

Upper Gear Housing Installation

13 1. Be sure nylon plug is at base of splines inside lower driveshaft. Apply gearcase oil to the splines at both ends of the intermediate driveshaft, and insert it into the lower driveshaft. Rotate shift rod head **B** 90° to port to provide clearance when installing upper gear housing.

2. Install water tube in upper gearcase. See **Section 7** for text and photo.

14 3. Align the upper gear housing fore and aft to make sure the driveshaft and water tube seat simultaneously, then set it onto the lower gearcase. As shift rod head appears inside exhaust opening, turn head forward to engage guide pin. You may have to rotate the U-joint shaft slightly to engage the driveshaft splines. Use hand pressure only to seat the housing.

4. Clean the six gear housing mounting bolts in solvent.

Note Do not wire brush the yellow-green material on the bolt threads. This is a locking device that prevents the bolts from loosening. If this material is removed, the bolts must be replaced.

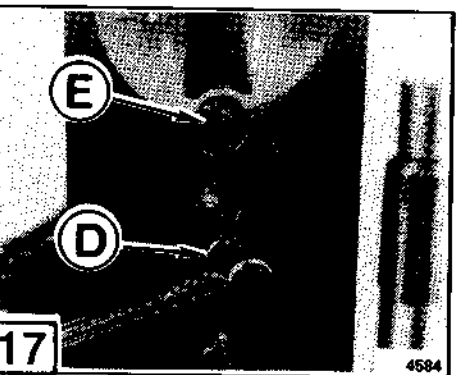
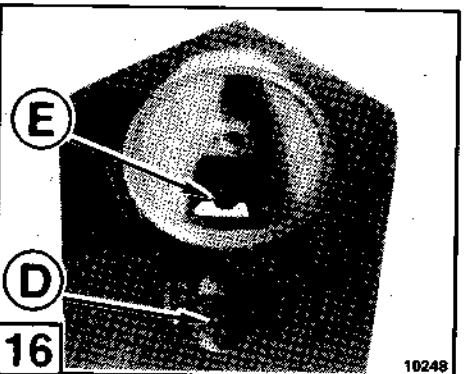
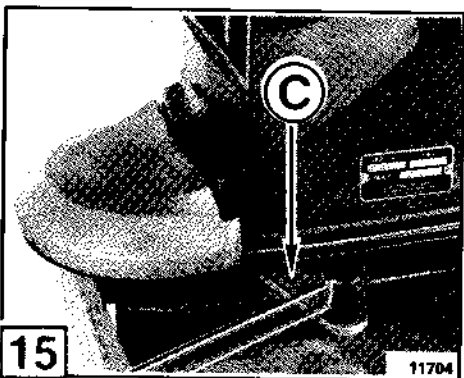
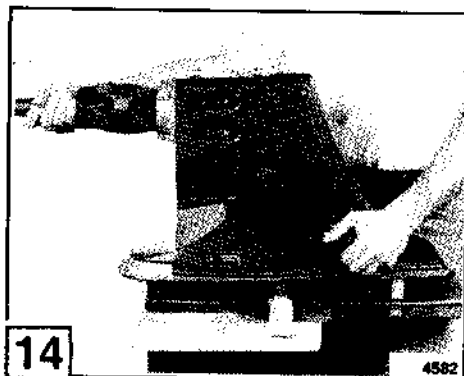
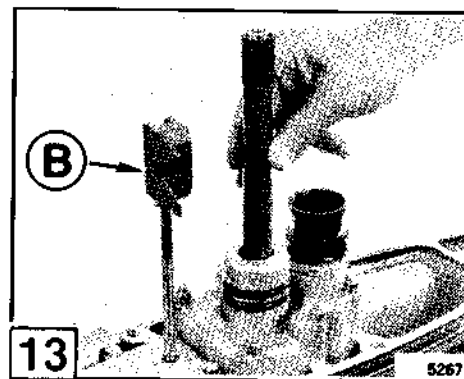
15 5. Lightly apply *OMC Gasket Sealing Compound* to the four short bolts. Install and tighten them to a torque of 22-24 ft. lbs. (30-33 N·m). Use OMC Wrench P/N 912031 **C** for clearance.

16 **17** 6. Turn the gearcase over. Lightly apply *OMC Gasket Sealing Compound* to the threads of both bolts under ventilation plate. Place the $\frac{7}{16}$ in. flat washer on the largest bolt **D** and install it, then screw in the remaining bolt **E** under the trim tab. Tighten both to a torque of 22-24 ft. lbs. (30-33 N·m).

Pressure and Vacuum Testing Vertical Drive

Now that the vertical drive is assembled, repeat the pressure and vacuum tests made previously. Pressurize the drive to 3-5 PSI (21-42 kPa) and 16-18 PSI (110-124 kPa) and pull vacuum to 3-5 in. and 15 in. of mercury. These additional tests will check sealing of the driveshaft bearing housing O-ring and upper gear housing. Find pressure leaks by submerging drive or using a soapy water solution. Find vacuum leaks by applying a heavy oil to suspected areas. Make repairs if necessary and repeat these tests. Drive must not lose more than 1 unit of pressure/vacuum in 3 minutes.

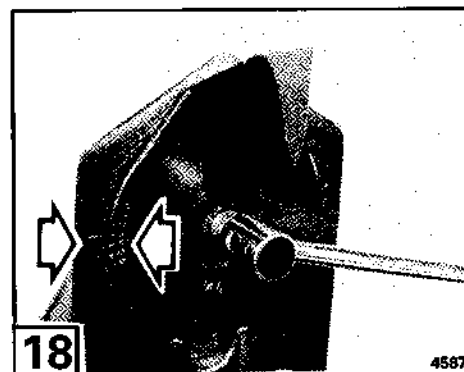
Note Do not fill vertical drive with oil until it passes both pressure and vacuum tests. Drives that fail either test will allow water entry when in use and cause subsequent damage to internal parts.



Trim Tab Installation

1. Thoroughly clean all old sealer from the trim tab screw threads with a wire brush. Clean the housing hole with a thread tap.

18 2. Apply *OMC Gasket Sealing Compound* to the bolt threads. Position the trim tab on the housing and align the reference marks or the index rib with the original grid number setting. Tighten the screw to a torque of 28-32 ft. lbs. (38-42 N-m). If the original setting is not known, align the rib with grid number '3'.



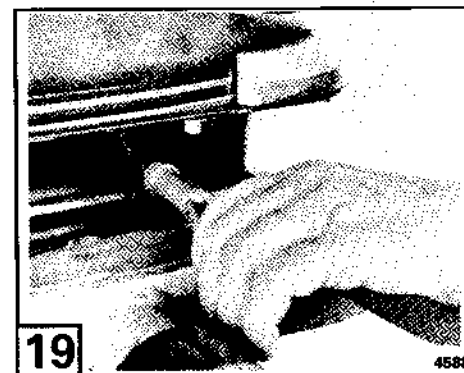
Vertical Drive Filling, Gearcase Lubricant

1. Place the drive in a vertical position. Remove the level indicator gauge and discard the seal. Install a new seal, then insert the gauge into the housing and let it rest on top of the threads.

Note Do not screw in the gauge. Gauge must rest on threads to ensure adding the proper amount of oil when making an initial fill. It will also allow the reservoir to vent while filling.

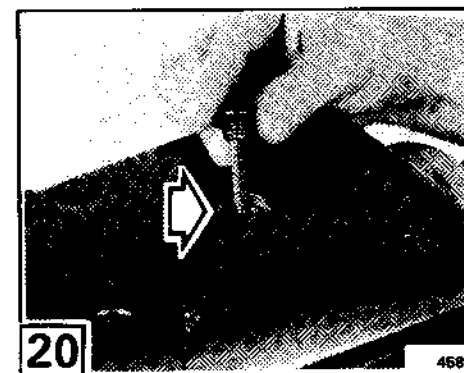
2. Remove the fill plug on the side of the lower gearcase above the anti-ventilation plate. Discard the nylon washer and replace it with a new one.

19 3. Fill the drive with *OMC Hi-Vis* gearcase lubricant. Fill slowly to allow air to purge.



Note Filling drive too quickly may form air pockets that will cause an inaccurate oil level reading. Running drive with improper oil level will result in immediate internal damage.

20 4. Frequently check gauge while filling. When oil reaches level line, stop filling and screw in gauge. This will create an air lock to prevent oil loss when the fill plug is installed. Tighten fill plug to a torque of 60-84 in. lbs. (7-9 N-m). Finish procedure by tightening level indicator to a torque of 10-20 ft. lbs. (14-16 N-m).



5. After drive has been run, recheck oil level. Fill drive through gauge opening to bring oil up to level line on gauge. Take this and subsequent level readings with gauge completely screwed in. **Checks made with gauge resting on threads are for initial fill only.**

Vertical Drive Installation

Remove vertical drive from the holding fixture and mount on boat. See **Section 17** for installation procedure.

Section 8

Lower Gearcase - Counter Rotation

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Safety Warning

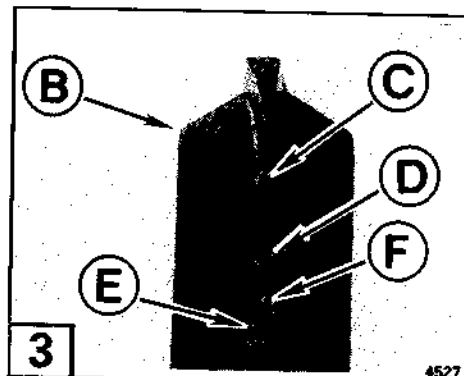
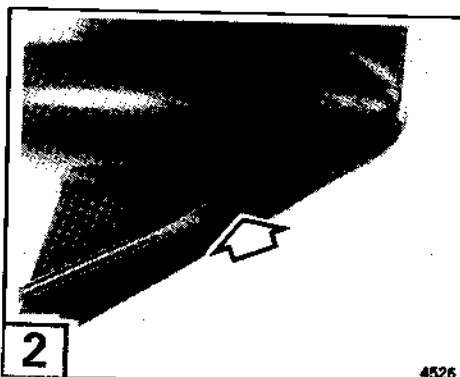
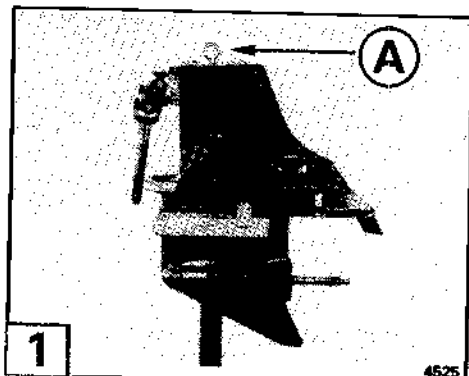
Before working on any part of the lower gearcase, read the section called Safety at the beginning of this manual.

