



TWIN-CAM AND SPORTSTER OIL PUMP INSPECTION BEST PRACTICES

2016-09-07



Engine

APPLIES TO	SYMPTOMS
All Twin-Cam and Sportster engines with duel-gerotor style oil pump having a center plate.	<ul style="list-style-type: none">• Engine oil pump inspection

This document will outline inspection and measurement procedures for gerotor style oil pumps. It provides inspection procedures only without specifications. Refer to the appropriate service manual for clearance and tolerance specifications.

As with many internal engine components, evidence of normal wear will be present. Scratches, small gouges, and light scoring are typical conditions of an oil pump run in an engine that has been through a wear-in cycle. Wear marks occur as mating components with material harder than the pump components wear-in (i.e. bearings). It is critical to follow both the recommended wear-in cycle as well as the service intervals. Indications of wear-in are not a warrantable condition. We will attempt to explain the difference between normal wear and worn-out parts.

Inspection

Pump condition can be assessed by both visual inspection and measurements.

- Remove and disassemble the oil pump.
- Wash all parts and allow to dry.
- Lay parts on a clean towel for inspection.

Visual Inspection

Gerotor sets:

- Check both faces of the gerotor sets for circular grooves. It is typical for the side facing the aluminum surfaces to have more circular scratches than the separator plate side.
- See Figure 1. This is an example of a gerotor set with grooves consistent with normal wear-in and does not require replacement.
- See Figure 2. Deep grooves are considered excessive and require that the gerotor be replaced as a set.
- See Figure 3. The outer diameter surface finish has shown to have little effect on the performance of the pump. In general, the gerotor and oil pump body will wear together creating a matched worn-in interface. If the wear is suspect, assemble the gerotor into the pump housing and measure pump body to gerotor clearance using a flexible feeler gauge.

1002925



Figure 1. Normal Wear-In

1002929



Figure 2. Excessive Wear



Figure 3. Wear that is less critical to pump performance. Measurement is required. Inspect the housings and plates:

The interface between the cam support plate and the feed gerotor will always have indications of run-in, even at low mileage. This is especially evident on an anodized P&A cam support plate where the anodization wears away.

- See Figure 4. Light grooves show normal wear.
- See Figure 5. Excessive wear will appear as deep grooves.
- See Figure 6. Excessive wear versus normal run-in wear should be judged by placing a straight edge across the surface. If a uniform gap is visible, the cam support plate should be replaced.
- Figure 7 shows typical normal wear in the housing bore.
- See Figure 8. Deep grooves in the bore bottom face indicate excessive wear. Grooves around the circumference are less critical as discussed in the rotor inspection.

