4.3 & 4.9 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 cylinder block, below 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
4.3L (265") 2-Bbl.	S
4.9L (301") 4-Bbl.	W
4.9L (301") Turbocharged 4-Bbl.	T

ENGINE REMOVAL

See Engine Removal at end of ENGINE Section.

CYLINDER HEAD & MANIFOLDS

INTAKE MANIFOLD

Removal – 1) If equipped, remove turbocharger assembly. Drain cooling system. Remove air cleaner and disconnect closed ventilation pipe at air cleaner. Disconnect air cleaner vacuum source at manifold and hot air duct.

2) Remove water outlet bolts, then remove water outlet and position aside with radiator hose attached. Disconnect electrical wiring, vacuum lines, fuel lines and carburetor linkage at manifold. Remove spark plug wires from brackets and remove distributor cap with wires attached. Remove manifold bolts and remove intake manifold with carburetor attached.

Installation – Install new gaskets on cylinder heads and intake manifold assembly. Install "O" ring seal between manifold and timing chain cover. Install intake manifold assembly on engine and tighten bolts loosely. Tighten intake manifold-to-timing chain cover bolt, then tighten all other manifold bolts. Reverse removal procedure to complete installation.

EXHAUST MANIFOLD

Removal (Left Side) – 1) Raise vehicle on hoist. Remove exhaust crossover pipe. Remove EFE valve. Lower vehicle and remove air cleaner. Remove temperature sending unit wire and ground strap.

2) Disconnect No. 1, 3 and 5 spark plug wires at spark plugs. Remove heat shield. Remove exhaust manifold bolts and remove manifold.

Removal (Right Side) – 1) Raise vehicle on hoist. Remove exhaust crossover pipe. Remove exhaust pipe flange bolts. Remove rear converter attaching bolts and let converter hang free. Remove oil filter and disconnect oxygen sensor. Remove 2 front exhaust manifold bolts.

2) Remove air management hose at valve. Remove center and 2 rear bolts from exhaust manifold. Remove air management hose at converter. Lower vehicle. Remove 2 center exhaust manifold bolts and remove manifold.

Installation – Clean all mating surfaces of exhaust manifold and cylinder head of gasket material and/or dirt or carbon. Position manifold to cylinder head and install center bolts, then install remaining bolts and tighten. Reverse removal procedure to complete installation.

CYLINDER HEAD

Removal – Drain cooling system. Remove air cleaner and carburetor heated air pipe. Remove intake manifold, push rod cover and rocker arm cover. Remove push rods, battery ground cable and engine ground strap. If equipped, remove automatic transmission dipstick tube bracket from right rear cylinder head. Remove exhaust pipe-to-manifold bolts. Remove cylinder head bolts and remove head with exhaust manifold attached.

CAUTION – *Do not strike rocker arm studs. Studs are hardened and may crack if struck.*

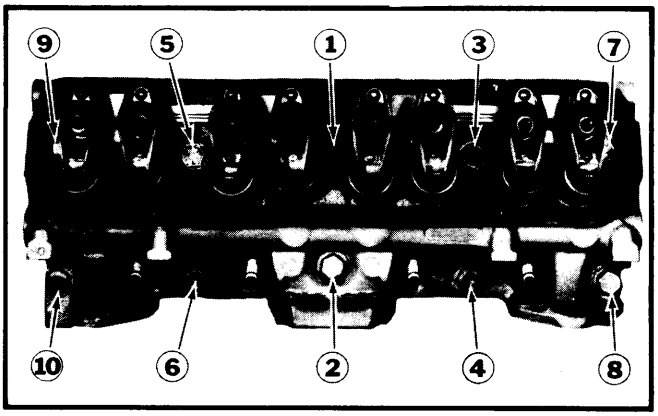

Fig. 1 Cylinder Head Tightening Sequence

Installation – 1) Clean all gasket surfaces. Place new gasket on block; install cylinder head. Start all bolts and tighten to specifications. *See Fig. 1.*

2) Install push rods, reposition rocker arms and tighten to specifications. To complete installation, reverse removal procedure.

NOTE – *If rocker arm studs have been removed from head, sealer must be applied to lower threads of stud.*

VALVES

VALVE ARRANGEMENT

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

VALVE GUIDE SERVICING

Valve guides are integral with head. If valve stem to guide clearance is excessive, ream guide to proper size to accomodate oversize valve stems. Valves are available in .003" oversize. Valve seat must be refaced after reaming valve guide.

