

AUXILIARY SHAFT AND BEARINGS

Refer to Fig. 31 for installation information on the auxiliary shaft.

If necessary, the auxiliary shaft bearings can be removed using the slide-hammer Tool T58L-101-A.

Install new bearings using a driver, Tool T57T-7003-A. Be sure to align the oil holes in the bearings with those in the block when installing.

CYLINDER FRONT COVER

The front seal has been designed so that it is not necessary to remove the cylinder front cover with the engine in the chassis.

When disassembling the engine, first remove the front seal from the cover while the cover is still on the engine, using the tool and procedure shown in Fig. 26.

When assembling the engine, install the cover on the engine without the seal and then use the special tool shown in Fig. 27 to press the seal into place. This will avoid damage to the seal.

Before finally adjusting the cover into position and torquing the attaching bolts, use the tool shown in Fig. 33 to position the cover in relation to the crankshaft. Torque the bolts to specifications with this tool in place. This will assure that the timing belt does not interfere with the front cover when operating.

Fig. 34 shows the method of overlapping the front and side pan gaskets when assembling.

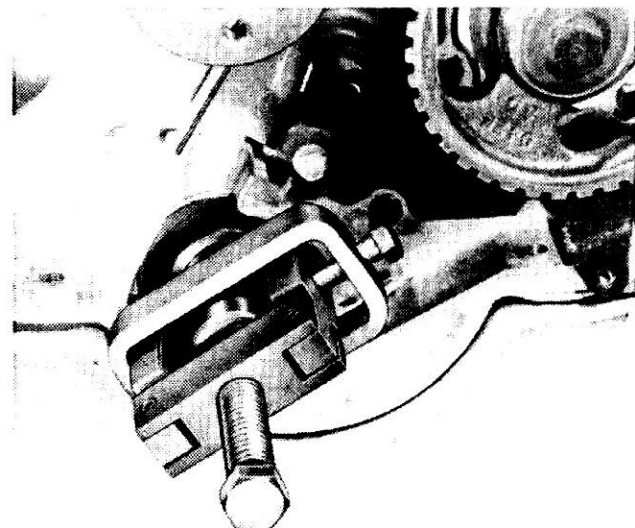
Refer to Fig. 36 as a guide for further assembly information.

FLYWHEEL

Information on installation of both automatic and manual transmission flywheels is given in Fig. 35.

CLUTCH PILOT BEARING

This engine is equipped with a sealed roller bearing clutch pilot (Fig. 33).



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FIG. 26 Removing Cylinder Front Cover Seal

Inspection procedures are outlined under Flywheel Cleaning and Inspection in Part 21-01.

Removal

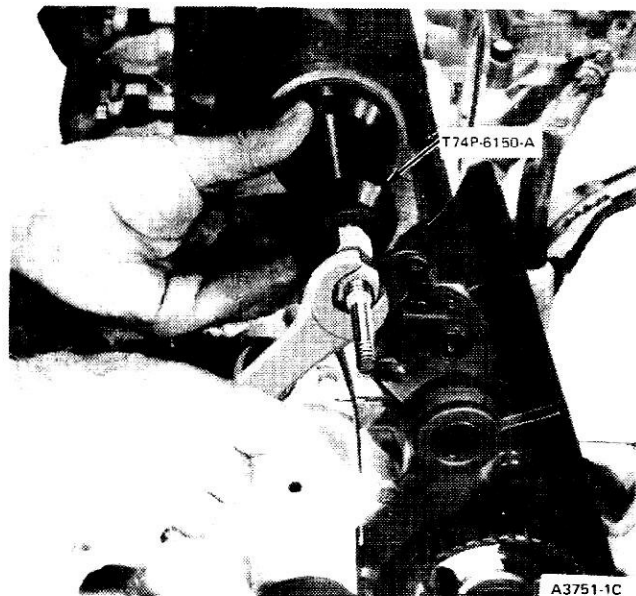
1. Remove the transmission, clutch pressure plate, and disc following the procedures in Volume One, Group 16—Clutch.
2. Using Tools T59L-100-B and T58L-101-A, remove the pilot bearing (Fig. 28).

Installation

1. Using Tool T71P-7137-C and T71P-7137-M, install the pilot service bearing (Fig. 29).
2. Install the clutch pressure plate, disc, and the transmission following the procedure in Volume One, Group 16—Clutch.

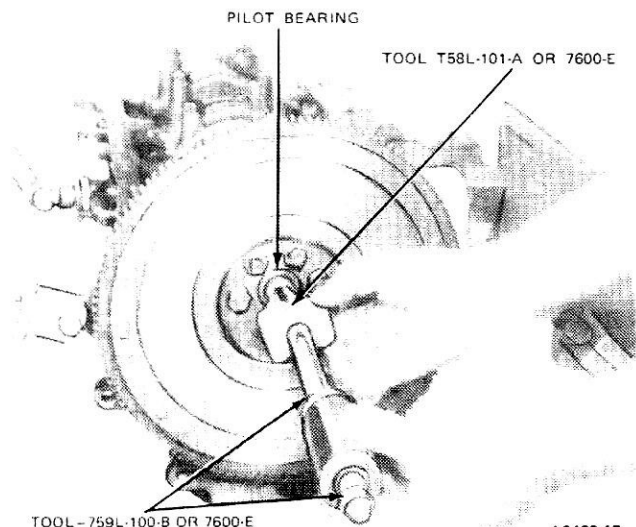
OIL PAN

Oil pan removal and installation instructions are given in Fig. 35.



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FIG. 27 Installing Camshaft Seal—Typical of Crankshaft and Auxiliary Shaft Seal Installation



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FIG. 28 Removing Pilot Bearing—Typical

