

70 H.P. Force Lower Unit

The "Coding System" for shimming all Force 70 H.P. outboard lower units has been eliminated. That system has been replaced with the procedures and special tools utilized by Mercury and Mariner Outboards. Since the design of the Force 70 H.P. lower unit uses many of the same components as the Mercury and Mariner 60 H.P., it was decided to also use the same time tested and proven system of shimming.

This affects all 70 H.P. outboards produced by Force (1991 models and newer). The following is the listing of the additional special tools required, the procedures for shimming the lower unit, and the procedures for checking back lash.

Qty.	Part No.	Description
1	91-14311A2	Bearing Preload Tool
1	91-19660--1	Backlash Indicator Tool
1	91-58222A1	Dial Indicator
1	91-83155	Dial Indicator Adaptor Kit
1	91-817008 A2	Pinion Gear Location Tool

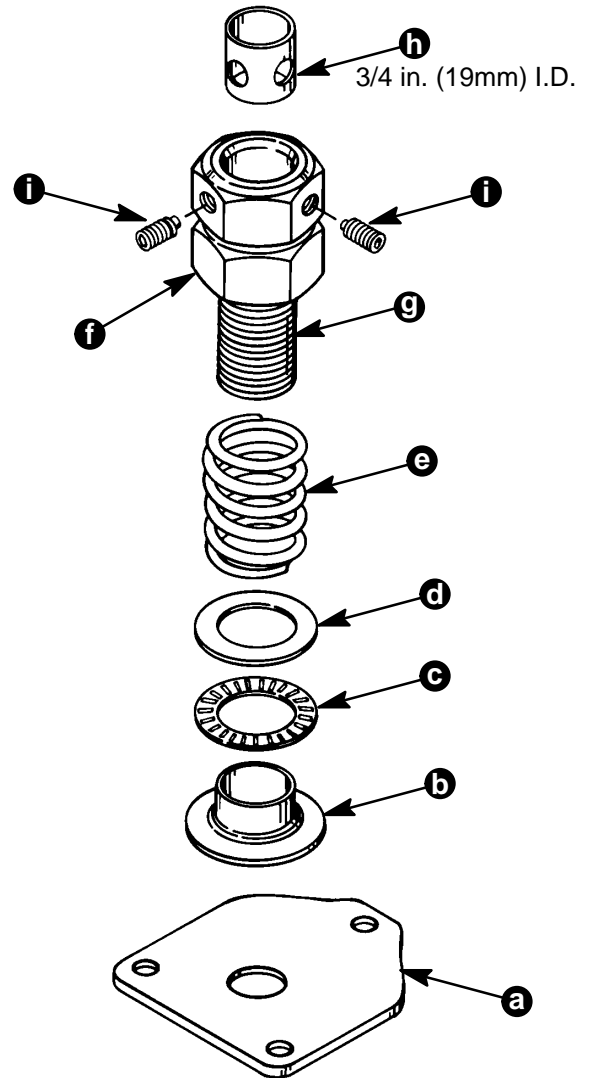
Pinion Gear Location and Forward Gear Backlash

DETERMINING PINION GEAR LOCATION

NOTE: Read entire procedure before attempting any change in shim thickness.

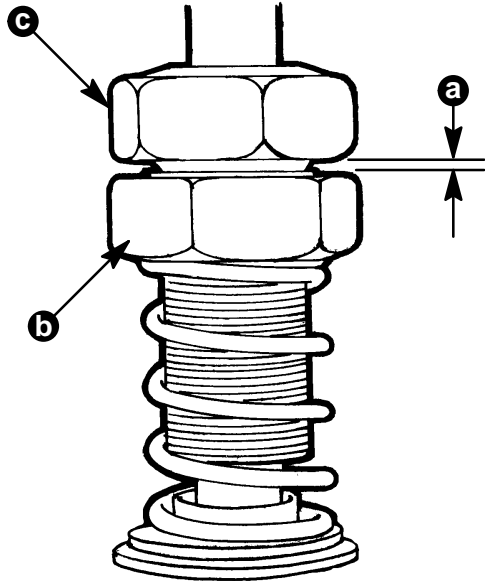
IMPORTANT: Forward gear assembly must be installed in gear housing when checking pinion gear depth to obtain accurate shim measurements.

1. Clean the gear housing bearing carrier shoulder and diameter.
2. Position gear housing upright (driveshaft vertical). Install Bearing Preload Tool in sequence shown.