VALVE STEM OIL SEALS

Valve stem seals are installed in the 2nd groove (from end of stem). Special valve seal installer and tester tools are available.

4.3 & 4.9 LITER V8 (Cont.)

VALVE SPRINGS

Removal – 1) Remove rocker arm cover, spark plug, and distributor cap. Crank engine until distributor rotor is in position to fire on cylinder being serviced. Install air fitting tool (J-22278 or equivalent) in spark plug hole.

2) Apply air pressure to cylinder. Remove rocker arm assembly. Reinstall rocker arm nut. Insert slotted end of compressor tool (J-5892-1 or equivalent) under rocker arm nut and compress valve spring. Remove valve spring retainer cup locks and remove valve spring compressor, valve spring retainer, oil shield and valve stem seal.

Installation – Install new parts and compress valve spring. Install seal and locks. Remove compressor. Install rocker arm and tighten rocker arm ball retaining nut.

ROCKER ARM STUDS

Removal & Installation – 1) Drain radiator. Remove rocker arm cover. Remove rocker arm and nut. Using a deep well socket, remove rocker arm stud.

NOTE – *Coat lower stud threads with thread sealer.*

2) Install new stud and tighten to specifications.

HYDRAULIC VALVE LIFTER ASSEMBLIES

NOTE – *Lifters are serviced as complete assemblies only. Parts are not interchangeable between lifters. If any component of lifter is worn or damaged, complete lifter must be replaced.*

If lifters are disassembled for cleaning and inspection, after reassembly they should be tested using a suitable leak-down tester. Leak-down rate should be 20-90 seconds with 50 pound load and plunger travel of .125". Replace lifters if not within specified limits.

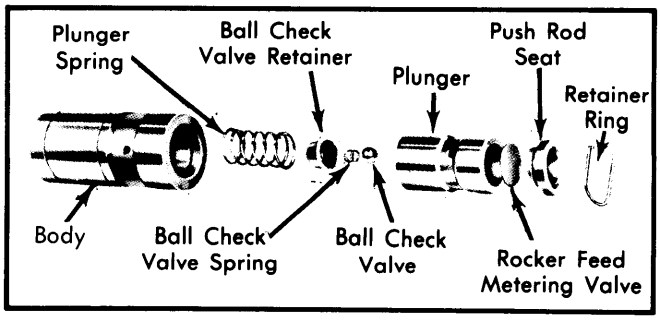

Fig. 2 Hydraulic Valve Lifter Assembly

PISTONS, PINS & RINGS

OIL PAN

See oil pan removal at end of ENGINE Section.

PISTON & ROD ASSEMBLY

Removal – 1) Remove oil pan, oil pump, intake manifold and cylinder head(s). Use ridge reamer to remove any ridge or deposits on upper end of cylinder bore.

NOTE – *Piston must be at bottom of stroke and covered with cloth to collect cuttings.*

2) Inspect connecting rods and caps for cylinder identification and mark as necessary. Remove rod cap and push rubber hose onto connecting rod bolts (to protect cylinder walls). Push piston and rod assembly out top of cylinder block. Install cap on mating rod.

Installation – When installing piston rings, make sure markings on compression rings face up (top of piston). Lightly coat pistons, rings and cylinder bores with motor oil. Compress piston rings using suitable ring compressor. Install piston and rod assembly in cylinder bore, making sure notch in top of piston faces front of engine and dimple in connecting rod faces rear of engine. *See Fig. 3.* Lubricate bearing, install rod cap and nuts and tighten.

FITTING PISTONS

When measuring piston for size or taper, measurement must be made on skirt 90° from piston pin hole (with piston pin removed). The largest reading must be taken at top of skirt. Measure cylinder bore with inside micrometer or cylinder bore gauge 90° to crankshaft. Maximum cylinder out-of-round and/or taper is .003". Pistons are available in oversizes up to .030".

NOTE – *Measure piston and bore at room temperature. Higher or lower temperatures will result in improper fit.*

PISTON PINS

Removal – Using suitable removal tool, press piston pin out of piston and rod assembly. Separate piston from rod.

Installation – 1) If piston pin fit is not to specifications, pin bores must be honed and oversize pins installed. When assembling piston and connecting rod, notch in top of piston must face front of engine.

2) Dimpled side of connecting rod must face rearward on both banks. Lubricate piston pin and install using a suitable tool and press.