OMC Special Tools

P/N	Description
311875	Spline Socket
314438	Driveshaft Socket
316982	Puller Bolts (2)
321517	Bearing Installer
326551	Seal Installer
326562	Bearing and Seal Installer
326690	Seal Installer
328366	Gauge Bar
328367	Gauge Bar
328828	Installer
330224	Gauge Bar
330278	Puller Legs (2)
331045	Retaining Ring Pliers
334455	Pinion Nut Holder
378103	Universal Puller
383175	Guide Pin Set (2)
391010	Two-Jaw Puller
391012	Two-Jaw Puller
391257	Bearing Installer/Remover
391259	Bearing and Seal Remover
912031	Wrench
912277	Height Gauge
912280	Alignment Plate
984329	Shim Gauge Kit

Sealants, Lubricants and Adhesives

OMC Gasket Sealing Compound
OMC Triple-Guard® Grease
OMC Needle Bearing Assembly Grease
OMC Hi-Vis® Gearcase Lubricant
OMC Locquic Primer
OMC Screw Lock
OMC Ultra Lock
OMC Nut Lock



Vertical Drive Removal

To service the lower gearcase assembly, remove the complete vertical drive unit from the transom of the boat. See **Section 17** for the removal procedure.

Upper Gear Housing Removal

1 1. Mount the vertical drive assembly in a suitable holding fixture and clamp it securely. Unscrew the lifting eye **A** and leave the oil level hole open so the oil reservoir vents when draining.

2 2. Place a 4 quart drain pan under the lower gearcase. Remove the lower drain plug, discard the nylon washer, and let the vertical drive drain completely.

3 3. Note the relationship of the gearcase index mark and trim tab grid **B** so the two can be realigned later. Remove the screw **C** and trim tab.

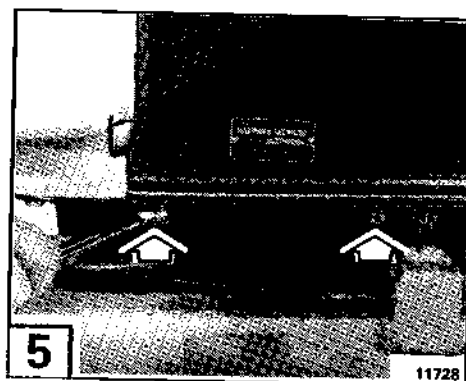
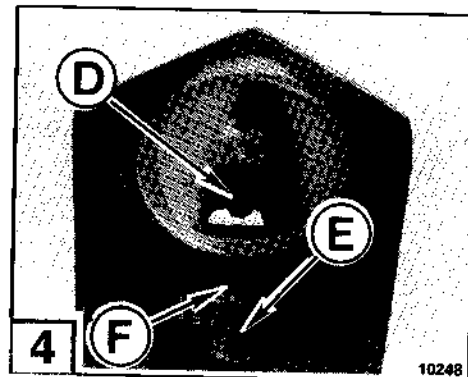
If there is no grid, scribe a reference mark on the gearcase and trim tab so tab can be reinstalled in the same position.

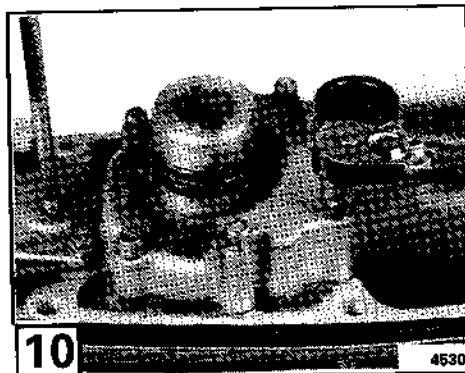
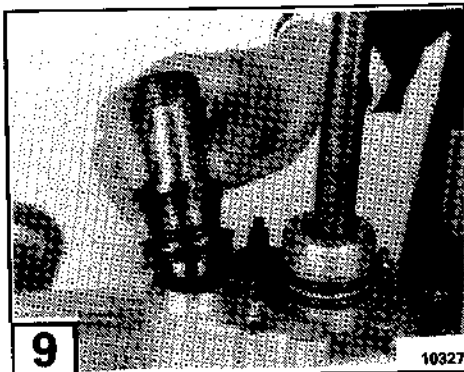
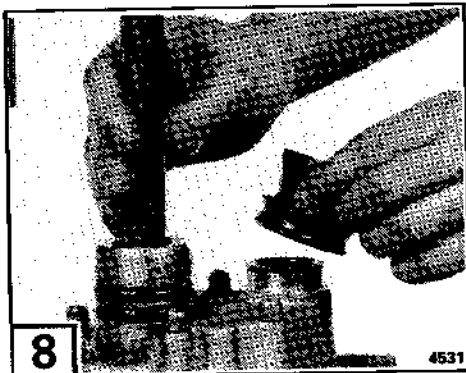
3 **4** 4. Remove screw **D** under the trim tab, then remove screw **E**. Do not unscrew the anode screw **F**.

5 5. Take out the four bolts along the underside of the upper gear housing.

6 6. The upper gear housing is now held in place only by O-rings. Firmly hold the housing as shown and pull upward forcefully. Rotating the housing side-to-side while pulling will help free it.

7 7. Lift gear housing until shift rod head disengages guide pin, then rotate head of shift rod 90° to port so head clears exhaust opening when removing upper gear housing.





Lower Gearcase Disassembly

8 9 1. Pull out the intermediate driveshaft and lift off the plastic water tube guide. Also remove water tube and seal if stuck in tube guide.

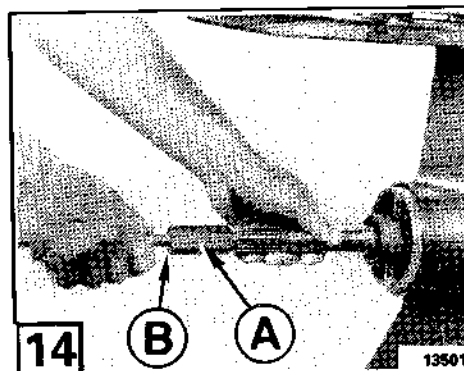
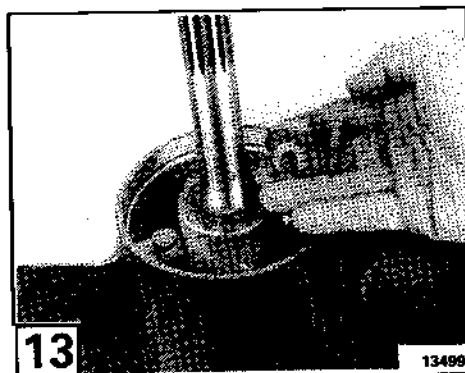
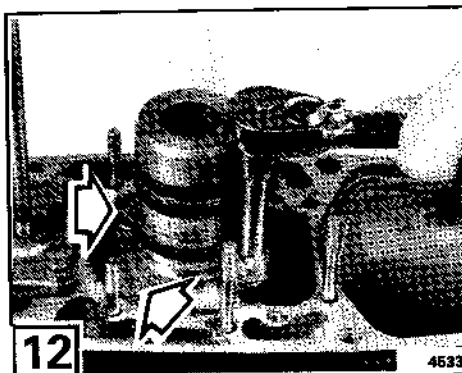
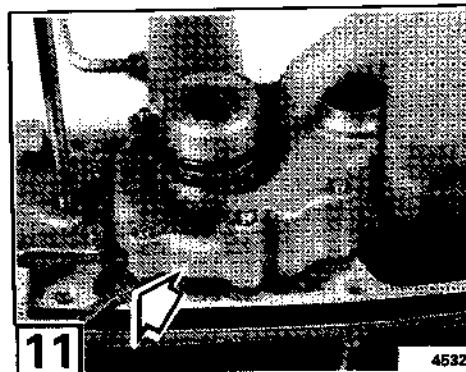
10 2. Remove and discard the elastic locknuts securing the water passage housing. Set the flat washers aside.

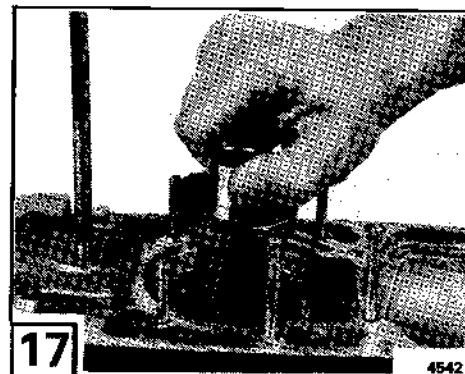
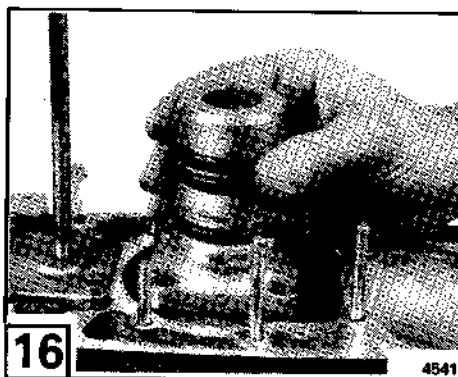
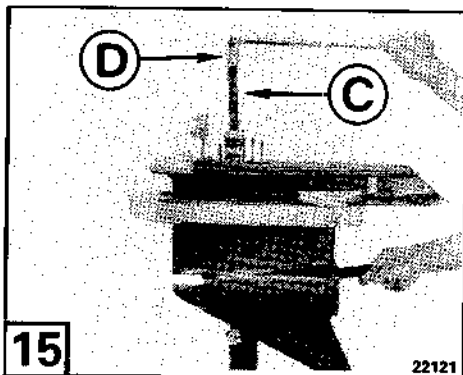
11 3. The housing is held by a gasket and an O-ring. Loosen the housing by pulling up on it while gently prying under the edge of the casting near the forward studs. When it's free pull it up over the driveshaft housing and discard the gasket underneath.