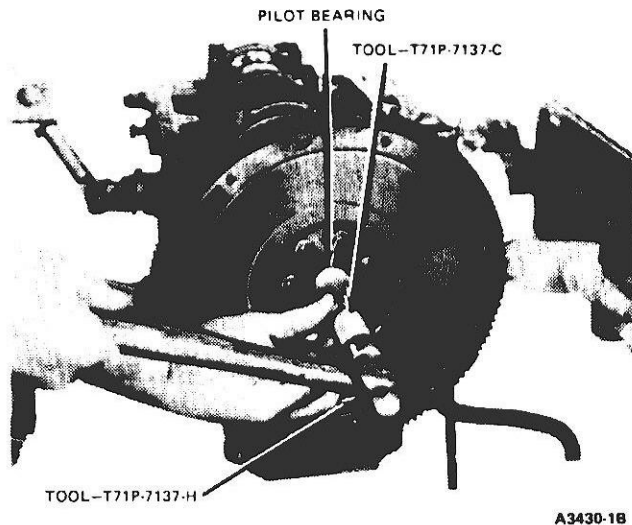


FIG. 29 Installing Clutch Pilot Bearing—Typical

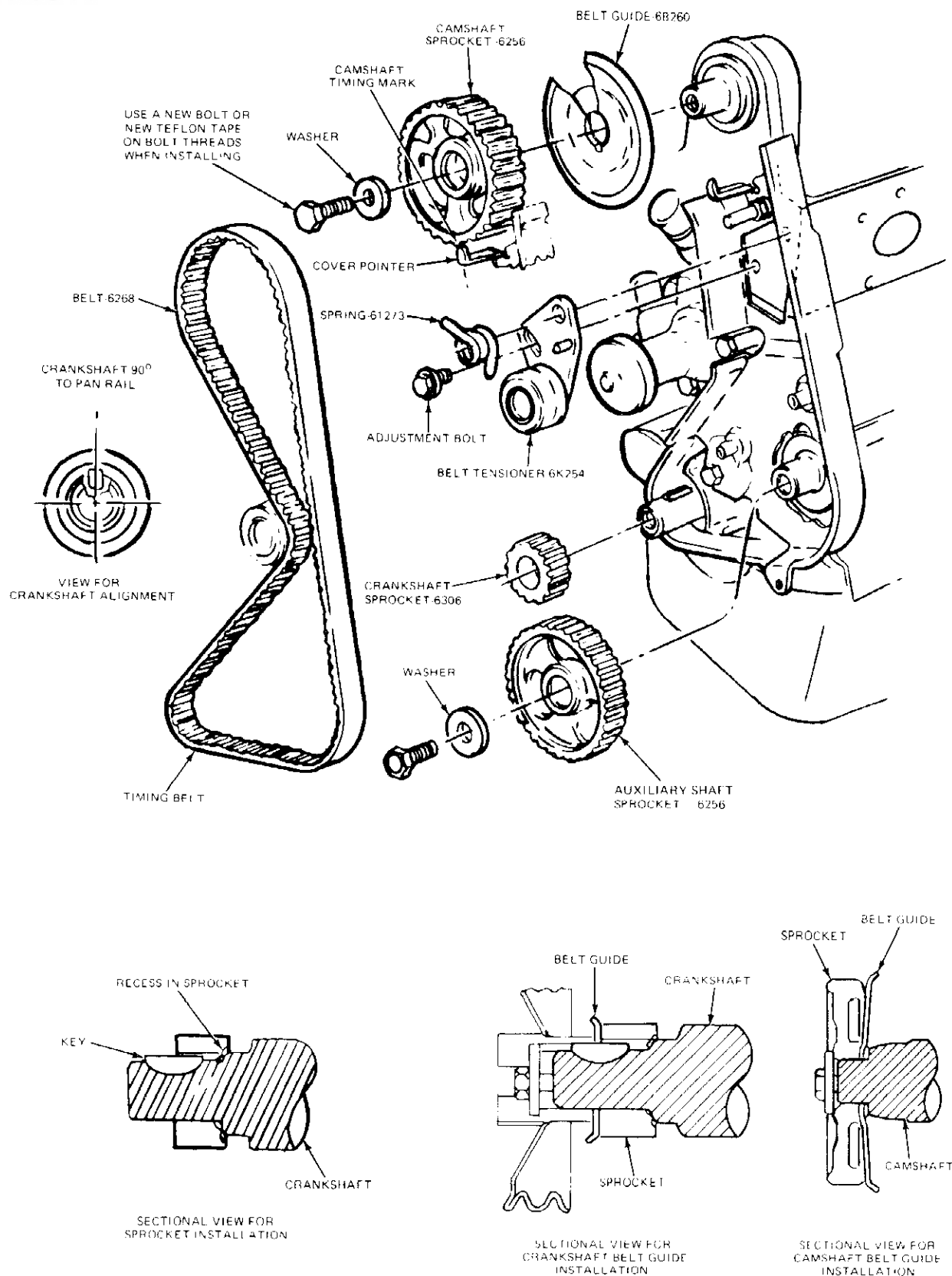


FIG. 30 Installing Cam Drive Belt, Sprockets and Tensioner

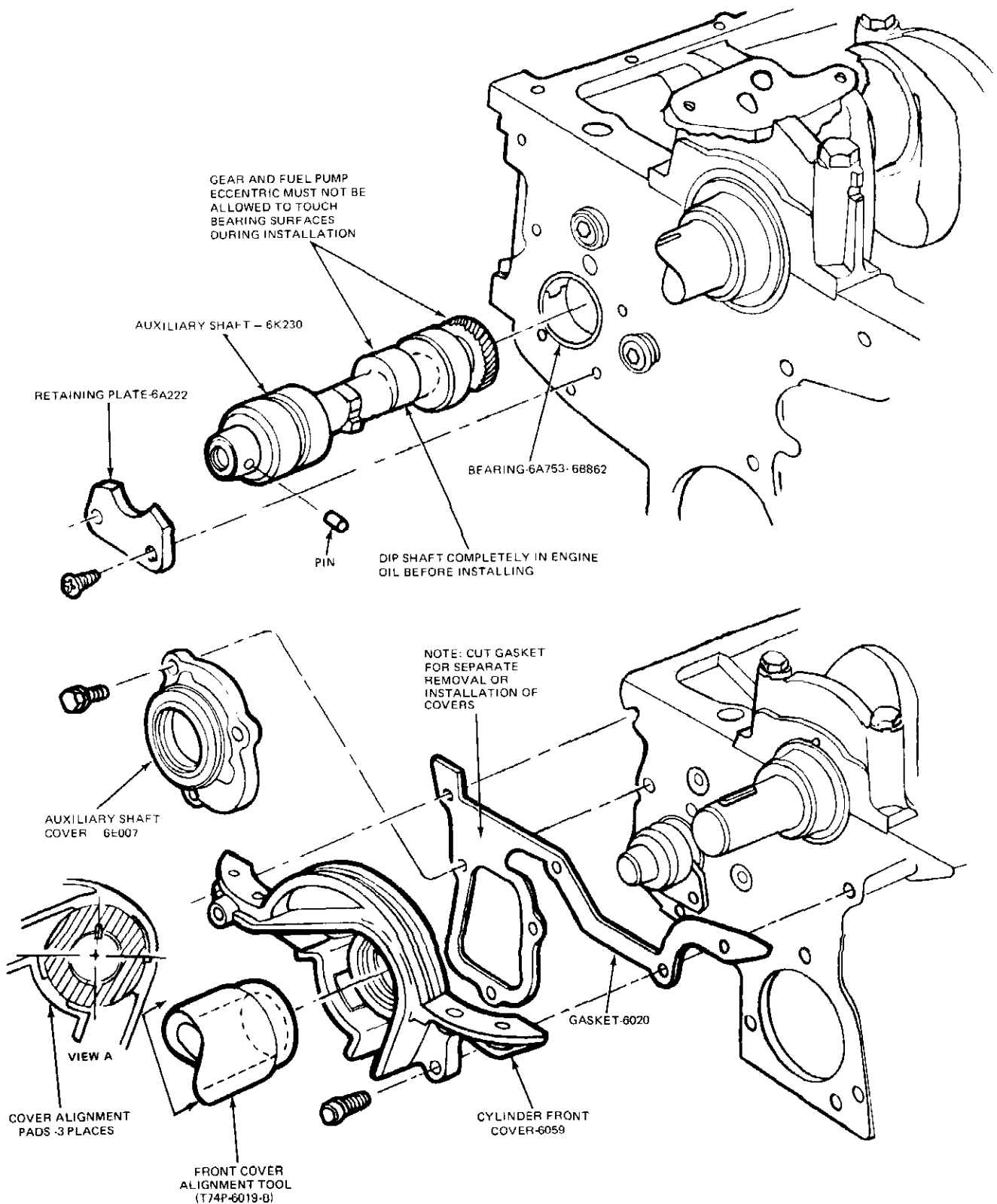


FIG. 31 Installing Auxiliary Shaft and Bearings and Cylinder Front Cover

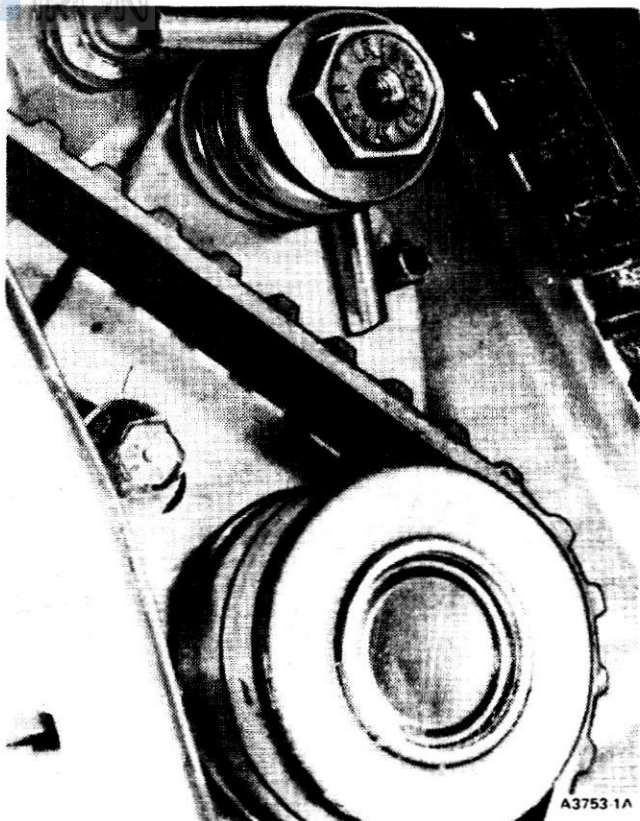


FIG. 32 Timing Belt Tensioner



FIG. 33 Positioning Front Cover

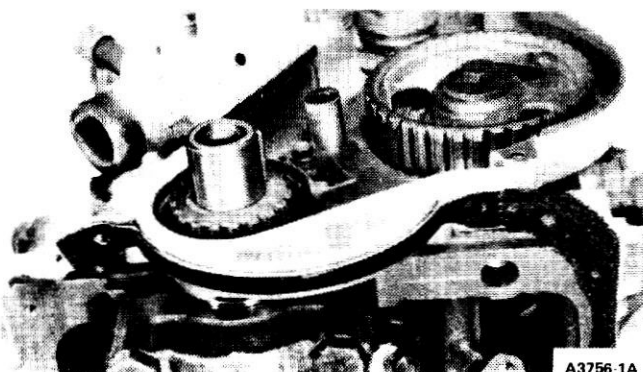


FIG. 34 Gasket Installation

OIL PUMP

Oil pump installation information is shown in Fig. 36. Prime the oil pump with engine oil when making final installation.

CRANKSHAFT REAR OIL SEAL

A split lip-type crankshaft rear oil seal is used on this engine. Installation information is given in Fig. 38.

