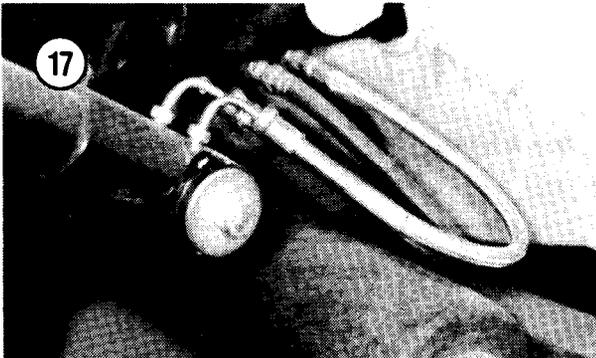
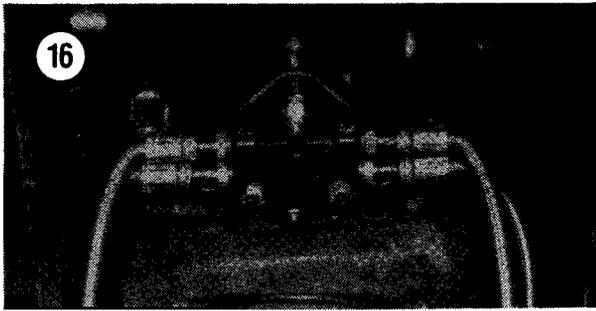
1. Remove 2 nuts from the hydraulic hose connector under the unit (**Figure 16**). Lower the connector.
2. Disconnect hydraulic lines at connector. Cap hoses and plug connector fittings.
3. Disconnect trim cylinder at forward anchor pin (**Figure 17**) and move assembly to one side out of the way.
4. Remove the cotter pin, lower swivel pin and washer (**Figure 18**).
5. Remove 2 screws holding the tilt stop switch actuating lever (note that only one screw, A, is shown in the cutaway in **Figure 19**). Remove the switch lever.
6. Remove the Allen head pipe plug located at the bottom of the upper swivel shaft (under the switch lever) and the Allen screw at the top side of the gimbal ring.

①



①





7. Remove the plug (B, Figure 19) from each side of the gimbal housing.
8. Disconnect the steering link rod from the steering arm.
9. Insert an appropriate size socket through the starboard plug side to engage the steering lever bolt (C, Figure 19). Repeat this procedure on the opposite side to engage the nut. Remove the nut and bolt.
10. Insert a slide hammer up through the gimbal ring and engage the upper swivel shaft with puller part No. C-91-38919. Remove the upper swivel shaft.
11. Remove the steering lever and washers located under it.
12. Remove the screws holding the tilt stop switch wires to the gimbal housing. Remove the gimbal ring.

**Disassembly**

1. Remove 2 screws and nuts holding the tilt stop switch assembly. Remove the switch assembly.
2. Pry 2 oil seals from the lower swivel pin roller bearing.
3. If roller bearing is to be replaced, press from gimbal ring with an appropriate driver or socket. See Figure 20.

**Cleaning and inspection**

1. Clean gimbal ring and bearing in solvent. Blow dry with compressed air.
2. Check lower swivel pin area where needle bearing rides for pitting, grooving and uneven wear. Replace bearing and swivel pin as required.
3. Check tilt stop switch operation with an ohmmeter. Ohmmeter should show continuity when connected to switch leads. Operate switch button and meter should show no continuity.