12 4. Remove the four driveshaft bearing housing screws and washers. This will allow the driveshaft to move upward when unscrewing the pinion nut.

13 5. Remove the two screws and retainers holding the propeller shaft bearing housing.

14 6. Screw OMC Adapter P/N 432398 **(A)** onto OMC Slide Hammer P/N 432128 **(B)** until it seats. Screw adapter completely onto propeller shaft, and pull propeller shaft bearing housing assembly out of gearcase.





15 7. Reinsert the intermediate driveshaft ©. Hold the pinion nut with OMC Pinion Nut Holder P/N 334455 and unscrew the pinion nut by turning the driveshaft with OMC Spline Socket P/N 311875 ①.

16 8. Remove the intermediate driveshaft, then pull out the driveshaft bearing housing.

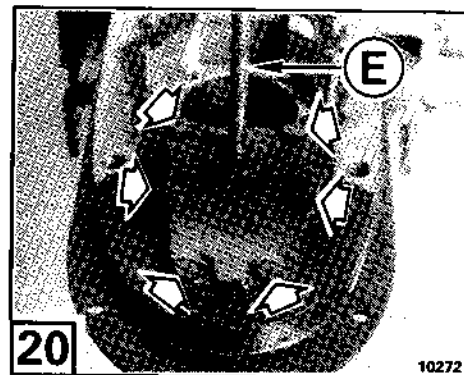
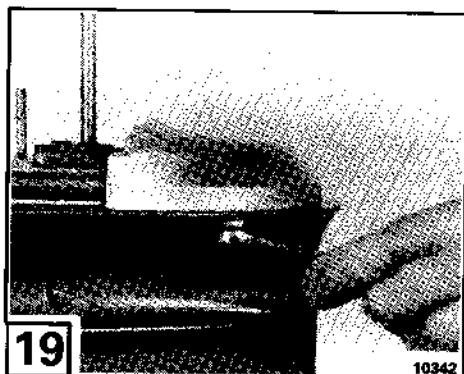
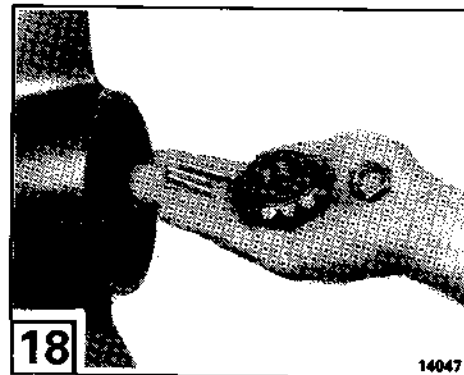
17 9. Pull the lower driveshaft out of the gearcase; try wiggling it to loosen it. A thrust bearing, thrust washer and shims will come out with the driveshaft.

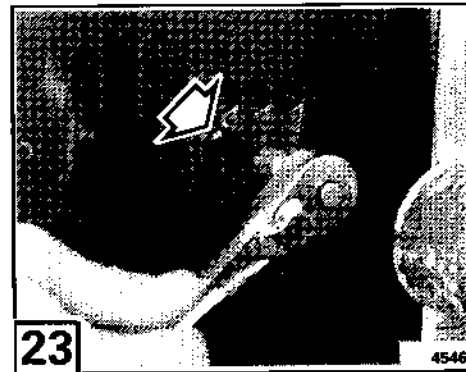
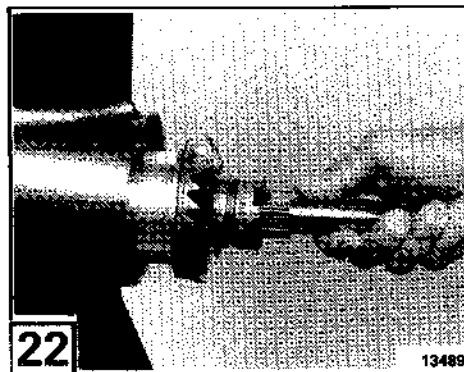
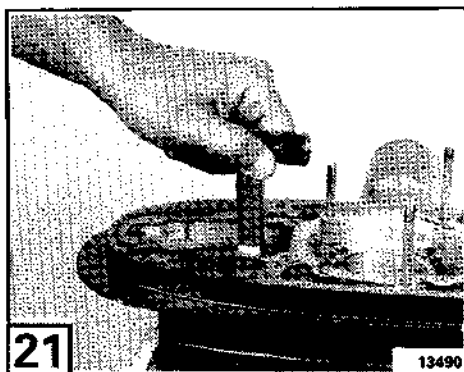
18 10. Reach inside the gearcase and take out the pinion gear, nut and any loose needle bearings that may have fallen into the gearcase when the lower driveshaft was pulled out.

19 11. Remove two anode screws and anode to expose shift rod cover completely.

20 12. Push down on the shift rod ②. This will move the detent lever downward to clear the inside of the gearcase when the propeller shaft assembly is pulled out.

20 13. Completely unscrew the shift rod, but do not pull it out of the shift rod cover. Remove the six cover screws, then lift off the shift rod and cover assembly. Discard the gasket underneath.





21 22 14. Reach into the shift cavity with a suitable tool, and depress the shift detent. While holding the detent down, pull the clutch shaft and bearing housing assembly out of the gearcase.

Note If the shift detent is not held in the fully depressed position, it will pop up when the clutch shaft is pulled, and prevent removal of the clutch shaft and bearing housing assembly.

Lower Driveshaft Bearing Removal

23 Note 1. **Remove the lower driveshaft bearing only if it needs to be replaced.** Before attempting removal, take out the bearing retaining screw on the side of the gearcase, otherwise the gearcase will be damaged. Replace the screw's O-ring.

2. If the driveshaft bearing must be replaced, use OMC Bearing Remover and Installer P/N 391257 and assemble it as follows:

24

- Ⓐ Flange Nut P/N 326586
- Ⓑ Plate P/N 391260
- Ⓒ Rod P/N 326582
- Ⓓ Remover P/N 326579

Note Make sure all loose needles are inside bearing case before pulling bearing. The needles will provide a surface for the remover tool to pull against.

25

3. Turn nut and pull bearing up.

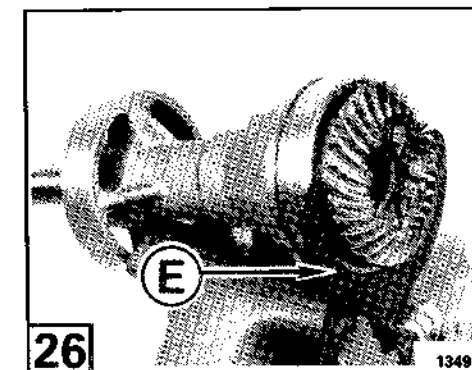
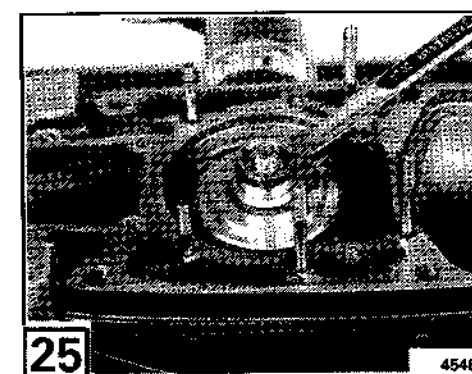
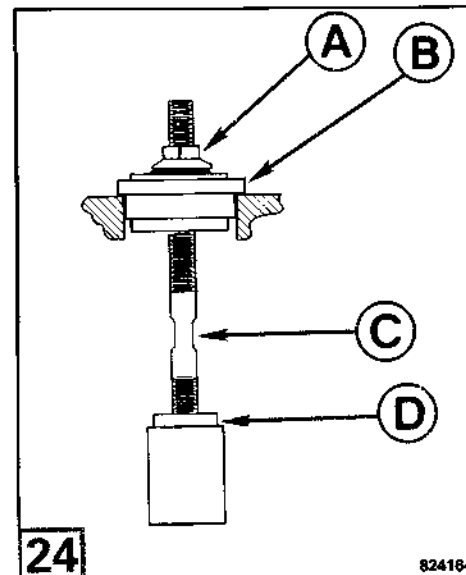
Propeller Shaft and Bearing Housing Disassembly - Forward Gear

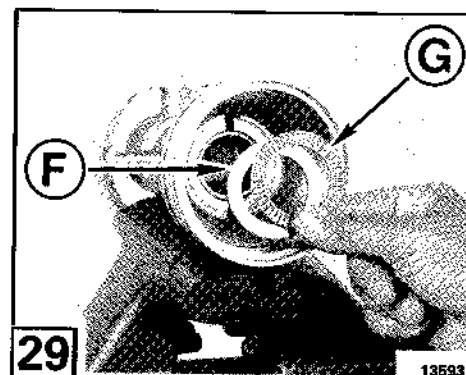
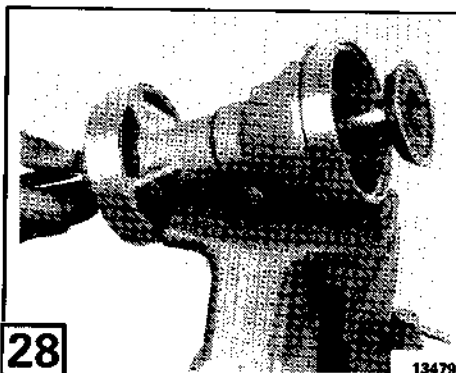
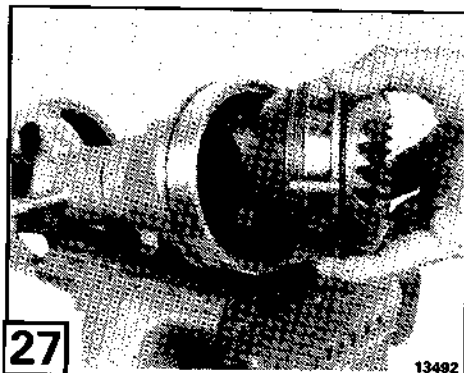
1. Remove and discard the bearing housing O-ring(s).

