

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

No. 2 Intake No. 7 Exhaust

No. 3 Intake No. 3 Exhaust

No. 6 Intake No. 8 Exhaust

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

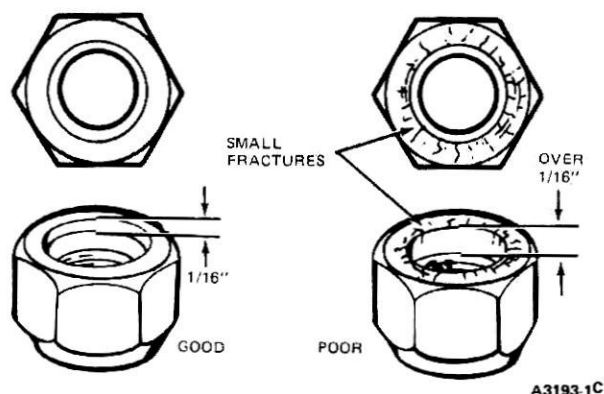
No. 2 Intake No. 4 Exhaust

No. 5 Intake No. 5 Exhaust

No. 6 Intake No. 8 Exhaust

Engines With Positive Stop Rocker Arm Studs

Each stud nut should be removed and inspected for conditions shown in Fig. 21 when adjusting valve clearance.

**FIG. 21 Inspection of Rocker Arm Stud Nut****REMOVAL AND INSTALLATION****ROCKER ARM STUD REPLACEMENT—5.0L (302 CID) AND 5.7L (351 CID) "W" V-8 ENGINE**

If it is necessary to remove a rocker arm stud, tool kit T62F-6A527-B is available which contains the following: a stud remover, a 0.006-inch oversize reamer and a 0.015-inch oversize reamer. For 0.010-inch oversize studs, use reamer T66P-6A527-B. To press in replacement studs, use stud replacer T69P-6049-D.

Rocker arm studs that are broken or have damaged threads may be replaced with standard studs. Studs in the head may be replaced with 0.006, 0.010 or 0.015-inch oversize studs which are available for service.

Standard and oversize studs can be identified by measuring the stud diameter within 1-1/8 inch from the pilot end of the stud. The stud diameters are:

Standard... 0.3714-0.3721

0.006 oversize... 0.3774-0.3781

0.010 oversize... 0.3814-0.3821

0.015 oversize... 0.3864-0.3871

When replacing a standard size rocker arm stud with a 0.010 or 0.015-inch oversize stud, always use the 0.006-inch oversize reamer before finish reaming with the 0.010 or 0.015-inch oversize reamer.

1. Position the sleeve of the rocker arm stud remover (Tool T62F-6A527-B) over the stud with the bearing end down. **When working on a 5.0L (302 CID) or 5.7L (351W CID) V-8 cylinder head, cut the threaded part of the stud off with a hack saw. This is necessary because the puller is designed for 3/8-inch studs and will not grip the 5/16-inch thread.** Thread the puller into the sleeve and over the stud until it is fully bottomed. Hold the sleeve with a wrench, then rotate the puller clockwise to remove the stud (Fig. 22).

If the rocker arm stud was broken off flush with the stud boss, use an easy-out to remove the broken stud following the instructions of the tool manufacturer.

**FIG. 22 Removing Rocker Arm Stud**

2. If a loose rocker arm stud is being replaced, ream the stud bore using the proper reamer (or reamers in sequence) for the selected oversize stud (Fig. 23). **Make sure the metal particles do not enter the valve area.**

Coat the end of the stud with Lubriplate or equivalent. Align the stud and installer T69P-6049-D with the stud bore, then tap the sliding driver until it bottoms (Fig. 24). When the installer contacts the stud boss, the stud is installed to its correct height.

CORE PLUGS**Removal**

To remove a large core plug, drill a 1/2-inch hole in the center of the plug and remove with a universal

impact slide hammer (T59L-100-B and T50T-100-A) or pry it out with a large drift punch. Clean and inspect the plug bore.

Prior to installing a core plug the plug bore should be inspected for any damage that would interfere with the proper sealing of the plug. If the bore is damaged it will be necessary to true the surface by boring for the next specified oversize plug.

Oversize (OS) plugs are identified by the OS stamped in the flat located on the cup side of the plug.