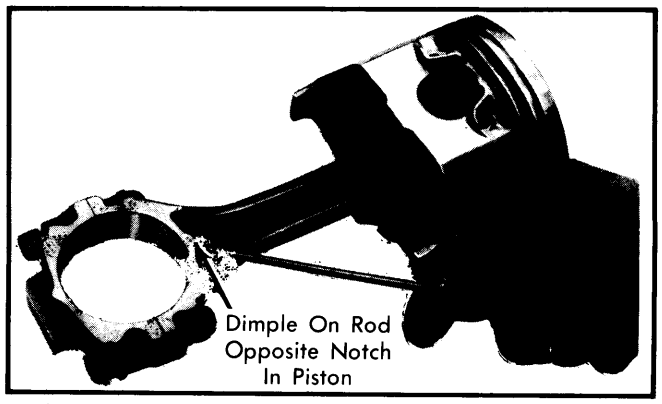

Fig. 3 Connecting Rod Thrust Side Identification

CRANKSHAFT & ROD BEARINGS

MAIN AND CONNECTING ROD BEARINGS

NOTE – *Following procedures are performed with oil pan, oil baffle and oil pump removed.*

4.3 & 4.9 LITER V8 (Cont.)

Connecting Rod Bearings – After ensuring rod caps are marked for cylinder identification, remove rod caps (with crankshaft journal of cylinder to be checked at bottom of throw). Use Plastigage method to check for proper bearing clearances. New bearings are available in standard, .001" and .002" undersize. Selective fitting is required on each connecting rod. A standard bearing half may be used in combination with a .001" undersize or a .002" undersize in combination with a .001" undersize. Coat bearing surfaces with oil, install rod cap and tighten nuts. Rotate crankshaft after bearing replacement to ensure that bearings are not tight.

Main Bearing – 1) When checking main bearing clearance with engine in vehicle, place a .002" brass shim between crankshaft journal and lower bearing in each bearing cap next to bearing being checked. Ensure that all cap bolts are tight and remove bearing cap of bearing to be checked. Use Plastigage method to check clearances. New bearings are available in standard, .001" and .002" undersize.

2) Remove upper main bearing by inserting suitable tool in oil hole of crankshaft journal and rotating crankshaft clockwise to roll bearing from engine. Oil new upper bearing and insert plain end of bearing at indented side of bearing seal and rotate crankshaft to install. Install lower bearing in cap so indentation in bearing and cap coincide. Install bearing cap and tighten bolts.

THRUST BEARING

With all main caps and connecting rods installed and torqued, tap end of crankshaft at rear until tight against front of thrust bearing. Measure clearance between crankshaft counterweight and thrust bearing. If clearance is outside limits, (.003" to .009"), install new thrust bearing.

REAR MAIN BEARING OIL SEAL

1) Remove oil pan and oil pump. Remove rear main bearing cap and use suitable tool made from brass bar stock to pack upper seal. Insert tool against 1 end of oil seal in block and drive gently into groove until tool bottoms. Remove tool and repeat at other end of seal in cylinder block. Clean block and bearing cap parting line thoroughly.

2) Form a new seal in cap using suitable tool (J-7588). Remove new seal and cut four pieces approximately 3/8" long from this seal. Work two 3/8" pieces into each gap which has been made at end of seal in block. Without cutting ends, work seal pieces in until flush with parting line and no fibers are protruding over metal next to groove.

3) Form another new seal in cap using suitable tool (J-7588). Assemble cap to block and tighten. Remove cap and inspect parting line to insure that no seal material has been compressed between block and cap. Clean as necessary. Apply a 1/16" bead of sealer from center of seal to outer gasket groove. Reassemble cap and tighten.

CAMSHAFT

ENGINE FRONT COVER

Removal – Drain radiator and cylinder block. Remove fan belt and drive belt(s). Remove fan and pulley. Disconnect lower radiator hose. Remove fuel pump and harmonic balancer. Remove bolts attaching oil pan to cover, cover to block, and cover to intake manifold. Remove cover.

Installation – Thoroughly clean gasket surfaces on block and cover, inspect oil pan gasket and replace if damaged. Use new "O" ring seal in water passage in intake manifold. Install and tighten cover-to-block and intake manifold bolts first, then install oil pan screws.

FRONT COVER OIL SEAL

To replace seal, remove fan and accessory drive belts. Remove harmonic balancer. Remove seal by prying out of bore with pry bar. Using a suitable tool (J-21147), install new seal with lip of seal facing rear of engine.

TIMING CHAIN

Removal – Remove timing chain cover, fuel pump eccentric and bushing. Remove timing chain cover oil seal. Align timing chain marks for reassembly. See *Fig. 4*. Slide timing chain and sprockets off crankshaft and camshaft at same time.