26 27

2. Remove the anode and discard it if it's more than 2/3 deteriorated. Clamp the bearing housing by the anode bosses in a vise. Remove the forward gear assembly by unscrewing it with OMC Spanner P/N 432400 Ⓔ.

Note The forward gear assembly is serviced as a single unit. Do not attempt to disassemble it.





28 **29** 3. Push the propeller shaft out of the bearing housing, then lift the thrust washer **F** and thrust bearing **G** out of the housing (or off the back of the propeller shaft). Discard the thrust bearing.

30 4. Remove both seals using OMC Puller Bridge P/N 432127 and OMC Large Puller Jaws P/N 432129. Position plate on top of housing to support bridge, and tighten jaws securely behind lower seal.

31 **Note** Do not remove housing bearings unless you intend to replace them. Bearings may be damaged during removal.

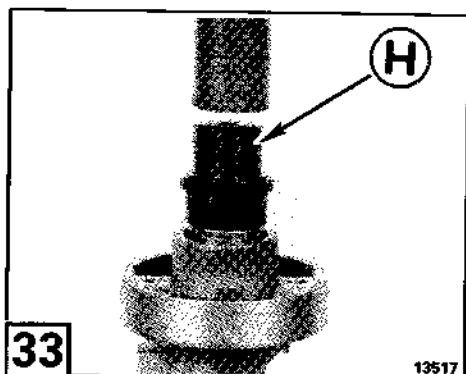
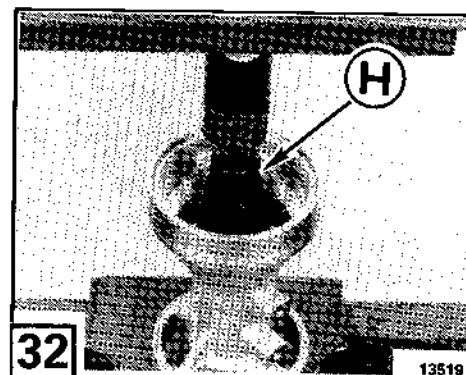
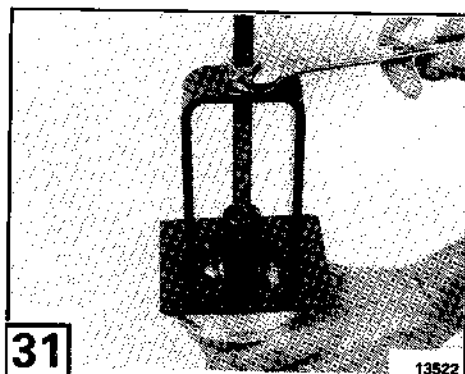
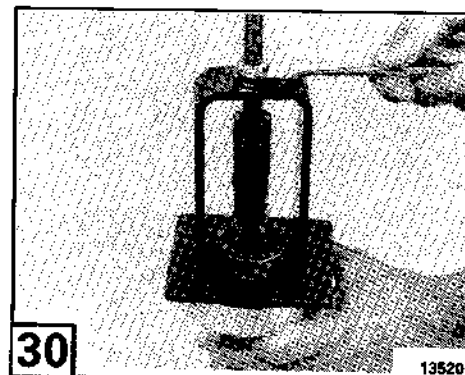
5. Remove either bearing using OMC Puller Bridge P/N 432127 and OMC Large Puller Jaws P/N 432129. Rest puller plate on top of housing to support bridge, and tighten jaws securely behind bearing.

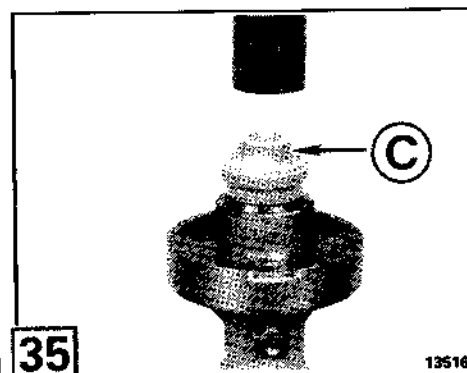
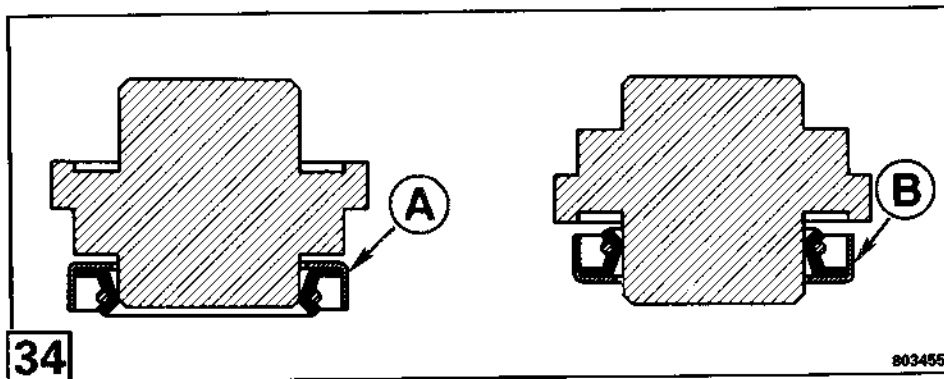
6. Clean housing and bearings in solvent and dry thoroughly. If bearings were not replaced, rotate needles with your fingers to check for freedom of movement. Inspect O-ring groove(s) and sand off any sharp edges that would cut O-ring(s) prevent sealing.

Propeller Shaft and Bearing Housing Reassembly - Forward Gear

32 1. To replace the large bearing, lightly coat the outside case with gearcase oil. Place bearing housing on a suitable fixture. Face the lettered end of the bearing case toward the large diameter end of OMC Bearing Installer P/N 432401 **H** and slide it onto tool. Press bearing into housing until the tool seats.

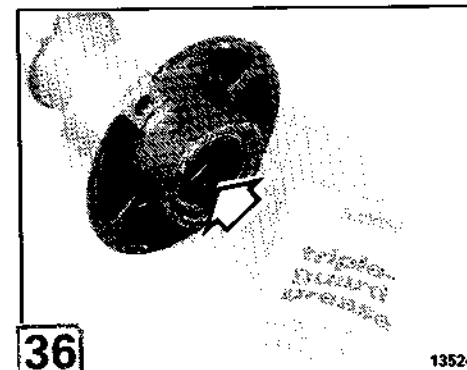
33 2. To replace the small bearing, lightly coat the outside case with gearcase oil. Place lettered end of bearing case on small diameter end of OMC Bearing Installer P/N 432401 **H**, then press bearing into housing until the tool seats.





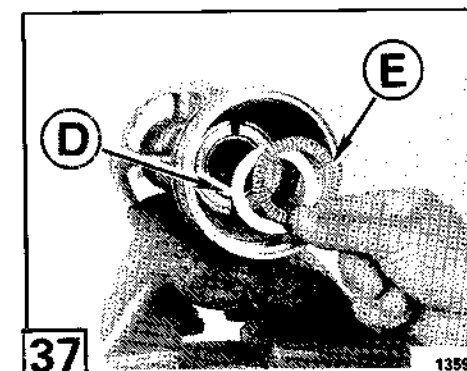
34 **35** 3. Apply a light coat of *OMC Gasket Sealing Compound* to the metal cases of two new seals. Position the inner seal **A** with the lip of outer seal **B** away from housing and install using opposite end of tool. Position seals on OMC Seal Installer P/N 326690 **C** as shown. Press in one at a time until the tool seats.

36 4. Apply *OMC Triple-Guard®* grease to the lips of both seals, and into the cavity between them. This will prolong the life of the seals.



37 5. Clamp the housing in a vise. Place the thrust washer **D**, then new thrust bearing **E**, inside the housing.

38 6. Coat the bearing surfaces of the propeller shaft with gearcase oil. Slide the propeller shaft into the housing and position it against the thrust bearing.



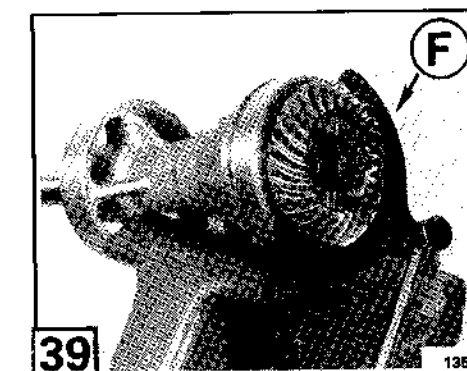
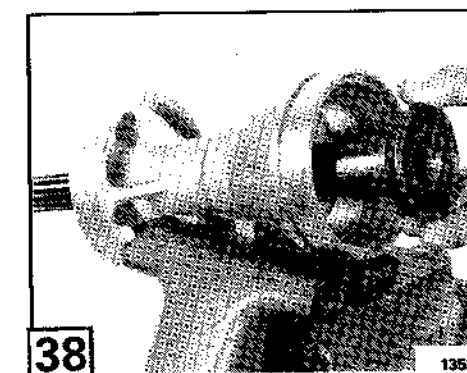
39 7. Lightly oil the threads of the forward gear assembly. Carefully start the threads in the housing, and screw it in by hand as far as possible. Tighten the gear assembly to a torque of 100 ft.lbs. (136 N·m) using OMC Spanner Wrench P/N 432400 **F**.