Coat the plug and/or bore lightly with an oil-resistant (oil galley) or water-resistant (cooling jacket) sealer and install it following the procedure for cup type or expansion type:

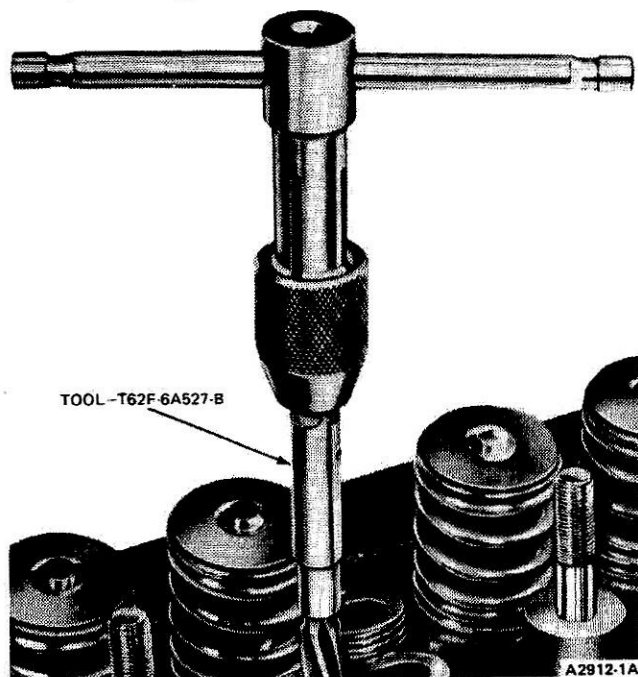


FIG. 23 Reaming Rocker Arm Stud Bore

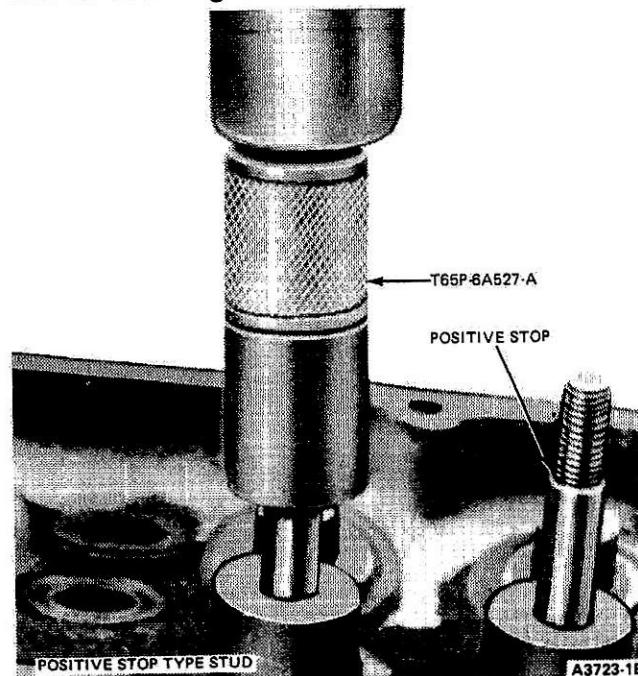


FIG. 24 Installing Rocker Arm Stud

INSTALLATION

Cup-Type

Cup-type core plugs (Fig. 25) are installed with the flanged edge outward. The maximum diameter of this plug is located at the outer edge of the flange. The flange on cup-type plugs flares outward with the largest diameter at the outer (sealing) edge.

It is imperative to install the plug in the machined bore using a properly designed tool. Under no circumstances is the plug to be driven into the bore using a tool that contacts the flange. This method will damage the sealing edge and will result in leakage and/or plug blow out. The flanged (trailing) edge must be below the chamfered edge of the bore to effectively seal the plugged bore. If the core plug replacing tool has a depth seating surface, do not seat the tool against a non-machined (casting) surface.

Expansion-Type

Expansion-type core plugs (Fig. 25) are installed with the flanged edge inward. The maximum diameter of this plug is located at the base of the flange with the flange flaring inward.

It is imperative to push or drive the plug into the machined bore by using a properly designed tool. Under no circumstances is the plug to be driven using a tool that contacts the crowned portion of the plug. This method will expand the plug prior to installation and may damage the plug and/or plug bore. When installed, the trailing (maximum) diameter must be below the chamfered edge of the bore to effectively seal the plugged bore. If the core plug replacing tool has a depth seating surface, do not seat the tool against a non-machined (casting) surface.

