mercruiser
STERN DRIVES/INBOARD ENGINES

service bulletin

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CIRCULATE TO:
SERVICE MANAGER
PARTS MANAGER
MECHANICS

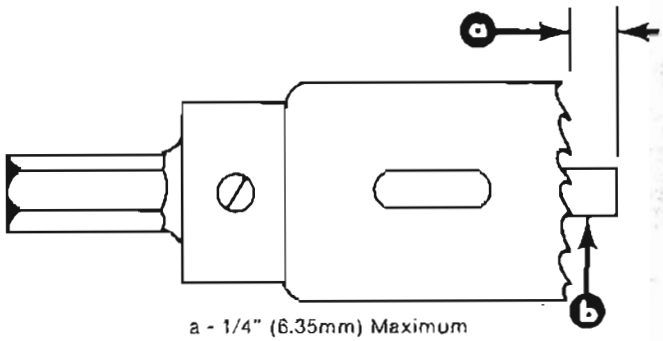
NEW GIMBAL RING REPLACEMENT PROCEDURE For MERCRUISER 120-thru-260 With SIDE-MOUNT ROTARY SWITCH

The new gimbal ring replacement procedure DOES NOT require the removal of engine and transom assembly from boat.

Gimbal ring replacement requires the use of a 1" NPT (National Pipe Taper) tap and a 1⅛" (26.8 mm) hole saw. Tap and hole saw can be obtained from your local factory branch or distributor, if desired, by ordering Tap and Hole Saw Kit (C-91-86191A1).

New parts needed are (2) plastic plugs (C-22-88847) to plug holes in gimbal housing and (1) special nut (B-11-88462) used on top end of swivel shaft.

IMPORTANT: If using your own hole saw, it MUST BE fitted with a pilot rod in place of drill bit to prevent hole saw from wandering when cutting holes. Pilot rod MUST BE installed so that it protrudes a maximum of ¼" (6.35mm) from cutting teeth on hole saw, as shown in Figure 1.



a - 1/4" (6.35mm) Maximum
b - Pilot Rod

Figure 1. Pilot Rod Installed In Hole Saw

Warranty labor allowance is 1.5 hours per drive unit.

Removing Old Gimbal Ring and Upper Swivel Shaft

1. Cut out template. (Figure 7)

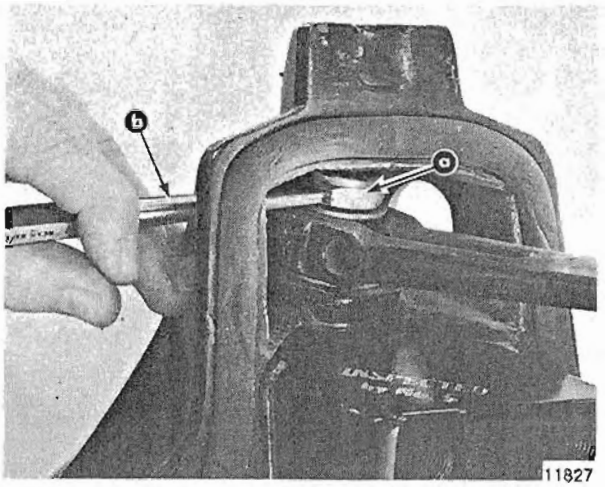
> **CAUTION: Be sure to position template accurately when marking access hole locations in the following step. If holes are not located properly, it will not be possible to remove upper swivel shaft.**

2. Place template (Figure 7) on left side of gimbal housing (as shown in Figure 2) and mark gimbal housing with a punch at location indicated. Repeat same procedure on right side of gimbal housing, using opposite side of template.

> **CAUTION: Be sure to drill and cut holes perpendicular to gimbal housing surfaces in the following steps.**

3. Position drive unit so that it is straight-ahead, then drill same size holes as pilot rod (in hole saw being used) thru gimbal housing at locations marked with punch. If using hole saw from Tap and Hole Saw Kit (C-91-86191A1), drill ¼" (6.35mm) holes.