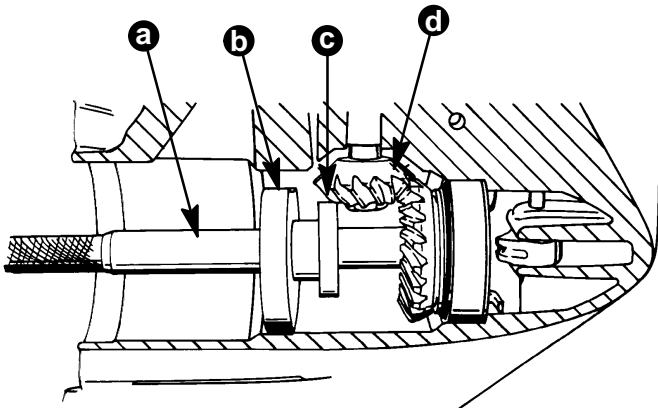
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- a - Plate
 - b - Adaptor: Bearing surfaces clean and free of nicks
 - c - Thrust Bearing: Oiled and able to move freely
 - d - Thrust Washer: Clean and free of nicks and bends
 - e - Spring
 - f - Nut: Threaded all-the-way onto bolt
 - g - Bolt: Held snug against spring
 - h - Sleeve: Holes in sleeve must align with set screws
 - i - Set Screw (2): Tighten against drive shaft, bolt should not slide on driveshaft

3. Measure distance (a).
4. Increase distance (a) by 1 in. (25.4mm).
5. Rotate driveshaft 10 revolutions. This properly seats upper driveshaft tapered roller bearing.



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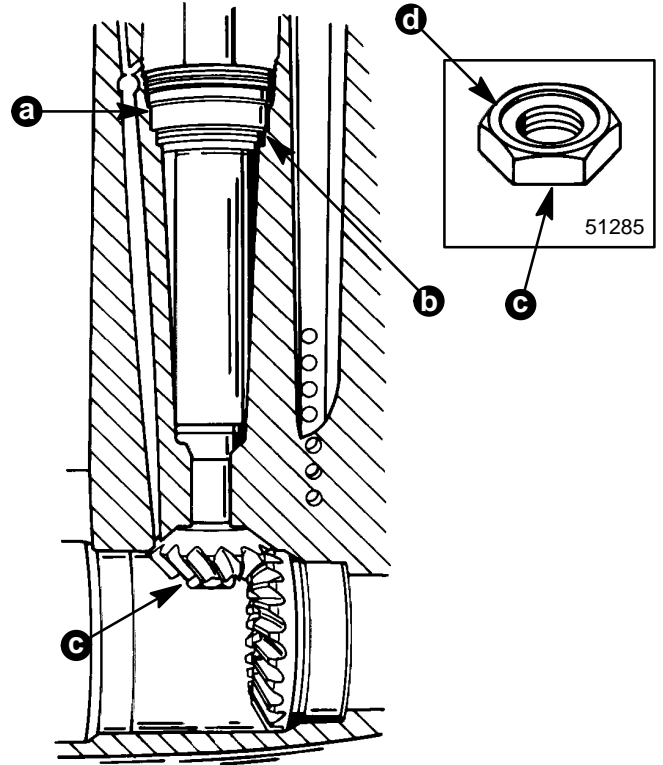
6. Insert Pinion Location Tool (a). Position access hole (b) as shown. Insert feeler gauge between gauging surface (c) and pinion gear (d).



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- a - Pinion Location Tool (91-817008A2)
- b - Access Hole
- c - Gauging Surface
- d - Pinion Gear

7. The correct clearance between the gauging surface (b) and the pinion gear (c) is .025 in. (0.64mm).
8. To obtain .025 in. (0.64mm), add or subtract shims below the upper bearing race (b) to lower or raise the pinion gear.
9. After final adjustment to pinion height has been completed, follow procedures in determining forward gear backlash.