FLYWHEEL RING GEAR—MANUAL-SHIFT TRANSMISSION

Removal

To replace a damaged or worn ring gear, heat the ring gear with a blow torch on the engine side of the gear, and knock it off the flywheel. Do not hit the flywheel when removing the ring gear.

Installation

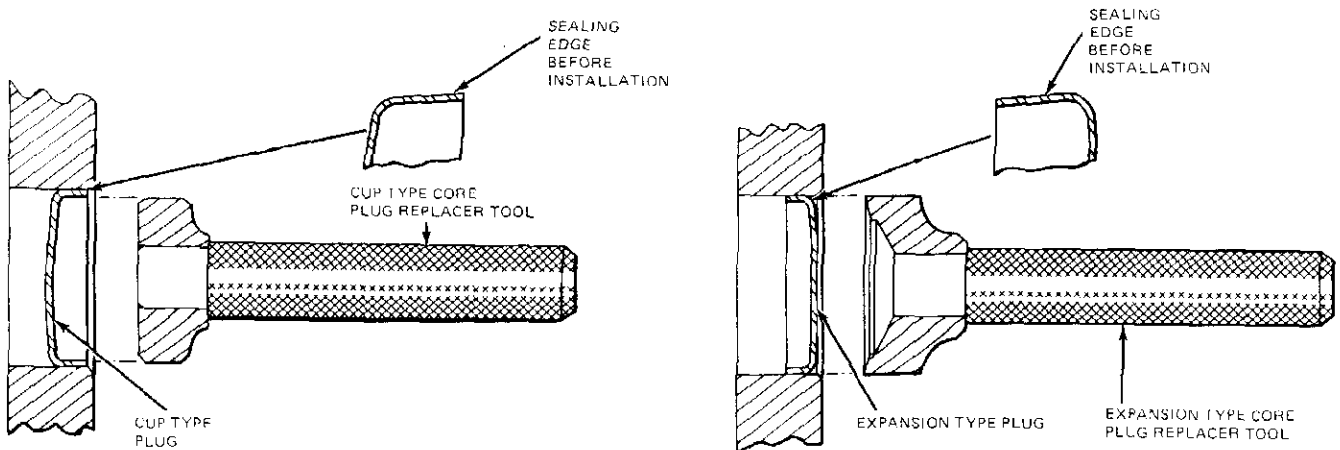
Heat the new ring gear evenly until the gear expands enough to slip onto the flywheel. Make sure the gear is seated properly against the shoulder. **Do not heat any portion of the gear to a temperature higher than 500 degrees F. If this limit is exceeded, the temper will be removed from the ring gear teeth.**

CRANKSHAFT REAR OIL SEAL—EXCEPT 2.8L V-6 ENGINE

A split-lip type crankshaft rear oil seal is provided for service. The complete seal may be replaced without removing the crankshaft (Fig. 26).

Removal

1. Remove the oil pan and the oil pump (if required), following procedures under Oil Pan and Oil Pump Removal.



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FIG. 25 Typical Core Plugs and Installation Tools

- Loosen all the main bearing cap bolts, thereby lowering the crankshaft slightly but not to exceed $1/32$ inch.
- Remove the rear main bearing cap, and remove the oil seal from the bearing cap and cylinder block. On the block half of the seal use a seal removal tool, or install a small metal screw in one end of the seal, and pull on the screw to remove the seal. **Exercise caution to prevent scratching or damaging the crankshaft seal surfaces.**
- Remove the oil seal retaining pin from the bearing cap if so equipped. **The pin must not be used with the split-lip seal.**

- Dip the split-lip type seal halves in the clean engine oil.
- Carefully install the upper seal (cylinder block) into its groove with undercut side of seal toward the **FRONT** of the engine (Fig. 26), by rotating it on the seal journal of the crankshaft until approximately $3/8$ inch protrudes below the parting surface.

Be sure no rubber has been shaved from the outside diameter of the seal by the bottom edge of the groove. Do not allow oil to get on the sealer area (Fig. 27).

- Tighten all the bearing cap bolts and torque to specifications (except rear main bearing cap).
- Install the lower seal in the rear main bearing cap with undercut side of seal toward the **FRONT** of the engine (Fig. 26). Allow the seal to protrude approximately $3/8$ -inch above the parting surface to mate with the upper seal when the cap is installed.

