

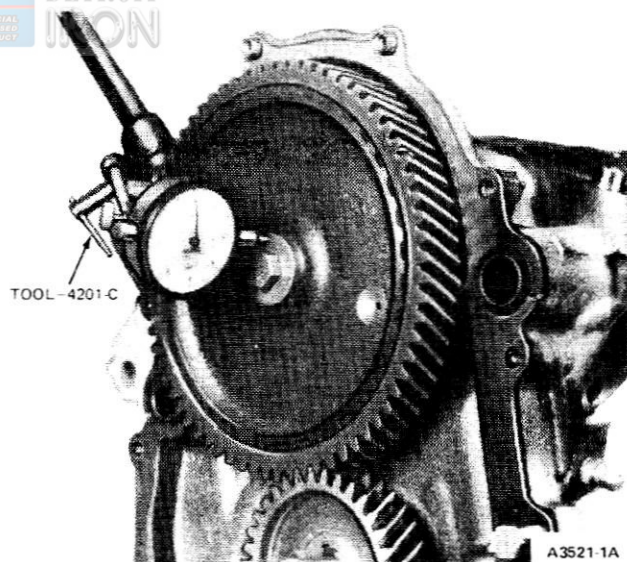


FIG. 12 Checking Camshaft End Play—2.8L V-6 Engine

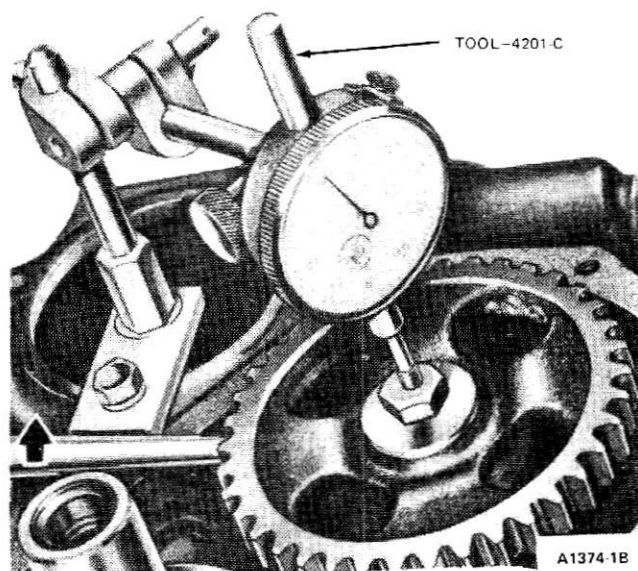


FIG. 13 Checking Camshaft End Play—Typical I-6 Engine

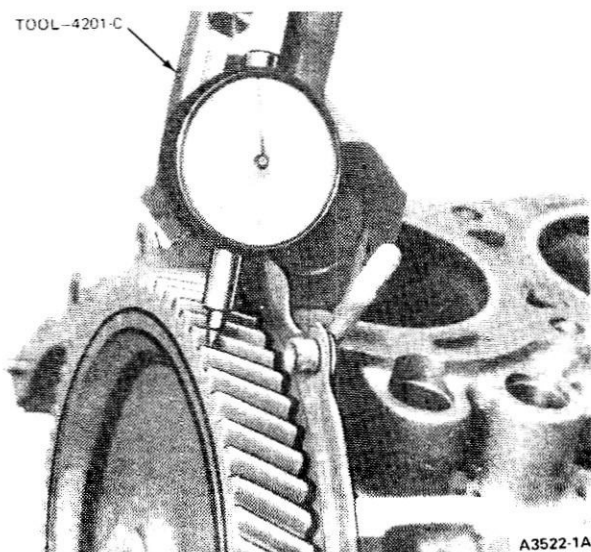


FIG. 14 Checking Timing Gear Backlash—2.8L V-6 Engine

Install a dial indicator on the cylinder block as shown in Fig. 15. Hold the camshaft gear against the camshaft thrust plate and zero the indicator.