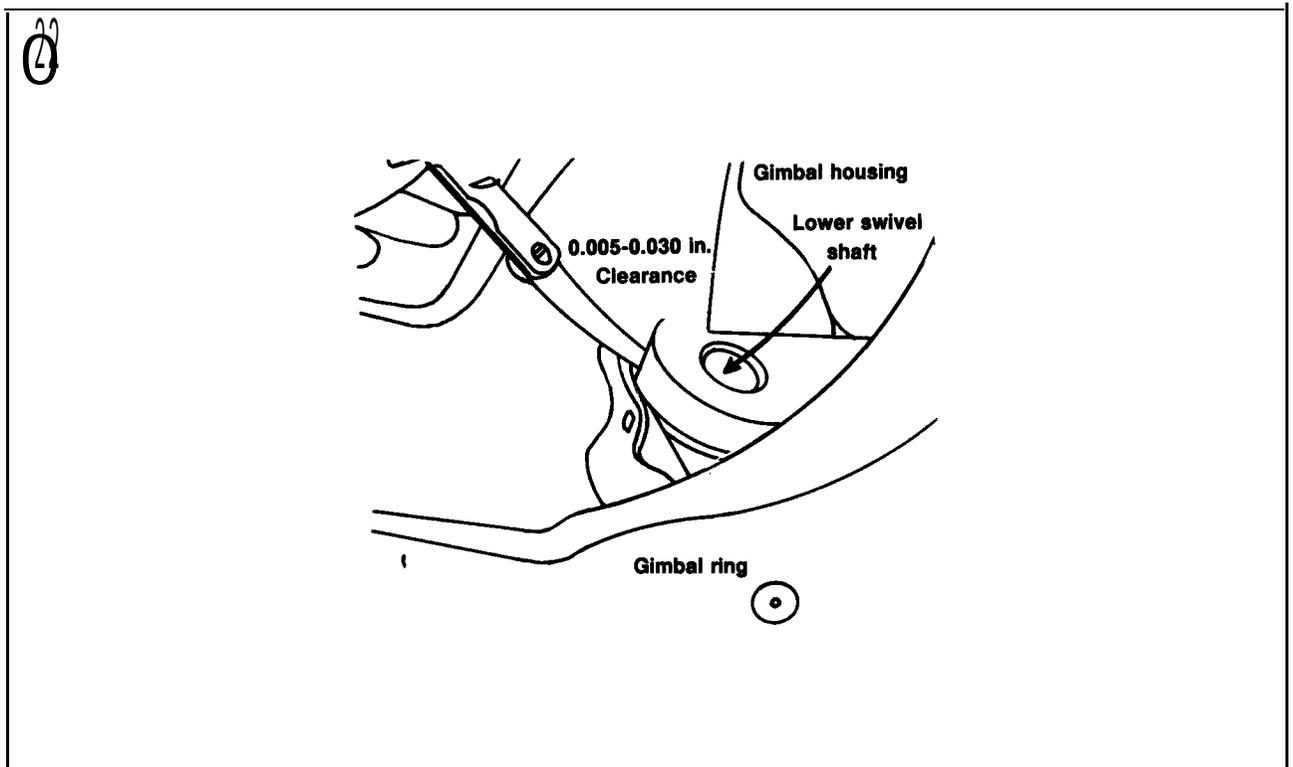
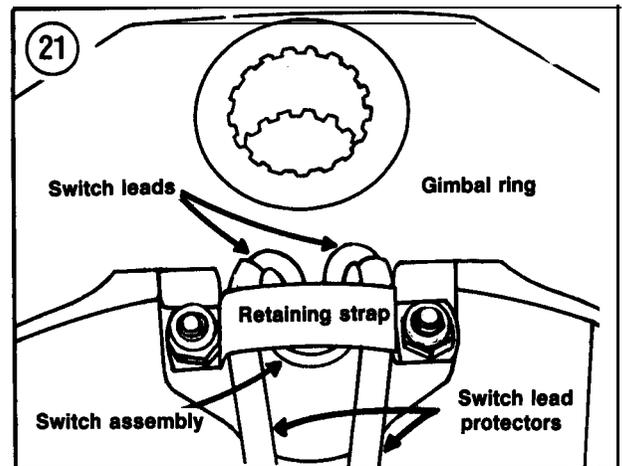
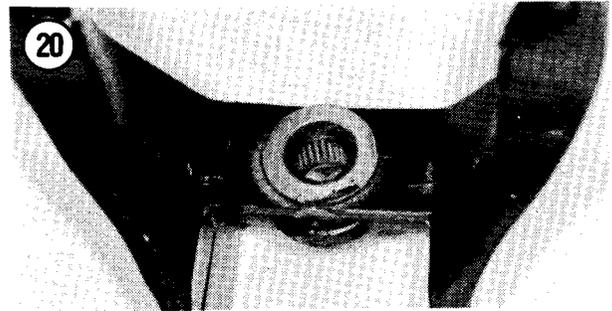
**Reassembly**

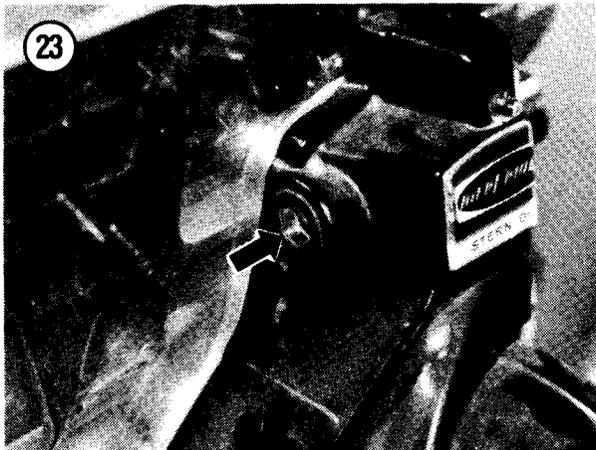
1. Install lower swivel pin needle bearing with an appropriate size driver.
2. Install new lower swivel bearing oil seals.