On 2.3L I-4 engines, install the seals so that the locating tab faces the rear of the engine (Fig. 28).

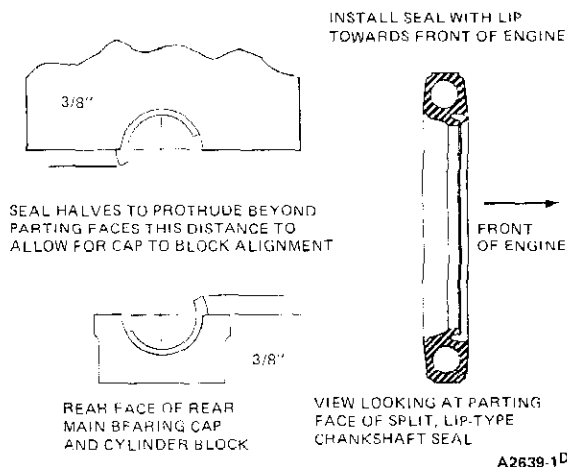
- Apply an even $1/16$ inch bead of RTV silicone rubber sealer to the areas shown in Fig. 27, following the procedure given in the illustration.

NOTE: Do not delay installation of bearing cap, as this sealer sets up in 15 minutes. Install the rear main bearing cap. Torque the cap bolts to specifications.

- Install the oil pump and oil pan. Fill the crankcase with the proper amount and viscosity oil.
- Operate the engine and check for oil leaks.

CRANKSHAFT REAR OIL SEAL—2.8L V-6 ENGINE

NOTE: Unlike other engines, the 2.8L V-6 engine does **NOT** require removal of the oil pan or the rear main bearing cap to replace the rear oil seal. Instead, the transmission must be removed.



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FIG. 26 Installing Crankshaft Rear Oil Seal—Except 2.3L I-4 and 2.8L V-6 Engines

Installation

- Carefully clean the seal grooves in the cap and block with a brush and suitable solvent. Also clean the area where sealer is later to be applied (Fig. 27). Dry the area thoroughly, so no solvent touches the seal.

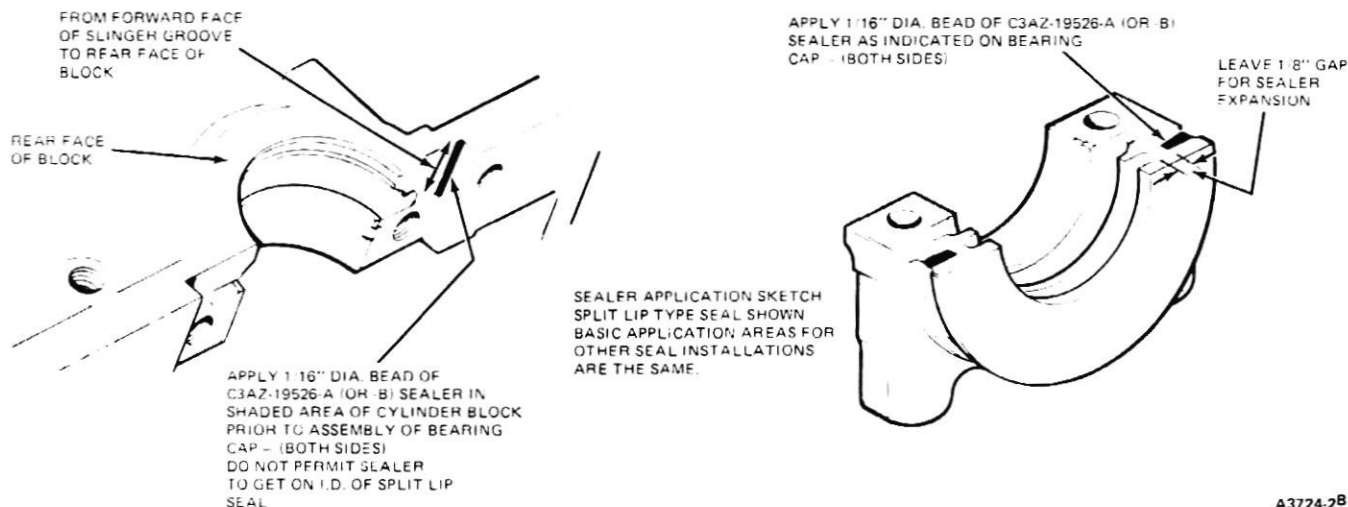


FIG. 27 Applying RTV Sealer To Main Bearing Cap and Block—Typical for I-6 and V-8 Engines