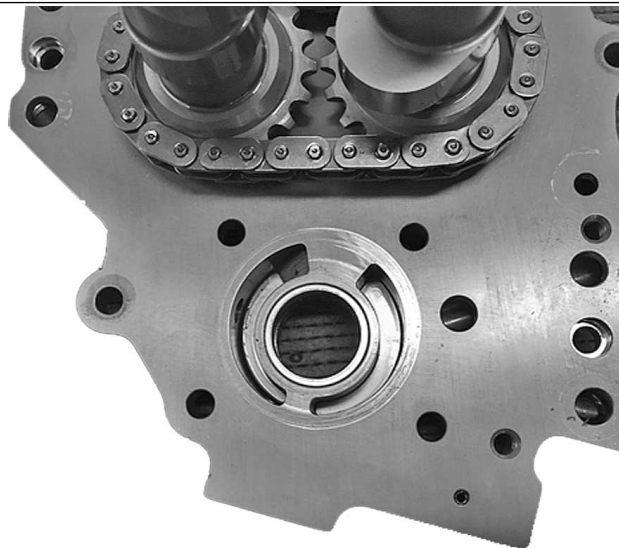


Figure 4. Typical Wear

1002941

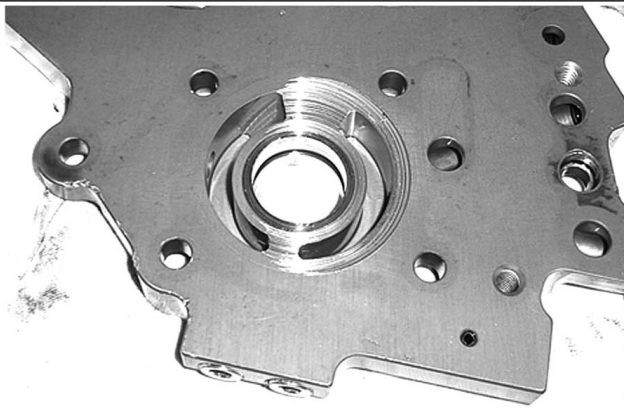


Figure 5. Excessive Wear

1002957



Figure 6. Measure Plate Wear

1002945



Figure 7. Typical Housing Wear



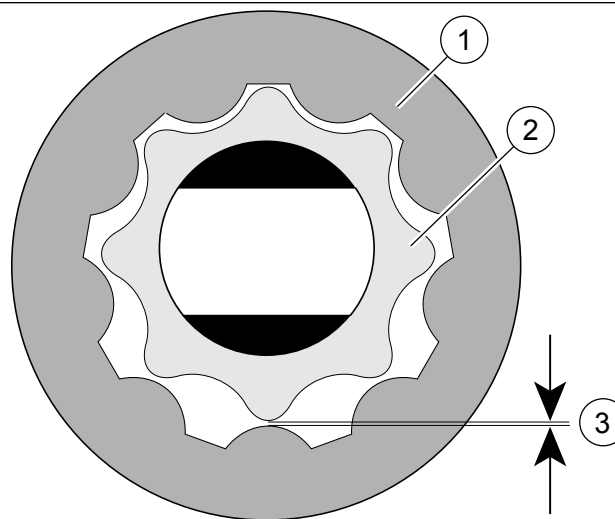
Figure 8. Excessive Housing Wear

Measurement Inspection

Pump wear can be assessed dimensionally by two main clearance measurements, axial clearance and gerotor tip-to-tip clearance. These measurements, although critical, can be superseded by individual component visual inspection.

Measure Gearotor Tip Clearance.

1. See Figure 9. Mesh rotors of one gerotor set together.
2. Measure clearance between tips of lobes.
3. If clearance is greater than the wear limit, replace the rotor set or oil pump assembly.



1. Outer rotor
2. Inner rotor

3. Tip clearance

Figure 9. Measure Rotor Tip Clearance

Measure Radial Clearance

1. Place the outer rotor in the housing bore.
2. Use a flexible feeler gauge to measure clearance between rotor and bore.

Measure Axial Clearance

1. See Figure 10. Install both gerotor sets, center plate and wave spring.
2. Measure margin.
3. Replace the pump assembly if not within wear limits.

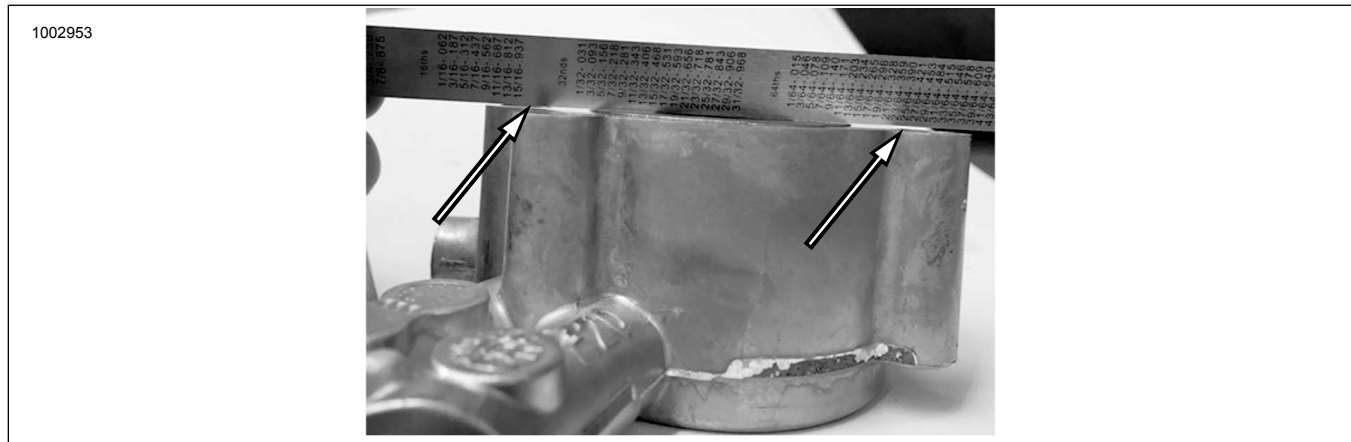


Figure 10. Measure Margin