200" V6 ENGINE

IDENTIFICATION CODING

Engine code is stamped on pad at right side of block behind distributor.

Application	Code
Chevrolet	
200" 2-Bbl. V6	M

ENGINE REMOVAL

See Engine Removal at end of ENGINE Section.

CYLINDER HEAD & MANIFOLDS

INTAKE MANIFOLD

Removal – Drain cooling system, remove air cleaner. Disconnect the following:

- Battery, belts and hoses.
- Carburetor fuel lines, hoses and linkage.
- Crankcase vent line and vacuum advance hose from distributor.

Remove the following:

- Alternator upper bracket and distributor.
- Brackets (as required) and accelerator bellcrank.
- Intake manifold and carburetor as an assembly.

Installation – **1)** Clean mating surfaces of heads and manifold. Install block seals and head gaskets. Use suitable sealer at water passages and area where seals butt to gaskets.

2) Some engines do not have front or rear manifold seals. Use suitable sealer to lay a bead along front and rear ridge of block and about ½" up each head to hold manifold side gaskets. Tighten in sequence. *See Fig. 1.* To complete installation, reverse removal procedures.

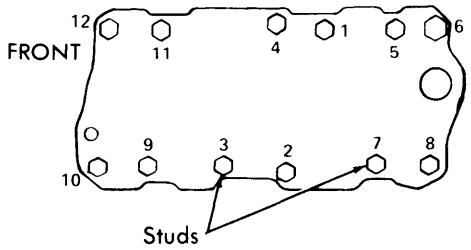

Fig. 1 Intake Manifold Tightening Sequence

CYLINDER HEADS

Removal – Drain cooling system and remove intake manifold as previously outlined. Remove exhaust manifold, rocker arm assembly and alternator bracket. Position alternator and air compressor (if equipped), to one side. Remove bolts, cylinder head and gaskets.

Installation – Clean all mating surfaces and install gaskets.

NOTE – *Two types of gaskets are used on this engine. On the steel gasket, use thin coat of sealer on both sides. With the composition steel asbestos gasket, do not use sealer.*

Install cylinder head, apply sealing compound to head bolts and gradually tighten to specified torque. *See Fig. 2.*

Install rocker arm assembly, intake manifold and exhaust manifold. Complete installation by installing removed or disconnected components. Fill cooling system.

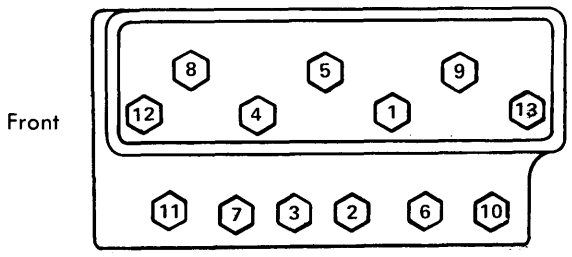

Fig. 2 Cylinder Head Tightening Sequence

VALVES

VALVE GUIDE SERVICING

If valve guide stem-to-guide clearance is excessive, ream valve guide to next size oversize. Service valves are available in standard, .003", .015" and .030" oversize. Replacement valves are identified by size stamped on head.

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. *See Fig. 3.*

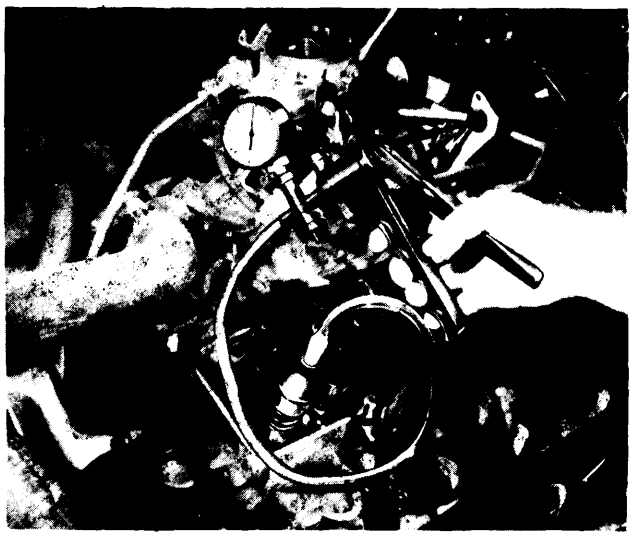

Fig. 3 Valve Stem Oil Seal Check

200" V6 ENGINE (Cont.)

VALVE SPRINGS

Removal – 1) With rocker arms and head removed, compress valve springs using tool J-8062 (or equivalent). Remove locking keys and release compression tool.