3. Install tilt stop switch with leads positioned as shown in **Figure 21**.

### Installation

1. Insert switch leads through gimbal housing. Install screws holding harness to gimbal housing.
2. Position gimbal ring in gimbal housing.
3. Slide washer between gimbal ring and housing, then install lower swivel pin and a new cotter pin. See **Figure 18**.
4. Position steering lever (with shim washers) straight ahead and install upper swivel shaft through gimbal ring, housing and steering lever.
5. Adjust height of upper swivel shaft as required until Allen screw can be installed through the side of the gimbal ring. Tighten screw to specifications (**Table 1**).
6. Install bolt through steering arm and nut. Tighten to specifications (**Table 1**).
7. Check clearance between gimbal ring and gimbal housing at lower swivel shaft with a feeler gauge (**Figure 22**). If clearance is not 0.005-0.030 in., reverse Steps 3-6 and change the shim washers under the steering lever as required to bring the clearance within specifications.





8. Wipe gimbal housing plug threads with Perfect Seal (part No. C-92-34277) and install one plug in each side of housing. See **Figure 23**.

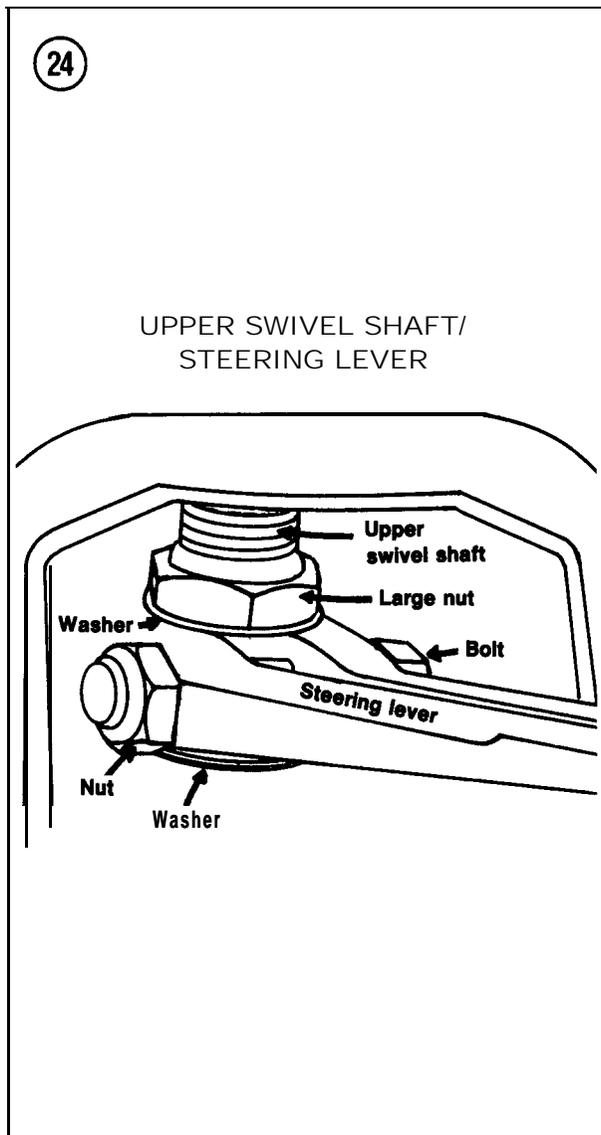
9. Wipe Allen screw threads with Perfect Seal and install in end of upper swivel shaft.

10. Install switch actuating lever. Tighten screws securely.

11. Install trim cylinders to anchor pin.

12. Connect hydraulic hoses to connector. Install connector to gimbal housing and tighten nuts securely.

13. Connect steering link rod to steering lever. Tighten nut to specifications (**Table 1**) and install a new cotter pin. If nut and rod slots do not align, back nut off slightly until they do, then install the cotter pin.