MAIN BEARINGS

Selective-fit main bearings are used in this engine. Number three journal is the thrust bearing.

Main bearing installation information is given in Fig. 38.

Check crankshaft end play according to the procedure given in Part 21-01, under Diagnosis and Testing—Crankshaft End Play.

Fit replacement main bearings according to the procedure given in Part 21-01 under Overhaul—Fitting Main or Connecting Rod Bearings With Plastigage.

CONNECTING ROD BEARINGS

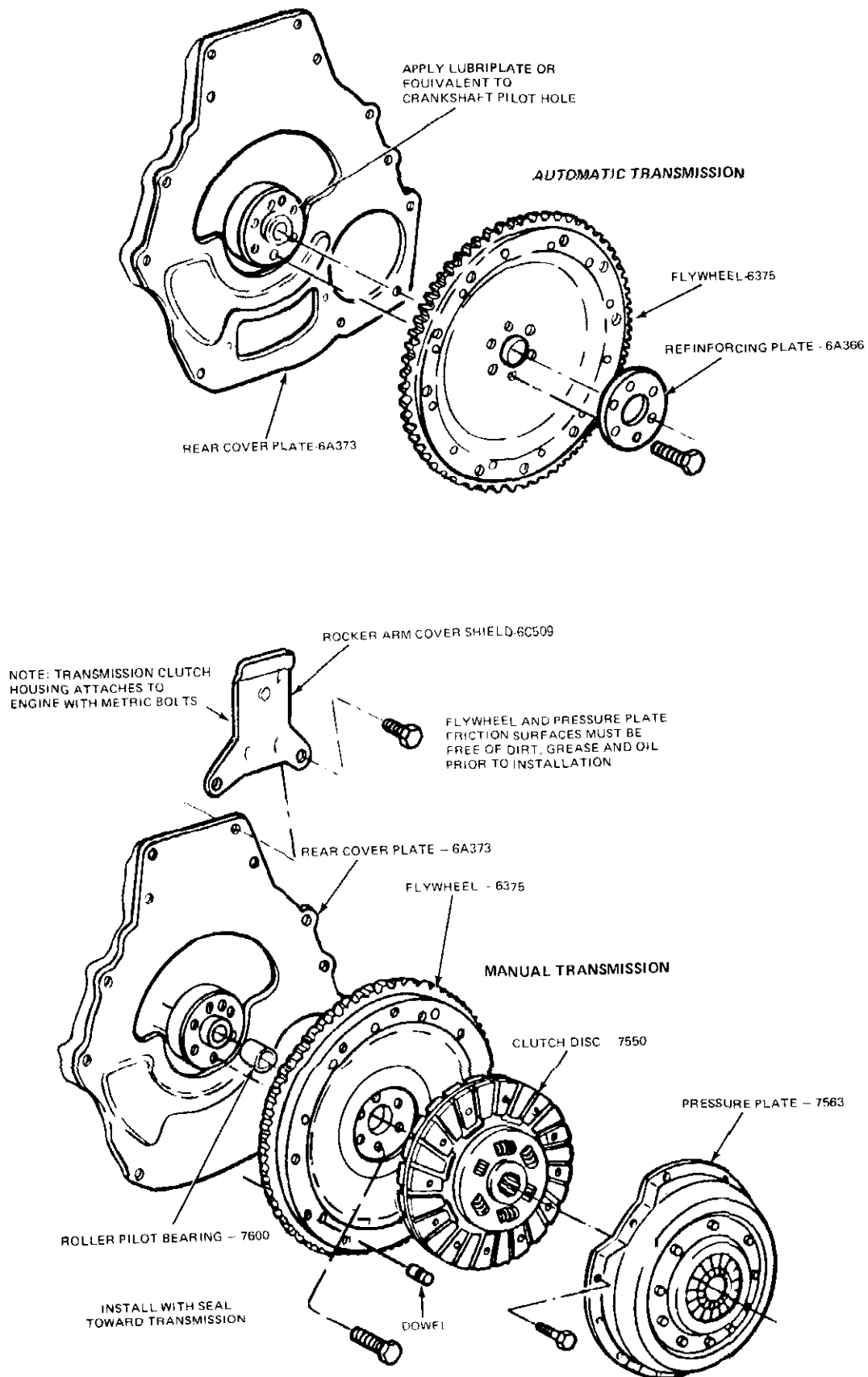
The connecting rod bearings are selective-fit. Refer to procedures under Overhaul—Fitting Main And Connecting Rods With Plastigage, Part 21-01.