Figure 2. Template in Position on Left Side of Gimbal Housing



a - Large Nut b - Center Punch

Figure 3. Removing Nut from on Top of Steering Lever (Viewed from Inside of Transom)

4. Using 1⅛" (28.6mm) hole saw, cut holes thru gimbal housing at pilot hole locations. DO NOT use excessive force. Remove metal chips with compressed air or a cloth.
5. Remove stern drive unit. (Refer to MerCruiser Service Manual, Page 2A-3 or 2B-3.) Also remove front anchor pin that secures trim cylinders to gimbal ring. Support trim cylinders with a rope to prevent damage to trim hoses.
6. Remove trim limit switch and trim position sender from sides of gimbal ring. (Refer to Page 6A-39 in Service Manual.) Position switch and sender so that they will not become damaged during further disassembly.
7. Remove hinge pins from both sides of gimbal ring with Hinge Pin Tool (C-91-78310). (Refer to Page 6A-39.) Apply heat to pins, if necessary, to aid in removal.

CAUTION: Use extreme care when cutting off bellows (in next step) to prevent damage to shift cable bellows, shift cable, water pickup hose and trim leads.

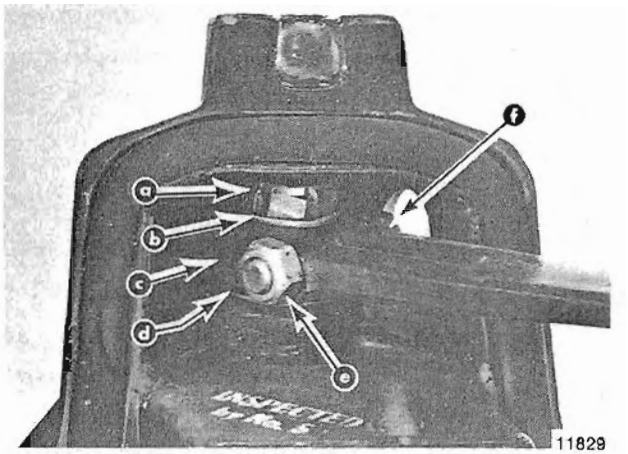
8. Pull bell housing away from gimbal housing and cut off universal joint bellows. If stern drive unit also is equipped with exhaust bellows (not exhaust tube), cut off this bellows also.
9. Loosen clamps and remove ends of bellows from mounting flange(s) on gimbal housing and bell housing. Position bell housing to the side of gimbal ring.
10. Remove cotter pin and drive lower swivel pin out of gimbal housing with a long drift or rod. (Refer to Page 6A-41.) DO NOT lose washer on swivel pin.
11. Remove allen head pipe plug from bottom end of upper swivel shaft. (Refer to Page 6A-41.)
12. Turn steering wheel, as required, so that head on steering lever retaining screw is accessible thru one of the access holes (cut in Step 4). While holding nut on other end of steering lever retaining screw with a box wrench, loosen screw with a socket and remove screw and nut thru access holes. (Discard nut; retain screw.)
13. Turn steering wheel so that steering lever is straight ahead, then unthread large nut (on top of steering lever) from upper swivel shaft by turning nut counterclockwise with a center punch and a hammer thru access holes, as shown in Figure 3. It may be necessary to pull swivel shaft downward slightly, using Slide Hammer Puller (C-91-34569A1) and Puller Head (C-91-38919), to allow nut to be completely unthreaded from shaft. (Refer to Page 6A-41.)

14. After nut has been completely unthreaded from shaft, remove swivel shaft from gimbal ring and housing with Slide Hammer Puller and Puller Head. Also remove large nut thru access hole and discard.
15. Remove gimbal ring from gimbal housing.