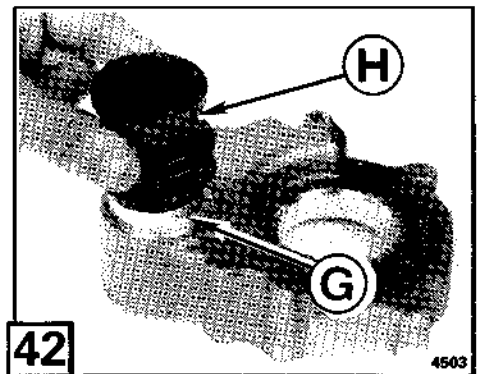
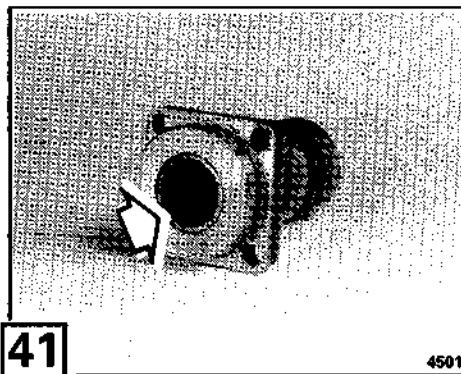
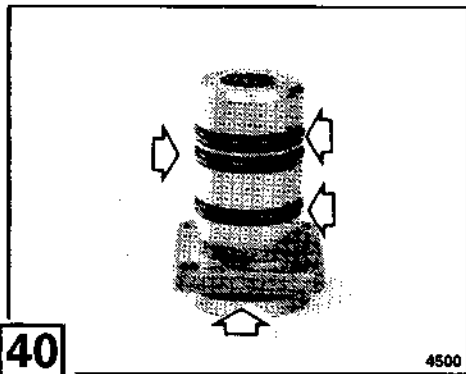
8. Attach the anode and tighten the screws to a torque of 60-84 in. lbs. (7-9 N·m).

Driveshaft Bearing Housing Disassembly

40 1. Remove and discard all four O-rings.

41 2. **The internal needle bearing is not serviceable, so do not remove it.** Spin the needles with your finger to see if they move freely. If they are damaged or corroded and must be replaced, order a replacement driveshaft housing and bearing assembly.



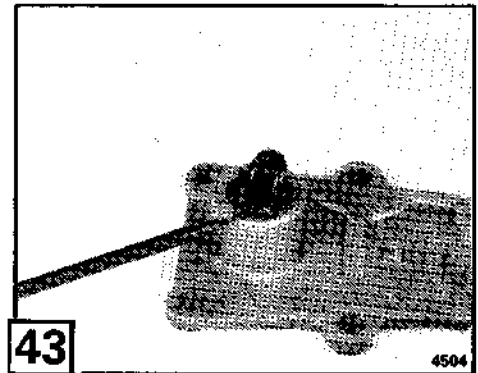


3. Clean the housing in solvent and dry it thoroughly. Inspect the O-ring grooves and sand off sharp edges that would cut the O-rings and prevent them from sealing.

Water Passage Cover Assembly

1. Clean the housing in solvent to remove traces of gasket material and sealer, then dry thoroughly.

42 2. Push the seal (G) into the cover outlet (it doesn't require sealer), then press the guide (H) onto the seal.



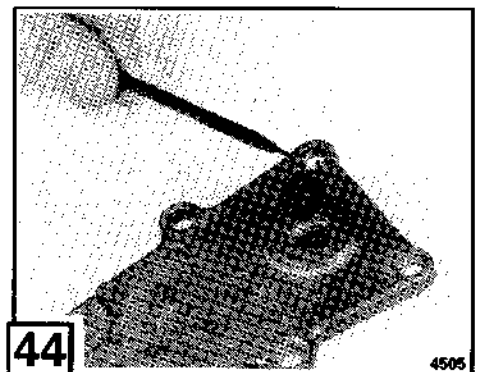
Shift Rod and Cover Disassembly

Note Do not pull the shift rod out of the cover unless you intend to replace the rod or one of the cover components.

1. Only two cover components are serviceable: the wiper and an internal O-ring. To replace them, first pull out the shift rod.

43 2. Pry the O-ring out of the bottom of the bronze bushing with a small sharp pick. Discard O-ring.

44 3. Pry out the wiper in a similar manner and discard it also.

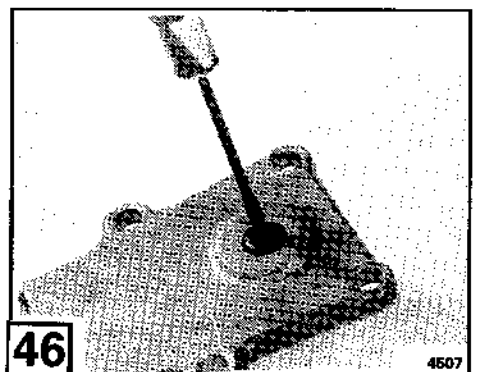


4. Clean the cover in solvent and dry it thoroughly. Inspect the rod threads for damage and replace cover, if necessary.

Shift Rod and Cover Assembly

45 1. Apply *OMC Triple-Guard* grease to a new O-ring and push it onto its seat inside the bushing.

46 2. Apply *OMC Triple-Guard* grease to a new rod wiper and press it into the cover. Push around the rim of the wiper with a small screwdriver to be sure it's seated.



- 47** 3. Lightly coat the shift rod threads with *OMC Triple-Guard* grease. Slowly screw the rod through the wiper and O-ring. Continue turning it until the last thread is through the bushing, then push the rod at least halfway through the cover.

Clutch Shaft and Bearing Housing Disassembly - Reverse Gear

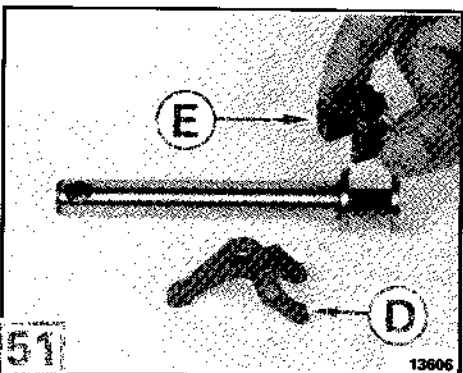
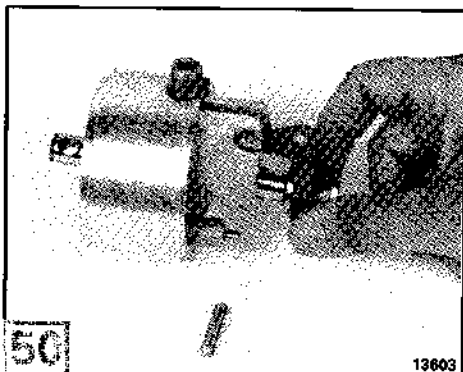
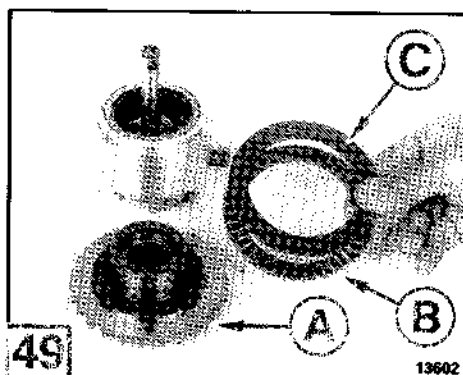
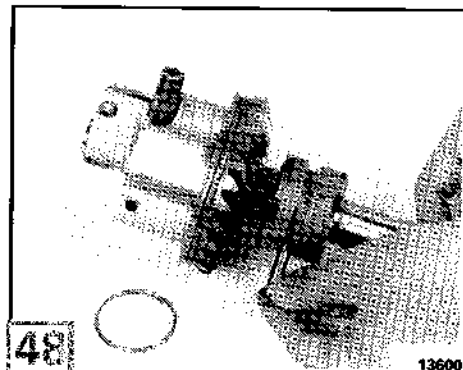
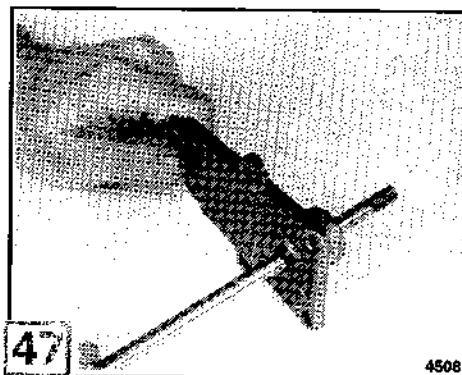
- 48** 1. Unwrap the spring from around the clutch dog, then remove the pin.

2. Pull the clutch shaft out of the housing, and slide the clutch dog off the rear of the shaft. The detent balls inside the rear of the shaft are not serviced, and are available only as an assembly with the clutch shaft.

- 49** 3. Lift the reverse gear **A**, thrust bearing **B**, and thrust washer **C** off the bearing housing.

Note Do not remove the bearing inside the reverse gear. It is not serviced separately, and is available only as an assembly with reverse gear.

- 50** **51** 4. Push the shifter pivot pin out of the housing. Pull out the shift shaft, cradle and shifter. Lift shifter **D** and cradle **E** off the shift shaft.



