

3.8 LITER V6 & 4.4, 5.0 & 5.7 LITER V8

IDENTIFICATION CODING

ENGINE IDENTIFICATION

Engine may be identified from the Vehicle Identification Number (VIN) stamped on a metal tab located on top of instrument panel at lower left of windshield. VIN number code also appears as part of a production or unit number stamped on pad on right front of block, below right cylinder head. The VIN number contains 17 digits. The 8th digit identifies the engine and the 10th digit establishes the model year.

Engine Code	
Engine	Code
3.8L (229") 2-Bbl. V6	K
4.4L (267") 2-Bbl. V8	J
5.0L (305") 4-Bbl. V8	H
5.0L (305") TBI	①7
5.7L (350") TBI V8	②8
① - Camaro and Firebird only.	
② - Corvette only.	

ENGINE REMOVAL

See *Engine Removal* at end of ENGINE Section.

CYLINDER HEAD & MANIFOLDS

INTAKE MANIFOLD

Removal (Carbureted Models) - 1) Disconnect negative battery cable at battery. Drain cooling system. Remove air cleaner. Disconnect upper radiator hose and heater hose at manifold. Disconnect carburetor linkage, fuel line, vacuum lines and electrical wiring at manifold.

2) Disconnect crankcase vent lines and spark advance hose at distributor. Disconnect right side spark plug wires at spark plugs. Remove distributor cap, position cap and wires aside, mark position of rotor with chalk and remove distributor. If equipped, remove A/C and cruise control servo brackets.

3) If necessary, remove accelerator return spring, bracket and bellcrank. Remove alternator upper bracket. If necessary, remove EGR solenoid and bracket. On 4-Bbl. models, remove carburetor and EGR valve. On 2-Bbl. models, remove idle speed solenoid. On all models, remove vacuum brake line, manifold bolts and manifold.

Removal (TBI Models) - 1) Disconnect battery negative cable. Drain radiator, remove air cleaner, EGR solenoid, and fuel inlet line. Disconnect idle air motors, injectors, and Throttle Position Sensor (TPS). On 5.0L engine, remove alternator adjustment bracket. On all models, remove power brake booster line and fuel return line.

2) If equipped with A/C, remove A/C strut. On 5.7L engine, remove air hose at check valve and air control valve. Remove air pump and lay aside. On all engines, disconnect PCV hose, vacuum hoses, fuel balance tube, TBI-to-manifold bolts and TBI plate. Remove distributor. Remove radiator and heater hoses at thermostat housing and remove manifold.

Installation (All Models) - 1) Clean mating surfaces of heads and manifold. Install manifold side gaskets on cylinder heads. Using RTV sealer, lay a $\frac{3}{16}$ " bead along front and rear

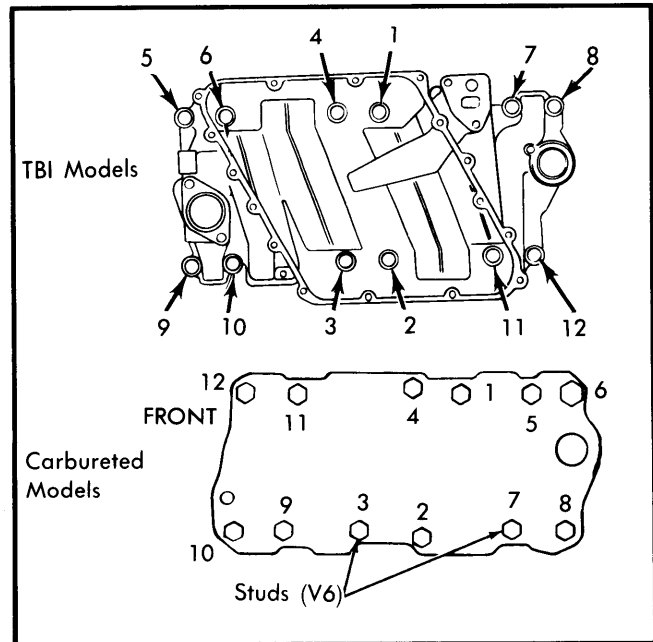


Fig. 1 Manifold Tightening Sequence

ridge of block, about $\frac{1}{2}$ " up each head to seal and retain manifold side gaskets.

2) Use sealer at water passages also. Install manifold and bolts, tightening bolts in sequence. See Fig. 1. Reverse removal procedure to complete installation.