Installing Heavy-Duty Gimbal Ring (with Square Upper Swivel Shaft)

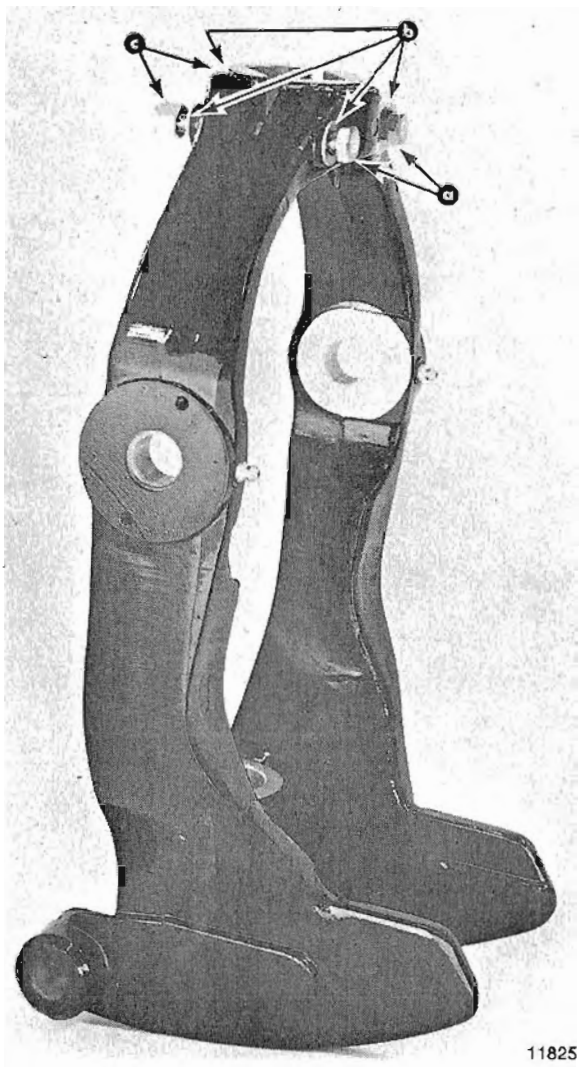
IMPORTANT: Inspect center portion of steering lever retaining screw (removed earlier). If screw is grooved (from rubbing on swivel shaft), steering lever MUST BE replaced at this time, and a NEW retaining screw MUST BE installed in next step.

1. Reinstall retaining screw in steering lever and thread on new locknut. (Figure 4) BE SURE to use new locknut. DO NOT tighten screw and nut at this time.
2. Before installing new grooved elastic locknut, thread locknut all-the-way onto threads on new upper swivel shaft (to cut threads in elastic portion of nut), then remove nut.
3. Insert grooved elastic locknut thru one of the access holes in gimbal housing and place into position on top of steering lever and upper (smaller) washer. (Figure 4) Align locknut, upper washer, steering lever and lower washer by inserting finger into upper swivel shaft bore in gimbal housing.
4. Check that upper swivel shaft fits properly in new gimbal ring. Shaft MUST fit all-the-way into gimbal ring until shoulder on shaft bottoms-out. If necessary, clean up mating surfaces on gimbal ring and swivel shaft with a FINE file. After fitting swivel shaft, remove shaft and coat mating surfaces on ring and shaft with Special Lubricant 101 (C-92-79214).
5. Place one flat washer on each of the long screws and insert screws thru holes in gimbal ring, as shown in Figure 5. Place one flat washer over end of each screw, then coat threads on screw with Special Lubricant 101 and thread on nuts. DO NOT tighten nuts at this time.
6. Guide gimbal ring over bell housing and place in position in gimbal housing.
7. Reinstall lower swivel pin and washer and secure with NEW cotter pin. (Refer to Page 6A-42 in Service Manual.) Grease swivel pin with Universal Joint Lubricant [from U-Joint Grease Kit (C-91-74057A1)] thru fitting on side of gimbal ring until lubricant appears under washer.
8. Position gimbal ring so that it is straight-ahead. While holding steering lever, washers and locknut in position with fingers (thru access holes), insert upper swivel shaft (with flat on splined portion of shaft forward) thru gimbal ring and into gimbal housing. Turn gimbal ring slightly back-and-forth, if necessary, to engage splines on swivel shaft with splines in steering lever and push shaft into gimbal ring and housing as far as it will go. Thread on locknut with fingers as far as possible.
9. Tighten locknut (in clockwise direction), using grooves on nut and a pin punch and a hammer, until a clearance of .002" to .010" (0.051mm to 0.254mm) exists between washer (on lower swivel pin) and gimbal housing. (Refer to Page 6A-43.) Strike bottom end of upper swivel shaft with a hammer to seat shaft in ring, then recheck clearance and tighten nut further, if necessary.
10. Grease upper swivel shaft (thru fitting on top of gimbal housing) with Universal Joint Lubricant until lubricant appears under steering lever. Swivel shaft MUST BE greased heavily to prevent metal chips from getting into swivel shaft needle bearings in Step 20.
11. Turn steering wheel, as required, and torque steering lever retaining screw and nut (installed in Step 1) to 60 ft. lbs. (8.3mkg), using a box wrench and a socket.
12. Torque gimbal ring screws (installed in Step 5) to 25 ft. lbs. (3.46mkg), while holding nuts on front side of gimbal ring with wrench. (Figure 5)