**With Side-Mounted Rotary Trim Switch**

**Removal**

The transom assembly must be removed from the boat to remove the gimbal ring.

1. Remove exhaust bellows, trim limit switch and trim position sender leads from gimbal housing.

2. Remove 2 nuts from the hydraulic hose connector under the unit (**Figure 16**). Lower the connector.

3. Disconnect hydraulic lines at connector. Cap hoses and plug connector fittings.

4. Disconnect trim cylinder at forward anchor pin (**Figure 17**) and move assembly to one side out of the way.

5. Remove the cotter pin, lower swivel pin and washer (**Figure 18**).

6. Remove the Allen head pipe plug located at the bottom of the upper swivel shaft.

7. Remove the large nut and washer from top of upper swivel shaft and the nut and bolt through the steering lever. See **Figure 24**.

8. Insert a slide hammer up through the gimbal ring and engage the upper swivel shaft with puller part No. C-91-38919. Remove the upper swivel shaft.

9. Remove the steering lever and washers.

10. Remove the gimbal ring and washers from the gimbal housing. Remove the gimbal ring.

### Disassembly

1. Pry 2 oil seals from the lower swivel pin roller bearing.
2. If roller bearing is to be replaced, press from gimbal ring with an appropriate driver or socket. See **Figure 22**.

### Cleaning and inspection

1. Clean gimbal ring and bearing in solvent. Blow dry with compressed air.
2. Check lower swivel pin area where needle bearing rides for pitting, grooving and uneven wear. Replace bearing and swivel pin as required.
3. Check anti-friction washers on gimbal ring for excessive wear. Replace as required.

### Reassembly

1. Install lower swivel pin needle bearing with an appropriate size driver.
2. Install new lower swivel bearing oil seals.
3. If anti-friction washers were removed, align holes in new washers with holes in gimbal ring and epoxy in place.

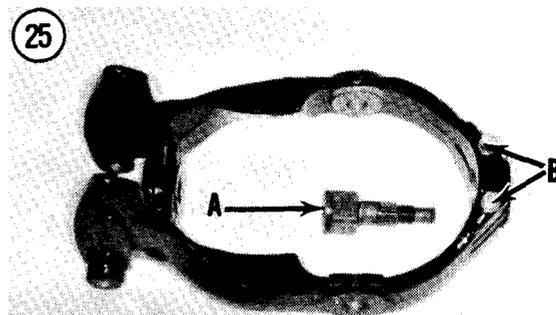
### Installation

1. Wipe oil seal lips and bearing rollers with Multipurpose Lubricant (part No. C-92-63250).
2. Position gimbal ring in gimbal housing.

#### NOTE

*Swivel pin can be turned with a screwdriver blade if necessary to align cotter pin holes in Step 3.*

3. Slide washer between gimbal ring and housing, then install lower swivel pin (slotted end facing down) and a new cotter pin. See **Figure 18**.
4. Lubricate lower swivel pin roller bearing with Multipurpose Lubricant through grease fitting on side of gimbal ring.
5. Insert upper swivel shaft through gimbal ring and into but not through the gimbal housing. Position washer and steering arm on gimbal



housing. As shaft protrudes through the steering arm, install washer and nut but do not tighten.

6. Continue to install shaft until bolt can be installed through the steering arm. Install bolt and nut but do not tighten.

7. Tighten swivel shaft nut installed in Step 5 until snap ring in swivel shaft groove bottoms out on gimbal ring.

8. Wipe Allen head pipe plug threads with Perfect Seal and install in bottom of swivel shaft. Tighten plug securely.

9. Loosen swivel shaft nut tightened in Step 7 until clearance between washer and lower swivel shaft is **0.005-0.007 in.** (**Figure 22**).

10. Tighten steering arm bolt installed in Step 6 to specifications (**Table 1**).

11. Install trim cylinders to anchor pin.

12. Connect hydraulic hoses to connector. Install connector to gimbal housing and tighten nuts securely.

### With Square Upper Swivel Shaft

#### Removal

**MerCruiser** I-Drive transom assemblies (serial No. 5490562 and above) and **V8** I-Drive assemblies (serial No. 5472 161 and above) use a square (instead of splined) connection between the upper swivel shaft and gimbal ring. See **A**, **Figure 25**. These can be identified by the 2 stainless steel bolts located at the top of the gimbal ring (**B**, **Figure 25**).