PISTONS AND CONNECTING RODS

Installation information on the connecting rods and pistons is given in Fig. 40.

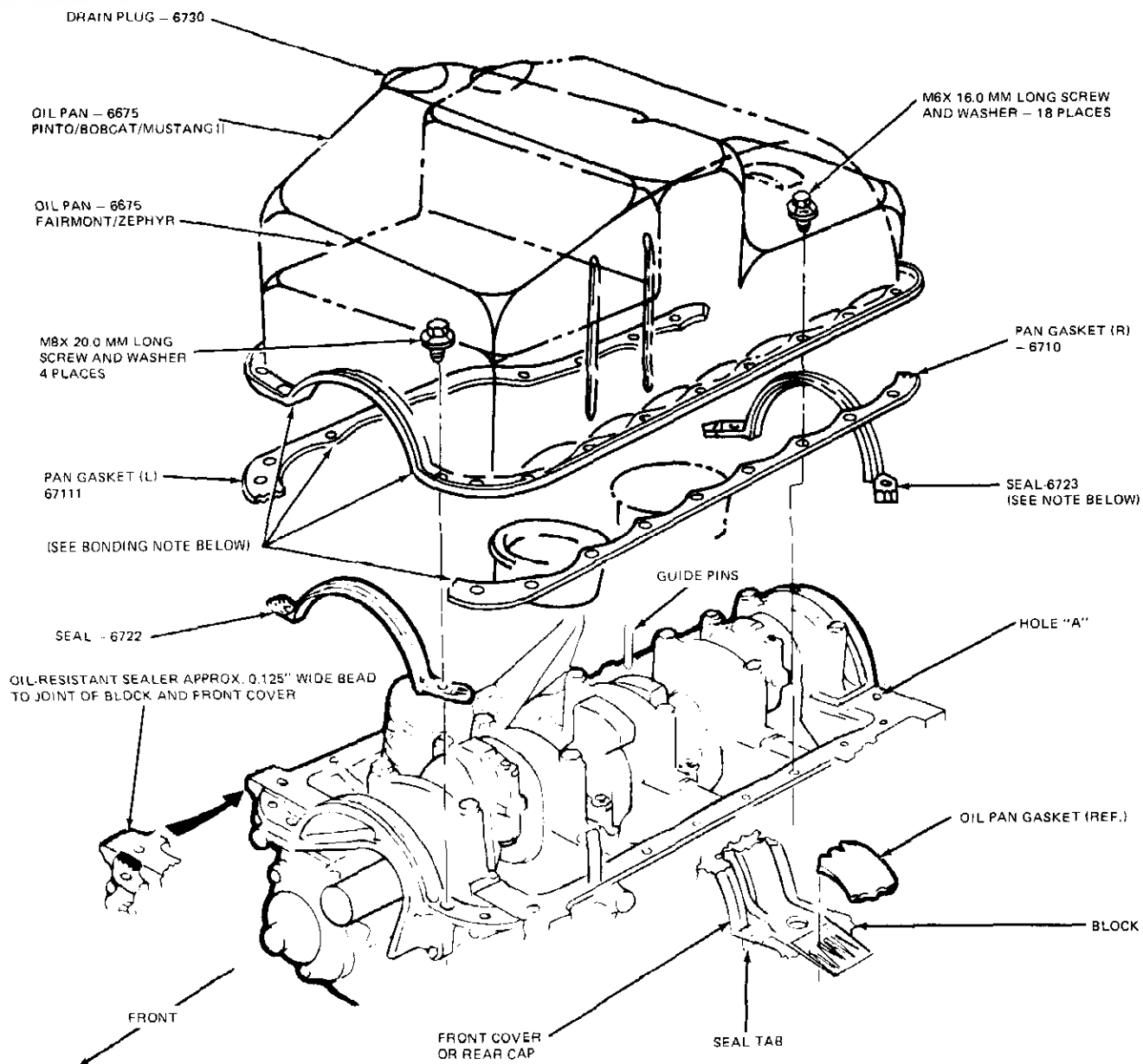
OIL FILTER

Installation information for the oil filter, oil pressure sender, water temperature sender and the fuel pump are shown in Fig. 41.



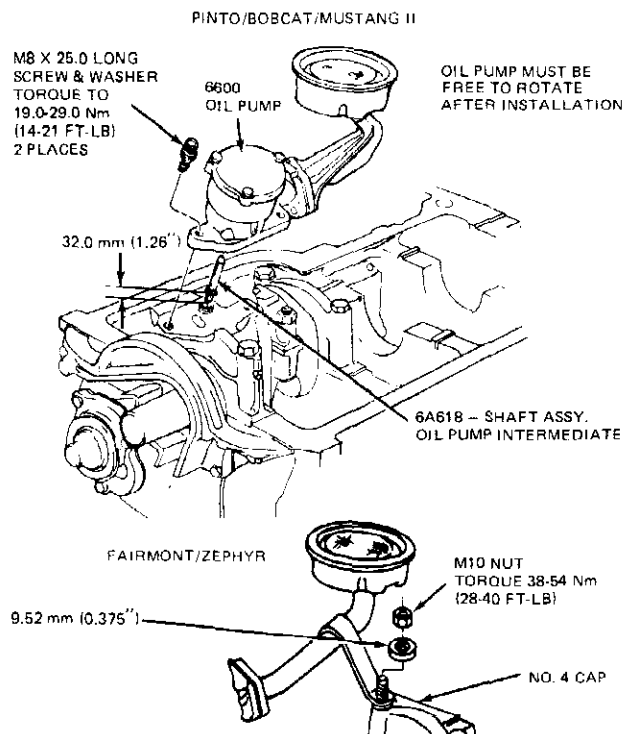
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FIG. 35 Flywheel Installation