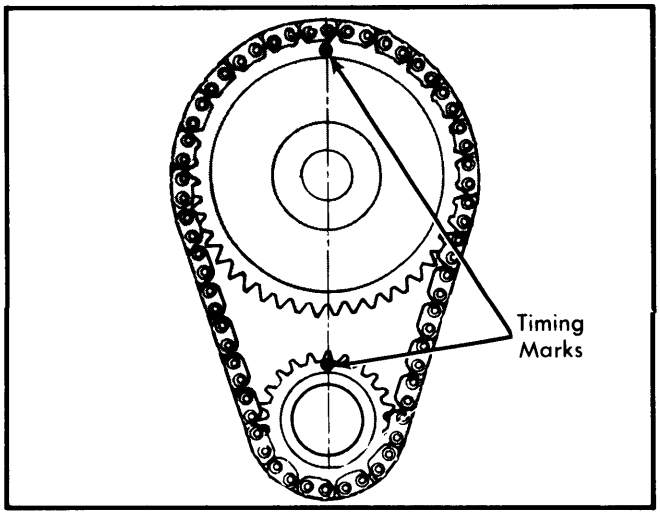

Fig. 4 Timing Chain Sprocket Alignment

Installation – Install new timing chain and/or sprockets, ensuring that marks on timing sprockets are aligned exactly on a straight line passing through shaft centers. Camshaft should extend through sprocket so hole in fuel pump eccentric will locate on shaft.

CAMSHAFT

NOTE – *Camshaft may be removed without removing engine from vehicle. It may be necessary to raise front of engine to permit removal of camshaft.*

Removal – 1) Remove transmission and flywheel. Drain cooling system. Remove hood latch brace and radiator. Remove rocker arm covers, distributor, intake manifold, push rod cover, push rods and lifters.

2) Remove harmonic balancer, fuel pump, timing chain cover, fuel pump eccentric and bushing. Align timing marks on timing chain sprockets and remove timing chain and sprockets. Remove camshaft thrust plate and carefully pull camshaft from engine.

Installation – To install, reverse removal procedures.

4.3 & 4.9 LITER V8 (Cont.)

NOTE – *Before installation, coat camshaft lobes and inner diameters of bearings with heavy oil. Rotate camshaft several revolutions to ensure that it is free.*

CAMSHAFT BEARING REPLACEMENT

Use suitable tool (J-6173-01) and note the following:

1) To replace rear bearing (without removing and disassembling engine) propeller shaft, transmission and clutch housing must be removed to get at camshaft rear plug. If front bearing is being replaced, insert remover adapter in center bearing to support shaft.

2) Outside of new bearing should be coated with oil before installation. Notch in edge of bearing is used to properly position bearing with respect to oil holes when installing. Index notch in edge of bearing with pin on replacer adapter. When bearings are installed in production, notches all face front except on rear bearing. In field service, all bearings should be installed with notches facing rear.

3) Rear bearing should be pulled in until front edge is flush with block to leave room for camshaft rear plug. Other bearings should be flush with both sides of bearing web.

ENGINE OILING

Crankcase Capacities – 4 quarts with or without oil filter change.

Oil Filter – Replace at first oil change, then every second oil change after that.

Normal Oil Pressure – 40 psi@2600 RPM on all models except turbo. On turbo models, 60 psi@2600 RPM.

Pressure Regulator Valve – In oil pump body. Not adjustable.

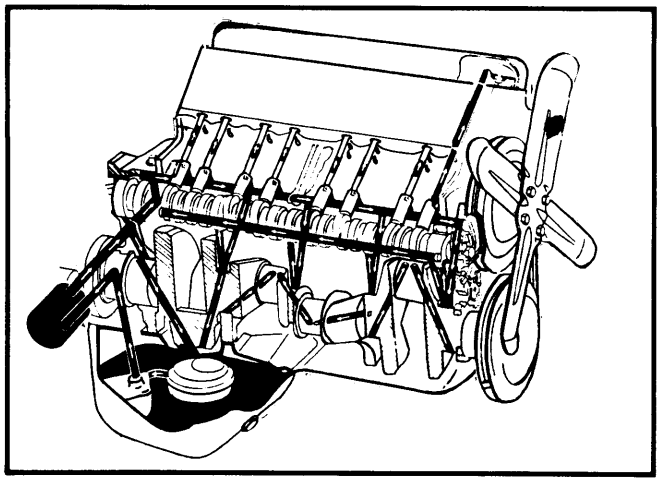

Fig. 5 Engine Oiling System

ENGINE OILING SYSTEM

Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, camshaft bearings and upper valve train parts. Splash feed from crankshaft and connecting rod lubricate cylinder walls, piston pins and bushings. Timing chain and sprockets receive metered jet lubrication as do fuel pump eccentric and rocker arm. A hole in the block from the push rod gallery through distributor boss lubricates distributor shaft and bushings.

