

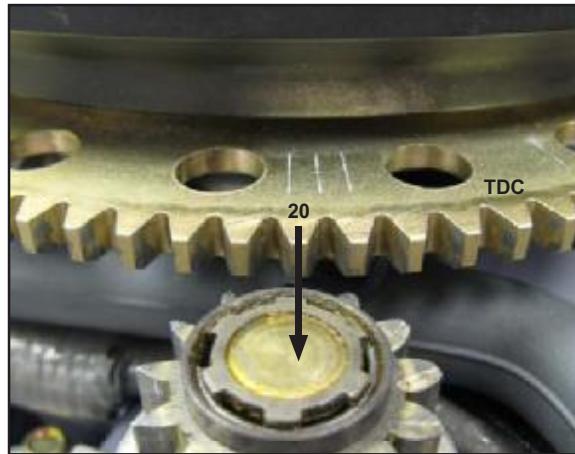
**TECH TIPS — Subject: Balancer Removal and Replacement**  
**Model: F150**

The F150 engine has a balancer assembly that is driven by a gear on the crankshaft. The balancer assembly contains two counter rotating balance shafts. Occasionally, it may be necessary to remove the balancer assembly from an F150 engine to inspect internal components. Proper timing of the balancer shafts with the crankshaft is required for proper operation. The procedure in the F150 Service Manual requires removal of the flywheel to gain access to the timing alignment marks on the crankshaft and the cylinder block. A procedure has been developed that permits proper timing and installation without removing the flywheel.

**NOTE:** Refer to the Service Manual for the location of components, torque specifications, proper sealants and other related procedures.

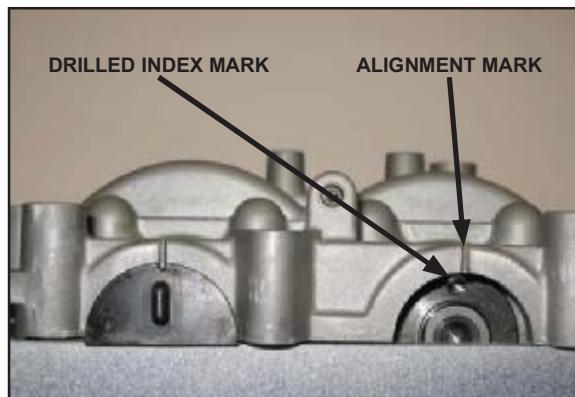
**Balancer Assembly Removal:**

1. To gain access to the balancer assembly remove:
  - a. Flywheel cover
  - b. Air silencer assembly
  - c. Wiring harness from retaining clip on the starboard side of the powerhead. It is not necessary to remove the harness from the electrical panel or sensors.
  - d. Fuel filter mounting bolts and move the filter assembly out of the way.
  - e. Front engine hanger bracket.
  - f. Disconnect the engine to boat harness 10-pin connector.
  - g. Electrical panel (3 bolts) and relocate to expose the balancer bolts.
2. Use a small flat screwdriver to carefully loosen the starboard half circle rubber seal located on the top of the balancer assembly. Gently pry the seal from the balancer. Normally, this seal can be reused. Take care to not damage the seal during removal.
3. Rotate the flywheel clockwise until the 20° BTDC mark is centered on the end of the electric starter bendix shaft.



4. Look into the balancer opening where you removed the rubber seal. The drilled index mark on the end of the balancer shaft should be aligned with the alignment mark on the balancer housing.

**NOTE:** There may be other reference marks on the end of the balance shaft but only one drilled index mark.



5. If the drilled index mark is not aligned, verify that the 20° mark on the flywheel is still centered on the starter shaft.
6. If the drill index mark is still not aligned, the balancer assembly gears may be damaged, previously installed out of time or the flywheel key may be sheared. Further inspection will be necessary after removing the balancer.
7. Remove the 12 balancer mounting bolts in the sequence shown in the Service Manual.

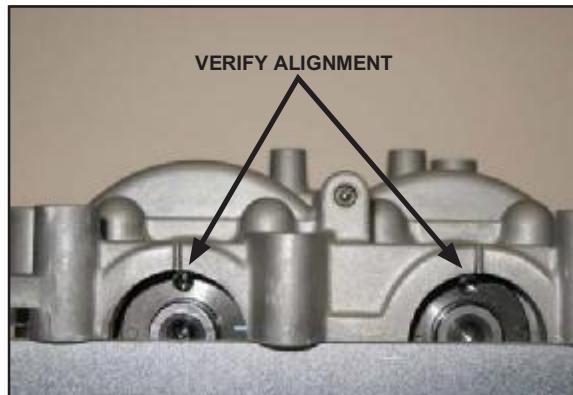
#### Balancer Assembly Installation:

1. Thoroughly clean the crankcase and balancer mating surfaces. Apply a thin coating of Yamaha Gasket Maker (Loctite S518) to the mating surface of the balancer. Use the sealer sparingly; do not allow excess that will squeeze out into the internal cavities of the engine. Pay particular attention to the oil passage between the crankcase and balancer assembly.



