

## Pinpoint Test A: Low Oil Pressure

### Normal Operation

Oil is drawn into the oil pump through the oil pump screen and pickup tube in the sump of the oil pan. Oil is pumped through the oil filter on the left front side of the cylinder block then enters the main gallery where it is distributed to the crankshaft main journals and to both cylinder heads. From the main journals, the oil is routed through cross-drilled passages in the crankshaft to lubricate the connecting rod bearings. Controlled leakage through the crankshaft main bearings and connecting rod bearings is slung radially outward to cool and lubricate the cylinder walls as well as the entire connecting rod, piston and piston ring assembly. The left cylinder head is fed from a drilling into the supply passage feeding the main gallery at the front of the cylinder block. The right cylinder head is fed from a drilling into the rear of the main gallery. Main gallery pressure is reduced as it enters the cylinder head galleries through fixed serviceable orifices, located at the upper part of the feed passages. It is this reduced pressure in the cylinder head galleries which feed the camshaft journals, the hydraulic lash adjusters and the primary and secondary timing chain tensioners. The camshaft lobe and roller followers or rocker arms are lubricated by splash created through valve train operation.

#### This pinpoint test is intended to diagnose the following:

- Excessive crankshaft end play
- Excessive main bearing clearance
- Excessive connecting rod bearing clearance
- Excessive camshaft bearing cap clearance
- Loose oil galley plugs
- Loose timing chain tensioner bolts
- Oil pump screen and pickup tube
- Restricted oil flow passages
- Worn or damaged oil pump

### PINPOINT TEST A: LOW OIL PRESSURE

Test Step	Result / Action to Take
<b>A1 CHECK THE CRANKSHAFT END PLAY</b>	
<ul style="list-style-type: none"><li>• Check the crankshaft end play. Refer to Crankshaft End Play in this section.</li><li>• <b>Is the crankshaft end play within specification?</b></li></ul>	<b>Yes</b> GO to A2.  <b>No</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.
<b>A2 VERIFY THE CAMSHAFT BEARING CAPS ARE NOT DAMAGED AND TIGHT</b>	
<ul style="list-style-type: none"><li>• Check that the camshaft bearing caps are not damaged and the bolts are properly tightened. Refer to the Specification chart in the appropriate engine section.</li><li>• <b>Are the camshaft bearing caps loose or damaged?</b></li></ul>	<b>Yes</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.  <b>No</b> GO to A3.
<b>A3 CHECK CAMSHAFT JOURNAL-TO-BEARING CLEARANCE</b>	
<ul style="list-style-type: none"><li>• Check the camshaft journal-to-bearing clearance. Refer to the Specification chart in the appropriate engine section.</li><li>• <b>Is camshaft journal-to-bearing clearance within specification?</b></li></ul>	<b>Yes</b> GO to A4.  <b>No</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.
<b>A4 CHECK FOR RESTRICTED OIL FLOW</b>	
<ul style="list-style-type: none"><li>• Verify the oil supply and return passages are not plugged and clean</li></ul>	<b>Yes</b>

<p>of debris. Refer to the oil flow chart in the appropriate engine section.</p> <ul style="list-style-type: none"> <li>• <b>Is oil flow restricted?</b></li> </ul>	<p>REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.</p> <p><b>No</b> GO to A5.</p>
<p><b>A5 CHECK THE TIMING CHAIN TENSIONERS FOR DAMAGE AND VERIFY THE BOLTS ARE TIGHT</b></p>	
<ul style="list-style-type: none"> <li>• Check that the timing chain tensioners are not damaged or the bolts are loose. Refer to the Specification chart in the appropriate engine section.</li> <li>• <b>Are the timing chain tensioners damaged or bolts loose?</b></li> </ul>	<p><b>Yes</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.</p> <p><b>No</b> GO to A6.</p>
<p><b>A6 CHECK THE OIL PUMP PICKUP TUBE AND SCREEN FOR DAMAGE</b></p>	
<ul style="list-style-type: none"> <li>• Check that the oil pump pickup tube and screen is not plugged, cracked or that the bolts are loose. Refer to the Specification chart in the appropriate engine section.</li> <li>• <b>Is the oil pump screen and pickup tube damaged or loose?</b></li> </ul>	<p><b>Yes</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.</p> <p><b>No</b> GO to A7.</p>
<p><b>A7 CHECK THE OIL PUMP FOR DAMAGE</b></p>	
<ul style="list-style-type: none"> <li>• Verify the oil pump is not damaged.</li> <li>• <b>Is oil pump damaged?</b></li> </ul>	<p><b>Yes</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.</p> <p><b>No</b> GO to A8.</p>
<p><b>A8 CHECK CRANKSHAFT MAIN BEARING JOURNAL-TO-BEARING CLEARANCE</b></p>	
<ul style="list-style-type: none"> <li>• Check the crankshaft main bearing journal-to-bearing clearance. Refer to the Specification chart in the appropriate engine section.</li> <li>• <b>Is crankshaft main bearing journal-to-bearing clearance within specification?</b></li> </ul>	<p><b>Yes</b> GO to A9.</p> <p><b>No</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.</p>
<p><b>A9 CHECK CONNECTING ROD BEARING JOURNAL-TO-BEARING CLEARANCE</b></p>	
<ul style="list-style-type: none"> <li>• Check the connecting rod bearing journal-to-bearing clearance. Refer to the Specification chart in the appropriate engine section.</li> <li>• <b>Is connecting rod bearing journal-to-bearing clearance within specification?</b></li> </ul>	<p><b>Yes</b> The concern may have been caused by debris or an incorrect assembly. REPEAT the oil pressure test.</p> <p><b>No</b> REPAIR as necessary. Refer to the appropriate section in Group 303 for the procedure.</p>