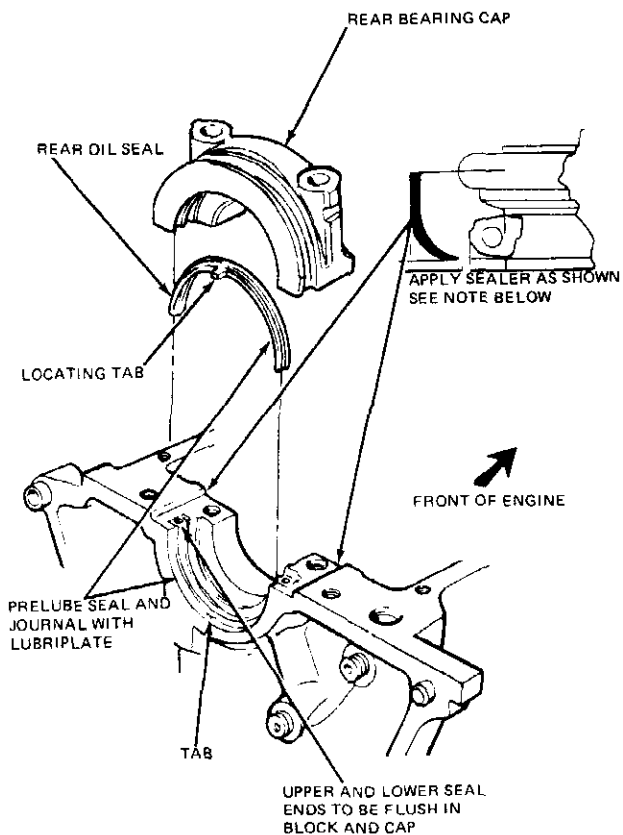


1. APPLY GASKET ADHESIVE EVENLY TO OIL PAN FLANGE AND TO PAN SIDE GASKETS. ALLOW ADHESIVE TO DRY PAST WET STAGE, THEN INSTALL GASKETS TO OIL PAN.
2. APPLY SEALER TO JOINT OF BLOCK AND FRONT COVER. INSTALL SEALS TO FRONT COVER AND REAR BEARING CAP AND PRESS SEAL TABS FIRMLY INTO BLOCK. BE SURE TO INSTALL THE REAR SEAL BEFORE THE REAR MAIN BEARING CAP SEALER HAS CURED.
3. POSITION 2 GUIDE PINS AND INSTALL THE OIL PAN. SECURE THE PAN WITH THE FOUR M8 BOLTS SHOWN ABOVE.
4. REMOVE THE GUIDE PINS AND INSTALL AND TORQUE THE EIGHTEEN M6 BOLTS, BEGINNING AT HOLE "A" AND WORKING CLOCKWISE AROUND THE PAN.

FIG. 36 Oil Pan Installation



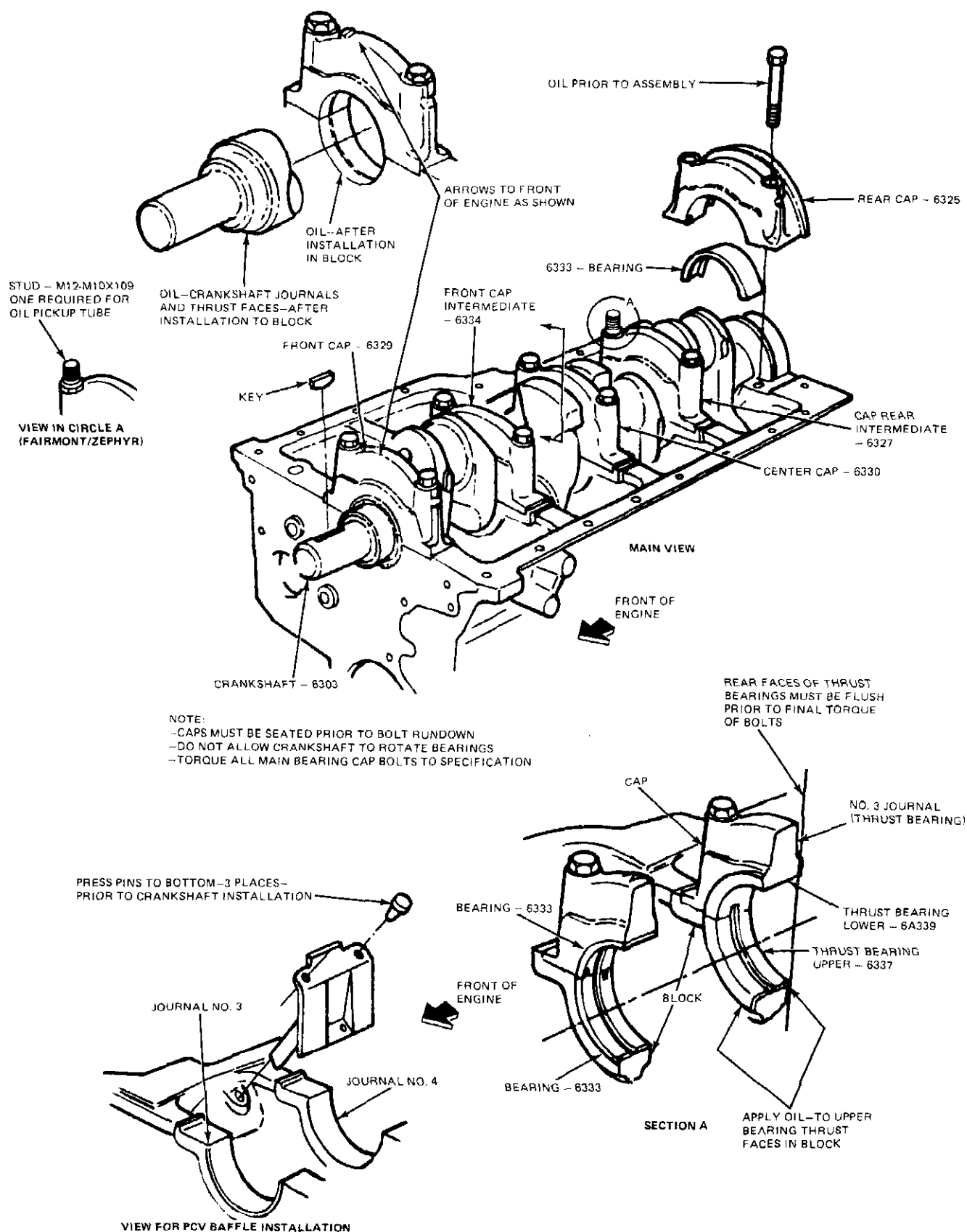
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FIG. 37 Oil Pump Installation

SEALER NOTE: CLEAN THE AREA WHERE SEALER IS TO BE APPLIED BEFORE INSTALLING THE SEALS. USE FORD SPOT REMOVER B7A-19521-A OR EQUIVALENT. AFTER THE SEALS ARE IN PLACE, APPLY A 1/16 INCH BEAD OF C3AZ-19562-A OR -8 SEALER AS SHOWN. SEALER MUST NOT CONTACT SEALS.