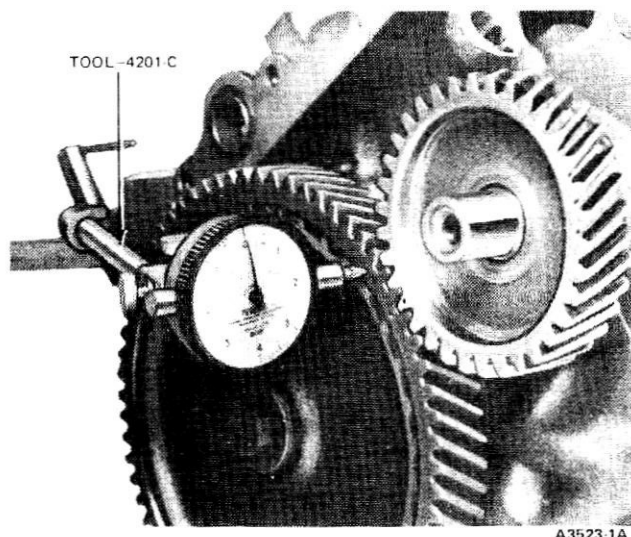


FIG. 15 Checking Timing Gear Runout—2.8L V-6 Engine

Rotate the crankshaft to turn the camshaft, while holding the camshaft gear against the thrust plate. Check the gear runout through one complete revolution of the camshaft. If the gear runout exceeds specifications, remove it and check for burrs or foreign particles on or between the camshaft and gear pilot diameter and/or mating flanges. Recheck the runout; if it still exceeds specifications, replace the gear. Recheck runout on new gear following same procedure.

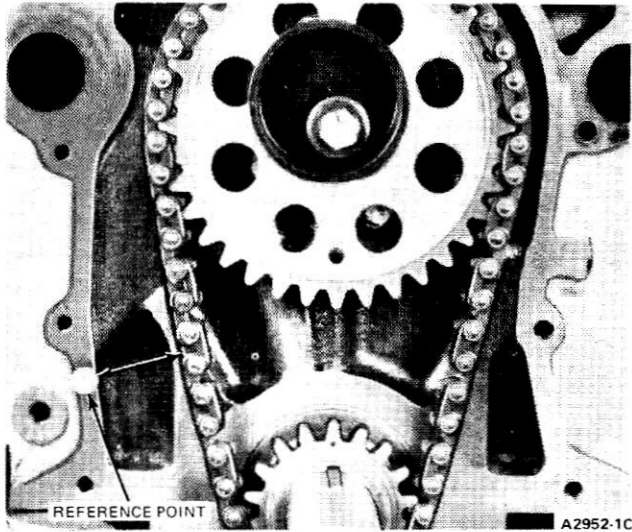
TIMING CHAIN DEFLECTION

1. Rotate the crankshaft in a counterclockwise direction (as viewed from the front) to take up the slack on the left side of the chain.
2. Establish a reference point on the block and measure from this point to the chain (Fig. 16).
3. Rotate the crankshaft in the opposite direction to take up the slack on the right of the chain. Force the left side of the chain out with the fingers and measure the distance between the reference point and the chain. The deflection is the difference between the two measurements.

If the deflection exceeds specifications, replace the timing chain and sprockets.

CRANKSHAFT END PLAY

1. Force the crankshaft toward the rear of the engine.
2. Install a dial indicator so that the contact point rests against the crankshaft flange and the indicator axis is parallel to the crankshaft axis (Fig. 17).
3. Zero the dial indicator. Push the crankshaft forward and note the reading on the dial.
4. If the end play exceeds the wear limit, replace the thrust bearing. If the end play is less than the minimum limit inspect the thrust bearing faces for scratches, burrs, nicks, or dirt. If the thrust faces are



**FIG. 16 Checking Timing Chain Deflection—
Typical V-8**

not damaged or dirty, they probably were not aligned properly. Install the thrust bearing and align the faces following the procedure recommended under Main Bearing Replacement in the pertinent engine section. Recheck the end play.