EXHAUST MANIFOLDS

Removal (All Except 5.7L Engine - Left Side) - Disconnect battery negative cable. Raise vehicle on hoist. Disconnect exhaust pipe at manifold and suspend with wire. Lower vehicle. If equipped, remove A/C compressor and bracket and position aside, leaving refrigerant lines attached. Remove power steering bracket. Remove end bolts, then center bolts and remove manifold.

Removal (All Except 5.7L Engine - Right Side) - 1) Disconnect negative battery cable at battery. Remove air cleaner and heat stove pipe. Raise vehicle on hoist. Disconnect exhaust pipe at manifold and suspend exhaust pipe with wire.

2) Lower vehicle. Disconnect spark plug wires, EFE valve vacuum hose and any emission control devices that interfere with manifold removal. On V6 model, remove engine oil dipstick tube retainer. On all models, remove end bolts, then center bolts and remove manifold.

Removal (5.7L Engine) - Remove spark plug wires from spark plugs. Remove spark plug wires from spark plugs. Remove spark plug wiring heat shields. Disconnect exhaust pipe from manifolds and suspend with wire. Remove manifold end bolts, center bolts, and manifold.

Installation (All Models) - Clean exhaust manifold and cylinder head mating surfaces of any carbon and/or dirt. Position manifold to cylinder head and install bolts finger tight. With manifold correctly positioned on cylinder head, tighten bolts to specifications. Reverse removal procedure to complete installation.

3.8 LITER V6 & 4.4, 5.0 & 5.7 LITER V8 (Cont.)

CYLINDER HEADS

Removal – 1) Remove intake manifold as previously described. Remove alternator lower mounting bolt and position alternator aside. Remove exhaust manifolds as previously described. If equipped, remove A/C compressor and forward mounting bracket and position aside, leaving refrigerant lines connected.

2) Remove rocker arm covers and remove rocker arm assemblies. Drain cylinder block of coolant. If necessary, remove diverter valve. Remove head bolts, cylinder heads and gaskets. Place each cylinder head on 2 wood blocks to prevent damage.

NOTE – Two types of gaskets are used on these engines. On steel gaskets, use a thin, even coat of sealer on both sides. On composition steel gaskets, do not use sealer of any type.

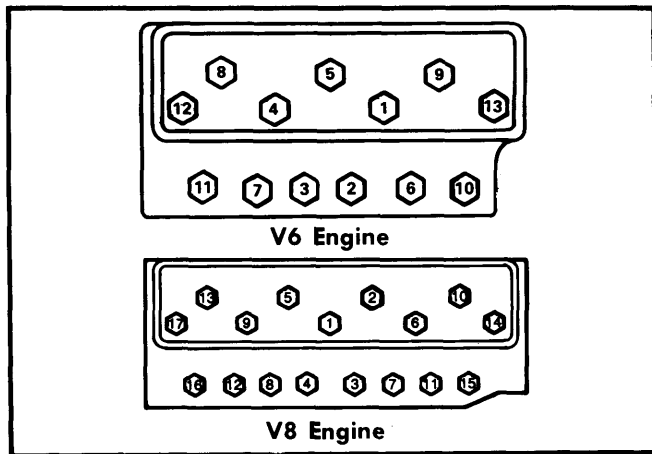


Fig. 2 Cylinder Head Tightening Sequence

Installation – 1) Clean cylinder block and cylinder head mating surfaces of any gasket material, carbon and/or dirt. Make sure mating surfaces are free of any nicks or heavy scratches. Clean bolt hole threads in cylinder block to ensure proper bolt torque.

2) Install gaskets over dowel pins with "bead" side up. Install cylinder heads, applying sealing compound to head bolt threads and tighten in sequence. See Fig. 2. Install push rods and rocker arms and adjust valves. Reverse removal procedure to complete installation.

VALVES

VALVE ARRANGEMENT

V6 Engines

E-I-E-I-E (Left bank, front to rear).

E-I-I-E-I-E (Right bank, front to rear).

V8 Engines

E-I-I-E-E-I-I-E (Both banks, front to rear).

VALVE GUIDE INSPECTION & SERVICING

Insert valve with valve head positioned $\frac{1}{16}$ " above valve seat. Attach dial indicator to cylinder head. Position dial indicator stem against valve stem just above valve guide. Rock valve in guide and measure guide wear as shown on indicator. If valve guide wear is excessive, ream valve guide to next size oversize. Service valves are available in standard, .003", .015" and .030" oversize.