Push Rods and Rocker Arms – Oil from each lifter is directed up through hollow push rods to rocker arms. Oil then passes through a hole in push rod contact area of rocker arm and fills it. This supply lubricates rocker arm ball and overflow lubricates top of valve stem and other valve train surfaces.

OIL PUMP

Removal – 1) Remove oil pan splash baffle. Hold oil pump while removing attaching bolts. Lower oil pump carefully while removing pump drive shaft.

NOTE – *Removal and installation of pump does not affect engine timing.*

2) If pump is disassembled for cleaning and inspection, do not loosen or remove oil pump screen from pump body. Do not attempt to change oil pressure by varying length of pressure regulator spring.

Installation – Position drive shaft in distributor and oil pump drive gears. Use new gasket between pump and block. Index drive shaft with pump drive gear shaft and install attaching bolts.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Cylinder Head Bolts	
Turbo	93
All Other Models	95
Intake Manifold Bolts	
Turbo	37
All Other Models	35
Exhaust Manifold Bolts	40
Oil Pan Bolts	12
Main Bearing Cap Bolts ①	
Turbo	100
All Other Models	70
Connecting Rod Cap Nuts	
Turbo	28
All Other Models	30
Flywheel-to-Crankshaft Bolts	95
Harmonic Balancer Bolt	
Turbo	163
All Other Models	165
Camshaft Sprocket Bolt	
Turbo	37
All Other Models	40
Engine Front Cover Bolts	30
Oil Pump-to-Block Bolts	30
Rocker Arm Studs	60
Rocker Arm Stud Nuts	20
Compressor Housing-to-Intake Manifold Bolt (Turbo)	27
Compressor Housing-to-Turbine Housing Bolt (Turbo)	15
Outlet Elbow-to-Compressor Housing Bolt (Turbo)	15

① – All rear main bearing cap bolts are tightened to 100 ft. lbs.

4.3 & 4.9 LITER V8 (Cont.)

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS

Engine	Net HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore	Stroke	Displ. Cu. Ins.
4.3L (265")	120@4000	205@2000	8.0:1	3.75"	3.00"	265
4.9L (301")	150@4000	245@2000	8.2:1	4.00"	3.00"	301
4.9L (301") Turbocharged	200@4000	340@2000	7.5:1	4.00"	3.00"	301

VALVES

Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
4.3L (265")							
Int.	1.60"	45°	46°	....	.3418-.3425"	.0010-.0027"	.....
Exh.	1.38"	45°	46°	....	①.3418-.3425"	.0020-.0037"	.....
4.9L (301")							
Int.	1.72"	45°	46°	.....	.3418-.3425"	.0010-.0027"	.....
Exh.	1.50"	45°	46°	.....	①.3418-.3425"	.0020-.0037"	.....

① – Exh. valves have tapered stems. .001" larger at stem end than at head end.

PISTONS, PINS, RINGS

Engine	PISTONS	PINS		RINGS		
	Clearance	Piston Fit	Rod Fit	Rings	End Gap	Side Clearance
4.3L (265")	①.0017-.0025"	.0002-.0004"	Press	1	.010-.020"	.0015-.0035"
4.9L (301")	①.0017-.0025"	.0002-.0004"	Press	2	.010-.020"	.0015-.0035"
				3	.035"	.0015-.0035"

① – Measurement taken at top of skirt.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Bearing	Crankshaft End Play	Journal Diam.	Clearance	Side Play
4.3L (265")	3.00"	.0002-.0018"	No. 4	.003-.009"	2.00"	.0005-.0025"	①.006-.022"
4.9L (301")	3.00"	.0002-.0018"	No. 4	.003-.009"	2.00"	.0005-.0025"	①.006-.022"

① – Total of both rods.

CAMSHAFT

Engine	Journal Diam.	Clearance	Lobe Lift
All	①1.900"	.....	.....

① – Bearing Diameter.

VALVE SPRINGS

Engine	Free Length	PRESSURE (LBS.)	
		Valve Closed	Valve Open
4.3L (265")	.....	75@1.66"	175@1.29"
4.9L (301")	.....	75@1.66"	175@1.29"