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FIG. 38 Rear Oil Seal Installation



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FIG. 39 Installing Crankshaft and Main Bearings

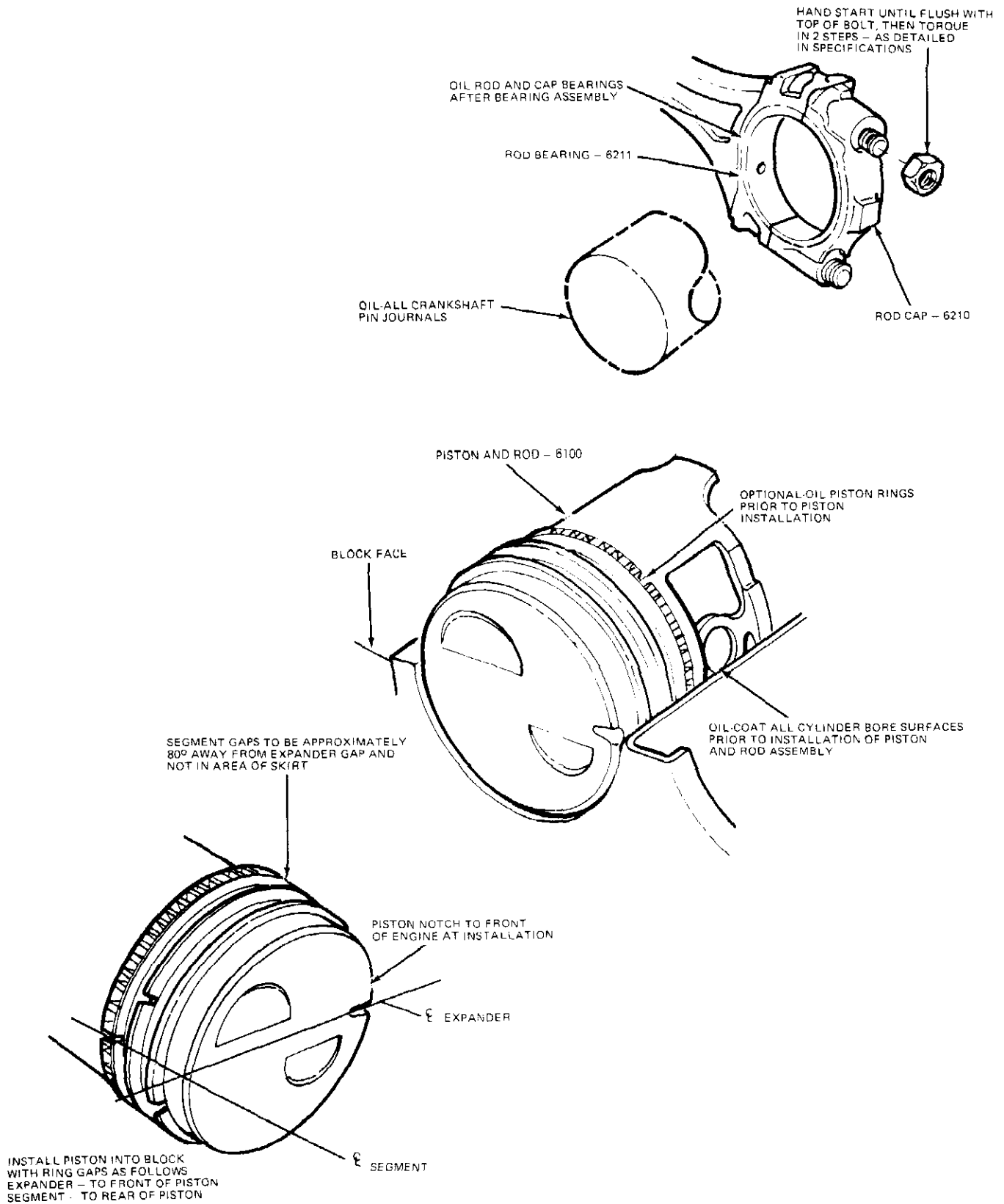
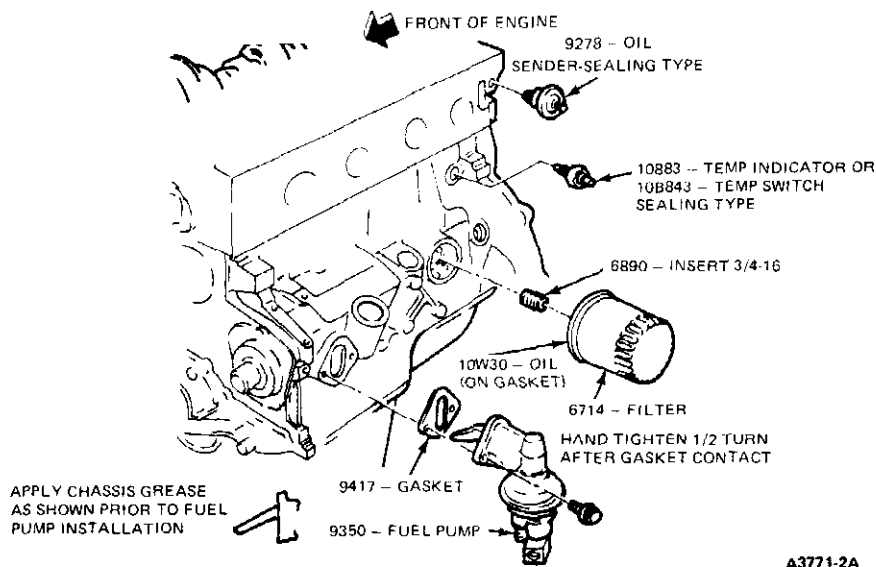


FIG. 40 Installing Pistons, Rings and Connecting Rods

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FIG. 40 Installing Pistons, Rings and Connecting Rods



A3771-2A

FIG. 41 Installing Oil Filter, Sending Units and Fuel Pump

DISASSEMBLY AND ASSEMBLY

CYLINDER HEAD

Information for disassembly and assembly of the cylinder head is contained in Fig. 20, 42 and 43.

When disassembling, mark the cam followers, lash adjusters and valves so that they can be installed in the original positions.

If the cylinder head is being repaired, remove the deposits from the combustion chambers with a scraper and wire brush before removing the valves.

If necessary to replace the cam bearings, use the tool system shown in Fig. 44.

The assembled height of the valve spring can be checked as shown in Fig. 44.

If the assembled height is greater than specified, install the necessary 0.030 inch thick spacer(s) between the cylinder head spring pad and the valve spring to bring the assembled height to the recommended dimension. **Do not install spacers unless necessary. Use of spacers in excess of recommendations will result in overstressing the valve springs and overloading the camshaft lobes. This could lead to spring breakage and worn cam lobes.**

When assembling the cylinder head, apply heavy SE oil to the valve stems, cam bearings and like parts. Apply Lubriplate or equivalent to the wiping surfaces of the cam and cam followers.

OIL PUMP

Disassembly

1. Remove the oil inlet tube from the oil pump and remove the gasket.
2. Remove the cover attaching screws, then remove the cover. Remove the inner rotor and shaft assembly, then remove the outer race.
3. Drill a small hole and insert a self-threading sheet metal screw of the proper diameter into the oil

pressure relief valve chamber cap and pull the cap out of the chamber. Remove the spring and plunger.

Assembly

The oil pump assembly is shown in Fig. 46.

1. Oil all parts thoroughly.
2. Install the oil pressure relief valve plunger, spring and a new cap.
3. Install the outer race and the inner rotor and shaft assembly. **Be sure the dimple (identification mark) on the outer race is facing outward and on same side as identification mark on rotor. The race rotor and shaft and the outer race are serviced as an assembly. One part should not be replaced without replacing the other.**

Install the cover and torque the cover attaching screws to specifications.