VALVE STEM OIL SEALS

Oil seals are installed on all valve stems and must be replaced whenever valve service is performed. See *Valve Spring Removal for disassembly*. Lightly coat seals with engine oil to prevent twisting. Reverse disassembly procedures to complete installation. Using valve oil seal leak detector J-23994 (or equivalent) apply vacuum to make sure no air leaks past seal.

VALVE SPRINGS

Removal (Cylinder Head Installed) – 1) Remove rocker arm cover, spark plug, rocker arm and push rods on the cylinder(s) to be serviced. Install air line adapter (J-23590) to spark plug port and apply compressed air to hold valves in place.

2) Using valve spring compressor (J-5892) to compress valve spring, remove valve locking keys, valve cap, valve spring and damper. Remove valve stem oil seal.

Removal (Cylinder Head Removed) – 1) With rocker arm removed, compress valve springs using compressor tool (J-8062). Remove locking keys and release compression tool.

2) Remove caps (or rotators), springs, spring dampers and oil seals. Keep all removed components separate for reinstallation in original location.

Checking – Check valve spring tension using valve and clutch spring tension tester (J-8056 or equivalent). Springs must be within 10 lbs. of specified load at required height (without dampers).

Installation (Cylinder Head Installed) – 1) Install valve stem oil seal over valve stem and seat against cylinder head. Set the valve spring and damper, oil shedder and valve cap (or rotator) in place. Compress the spring with compressor tool (J-5892) and install oil seal in the lower groove of the stem, ensuring the seal is flat and not twisted. A light coat of oil will help prevent twisting.

2) Install locking keys and release compressor tool. Grease may be used to hold keys in place while releasing tool. Using tool (J-23994), apply vacuum to the valve cap and ensure that no air leaks past seal. To complete installation, reverse removal procedure.

Installation (Cylinder Head Removed) – Install valve spring shims if used. Install springs, dampers, oil shedder and valve cap (or rotator). Compress spring with tool (J-8062) and install oil seal in lower groove of valve stem. Ensure that seal is flat and not twisted. Install valve locks and release spring compression tool.

VALVE SPRING INSTALLED HEIGHT

Installed height of valve spring should be $1\frac{23}{32}$ ". Measure from top of spring seat (in head) to top of oil shield. If measurement exceeds specifications, install a $\frac{1}{16}$ " shim at spring seat.

NOTE – At no time should valve spring be shimmed to give an installed height less than minimum specification.

3.8 LITER V6 & 4.4, 5.0 & 5.7 LITER V8 (Cont.)

VALVE ADJUSTMENT

1) To adjust valves, rotate crankshaft to No. 1 firing position and adjust following valves:

- V6 — Intake No. 1, 2 and 3.
- V6 — Exhaust No. 1, 5 and 6.
- V8 — Intake No. 1, 2, 5 and 7.
- V8 — Exhaust No. 1, 3, 4 and 8.

2) Adjust valves by backing off adjusting nut until lash is felt at push rod, then tighten until all lash is removed. Tighten adjusting nut an additional 1 full turn. Rotate crankshaft to No. 4 firing position (V6 engines) or No. 6 firing position (V8 engines) and adjust following valves:

- V6 — Intake No. 4, 5 and 6.
- V6 — Exhaust No. 2, 3 and 4.
- V8 — Intake No. 3, 4, 6 and 8.
- V8 — Exhaust No. 2, 5, 6 and 7.

3) When adjustment is complete, install rocker arm covers. Start engine and check timing and idle speed.

ROCKER ARM STUDS

Cylinder heads use pressed in rocker arm studs. Rocker arm studs that have damaged threads or are loose in cylinder head should be replaced. Studs are available in standard, .003" and .013" oversize.

Removal — Remove stud using removal tool (J-5802-1 or equivalent). Install removal tool over stud, install flat washer and nut and tighten nut until stud is removed.

NOTE — Do not install an oversize stud without first reaming stud hole, as damage to head casting may occur.

Installation — 1) If necessary, ream stud hole for oversize stud using reamer tool (J-5715 for .003" oversize, and J-6036 for .013" oversize).

2) Coat press fit area of stud with hypoid axle lubricant. Drive stud into place using guide tool (J-6880 or equivalent) and a hammer. When guide tool bottoms on head, stud is at correct height.