5. Remove the 25 loose needles from the inside the bearing housing.

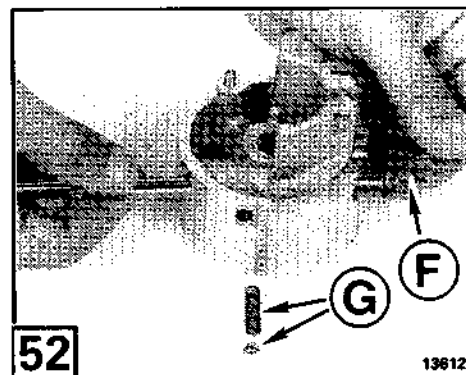
- 52** 6. Use a suitable tool to push the detent **F** out of the housing, then remove the detent ball and spring **G**.

Cleaning and Inspection - Reverse Gear, Bearing Housing and Clutch Shaft

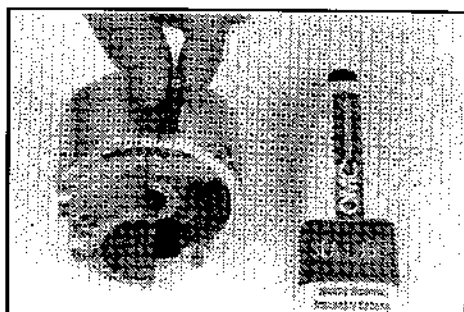
1. Clean all parts in solvent and dry thoroughly.
2. **Clutch Shaft** - Check splines for burrs that would prevent smooth clutch dog travel. Bearing surfaces must be free from pitting and corrosion.
3. **Clutch Dog** - Check drive lugs for wear or damage that would affect gear engagement. The retaining pin hole must not be elongated and internal splines must allow smooth travel.
4. **Reverse Gear** - Check drive lugs for wear, damage or discoloration. Check needles of internal bearing for freedom of movement, corrosion or discoloration.
5. **Shift Detent, Cradle, Shifter, Shaft and Pin** - Look for burrs, wear, or damage that would prevent slip-fit engagement and complete freedom of movement of shift mechanism.
6. **Bearing Housing and Bearings** - Check detent lever and pivot pin holes for burrs or damage that would prevent free movement of the shift mechanism. Inspect bearing needles for pitting, corrosion or discoloration.

Note Discoloration of a part usually indicates overheating damage due to lack of lubrication, or use of improper type of oil.

! Replace suspect components. Shift system failure can lead to operator suddenly and unexpectedly losing control of forward or reverse movement of boat.

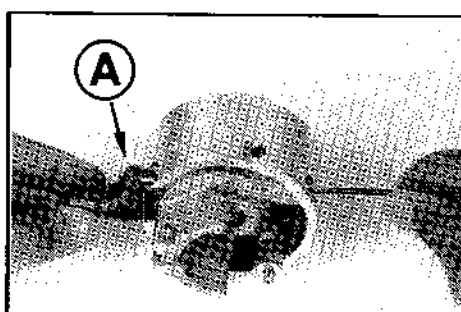


Safety Related



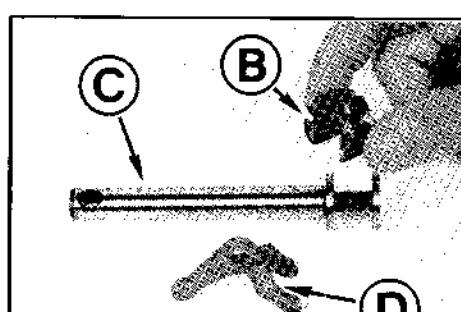
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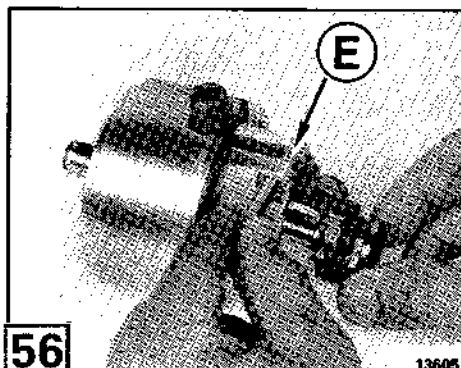
Clutch Shaft and Bearing Housing Reassembly - Reverse Gear

53 1. Lightly coat the detent ball and spring with *OMC Needle Bearing Assembly Grease*. First insert the spring in the housing, then the ball.

54 2. Insert the detent (A) into the housing, and push it up next to the detent ball. Make sure the ball is resting on the spring. Insert a screwdriver into the opposite end of the detent passage. Simultaneously depress the ball while pushing in on the detent until it snaps into the NEUTRAL position.

55 **56** 3. Place the cradle (B) on the shift shaft (C), then rest the shifter (D) on the cradle. Slide the shaft into the housing, and insert the shifter tip into the detent's pocket. Install the pivot pin (E).

57 4. Thoroughly grease the original 25 needles with *OMC Needle Bearing Assembly Grease* and place in the bearing case.



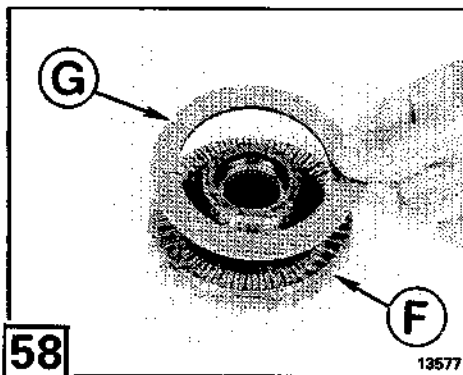
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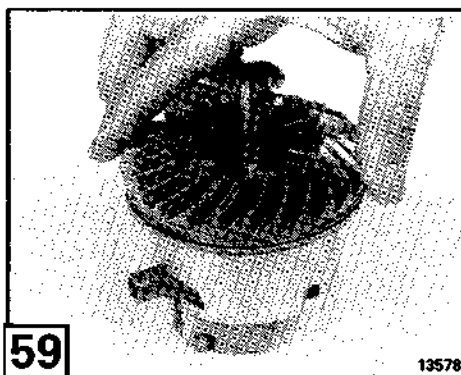


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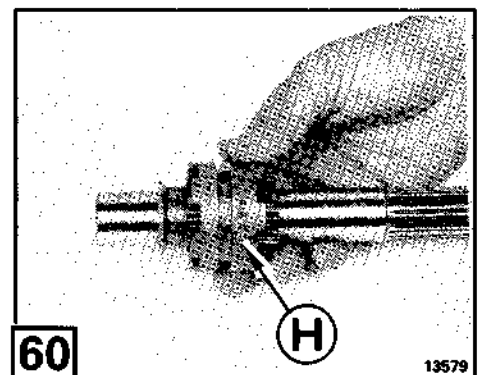
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58 5. Place the bearing (F) on the back of the reverse gear. Set the thrust washer (G) on top of the thrust bearing.

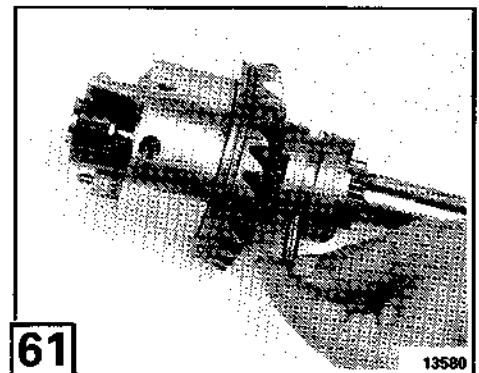


59 6. Insert the gear, bearing and washer assembly into the bearing housing. Be careful not to dislodge any of the loose needle bearings.



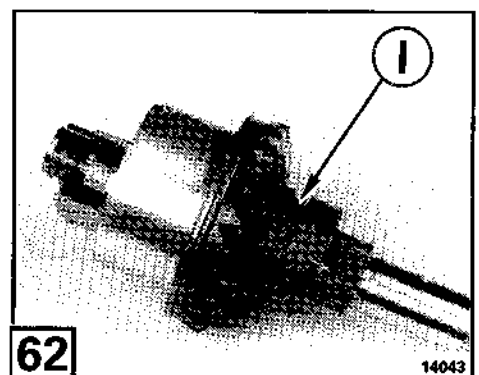
60 7. Before installing the clutch dog, you must correctly identify which is the rear end. Look for the words "prop end" (H) or the OMC part number; both are stamped on the forward lugs which must face the rear of the clutch shaft. Orient the clutch dog properly, align the clutch dog retaining pin hole with the slot in the clutch shaft, and slide the clutch dog onto the splines.

Note The clutch dog is not symmetrical. If it's installed backward it will not fully engage forward gear and will cause immediate damage to the gear and the clutch dog.



61 8. Slide the clutch shaft onto the shift shaft. Align the hole in the shaft with the hole in the clutch dog, then install pin.

62 9. Slide a new retaining spring (I) up over the clutch shaft and wrap it around the clutch dog pin. Position three coils over each end of the pin, making sure none of the coils overlap.



Lower Gearcase Cleaning and Inspection

Clean all parts in solvent and dry them thoroughly. Parts not covered below will be found in the section dealing with their specific assemblies.

1. Gearcase Housing - Scrape off all gasket material from shift cover and water passage cover surfaces. Use a thread tap to clean corrosion and sealer from all threaded holes. Check oil circulation hole at upper end of driveshaft bore to be sure it's open.

63 2. Water Cover Studs - Check for thread damage and looseness. To remove, double-nut stud and unscrew. Clean *Loctite* residue from stud hole with a thread tap. Spray threads of hole and new stud with *OMC Locquic Primer* P/N 384884. Apply *OMC Ultra Lock* P/N 388517 to the stud threads, and install to the depth shown.