a - Grooved Elastic Locknut (from Kit)
b - Upper Washer
c - Steering Lever
d - Lower Washer
e - Locknut
f - Retaining Screw

Figure 4. Grooved Elastic Locknut in Position (Viewed from Inside of Transom)



a - Screws (Install from This Side)
b - Flat Washers
c - Nuts

Figure 5. Gimbal Ring Screws Installed

13. Clean old Loctite from threaded hinge pin holes on each side of bell housing by running a ⅝"-18 tap into each hole, then spray threads with Locquic Primer "T" (C-92-59327).
14. Clean bellows mounting flange(s) on gimbal housing and bell housing with sandpaper or a wire brush and wipe clean with lacquer thinner.

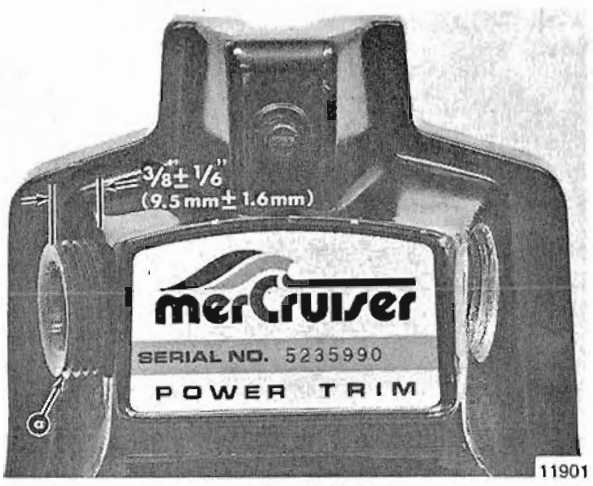
    NOTE: When installing bellows (in next step), BE SURE to use Bellows Adhesive (C-92-36340) and to position bellows and clamps correctly.
15. Place one grounding clip (with hole side inward) on each end of universal joint bellows and install bellows, using new clamps. (Refer to Page 6A-44). On units using exhaust bellows, also install new exhaust bellows, clamps and grounding clips at this time.

    NOTE: When installing bellows, also check that trim limit switch leads and trim position sender leads are positioned properly. (See Page 6A-44.)
16. Clean threads on hinge pins with a wire brush to remove old Loctite, then spray threads with Locquic Primer "T". After primer has dried, apply Loctite No. 35 (C-92-59328) to threads and reinstall hinge pins. (Be sure to use BOTH primer and Loctite.) Torque hinge pins to 50 ft. lbs. (6.9mkg). Grease hinge pins (thru fittings on gimbal ring) with Universal Joint Lubricant until lubricant appears on both sides of pin.
17. Reinstall trim limit switch and trim position sender. (Refer to Page 6A-37.) DO NOT tighten screws at this time.
18. Place new drive shaft housing to bell housing gasket into position on bell housing and re-install drive unit and trim cylinders. (Refer to Page 2A-3 or 2B-3.)
19. Adjust trim limit switch and trim position sender. (Refer to Pages 6A-37 and 6A-38.)