2) Remove cap, spring damper and oil seal. Keep all removed components separate for reinstallation in original location.

Installation – Check valve spring tension using valve & clutch spring tester J-8056 (or equivalent). Springs must be within 10 lbs. of specified load at required height (without dampers). To complete installation, reverse removal procedures.

HYDRAULIC VALVE LIFTERS

Lifters are serviced as complete unit only. If lifter is damaged or worn it must be replaced. Should lifter be disassembled for any reason, it must be tested using suitable leak-down rate tester. Make sure lifter foot is convex. *See Fig. 4.*

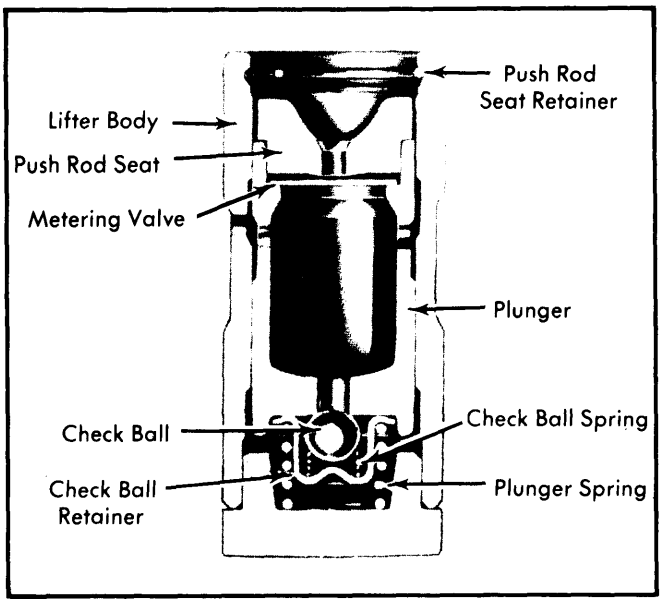

Fig. 4 Hydraulic Valve Lifter

PISTONS, PINS & RINGS

OIL PAN

See Oil Pan Removal at end of ENGINE Section.

PISTON & ROD ASSEMBLY

With cylinder heads removed, place piston at bottom of stroke and cover with cloth to catch cuttings. Use suitable ridge reamer to remove any ridge or deposit from upper portion of cylinder bore. Be sure piston and rod assemblies are marked for installation in original location.

Removal – 1) With piston at bottom of stroke, remove caps and install suitable guides over rod bolts. Push piston and rod out top of bore.

2) If necessary, rotate crankshaft to remove remaining caps.

Installation – 1) Apply light coat of engine oil to pistons, rings and cylinder bores. Use compression tool J-8037 (or equivalent) to compress rings. Make sure ring gaps do not line up anywhere on piston.

2) Install piston and rod assembly with rod bearing tang slot on opposite side from camshaft.

3) Remove guides from rod bolts and install bearings and caps. Tighten to specifications.

FITTING PISTONS

Measure piston bore diameter with dial indicator. With rod and pin removed, measure piston on skirt at right angle to pin at centerline. Maximum allowable clearance is .0027".

PISTON PINS

Using piston pin tool J-24086 and adapters (or equivalent), 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

MAIN & CONNECTING ROD BEARINGS

Connecting Rod Bearings – Remove rod cap and use Plastigage method to check bearing clearance. 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. Bearings are also available in .010" and .020" for use with reconditioned crankshafts.

NOTE – *During production, .009" undersize bearings may have been installed for close tolerances. These bearings will be identified by a "9" stamped on one side of the undersize journal along with a spot of green paint. Also the cap will be painted light green on each side.*

Main Bearings – 1) Remove main bearing caps and inspect for flaking or scoring. Use Plastigage method to check bearing clearances.

2) If clearance exceeds specifications, new bearings must be installed. Bearings are available in standard, .001", .002", .009", .010" and .020" undersize.

3) Use a micrometer to check for out-of-round condition on crankshaft journals. If journals are more than .0010" out-of-round, crankshaft must be replaced.

NOTE – *If bearing cap is replaced, shims may be used to get proper clearance.*

REAR MAIN BEARING OIL SEALS

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

200" V6 ENGINE (Cont.)

2) Remove upper seal with brass 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 with a piece of .004" shim stock. See *Fig 5*.

