

OEM No. 2004-11

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Circulate to: Sales Manager Accounting Service Manager Technician Parts Manager

"Prop Rattle" & Flo-Torq III Propeller Hub

Situation

What is prop rattle and how does the Flo-Torq III propeller (prop) hub reduce rattle?

PROP RATTLE

Crankshaft and driveshaft speed varies during rotation due to power strokes. This is the result of the piston coming up on its power stroke and combustion occurring, which in turn causes the crankshaft and prop shaft speed to increase. In between power strokes the crankshaft speed slows down due to normal drag in the system, while inertia of the prop causes the propeller shaft to remain rotating close to the same speed.

Prop rattle is seen more often in engines that use stainless steel props. The increased weight, and the resulting increased inertial force generated by these stainless steel props allow the props to maintain more of a constant speed, as compared with that of the crankshaft's speed. Consequently, the stainless steel prop does not slow down at the same rate as the crankshaft, and accordingly the clutch dogs separate slightly between the clutch and gear. On the next power stroke, the crankshaft will again accelerate and create a slight noise when the clutch dogs on the drive gear catch up with the dogs on the clutch/prop shaft. When this is repeated over and over it results in prop rattle. This prop rattle does not damage the clutch dogs or lower unit, and is normally only heard at idle or just off idle speeds.

When using a conventional (Flo-Torq II) prop hub in which the propeller is tightly fitted between a forward and aft thrust washer, the prop becomes locked to the prop shaft. In this instance, a separation noise will occur regularly since the inertia of the prop shaft is not influenced by any built-in dampening factors.

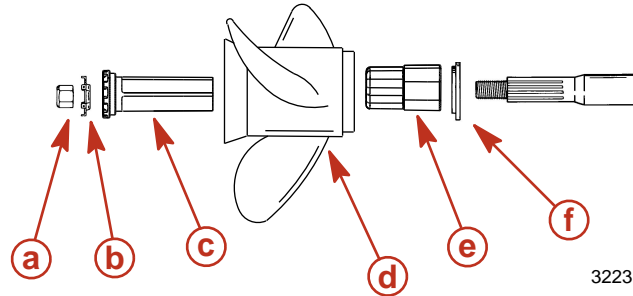
FLO-TORQ III PROP HUB

The Flo-Torq III plastic drive sleeve assembly has a small forward/aft clearance so that it or the prop is not locked to the prop shaft. This allows the two hub pieces to rotate $\pm 10^\circ$ relative to each other, and allows the springs to absorb the impacts from the combustion cycles instead of the clutch dogs. The plastic drive sleeve assembly has clearance, which allows it to move forward and aft slightly over the inner brass hub that is supplied with the Flo-Torq III hub kit. This free movement, along with the spring wires between the forward and aft section of the plastic hub, act as a shock absorber, reducing the noise. Do not shorten the inner brass hub of a Flo-Torq III prop hub; the prop must be allowed to have a slight forward and aft clearance.

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NOTE: With prop shaft held stationary, the prop will have approximately 0.7620 mm (0.030) in. to 3.1750 mm (0.125) in. end play and will rotate approximately $\pm 10^\circ$.



- | | |
|---|--|
| a - Prop nut | d - Propeller |
| b - Tab washer | e - Flo-Torq III plastic drive sleeve |
| c - Flo-Torq III inner brass hub/adaptor | f - Forward thrust washer |

Aluminum props do not have the weight and mass (inertia) to remain at a constant speed. Generally aluminum props tend to remain at crankshaft speed. Because of this, the clutch dogs do not separate and there is very little or no prop rattle.

NOTE: The Flo-Torq III plastic drive sleeve and inner brass hub are supplied standard with the 1.5 Liter OptiMax 75/90/115 HP engine. The forward thrust washer, prop nut, and tab washer are not supplied with the engine.

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