SAFETY WARNING: Use extreme care when tapping holes and installing plugs (in the following steps) to ensure that it is done correctly. If holes are threaded incorrectly, or if plastic plugs are not installed properly, water leakage into boat may result.

20. Place drive unit in a FULL RIGHT TURN. Coat cutting portion of 1" NPT tap with grease and thread RIGHT access hole in gimbal housing, using ONLY first ½" ±1/16" (12.7mm ±1.6 mm) of tap. (Mark tap with a piece of tape to indicate depth.) BE SURE to tap hole perpendicular to housing. Place drive unit in a FULL LEFT TURN and thread LEFT access hole in same manner. Remove metal chips with compressed air or a cloth.
21. Clean grease from threads in gimbal housing with solvent, then coat threads of 2 plastic plugs with Perfect Seal (C-92-34227) and install in access holes (using a ⅝" allen wrench) until ⅜" ±1/16" (9.5mm ±1.6 mm) is exposed. (Figure 6) Use care to prevent cross-threading plugs.

    NOTE: (Service Tip) If a ⅝" allen wrench is not available, plugs can be installed with a bolt that has a ⅝" hex head. Thread 2 nuts onto bolt and tighten one against the other to allow bolt to be turned with a wrench or socket.



a - Plastic Plug

Figure 6. Installing Plastic Plugs

22. Remove caps from grease fittings on old gimbal ring and reinstall on new ring.
23. Touch up any scratches or bare metal spots, using a Q-Tip saturated with Phantom Black Spray Paint (C-92-78373).

SAFETY WARNING: With boat in the water and engine running, turn steering wheel thru entire steering range and check for binding. Also, check gimbal housing for leakage in area where plastic plugs were installed.

Installing Old Style Gimbal Ring (with Splined Upper Swivel Shaft and Side-Mounted Rotary Switch)

Gimbal ring installation is described in MerCruiser Service Manual, Page 6A-42, with the following exceptions:

NOTE: (Service Tip) Before installing special grooved elastic locknut, thread locknut all-the-way onto threads on new upper swivel shaft (to cut threads in elastic portion of nut), then remove nut.

1. Special grooved nut B-11-88462 is used when installing upper swivel shaft to allow tightening of nut. Nut is tightened (in clockwise direction), using grooves on nut and a pin punch and hammer until a clearance of .005" to .007" (0.13mm to 0.18mm) exists between washer (on lower swivel pin) and gimbal housing. (Refer to Page 6A-43.)
2. Holes cut in gimbal housing are tapped and plugged as follows:

SAFETY WARNING: Use extreme care when tapping holes and installing plugs (in the following steps) to ensure that it is done correctly. If holes are threaded incorrectly, or if plastic plugs are not installed properly, water leakage into boat may result.

a. Place drive unit in a FULL RIGHT TURN. Coat cutting portion of 1" NPT tap with grease and thread RIGHT access hole in gimbal housing, using ONLY first ½" ± 1/16" (12.7mm ± 1.6mm) of tap. (Mark tap with a piece of tape to indicate depth.) BE SURE to tap hole perpendicular to housing. Place drive unit in a FULL LEFT TURN and thread LEFT access hole in same manner. Remove metal chips with compressed air or a cloth.

b. Clean grease from threads in gimbal housing with solvent, then coat threads of 2 plastic plugs with Perfect Seal (C-92-34227) and install in access holes (using a ⅝" allen wrench) until ⅜" ± 1/16" (9.5mm ± 1.6mm) is exposed. (Figure 6) Use care to prevent cross-threading plugs.

NOTE: (Service Tip) If a ⅝" allen wrench is not available, plugs can be installed with a bolt that has a ⅝" hex head. Thread 2 nuts onto bolt and tighten one against the other to allow bolt to be turned with a wrench or socket.