4. Position a new gasket and the oil inlet tube on the oil pump and install the attaching bolts.

PISTON AND CONNECTING ROD

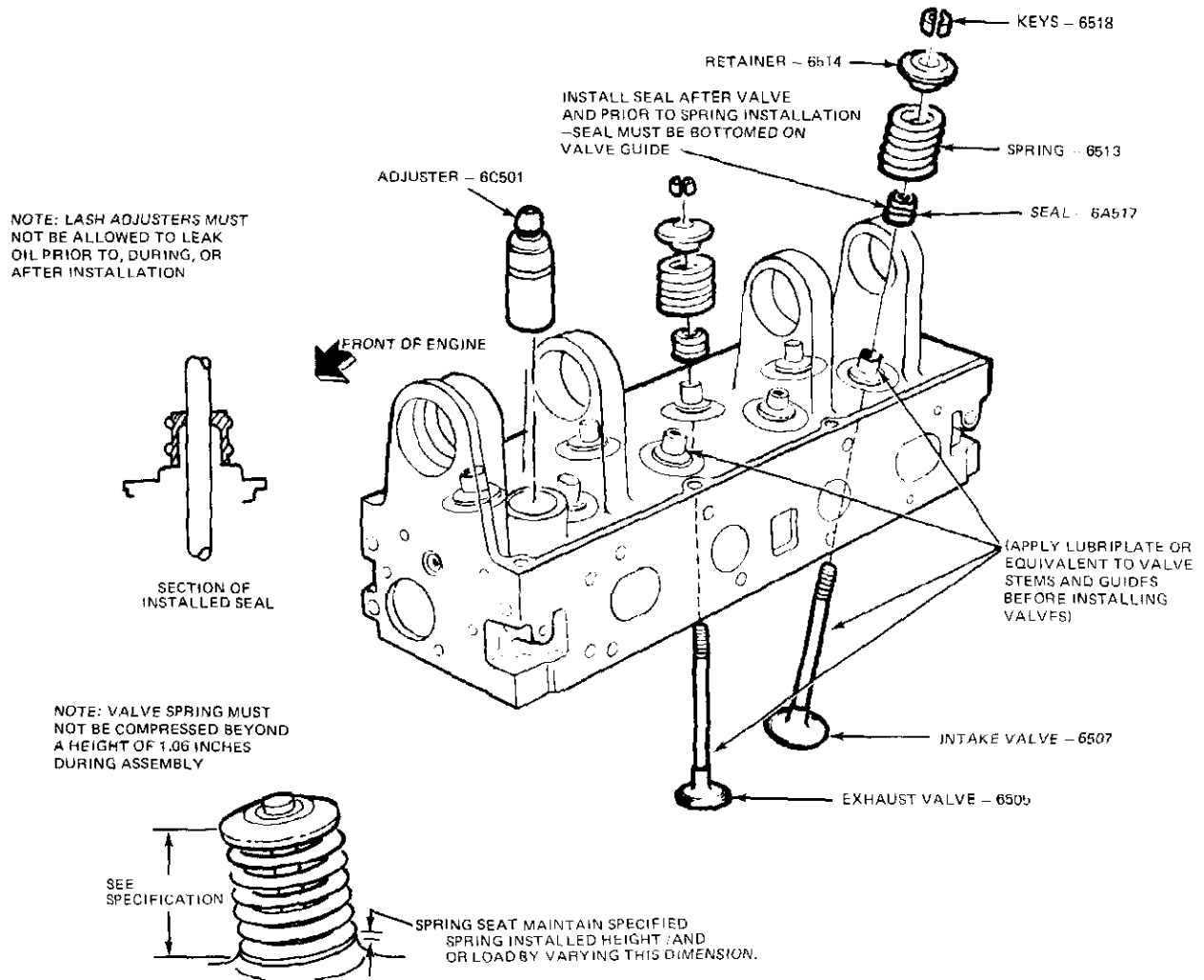
Disassembly

1. Remove the bearing inserts from the connecting rod and cap.
2. Mark the piston and pins to assure assembly with the same rod and installation in the same cylinders from which they were removed.
3. Press the piston pin from the piston and connecting rod. Remove the piston rings.

Assembly

Check the fit of a new piston in the cylinder bore before assembling the piston and pin to the connecting rod.

The piston pin bore of a connecting rod and the diameter of the piston pin must be within specifications.



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FIG. 42 Installing Valves, Springs, Seals, Retainers and Lash Adjusters

1. Apply a light coat of engine oil, SE, to all parts. Assemble the piston to the connecting rod with the boss on the side of the connecting rod and the arrow in the piston positioned as shown in Fig. 47.
2. Start the piston pin in the piston and connecting rod (this may require a very light tap with a mallet). Press the piston pin through the piston and connecting rod until the pin is centered in the piston.
3. Check the end gap and spacing (Fig. 40) of all piston rings. They must be within specifications.
4. Check the ring side clearance as outlined in Part 21-01.
5. Be sure the bearing inserts and the bearing bore in the connecting rod and cap is clean. Foreign material under the inserts will distort the bearing and cause a failure. Install the bearing inserts in the

connecting rod and cap with the tangs fitting the slots provided.

Make certain lock slots in cap are on the same side of bore as the lock slot in rod. Avoid nicking crank pin journals during rod installation.

HYDRAULIC LASH ADJUSTER

Two types of hydraulic lash adjusters are used. Type I is shown in Fig. 48. Type II in Fig. 49.

Both lash adjusters are assembled with a simple crimped collar which snaps into a groove on the outside body. This collar can be removed and re-installed as necessary without damaging it.

Use the hydraulic tappet leakdown tester (Part 21-01) to fill the lash adjusters with test fluid.