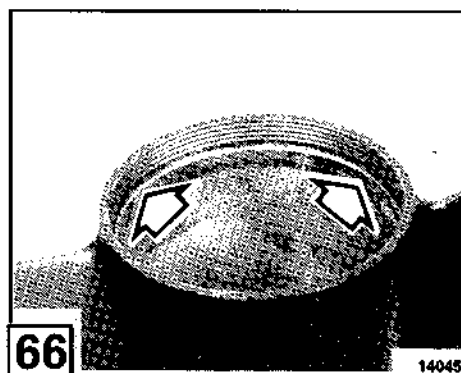
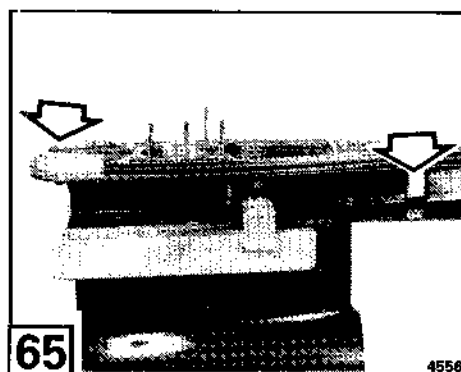
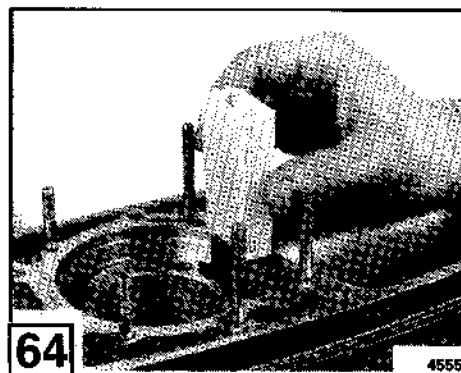
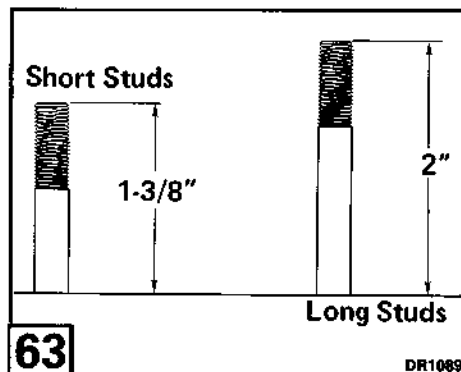
64 3. Water Intake Screen - If screen cannot be unplugged by cleaning, replace it. Place a screwdriver on each side of the intake screen under the locating tabs. Simultaneously press in and up on both sides to free screen. To install a new screen, face curved side forward and narrow end down. Push screen into housing until detents snap into place. Screen must cover all four intake openings.

65 4. Gearcase Anodes - If anodes are two-thirds deteriorated, replace them with new ones.

66 5. Hydrostatic Seal Rings - If rings inside gearcase hub are heavily damaged, exhaust gases may enter propeller area and cause ventilation. If problem is severe enough, gearcase will have to be replaced.

6. Lower Driveshaft - Check threads as well as internal and external splines for chips or cracks. Tapered gear surface must not show metal transfer or corrosion. The lower bearing surface must be free from corrosion, scoring or discoloration. The thrust bearing and needle bearing surfaces on the upper end must also show no evidence of corrosion, scoring or discoloration. Make sure the oil circulation hole is open and the nylon shaft support plug is inside shaft at base of splines.

7. Reverse Gear - Check teeth for chips or cracks. Inspect drive lugs for damage or wear. Thrust bearing and needle bearing surfaces must not be corroded or discolored.



8. **Pinion Gear** - Check teeth and internal splines for chips or cracks. Inspect tapered seat for metal transfer or corrosion.

9. **Intermediate Driveshaft** - Inspect splines at both ends for wear, cracks distortion or corrosion. Oil circulation hole through shaft must be open.

10. **Thrust Bearing** - Propeller shaft and driveshaft thrust bearings must turn freely. Rollers must not be pitted, worn or discolored.

Note Discoloration of a part usually indicates overheating damage due to lack of lubrication, or use of improper type of oil. Always replace suspect parts.

11. **Forward Gear and Bearing Assembly** - Check teeth for chips and cracks. Inspect drive lugs for damage or wear. Rotate bearing housing and check for freedom of movement. Gear and bearing are serviced as an assembly.

Shimming Driveshaft and Pinion Gear

The pinion gear must be precisely meshed with the forward and reverse gears for maximum longevity. This mesh, or tooth contact pattern, is controlled by shims found between the driveshaft bearing housing and thrust washer. Before the driveshaft and pinion are reassembled, you must determine the proper amount of shims.

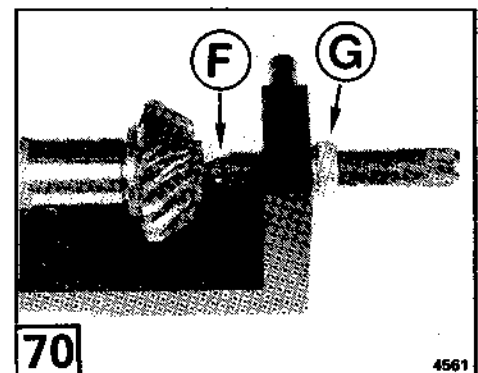
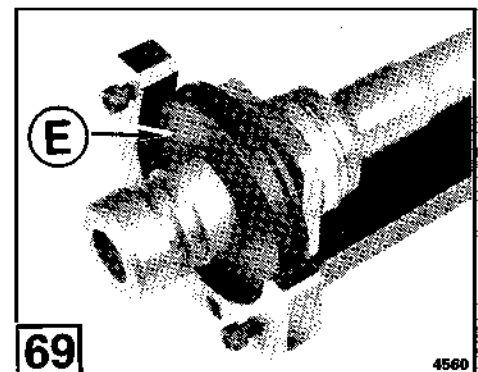
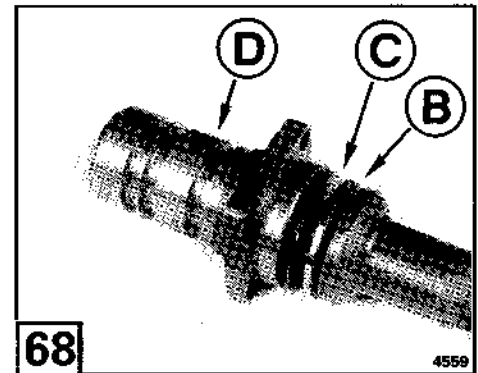
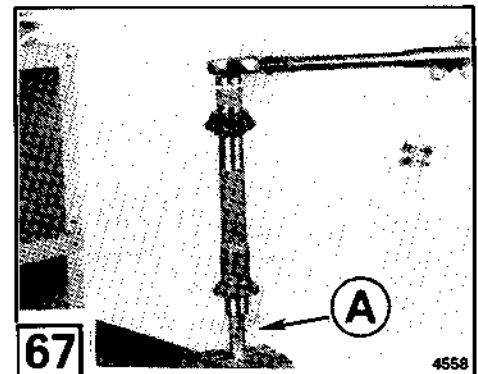
67 1. Clamp OMC Driveshaft Socket P/N 314438 (A) in a vise and slide the driveshaft onto it. Set the pinion gear on the shaft. Tighten the nut to a torque of 70-75 ft. lbs. (95-102 N·m).

68 2. Place the thrust bearing (B), thrust washer (C), and driveshaft bearing housing (D) on the driveshaft in that order. Do not install any old shims.

69 3. Face the stepped side of the OMC Alignment Plate (E) (from OMC Shim Gauge P/N 984329) away from the driveshaft bearing housing. Slide the plate over the shaft and seat it against the housing. Set the driveshaft and plate assembly into OMC Shim Fixture P/N 984329 and position plate inside fixture as shown.

70 4. Note the groove (F) around the pointed end of the fixture's tension screw. Tighten the screw against the end of the driveshaft until the screw sleeve reaches the groove. This will properly preload the assembly. Now tighten the tension screw's external locking (G).

5. Tilt the fixture backward until it rests on its support lugs, then Use OMC Gauge Bar P/N 328367.



71 6. Rest the gauge **A** in the fixture with the curved head up behind the pinion gear, and the base against the driveshaft bearing housing. Hold the gauge against the housing, then use a feeler gauge to determine the clearance between the gear and the gauge. Rotate the shaft and take a couple of readings at different locations to verify your measurement.

7. Write down your measurement. Subtract this figure from 0.020 in. (.51 mm) to determine the thickness of shims needed to correctly position the pinion gear.

Example Only:

.020 in.
<u>-.014 in.</u>
.006 in. Total thickness of shims required

8. Check your shimming accuracy by adding the indicated amount of shims to the driveshaft assembly and placing it back in the shim fixture. A feeler gauge reading between gauge and pinion should be 0.020 in. (.51 mm).