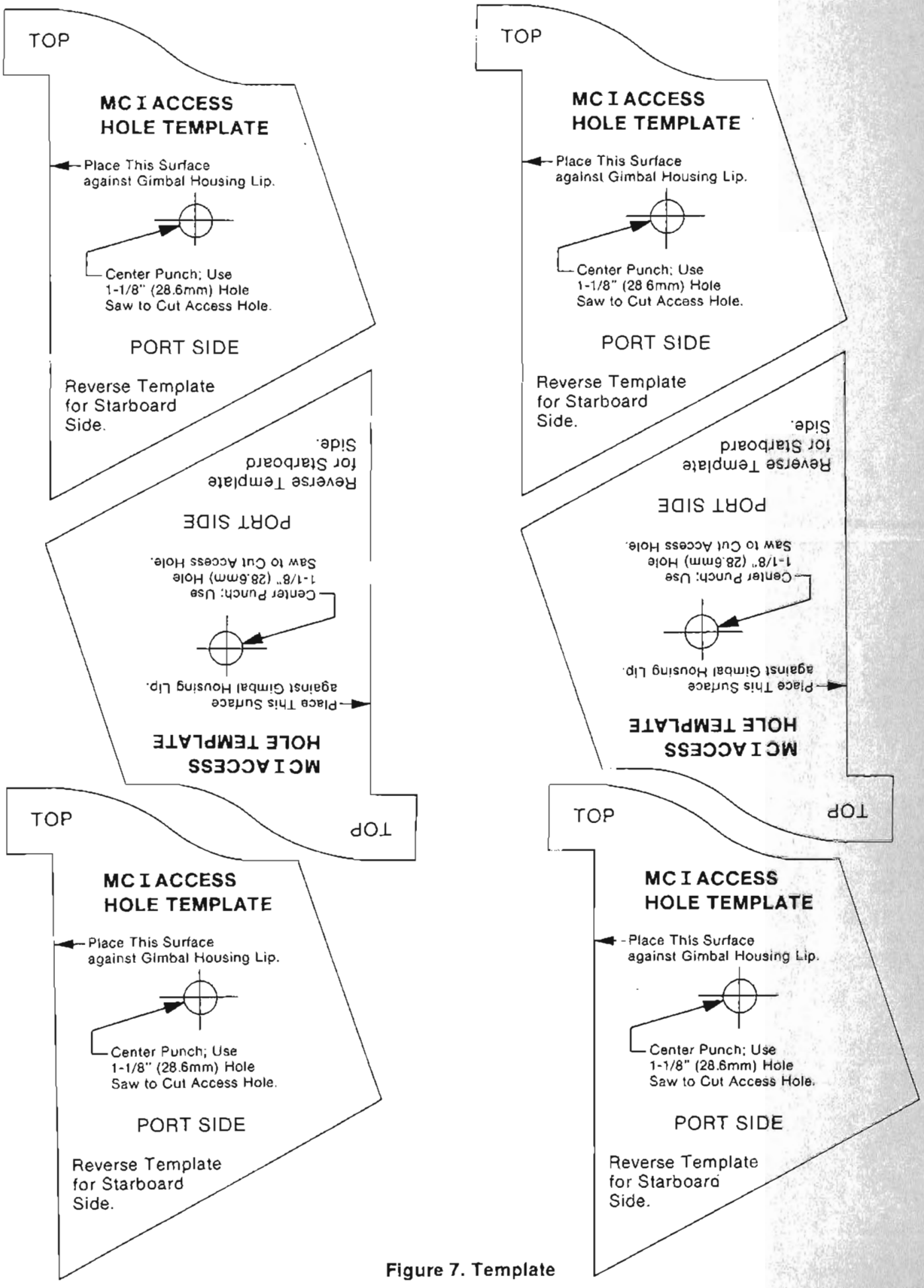


Figure 7. Template