HYDRAULIC VALVE LIFTERS

Lifters are serviced as a complete unit only. If lifter is damaged or worn, it must be replaced. Should lifter be disassembled for any reason, test lifter leakdown rate. See Fig. 3. Make sure lifter foot is convex.

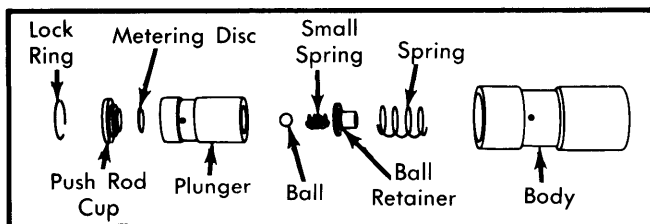


Fig. 3 Exploded View of Hydraulic Lifter Assembly

PISTONS, PINS & RINGS

OIL PAN

See Oil Pan Removal at end of ENGINE Section.

PISTON & ROD ASSEMBLY

NOTE — Piston should be at bottom of stroke and covered with a cloth to collect cuttings.

Removal — 1) With oil pan, oil pump and cylinder heads removed, use a ridge reamer to remove any ridge or deposits from upper portion of cylinder bore. Be sure piston and rod assembly is marked for reinstallation in original location.

2) With piston at bottom of stroke, remove connecting rod cap and install rod bolt guides over rod bolts. Push piston and rod assembly out top of bore and reinstall rod cap to respective rod. Rotate crankshaft as required to remove remaining piston and rod assemblies.

Installation — 1) Apply a light coating of oil to pistons, rings, cylinder bores and bearings. Install bearings to connecting rods. Use compression tool (J-8037) to compress rings. Ensure that ring gaps are staggered around piston and are not aligned.

2) Install piston and rod assembly with bearing tang slot on opposite side of camshaft. Remove rod bolt guides, install bearings and caps and tighten.

FITTING PISTONS

NOTE — New pistons must be installed into cylinders for which they were fitted. Old pistons should be returned to cylinders from which they were removed.

Measure cylinder bore diameter with an inside micrometer or dial bore gauge 2½" from top of cylinder. Center dial bore gauge in cylinder and set indicator to zero. Move gauge carefully up and down cylinder and turn in different directions to determine cylinder out-of-round and taper. Out-of-round must not exceed .002" and taper .005". Cylinder may be honed and .001" oversize pistons installed if measurements do not exceed specifications. Measure piston on skirt at right angles to piston pin at centerline of pin. Oversize pistons are available if cylinders are bored.

FITTING RINGS

1) Position ring in the cylinder bore that it will be used in. Push ring down into cylinder bore approximately ¼" above ring travel, making sure ring is positioned squarely in cylinder bore.

2) Measure gap between ends of ring using feeler gauge, if not within specifications, substitute another ring set until rings are within specifications.

CAUTION — Use care to avoid damage to ring or cylinder bore.

PISTON PINS

Using piston pin tool J-24086-8, remove pin. With piston and rod separated, inspect pin and pin bore for wear and measure clearance. If clearance exceeds .001", replace piston and pin assembly.

CRANKSHAFT & ROD BEARINGS

NOTE — During production, .009" undersize bearings may have been installed for close tolerances on some journals (not necessarily all journals). These bearings may be identified by a "9" stamped on one side of the undersize journal throw along with a spot of green paint. Also the cap of connecting rods may be painted light green on each side.

3.8 LITER V6 & 4.4, 5.0 & 5.7 LITER V8 (Cont.)

MAIN & CONNECTING ROD BEARINGS

NOTE — Precision bearings are used in these engines and shimming is not necessary for adjustment. Never file or grind connecting rods or caps when fitting bearings.

Connecting Rod Bearings — 1) Remove rod cap and use Plastigage method to check bearing clearance. Place Plastigage across full width of bearing journal, parallel to crankshaft. Install rod cap and tighten nuts. Remove rod cap and determine amount of clearance by measuring width of compressed Plastigage at widest point.

2) Bearings must be replaced if clearance is not within specifications. New bearings are available in standard, .001" and .002" undersize for use with standard size crankshaft and in .009", .010" and .020" undersize for use with reconditioned crankshaft.

3) Use a micrometer to check for out-of-round condition on crankshaft journals. If journals are more than .001" out-of-round or tapered, crankshaft must be replaced or reconditioned.

4) When all bearings are checked and/or replaced and checked once more, tap each rod lightly (parallel to crankpin). Rod clearance between rod cap and side of crankpin should be .006-.014".