9. Take the driveshaft out of the fixture, then remove all components, including the pinion gear.

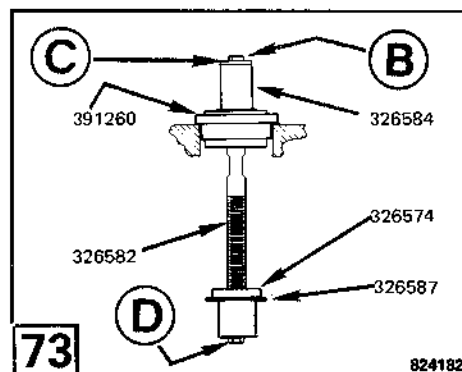
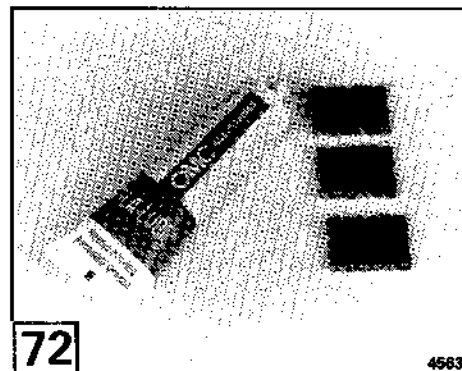
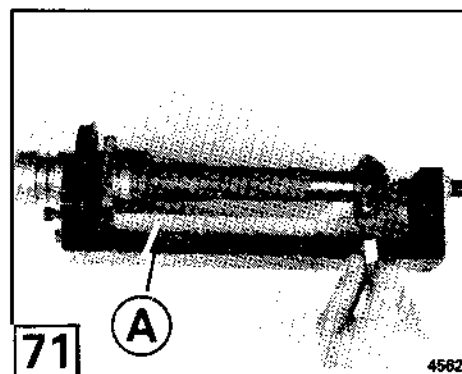
Lower Gearcase Assembly

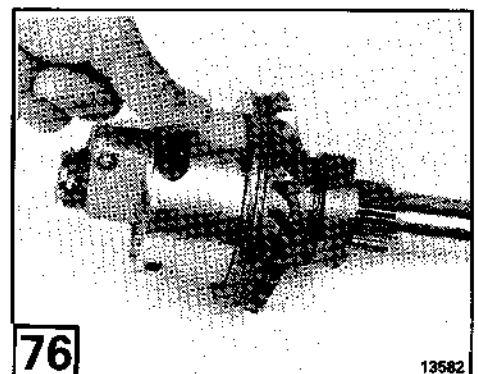
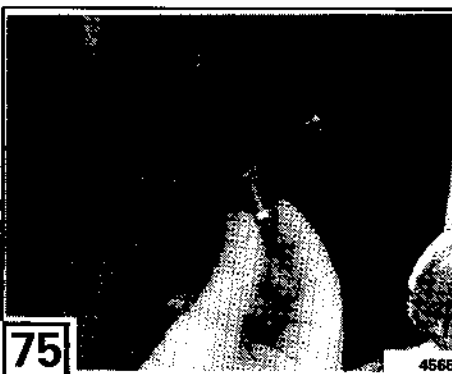
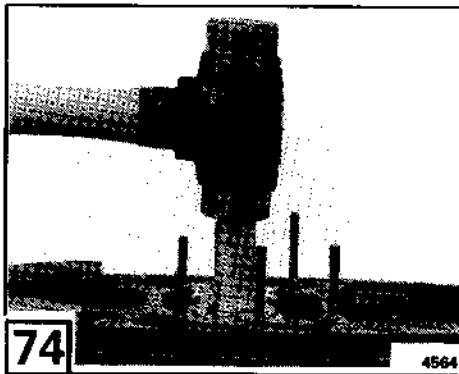
Parts must be clean, dry and in good condition. During reassembly, use recommended OMC lubricants, adhesives and sealers, or equivalent products that meet or exceed OMC specifications.

Lower Gearcase Driveshaft Bearing Installation

72 1. If the old bearing was not removed, the original 18 loose needles should be cleaned in solvent, inspected and dried thoroughly. When installing, liberally apply *OMC Needle Bearing Assembly Grease* to each roller. Reach inside the gearcase hub and push them into the bearing case. Check for cocked needles that would be knocked out when the driveshaft is inserted.

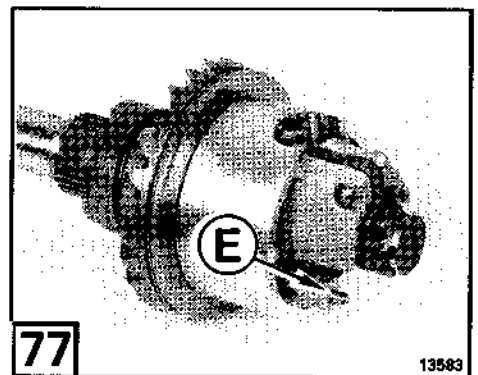
73 2. Install new bearings with OMC Bearing Remover and Installer P/N 391257. Attach the spacer with a 1/4-20 x 1/2 in. hex head screw **B** and a 1 in. O.D. flat washer **C**. Attach the installer with a 1/4-20 x 1 1/4 in. hex head screw **D**.





73 **74** 4. Use OMC Spacer P/N 326584, OMC Plate P/N 391260, OMC Rod P/N 326582, OMC Installer P/N 326574 and OMC Washer P/N 326587. Assemble as shown. New bearings have prelubricated needles, so apply a light coat of *OMC Needle Bearing Assembly Grease* only to outside of case. Face lettered side of case toward installer and slide on tool. Insert tool and bearing into gearcase, then drive in until driving rod seats on spacer.

75 5. Position a new O-ring on the pinion bearing screw. Apply *OMC Locquic Primer*, then *OMC Nut Lock* to threads of screw. Install the screw and tighten to a torque of 48-84 in. lbs. (5-9 N-m).

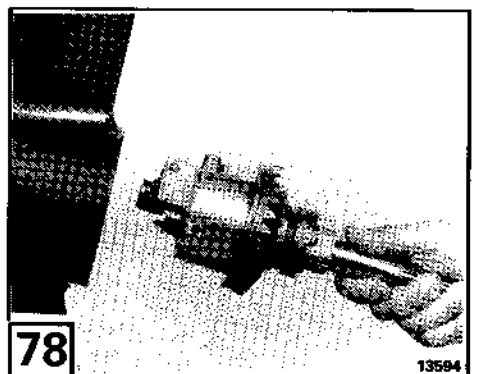


Reverse Gear, Bearing Housing and Clutch Shaft Installation

76 1. Press shift detent down. This will provide clearance to install the clutch shaft assembly.

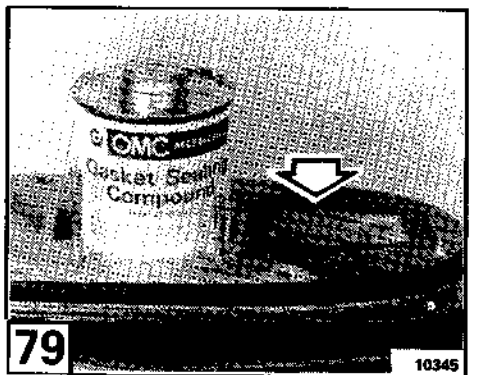
77 2. Note the position of the locating pin **E** at the front of the housing. The pin must engage a corresponding recess inside the nose of the gearcase.

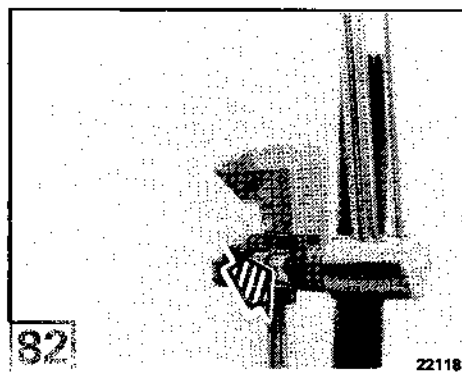
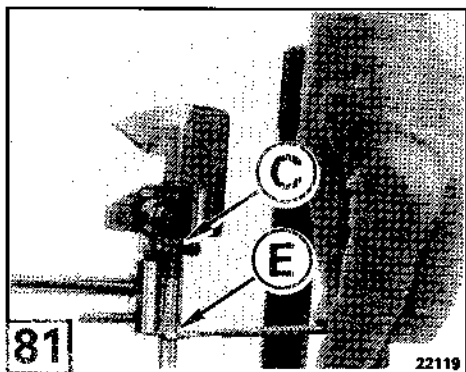
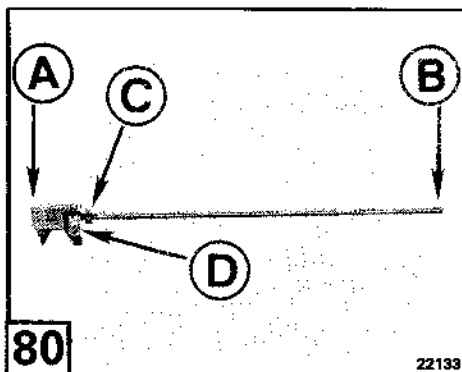
78 3. Tip the gearcase hub slightly downward. This will help hold the housing, washer, bearing and gear together, as well as keep the shift detent in the depressed position. Make sure the locating pin is properly engaged after the assembly is installed.



Shift Rod and Cover Installation

79 1. Lightly apply *OMC Gasket Sealing Compound* to both sides of a new shift rod cover gasket, and place it on the housing.





80 2. Total length of shift rod (A) to (B) must measure 16 $\frac{13}{16}$ in. If adjustment has to be made, loosen locknut (C), screw (D) and turn rod end to obtain correct measurement.

81 3. While holding the shift rod with a wrench (E), attach a crow foot wrench at a 90° angle to torque wrench and tighten nut (C) to a torque of 13-15 ft. lbs. (18-20 N-m).

82 4. Tighten shift rod screw to a torque of 24-36 in. lbs. (3-4 N-m).

83 5. Push the shift rod far enough through the cover so you can start threading the rod into the detent without the cover touching the gasket. Screw the rod into the detent four or five full turns. Final shift rod setting requires a height gauge and will be made later.

84 6. Seat the cover on the gasket. Apply *OMC Gasket Sealing Compound* to six cap screws and install. Tighten the screws to a torque of 60 - 84 in. lbs. (7-9 N-m).

7. While rotating the clutch shaft, push down on the shift rod. Look down through the driveshaft bore to make sure the clutch dog and gear lugs completely engage. This will help provide clearance to install the pinion gear and nut.

85 8. Attach anode to front of gearcase. Tighten screws securely.

Driveshaft and Pinion Gear Installation

1. Place the pinion gear inside the gearcase under the driveshaft bearing. Carefully insert the driveshaft into the gearcase, through the bearing, and into the gear.

86 2. Put the intermediate driveshaft into the lower driveshaft. Place the pinion nut in a holding device and position it under the gear. Rotate the driveshaft and start the nut.