This gimbal ring design can be removed with the engine and transom plate installed, but the procedure requires the use of templates to drill  $1\frac{1}{8}$  in. holes through the gimbal ring at specified

pilot hole locations for access to the steering lever retaining bolt and nut. This procedure is best left to a dealer or qualified marine shop, since an incorrectly located or drilled hole can ruin an otherwise perfectly good gimbal ring.

The procedure provided below requires that the engine and transom plate be removed (see Chapter Fourteen) with the transom assembly installed in a suitable holding fixture.

1. Remove bell housing and exhaust bellow/tube as described in this chapter.
2. Remove front anchor pin holding trim cylinder to gimbal ring (**Figure 17**). Support cylinders with rope or wire to prevent damage to the hydraulic lines.
3. Remove lower swivel pin cotter pin. Drive swivel pin from gimbal housing with a drift. Be sure to retrieve the swivel pin washer.
4. Hold stainless steel nuts on front of gimbal ring and loosen screws.
5. Remove steering lever retaining bolt and nut. **See Figure 24**. Discard nut, but keep the bolt.
6. Unthread upper swivel shaft nut as far as possible, then remove plug from bottom end of upper swivel shaft. Pull shaft down slightly with a slide hammer and puller (part No. C-91-63636) and finish unthreading nut.
7. Once nut is removed, remove the swivel shaft, steering lever and washers.
8. Separate gimbal ring from gimbal housing.

#### **Disassembly**

1. Pry 2 oil seals from the lower swivel pin roller bearing.
2. If roller bearing is to be replaced, press from gimbal ring with an appropriate driver or socket. **See Figure 20**.

#### **Cleaning and inspection**

1. Clean gimbal ring and bearing in solvent. Blow dry with compressed air.
2. Check lower swivel pin area where needle bearing rides for pitting, grooving and uneven wear. Replace bearing and swivel pin as required.

3. Check anti-galling washers on gimbal ring for excessive wear or misalignment. Replace as required.
4. Check gimbal ring upper swivel shaft/bore and hinge pin bores for excessive wear.
5. Check steering lever splines for excessive wear.
6. Check center portion of steering lever retaining bolt. If grooved from rubbing on the shaft, replace the bolt and steering lever.

#### **Reassembly**

1. Align grease hole in new lower swivel pin bearing with gimbal ring grease hole and install with an appropriate size driver.
2. Install new lower swivel bearing oil seals.
3. If anti-galling washers were removed, align holes in new washers with holes in gimbal ring and epoxy in place.
4. If installing a new gimbal ring, make sure that the upper swivel shaft fits properly. It should fit all the way into the ring until the shaft shoulder bottoms out. If necessary, clean mating surfaces on ring and shaft with a fine file and coat with Special Lubricant 101 (part No. C-92-792 14A1).
5. Install a flat washer on each of the stainless steel screws and insert screws through holes in rear of gimbal ring. Install another washer on end of screw, wipe screw threads with Special Lubricant 101 and thread nuts on but do not tighten.
6. Wipe oil seal lips and bearing rollers with Universal Joint Lubricant (part No. C-92-74057A1).
7. Position gimbal ring in gimbal housing.

#### **NOTE**

*Swivel pin can be turned with a screwdriver blade if necessary to align cotter pin holes in Step 8.*

8. Slide washer between gimbal ring and housing, then install lower swivel pin (slotted end facing down) and a new cotter pin. **See Figure 18**.
9. Insert upper swivel shaft through gimbal ring into but not through the gimbal housing. Install shaft through lower washer, steering arm and upper washer.

10. Install locknut on shaft and turn clockwise until clearance between washer and lower swivel shaft is 0.002-0.010 in. See **Figure 26**.
11. Strike bottom end of upper swivel shaft with a brass drift and hammer to seat shaft.
12. Recheck clearance with feeler gauge (**Figure 26**). Tighten nut more if required.
13. Install steering lever retaining bolt and new locknut. Do not tighten locknut at this time.
14. Tighten stainless steel gimbal ring screws to specifications (**Table 1**) while holding nuts on front of ring with a wrench.
15. Install plug on bottom end of upper swivel shaft.
16. Tighten steering lever retaining bolt to specifications (**Table 1**).
17. Lubricate upper swivel shaft through gimbal housing fitting with Universal Joint Lubricant until grease appears under the steering lever.
18. Reinstall trim cylinders to anchor pin.
19. Reinstall bell housing and exhaust bellows/tube as described in this chapter.