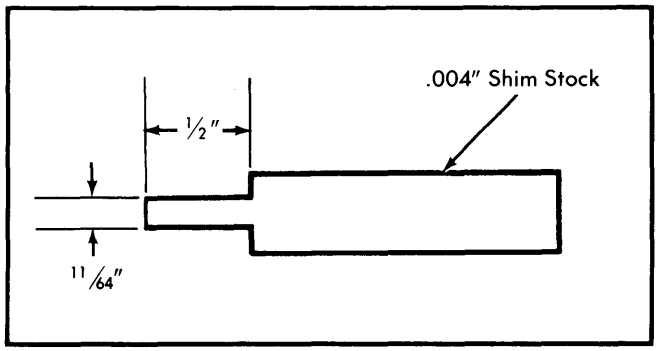

Fig. 5 Rear Main Bearing Oil Seal Installation Tool

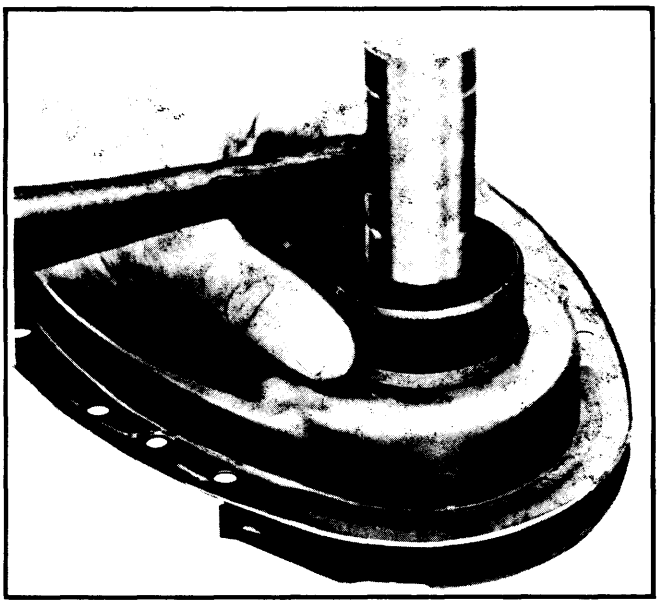

Fig. 6 Front Cover Oil Seal Installation

Installation – **1)** Position seal bead against tip of tool with seal lip toward front of engine. Use tool to help slip seal around seat surface.

2) Tool must stay in position until seal is seated with ends flush with block. Carefully remove tool without drawing seal with it.

3) Install lower half of seal in bearing cap and apply suitable sealant to ends of seal. Install bearing cap.

4) To seat thrust surfaces, tap end of crankshaft to the rear than to the front. Tighten cap bolts to specifications.

CAMSHAFT

FRONT ENGINE COVER

Removal – Drain cooling system, remove belts, fan and pulley. Use torsional damper tool J-23523 (or equivalent) to remove damper. Remove cover retaining screws, cover and gasket.

Installation – Apply suitable sealer to new gasket and a rubber sealer to joint formed where oil pan meets cylinder block. Tighten attaching screws alternately while pressing down on cover so that dowels are aligned with holes in cover. Install torsional damper, pulley, fan, belts and fill 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. See *Fig. 6*.

TIMING CHAIN

Removal – Remove front cover and use torsional damper retaining bolt to rotate crankshaft so timing marks are aligned. Remove oil slinger and camshaft sprocket bolts. Use two screwdrivers to pry camshaft and crankshaft sprockets alternately forward until free.

Installation – Position crankshaft so that No. 1 is at TDC. Assemble timing chain on sprockets and slide onto shafts. Be sure timing marks are aligned with each other and in line with sprocket hubs. See *Fig. 7*. Install oil slinger with concave side toward engine. Tighten bolt to specifications, install front cover and oil pan.

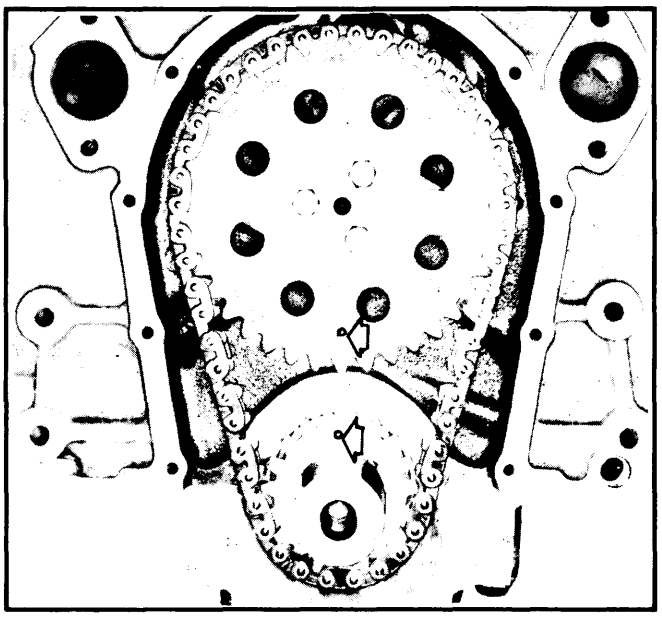

Fig. 7 Timing Gear Alignment

200" V6 ENGINE (Cont.)