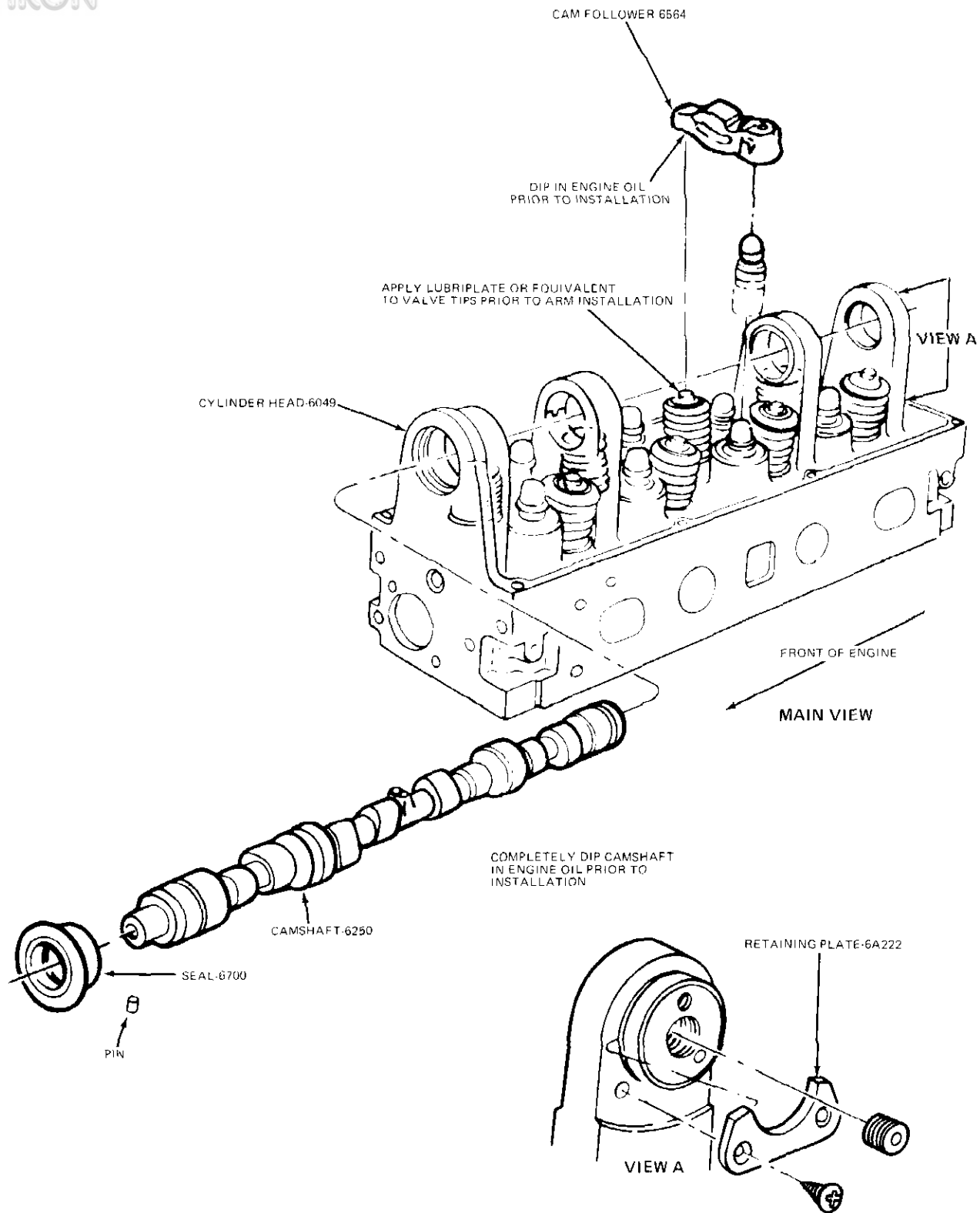


FIG. 43 Installing Camshaft

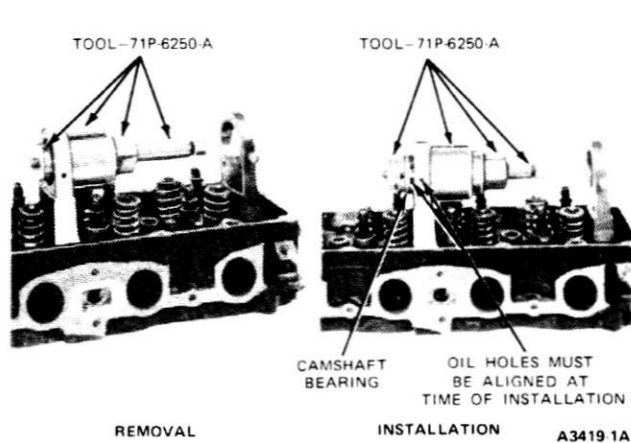


FIG. 44 Removing or Installing Camshaft Bearings—Typical

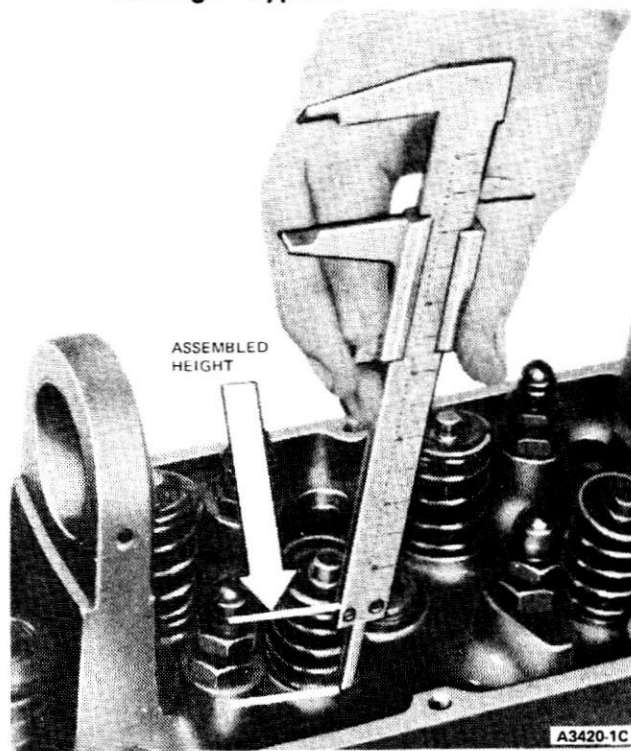


FIG. 45 Checking Valve Spring Assembled Height

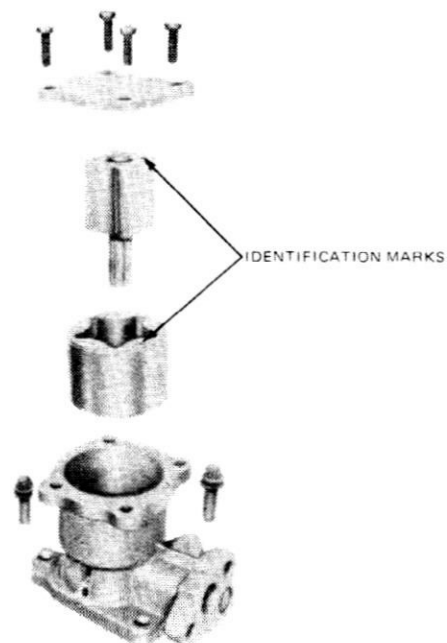


FIG. 46 Oil Pump

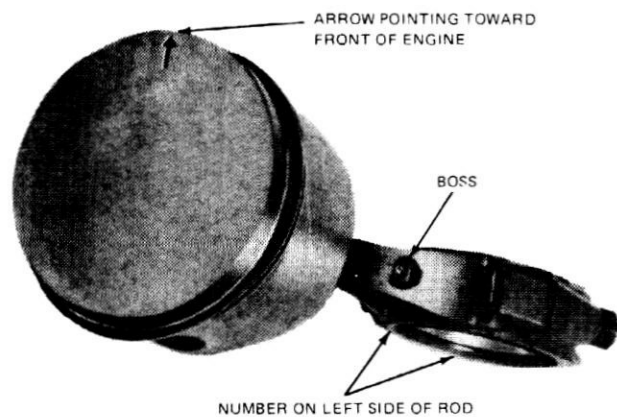


FIG. 47 Correct Piston and Rod Position