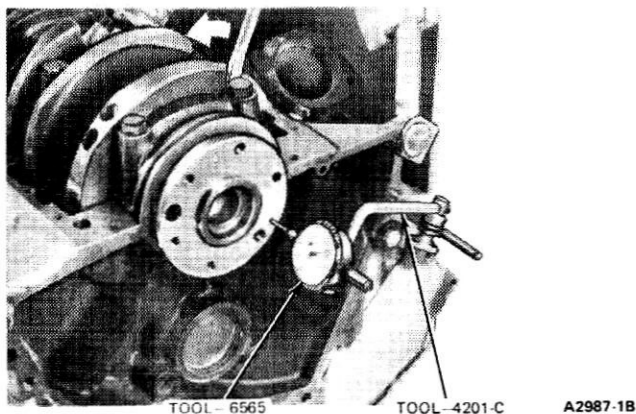


FIG. 17 Checking Crankshaft End Play

FLYWHEEL RUNOUT—AUTOMATIC TRANSMISSIONS

Remove the spark plugs.

Install a dial indicator so that the indicator point rests on the face of the ring gear adjacent to the gear teeth.

Hold the flywheel and crankshaft forward or backward as far as possible to prevent crankshaft end play from being indicated as flywheel runout.

Set the indicator dial on the zero mark. Turn the flywheel one complete revolution while observing the total indicator reading (TIR). If the TIR exceeds specifications, the flywheel and ring gear assembly must be replaced.

FLYWHEEL CLUTCH FACE RUNOUT— MANUAL-SHIFT TRANSMISSIONS

Install a dial indicator so that the indicator point bears against the flywheel face (Fig. 18). Turn the flywheel making sure to hold it in the full forward or rearward position so that crankshaft end play will not be indicated as flywheel runout.

If the clutch face runout exceeds specifications, remove the flywheel and check for burrs between the flywheel and the face of the crankshaft mounting flange. If no burrs exist, check the runout of the crankshaft mounting flange. Replace the flywheel or machine the crankshaft-flywheel mounting face sufficiently to true up the surface if the mounting flange runout exceeds specifications. Replace it or reinstall it on the flywheel. Refer to Ring Gear Replacement in this Part for the proper procedure.

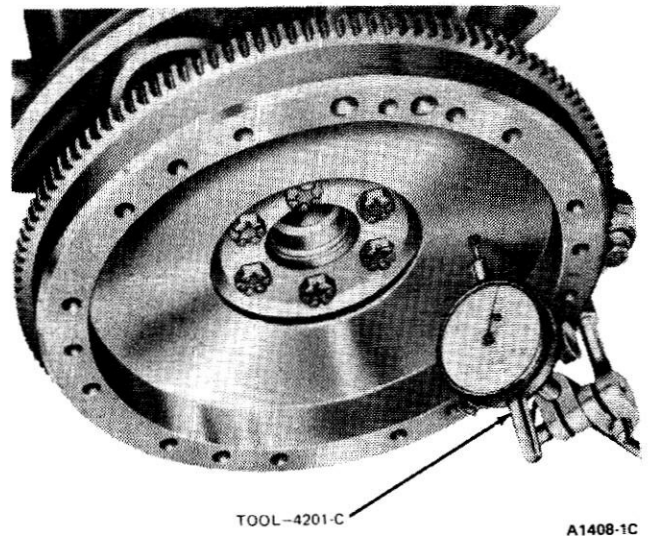


FIG. 18 Checking Flywheel Face Runout

ADJUSTMENTS

HYDRAULIC VALVE CLEARANCE—EXCEPT 2.3L I-4 AND 2.8L V-6 ENGINES

The 2.3L I-4 engine is an overhead cam engine with hydraulic lash adjusters. Refer to Part 21-05 for adjustment procedures. The 2.8L V-6 engine has mechanical tappets. Refer to Part 21-12 for adjustment procedures.

On V-8 engines, the valve arrangement on the left bank is E-I-E-I-E-I-E-I and on the right bank is I-E-I-E-I-E-I-E. For the I-6 engine, the valve arrangement is E-I-I-E-I-E-E-I-E-I-E-I-E.

A shorter or longer push rod is available for service to provide a means of compensating for dimensional changes in the valve mechanism. Refer to the master parts list for the correct part length.

Valve stem to valve rocker arm clearance should be within specifications with the tappet completely collapsed. Repeated valve reconditioning operations (valve and/or valve seat refacing) will decrease the clearance to the point that if not compensated for, the tappet will cease to function and the valve will be held open.