NOTE — If clearance cannot be brought within specifications with service bearings, grind crankpin to next undersize. If already ground to maximum undersize, replace crankshaft.

Main Bearings — 1) If bearings are being checked with engine in vehicle, crankshaft must be supported to take up clearance between upper bearing half and crankshaft. Support crankshaft at both damper and flywheel and ensure that all bearing caps, other than the one being checked, are tightened to specifications.

NOTE — Always install bearings in pairs. Never use an old bearing half with a new one.

2) Start with rear main bearing and work forward. Remove main cap and use Plastigage method to check bearing clearance. Place Plastigage across full width of bearing journal, parallel to crankshaft. Install main cap and tighten bolts to specification.

NOTE — On 5.7L engine, 4-bolt main should be checked by tightening outer bolts to 70 ft. lbs. (95 N·m) and inner bolts to 80 ft. lbs. (109 N·m).

3) Remove main cap and determine amount of clearance by measuring width of compressed Plastigage at widest point. Bearings must be replaced if clearance is not within specifications. New bearings are available in standard, .001" and .002" undersize for use with standard size crankshaft and in .009", .010" and .020" undersize for use with reconditioned crankshaft.

NOTE — If main bearing cap requires replacement, laminated shims are available. Shim requirement will be determined by bearing clearance.

4) Replace upper and lower inserts as a unit. Use a micrometer to check for out-of-round condition on crankshaft journals. If journals are more than .001" out-of-round or tapered, crankshaft must be replaced or reconditioned. If within specifications, coat bearings with oil and install main caps. When all bearings are checked and/or replaced and checked once more, check thrust bearing alignment.

THRUST BEARING ALIGNMENT

Make sure all main bearing caps are installed with arrows pointing toward front of engine. Torque main bearing cap bolts (except rear main) to specifications. Torque rear main bolts to 11 ft. lbs. (15 N·m) and tap end of crankshaft rearward and then forward to line up main bearing thrust surfaces with crankshaft thrust face. Torque all main bearing cap bolts to specifications. Rotate crankshaft to ensure there is no excessive drag. Measure end play at front end of rear main bearing using feeler gauge.

REAR MAIN BEARING OIL SEALS

NOTE — Always replace upper and lower seals as a unit. Lip of seals should face front of engine.

Removal — 1) Oil seal may be replaced without removing crankshaft. Remove oil pan and oil pump. Remove rear main bearing cap and take out old seal with a small screwdriver.

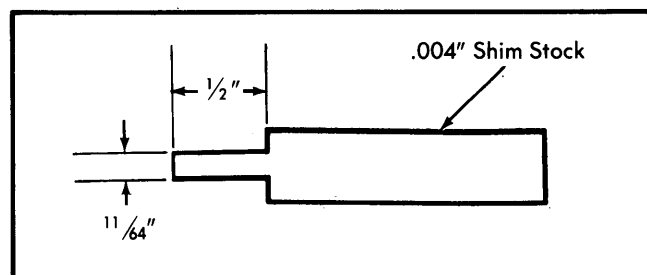


Fig. 4 Rear Main Bearing Oil Seal Installation Tool

2) Remove upper seal with a brass pin punch. Tap punch until seal protrudes enough to grip with pliers. Clean foreign material from bearing cap and block.

3) Check components for scratches, nicks and defects. Before installation, fabricate a seal installation tool using a piece of .004" shim stock. See Fig. 4.

Installation — 1) Coat seal lips and seal bead with light engine oil. Keep oil off seal mating ends. Position tip of tool between crankshaft and seal seat in cylinder block. Place seal between tip of tool and crankshaft, so that seal bead contacts tip of tool.

2) Roll seal around crankshaft using tool as a "shoe horn" to protect seal bead from sharp corner of cylinder block. Tool must be kept in position until ends of seal are seated flush with block. Carefully remove tool without pulling seal out with it.

3) Install lower half of oil seal in bearing cap and apply sealer to ends of seal. Install bearing cap and tighten to 10-12 ft. lbs. (13-16 N·m).

4) To line up main bearing thrust surfaces, tap end of crankshaft rearward and then forward. Torque main bearing cap bolts to specifications.

CAMSHAFT

FRONT ENGINE COVER

Removal — Drain cooling system, remove belts, fan and pulley. Use torsional damper removal tool (J-23523 or equivalent) to remove damper. Remove water pump. Remove front cover retaining bolts, cover and gasket.