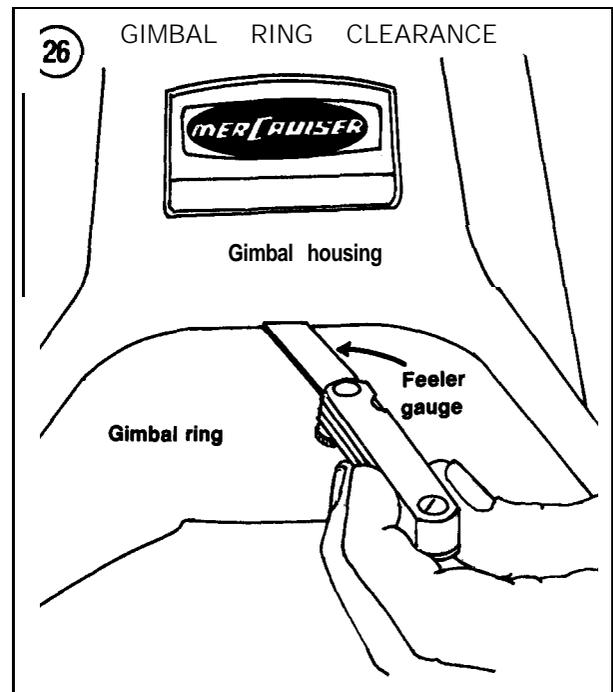


Table 1 GIMBAL HOUSING TIGHTENING TORQUES

<b>Fastener</b>	<b>in.-lb.</b>	<b>ft.-lb.</b>
<b>MERCUISER I</b>		
Bell housing hinge pin		60
Bell housing to drive shaft housing nut		50
Engine mount fastener		35
Exhaust bellows retaining clamp	35-38	
Exhaust elbow screw		20-25
Gimbal housing stud nut		20-25
Gimbal ring to upper swivel shaft screw		20
Hydraulic connector nut		10
Hydraulic pump bracket screw		14
Reverse lock valve screw		14
Shift bellows clamp	35-38	
Shift cable to core wire support nut		15
Shift cutout lever arm spring retainer	50-75	
Steering lever coupler screw nut		20
Steering lever to upper swivel shaft nut		45-50
Steering link rod		
Castle nut to Ride-Guide cable	20	
Castle nut to steering lever		15-18
Transom plate carriage bolt nut		20-25
Transom plate to gimbal housing screw		20-25
Universal joint bellows retaining clamp	35-38	
Universal joint shaft pipe plug		40-45
Bell housing hinge pin		80
Bell housing to drive shaft housing nut		80
Exhaust bellows retaining clamp	35	
Exhaust cover		12
Exhaust elbow screw		20-25
Gimbal housing stud nut		25-30
Gimbal ring to upper swivel shaft screw		20
Hydraulic connector nut		10
Hydraulic pump bracket screw		20
Oil hose retaining clamp	12-15	
Reservoir cover		20
Reverse lock valve screw		14
Steering lever to upper swivel shaft nut		45-50
Steering link rod		
Castle nut to Ride-Guide cable	20	
Castle nut to steering lever		15-18
Universal joint bellows retaining clamp	35	
Universal joint shaft pipe plug		40-45
Valve cover guide		15

(continued)

Table 1 GIMBAL **HOUSING TIGHTENING TORQUES (continued)**

Fastener	in.-lb.	ft.-lb.
<b>MERCUISER II, 215 AND III</b>		
Exhaust bellows retaining clamp	35	
Exhaust cover		15
Exhaust elbow screw		20-25
Gimbal housing		
To transom housing nut		<b>25-30</b>
Seal retaining cover screw		12
Gimbal ring to upper swivel <b>shaft</b> screw		20
Hydraulic connector		
To gimbal housing		10
To top connector tubing	<b>140-160</b>	
Hydraulic pump bracket screw		20
Oil hose retaining clamp		
Model 215-E and H	10-15	
Model III	25	
Reservoir cover to transom plate screw		20
<b>Shift</b> bellows clamp		
Steering lever		
Coupler screw		
Model II		20
Model 215E and H		35
Model III		30
To upper swivel <b>shaft</b>		45-50
Reverse lock valve screw		14
Transom plate bolt		
Model II		20-25
Model III		<b>25-30</b>
Universal joint bellows clamp		
Model II		12
All others	35	