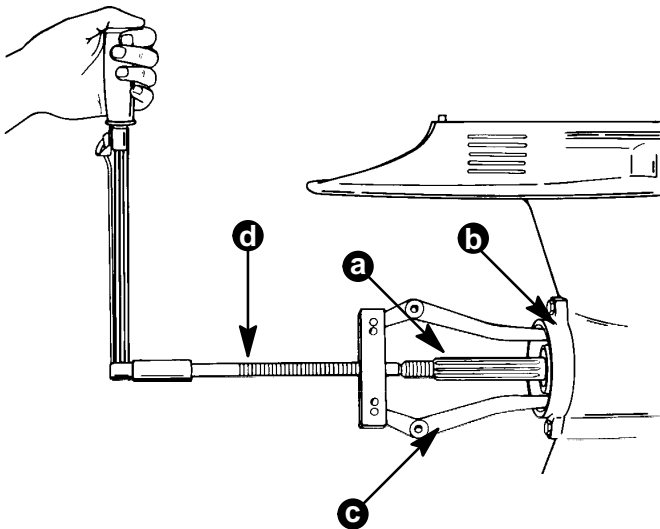
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- a - Bearing Race
- b - Shim(s)
- c - Pinion Nut [Recessed Side (d) Toward Pinion]
- d - Recessed Side Toward Pinion

DETERMINING FORWARD GEAR BACKLASH

NOTE: Read entire procedure before attempting any change in shim thickness.

1. Obtain correct pinion gear location; refer to "Determining Pinion Gear Location", preceding.
2. Install Bearing Preload Tool on driveshaft; refer to "Determining Pinion Gear Location", preceding.
3. Install components.
4. Torque puller bolt of bearing preload tool to 45 lb. in. (5 N·m)



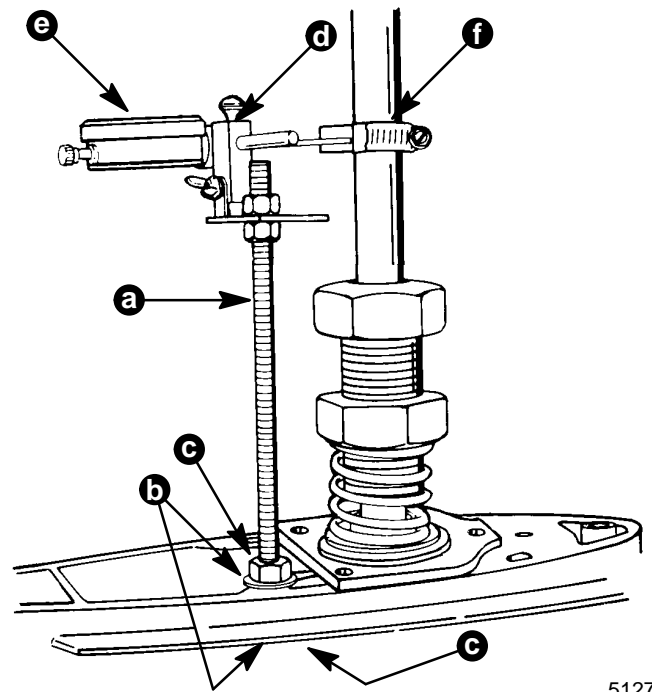
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- a - Propeller Shaft*
- b - Bearing Carrier* (Assembled)
- c - Puller Jaws (91-46086A1)
- d - Puller Bolt (91-58716) Torque to 45 lb. in. (5.1 N·m).

*Refer to "Bearing Carrier and Propeller Shaft Installation", following.

5. Rotate driveshaft 10 revolutions to properly seat forward gear tapered roller bearing.
6. Re-torque puller bolt to 45 lb. in. (5.1 N·m).

7. Install components.



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- a - Threaded Rod
- b - Washers
- c - Nuts
- d - Dial Indicator Adaptor Kit (91-83155)
- e - Dial Indicator (91-58222A1)
- f - Backlash Indicator Tool (91-19660--1)

8. Position Dial Indicator on line "3" on Backlash Indicator Tool.
9. Turn driveshaft back-and-forth (check for no rotation at the propeller shaft).
10. Dial Indicator registers amount of backlash, which must be between .013 in. (.33mm) and .019 in. (.48mm).
11. If backlash is less than the minimum reading, remove shim(s)* from in front of the forward gear bearing race.
12. If backlash is more than the maximum reading, add shim(s) in front of the forward gear bearing race.
- * By adding or subtracting .001 in. (0.025mm) shim, the backlash will change .00125 in. (0.032mm).
13. When final adjustment has been completed, remove and discard pinion nut. Apply Loctite 271 to threads of new pinion nut. Install and torque pinion nut to 50 lb. ft. (67.8 N·m).
14. Reassemble and install gear housing.