Installation — Apply suitable sealer to new gasket and a rubber sealer to joint formed where oil pan meets cylinder block.

3.8 LITER V6 & 4.4, 5.0 & 5.7 LITER V8 (Cont.)

Place gasket on cover and install cover-to-oil pan seal. Place cover over end of crankshaft and loosely install cover-to-block screws. Tighten screws alternately while pressing down on cover so that dowels are aligned with holes in cover. Do not force cover over dowels as distortion of holes will result. Install remaining screws. Install torsional damper using removal tool (J-23523 or equivalent) and adapter plate. Install pulley, fan, belts and water pump. Refill cooling system.

FRONT COVER OIL SEAL

Removal — The oil seal may be replaced without removing cover. Pry old seal outward with large screwdriver. Use caution when removing seal so crankshaft is not damaged.

Installation — Install new seal with open end toward inside of cover. Use seal aligner and installing tool J-23042 (or equivalent) to drive seal into position.

TIMING CHAIN

Removal — Remove front cover and use torsional damper retaining bolt to rotate crankshaft so timing marks are aligned. Remove camshaft sprocket bolts. Use 2 large screwdrivers to alternately pry camshaft sprocket forward until free.

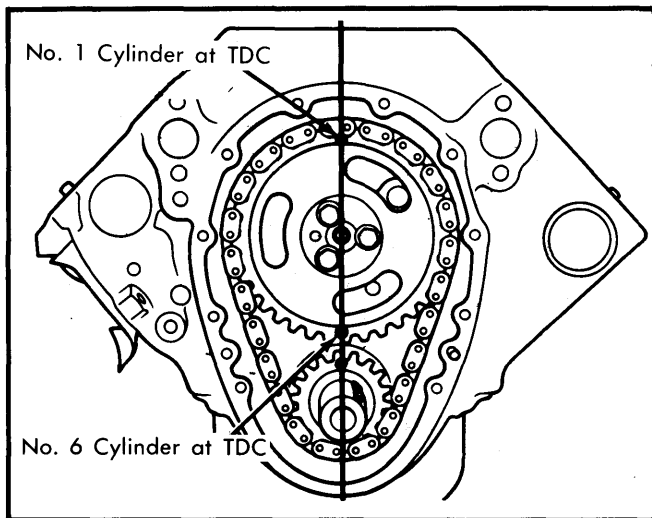


Fig. 5 Timing Chain Sprocket Alignment

Installation — 1) With camshaft installed, place timing chain over camshaft sprocket so that it hangs below sprocket. Align marks on camshaft and crankshaft sprockets. See Fig. 5.

2) Align dowel in camshaft with dowel hole in camshaft sprocket. Install sprocket on camshaft. Use mounting bolts to draw sprocket onto camshaft and tighten bolts. Check sprocket alignment, lubricate chain with engine oil and install other components previously removed.

CAMSHAFT

Removal — Remove intake manifold as previously described. Remove rocker arm assemblies, push rods and lifters. Remove radiator, grille, water pump and front engine cover. Remove fuel pump push rod. Install two $\frac{5}{16}$ x 4" bolts in camshaft bolt holes and carefully remove camshaft.

NOTE — All camshaft journals are same diameter. Use care when removing camshaft to prevent damage to lobes or

journals. If journals are more than .001" out-of-round, replace camshaft. If replaced, install all new lifters.

Installation — Lubricate journals with engine oil and apply Molykote or equivalent to camshaft lobes. Carefully install camshaft. Complete installation by reversing removal procedure.

CAMSHAFT BEARINGS

Removal — 1) With crankshaft and camshaft removed, drive welch plug out rear of cylinder block. Using camshaft bearing removal tool (J-6098 or equivalent), remove center 2 bearings. Index pilot in front bearing and install puller screw through pilot.

2) Install tool with shoulder toward bearing. Make sure enough threads are engaged. With 2 wrenches, use 1 to hold puller screw, the other to turn nut. Index pilot in rear bearing to pull rear intermediate bearing. Assemble removal tool on drive handle and remove front and rear bearings by driving toward center of engine.

Installation — 1) Install front and rear bearings first. These bearings act as guides for the pilot and center the remaining bearings being pulled into place. Assemble tool on driver handle and install camshaft front and rear bearings by driving toward center of block.

NOTE — No. 1 bearing should be installed so oil holes are equidistant from 6 o'clock position. No. 2 through No. 4 bearings should be installed with oil holes at 5 o'clock position; No. 5 at 12 o'clock position.