To determine whether a shorter or a longer push rod is necessary, make the following check:

1. Connect an auxiliary starter switch in the starting circuit. Crank the engine with the ignition switch OFF until the No. 1 piston is on TDC after the compression stroke.
2. With the crankshaft in the positions designated in Steps 3, 4 and 5 position the hydraulic lifter compressor tool on the rocker arm. Slowly apply pressure to bleed down the tappet until the plunger is completely bottomed (Fig. 19). Hold the tappet in this position and check the available clearance between the rocker arm and the valve stem tip with a feeler gauge. The feeler gauge width must not exceed 3/8-inch, in order to fit between the rails on the rocker arm. If the clearance is less than specifications, install a shorter push rod. If the clearance is greater than specifications, install a longer push rod.
3. With the No. 1 piston on TDC at the end of the compression stroke (POSITION NO. 1 in Fig. 20), check the following valves:

5.0L (302 CID) and 7.5L (460 CID) V-8 Engines

No. 1 Intake No. 1 Exhaust
No. 7 Intake No. 5 Exhaust
No. 8 Intake No. 4 Exhaust

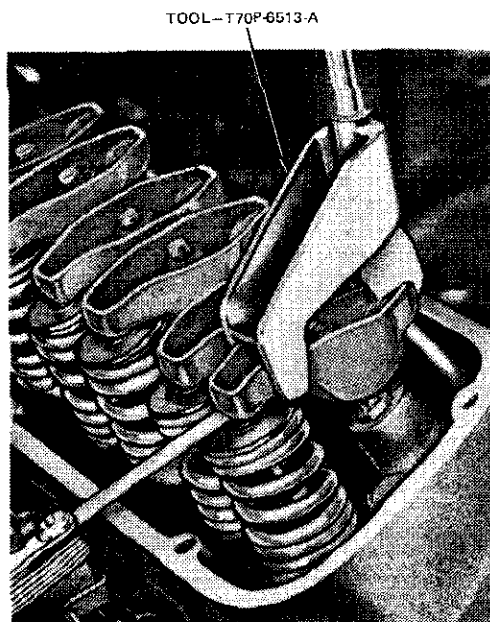
5.7L (351 CID) "M" and "W" V-8 Engines

No. 1 Intake No. 1 Exhaust
No. 4 Intake No. 3 Exhaust
No. 8 Intake No. 7 Exhaust

4. Rotate the crankshaft to POSITION NO. 2 in Fig. 20 and check the following valves:

5.0L (302 CID) and 7.5L (460 CID) V-8 Engines

No. 5 Intake No. 2 Exhaust
No. 4 Intake No. 6 Exhaust



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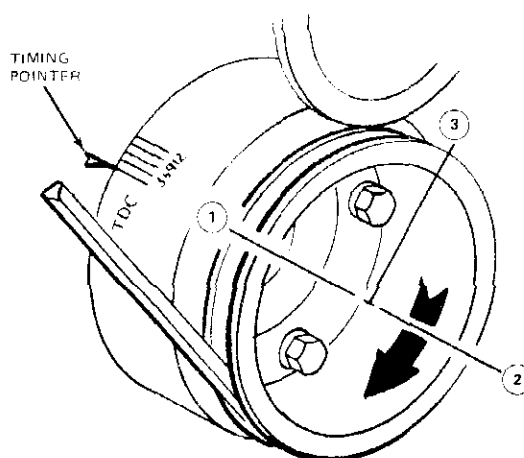
FIG. 19 Checking Valve Clearance—Hydraulic Tappets

5.7L (351 CID) "M" and "W" V-8 Engines

No. 3 Intake No. 2 Exhaust
No. 7 Intake No. 6 Exhaust

5. Rotate the crankshaft to POSITION NO. 3 in Fig. 20 and check the following valves:

With No. 1 at TDC at end of compression stroke make a chalk mark at points 2 and 3 approximately 90 degrees apart.



- POSITION 1 No. 1 at TDC at end of compression stroke.
POSITION 2 Rotate the crankshaft 180 degrees (one half revolution) clockwise from POSITION 1.
POSITION 3 Rotate the crankshaft 270 degrees (three quarter revolution) clockwise from POSITION 2.

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FIG. 20 Position of Crankshaft for Checking and Adjusting Valve Clearance