CAMSHAFT

Removal – Remove intake manifold, rocker arm assembly, push rods and lifters. Remove radiator, grille and front engine cover. Remove fuel pump push rod. Install long 5/16" bolts in camshaft bolt holes and remove camshaft.

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

Installation – Lubricate journals and camshaft lobes. Carefully install camshaft. Complete installation by reversing removal procedures.

CAMSHAFT BEARINGS

Removal – 1) With crankshaft and camshaft removed, drive welch plug from cylinder block. Use camshaft bearing removal tool set J-6098 (or equivalent) to remove center two bearings. Index pilot in front bearing and install puller screw through pilot. Install tool with shoulder toward bearing. Make sure enough threads are engaged.

2) Use two wrenches, one 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.

2) Use tool set J-6098 to install two center bearings with oil holes aligned. Reverse removal procedure to complete installation.

NOTE – *Welch plug should be installed flush to 1/32" deep and parallel with surface of block.*

ENGINE OILING

Crankcase Capacity – 4 qts. Add 1 qt. 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 gear type pump which is driven by distributor. The left hand main oil gallery feeds oil through drilled passages to camshaft and crankshaft bearings. The rocker arm assembly receives oil from the valve lifter oil gallery through hollow push rods. All other components are lubricated by splash or nozzle.

OIL PUMP

Removal – Remove oil pan. Remove attaching bolts from rear main bearing cap and remove pump and extension shaft.

NOTE – *Pump body and gears are not serviced separately. Any damage or wear to gears or body, entire pump must be replaced. See Fig. 8.*

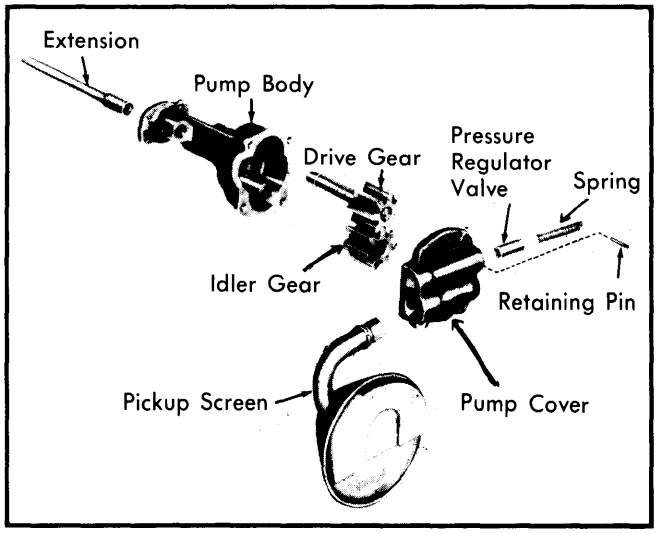

Fig. 8 Oil Pump

GENERAL SPECIFICATIONS

Engine	Net HP At RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore	Stroke	Displ. Cu. Ins.
200" 2-Bbl.	95@3800	160@2000	8.2-1	3.50"	3.48"	200

VALVES

Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
200"							
Int.	1.595-1.605"	45°	46°	.042"	.3410-.3417"	.0010-.0027"	.373"
Exh.	1.375-1.387"	45°	46°	.078"	.3410-.3417"	.0010-.0027"	.410"

200" V6 ENGINE (Cont.)

VALVE SPRINGS			
Engine	Free Length	PRESSURE (LBS.)	
		Valve Closed	Valve Open
200"	2.03"	76-84@1.70"	184-206@1.25"

CAMSHAFT			
Engine	Journal Diam.	Clearance	Lobe Lift
200"	1.868-1.869"	①.0020-.0035" ②.0005-.0015"	Int. .2484" Exh. .2667"

① – Journals No. 1,2 & 3
② – Journal No. 4.

PISTONS, PINS, RINGS						
Engine	PISTONS Clearance	PINS		RINGS		
		Piston Fit	Rod Fit	Rings	End Gap	Side Clearance
200"	.0007-.0017"	.0001-.0003"	①.0008-.0016"	1 2 3	.010-.020" .010-.025" .015-.055"	.0012-.0032" .0012-.0032" .002-.007"

① – Interference Fit.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS							
Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Bearing	Crankshaft End Play	Journal Diam.	Clearance	Side Play
200"	2.4489"	.0008-.0020"	No.4	.002-.006"	2.0992"	.0013-.0035"	.008-.014"