2) Using camshaft bearing removal tool (J-6098 or equivalent), install 2 center bearings with oil holes aligned with holes in block. Reverse removal procedure to complete installation.

NOTE — Welch plug should be installed flush to $\frac{1}{32}$ " deep and parallel with surface of block.

ENGINE OILING

Crankcase Capacity — 4 quarts (5 quarts for V8 with filter change).

Oil Filter — Full flow type. Change filter at first oil change and every other one thereafter.

Normal Oil Pressure — 34-39 psi @2000 RPM.

Pressure Regulator Valve — Located in oil pump body. Not adjustable.

ENGINE OILING SYSTEM

Oil is supplied under pressure by a gear-type pump, driven by the distributor, which in turn is driven by a helical gear on the camshaft. The main oil gallery (down center of block above camshaft on V8 engines, along left bank of V6 engines) feeds oil through drilled passages to the camshaft and crankshaft to lubricate bearings. The valve lifter oil gallery feeds valve lifters, which through hollow push rods feed individually mounted rocker arms. All other components are lubricated by splash or nozzle.

OIL PUMP

Removal — Remove oil pan. Remove pump-to-rear main bearing cap bolt and remove pump and extension shaft.

Disassembly — Remove pump cover and mark gear teeth so they may be reassembled with same teeth indexing. Remove idler gear and the drive gear and shaft from pump body. Remove pressure regulator valve retaining pin, valve and related parts. Pull pickup tube from body (if necessary).

3.8 LITER V6 & 4.4, 5.0 & 5.7 LITER V8 (Cont.)

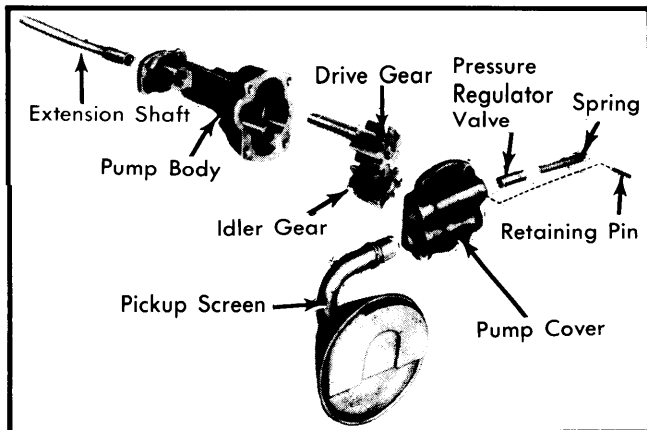


Fig. 6 Exploded View of Oil Pump Assembly

NOTE — If pickup tube and screen were removed, they should be replaced as an assembly. If pump gears or body are damaged or worn, replacement of entire pump assembly is necessary.

Reassembly — Apply sealer to end of replacement pickup tube and tap into place with plastic hammer. Install pressure regulator valve and related parts. Install drive gear and shaft in pump body. Install idler gear in pump body with smooth side of gear towards pump cover opening. Install pump cover and tighten screws. Turn drive shaft to ensure smooth operation.

Installation — Install pump and extension shaft to rear main bearing cap, aligning slot on end of extension shaft with drive tang on distributor drive shaft. Install pump to rear main bearing cap bolt and tighten.

ENGINE COOLING

WATER PUMP

Removal — 1) Disconnect battery negative cable. Drain cool-

ing system. Remove fan shroud or upper radiator support (if necessary). Remove drive belts. Remove fan and pulley from water pump hub. Remove upper and lower alternator brackets and power steering pump lower bracket from water pump (if equipped) and swing aside.

2) Remove lower radiator hose and heater hose from water pump. Remove water pump to block attaching bolts and remove water pump.

Installation — To install, reverse removal procedure, noting the following: If using a new pump, transfer pulley from old pump. Use a new gasket.

NOTE — For further information on cooling systems, see appropriate article in engine COOLING SYSTEMS Section.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N•m)
Cylinder Head Bolts	65 (88)
Intake Manifold Bolts	30 (44)
Main Bearing Cap Bolts	①70 (95)
Connecting Rod Cap Nuts	45 (61)
Exhaust Manifold Bolts	②20 (27)
Flywheel Bolts	60 (82)
Camshaft Sprocket Bolts	20 (27)
Torsional Damper Bolt	60 (82)
Oil Pump Bolt	③60 (82)
Clutch Pressure Plate Bolt	35 (48)
Water Pump	30 (41)
Application	INCH Lbs. (N•m)
Front Cover Bolts	84 (10)
Oil Pump Cover Bolts	84 (10)
① — Outer bolts on 5.7L engine	80 ft. lbs. (108 N•m).
② — Inside bolts on 5.7L engine	30 ft. lbs. (41 N•m).
③ — 5.7L engine	65 ft. lbs. (88 N•m).