2. Verify the flywheel 20° BTDC timing mark is still aligned with the center of the starter shaft.

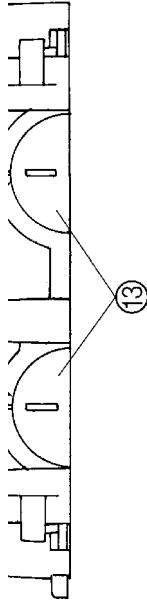
3. Ensure the drill index marks on the end of each balancer shaft is aligned with the alignment marks on the balancer housing.



4. Install the balancer assembly while maintaining correct alignment of the balancer shafts.
5. Torque the balancer assembly mounting bolts; follow the sequence and torque values shown in the Service Manual.
6. Turn the flywheel one complete turn clockwise. Align the 20° BTDC timing mark with the center of the starter shaft. Verify both drilled index marks on the balancer shafts align with the alignment marks on the balancer housing.
7. Apply Yamaha Gasket Maker (Loctite S518) to both half circle seals and reinstall them into the opening between the balancer housing and crankcase.
8. Reinstall the electrical panel, engine hanger, and fuel filter assembly, then properly route the harness, hoses and the engine to boat harness 10-pin connector.
9. Run the engine and check for leaks.



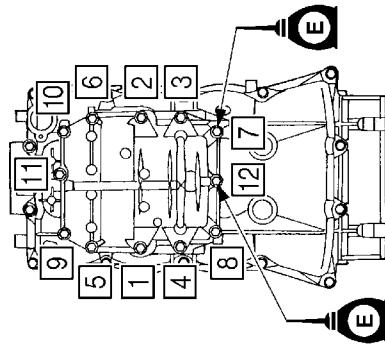
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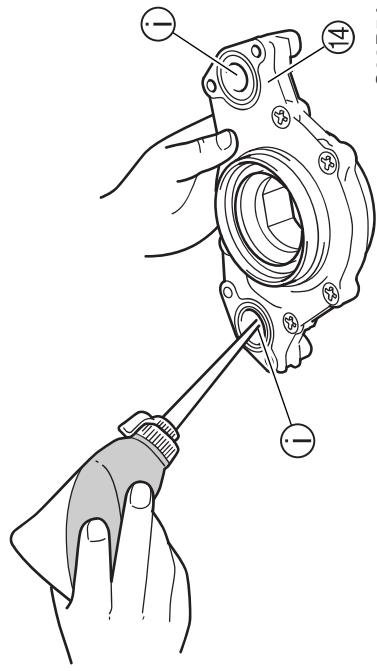
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**NOTE:**  
Do not get any sealant inside the balancer assembly.

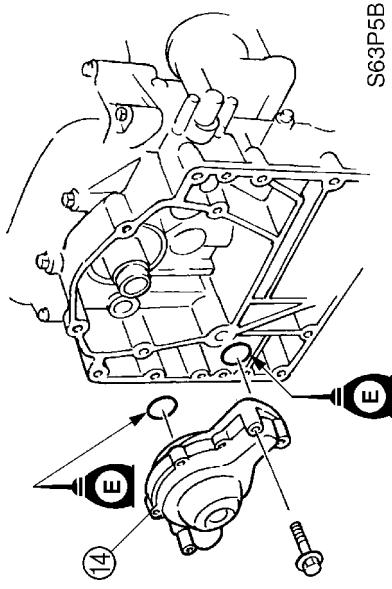
17. Install the balancer assembly onto the crankcase, and then tighten the balancer assembly bolts to the specified torques in two stages and in the sequence shown.



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19. Align the oil pump gear with the crankshaft, and then install the oil pump (14).

	<b>1-10</b> Balancer bolt (M8): 1st: 18 N·m (1.8 kgf·m, 13.3 ft·lb) 2nd: 31 N·m (3.1 kgf·m, 22.9 ft·lb)
	<b>11, 12</b> Balancer bolt (M6): 1st: 7 N·m (0.7 kgf·m, 5.2 ft·lb) 2nd: 13 N·m (1.3 kgf·m, 9.6 ft·lb)

**NOTE:**

- Before installing the oil pump, be sure to fill it with a small amount of engine oil through the oil passage (1).
- When installing the oil pump, install it so that the oil seal does not get damaged.