Removal

1. Remove the transmission assembly. Remove clutch pressure plate and clutch disc, if so equipped.
2. Remove the flywheel and rear plate.
3. Use an awl to punch two holes in the crankshaft rear oil seal. Punch the holes on opposite sides of the crankshaft and just above the bearing cap to cylinder block split line. Install a sheet metal screw in each hole (Fig. 29). Use two large screwdrivers or small pry bars and pry against both screws at the same time to remove the crankshaft rear oil seal. It may be necessary to place small blocks of wood against the cylinder block to provide a fulcrum point for the pry bars. **Use caution throughout this procedure to avoid scratching or otherwise damaging the crankshaft oil seal surface.**
4. Clean the oil seal recess in the cylinder block and main bearing cap. **Inspect and clean the oil seal contact surface on the crankshaft, following the procedure in this Part.**

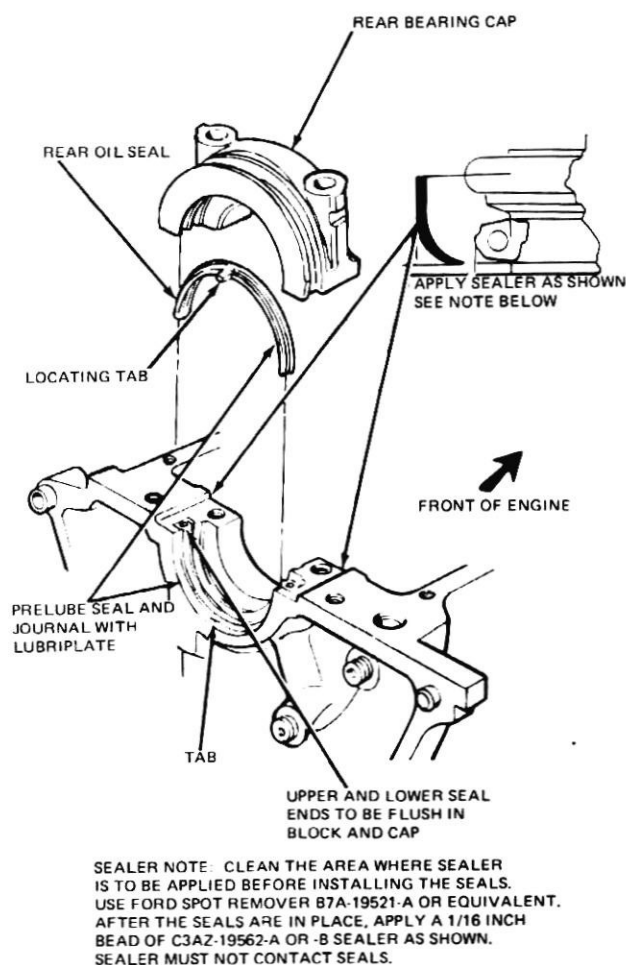


FIG. 28 Rear Oil Seal Installation—2.3L I-4 Engine

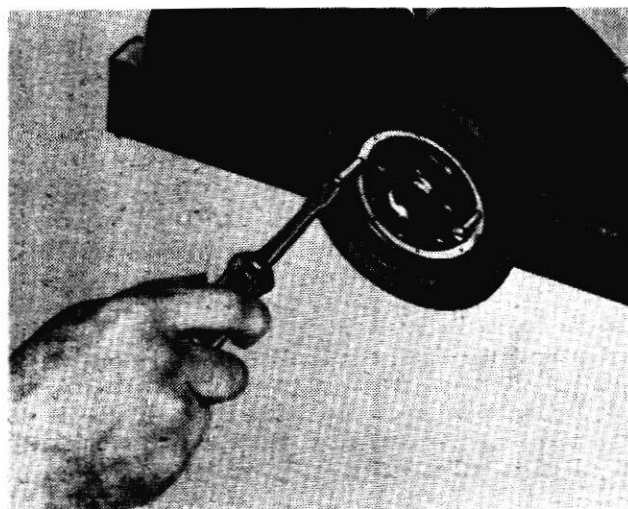


FIG. 29 Removing Crankshaft Rear Oil Seal—2.8L V-6 Engine