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS							
Engine	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore		Stroke	
				In.	(mm)	In.	(mm)
3.8L (229")	110@4200	170@2000	8.6:1	3.74"	95.0	3.48"	88.4
4.4L (267")	115@4000	200@2400	8.3:1	3.50"	88.9	3.48"	88.4
5.0L (305")	150@3800	240@2400	8.6:1	3.74"	95.0	3.48"	88.4
5.7L (350")	200@4200	285@2800	9.0:1	4.00"	101.6	3.48"	88.4

PISTONS, PINS, RINGS						
Engine	PISTONS		PINS		RINGS	
	①Clearance In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Rings	End Gap In. (mm)	Side Clearance In. (mm)
All	①.0007-.0017 (.018-.043)	.00025-.00035 (.0063-.0089)	.0008-.0016 (.020-.040) Press Fit	1	.010-.020 (.25-.50)	.0012-.0032 (.030-.081)
				2	.010-.025 (.25-.63)	.0012-.0032 (.030-.081)
				3	.015-.055 (.38-1.40)	.002-.007 (.05-1.29)

①VIN 8, .0025-.0035" (.064-.089 mm).

General Motors V6 & V8 Engines 6-167

ENGINES

3.8 LITER V6 & 4.4, 5.0 & 5.7 LITER V8 (Cont.)

ENGINE SPECIFICATIONS (Cont.)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS							
Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam. In. (mm)	Clearance In. (mm)	Thrust Bearing	Crankshaft End Play In. (mm)	Journal Diam. In. (mm)	Clearance In. (mm)	Side Play In. (mm)
All	①2.4484-2.4493 (62.189-2.212)	②.0008-.0020 (.020-.050)	③	.002-.006 (.05-.15)	2.0988-2.0998 (53.309-53.334)	.0013-.0035 (.033-.090)	④.006-.014 (.152-.355)

① — Front only. Rear 2.4479-2.4488" (62.176-62.199 mm); Others 2.4481-2.4490" (62.181-62.204 mm).

② — Front Only. Rear .0017-.0032" (.043-.081 mm); Others .0011-.1123" (.028-.058 mm).

③ — 3.8L (229") is No. 4; All other No. 5.

④ — VIN 8, .008-.014" (.20-.35 mm).

VALVES							
Engine & Valve	Head Diam. In. (mm)	Face Angle	Seat Angle	Seat Width In. (mm)	Stem Diameter In. (mm)	Stem Clearance In. (mm)	Valve Lift In. (mm)
3.8L (229") Int.	1.835-1.845 (46.60-46.86)	45°	46°	.031-.063 (.78-1.60)	.3410-.3417 (8.661-8.679)	.0010-.0027 (.025-.068)	.535 (13.59)
4.4L (267") Int.	1.72 (43.7)	45°	46°	.031-.063 (.78-1.60)	.3410-.3417 (8.661-8.679)	.0010-.0027 (.025-.068)	.535 (13.59)
5.0L (305") Int.	1.84 (46.73)	45°	46°	.031-.063 (.78-1.60)	.3410-.3417 (8.661-8.679)	.0010-.0027 (.025-.068)	.372 (9.45)
5.7L (350") Int.	1.94 (49.28)	45°	46°	.031-.063 (.78-1.60)	.3410-.3417 (8.661-8.679)	.0010-.0027 (.025-.068)	.410 (10.41)

VALVE SPRINGS			
Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
All	①2.03 (51.56)	76-84@1.70 (34-38@43.2)	194-206@1.25 (88-93@31.7)

①Damper is 1.86" (47.2 mm).

CAMSHAFT			
Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
3.8L & 4.4L (229" & 267")	1.8682-1.8692 (47.452-47.478)	Int. .357 (9.07) Exh. .390 (9.90)
5.0L (305")	1.8682-1.8692 (47.452-47.478)	Int. .248 (6.30) Exh. .267 (6.78)
5.7L (350")	1.8682-1.8692 (47.452-47.478)	Int. .273 (6.93) Exh. .282 (7.16)