TR8 V8

ENGINE CODING

ENGINE IDENTIFICATION

Engine number is stamped on cylinder head on left side of engine and may be viewed by looking down between intake manifold branches. Codes are as follows:

Engine Identification Codes

Application	Engine Code
Carbureted	
Federal	
Man. Trans.	10E00001A
Auto. Trans.	11E00001A
Calif.	
Man. Trans.	12E00001A
Auto. Trans.	13E00001A
Fuel Injection	
Man. Trans.	14E00001A
Auto. Trans.	15E00001A

ENGINE, CYLINDER HEAD & MANIFOLDS

ENGINE

NOTE – *Remove engine and transmission as an assembly.*

Removal – **1)** Disconnect battery, drain coolant from radiator and engine block, and remove hood. Remove fresh air duct, alternator belt and alternator. If equipped, remove air conditioning compressor, leaving hoses attached. Tie compressor to one side.

2) Remove gear shift lever boot and flange assembly. On fuel-injected engines, remove airflow meter, disconnecting pipe at plenum chamber.

3) On carbureted engines, remove cold air inlet hose from temperature control valves. Remove valves. Remove hot air hoses from air boxes.

4) On all models, disconnect heater hoses at firewall. Disconnect throttle cable from throttle linkage. Disconnect brake servo hose at intake manifold plenum chamber. Release clips securing hose to air boxes.

5) On carbureted engines, disconnect float-chamber vent pipe and engine breather pipe from charcoal canister. Remove rubber cover from starter motor lead and remove lead from terminal.

6) Disconnect starter motor and alternator harness multi-plug, located near radiator expansion tank. Disconnect cooling system hoses from thermostat housing. Disconnect all electrical leads from ignition coil.

7) On carbureted engines, disconnect fuel inlet pipe at filter. On fuel injected engines, depressurize fuel system and disconnect inlet pipe from fuel rail.

8) Remove connector from cooling fan switch. Raise front of vehicle until bottom of radiator is approximately 3 ft. (.9 m) above floor. Support body on stands. Raise rear of car and support on stands. Drain engine oil.

9) Disconnect back-up light wires at multi-plug connector. Loosen muffler front joint and balance pipe clamps. Remove rear rubber "O" rings from brackets, and remove muffler and tailpipe assembly front down pipes.

10) Mark propeller shaft and transmission flange position. Remove 4 bolts and nuts securing propeller shaft drive flange to transmission drive flange. Remove speedometer cable clamp bolt and cable. Disconnect clutch slave cylinder hydraulic pipe from hose.

11) Remove clutch hose bracket from clutch housing. Remove intermediate steering shaft lower 2 bolts. Loosen lock nuts holding brake hoses to front suspension struts. Remove steering arm front bolt and both rear steering arm lower caliper bolts. Remove remaining caliper bolts and calipers.

12) Remove 6 nuts securing damper and spring assemblies to inner wing valances. Remove power steering pipe bracket from subframe. Drain power steering fluid, and seal all pipes and housing ports.

13) Lower rear of vehicle. Place jack under subframe and raise to take the weight. Fit an engine lifting harness to engine and raise with mobile hoist to support weight of engine.

14) Remove engine mounting bolts and nuts. Remove subframe nuts, lower rubber bushings and spacers. Lower the subframe and suspension assemblies and remove from vehicle. Remove steering intermediate shaft.

15) Place jack under transmission, supporting weight, and remove engine rear mounting crossmember from body. Lower engine and transmission assembly, and remove from beneath vehicle.

Installation – To install engine and transmission assembly, reverse removal procedure. Be sure to refill and bleed power steering system and to refill cooling system and crankcase.

CARBURETED INTAKE MANIFOLD

Removal – **1)** Drain cooling system and remove fresh air duct. Disconnect top hose and expansion hose from thermostat housing.

2) Disconnect hose from diverter valve and brake servo hose from manifold nipple, releasing it from clips. Remove plug from cooling fan switch. Remove distributor vacuum pipe from left-hand carburetor and remove bolt and clip. Disconnect hose from back of distributor capsule.

3) Disconnect vacuum hose from right-hand carburetor (to EGR valve). Disconnect air cleaner interconnecting pipe from left-hand air cleaner box. Remove asbestos-wrapped EGR valve pipe completely. Disconnect engine breather hose from right-hand valve cover flame trap.

4) Disconnect float-chamber vent hose from canister and left-hand carburetor. Unclip spark plug leads from air cleaners.

TR8 V8 (Cont.)

Disconnect air temperature control valve from both air cleaners. Disconnect throttle cable from carburetor linkage, and remove kickdown cable bracket (vehicles with automatic transmissions).

5) Disconnect heater hoses from front and rear of manifold. Disconnect coolant temperature sensor lead. Disconnect purge air filter line from left-hand valve cover and remove filter from clip. Disconnect main fuel line filter and release front clip.

6) Disconnect carburetor countershaft link rod from left-hand carburetor by moving sleeves outward. Remove 12 intake manifold bolts and lift off manifold complete with carburetors and air cleaners.

7) Clean outside of manifold gasket, making sure all coolant is removed. Remove front and rear gasket clamps, and lift off and discard gasket and gasket seals. Clean threads of manifold bolts.

Installation – **1)** Apply silicon grease to each side of new gasket seals. Install seals in position, with ends engaged in notches formed between cylinder heads and block.

2) Apply Hylomar PL 32M sealing compound (or equivalent) to 4 corners of new gasket, on cylinder head side around area of water passage joints. Fit gasket with word, "FRONT" towards front of engine. Fit gasket clamps in place, but do not fully tighten clamp bolts.

3) Apply sealing compound to manifold side of gasket as in step **2)**. Locate intake manifold in position on cylinder heads. Coat intake manifold bolt threads with thread lubricant-sealant (3M EC 776 or equivalent). Install bolts, tightening evenly, beginning at the center and working outward. Tighten gasket clamp bolts.

4) Reverse remaining removal procedures to complete installation.

FUEL INJECTION INTAKE MANIFOLD

Removal – **1)** Drain cooling system and remove fresh air duct. Disconnect top hose and expansion hose from thermostat housing. Remove plenum chamber, airflow meter and extra air valve.

2) Disconnect pipes and filters from manifold, placing them to one side. Disconnect temperature switches, sensors and thermotime switch. Remove injectors.

3) Remove 12 intake manifold bolts and lift off manifold. Clean outside of manifold gasket, making sure any accumulation of coolant is removed. Remove 2 bolts and front and rear gasket clamps. Lift off clamps and discard gasket. Remove and discard gasket seals and clean threads of manifold bolts.

Installation – To install intake manifold and gasket, follow installation instructions for carbureted intake manifold.

CYLINDER HEAD

Removal – **1)** Remove intake manifold and gasket. Remove spark plug leads from valve cover clamp. On carbureted models, move check valve aside and remove air temperature control valve and hoses. Also remove heat chamber from exhaust manifold.

2) Remove dipstick tube bracket from left-hand valve cover. Remove dipstick and tube. Remove valve cover screws and lift off valve cover. Remove right-hand valve cover. Remove 4 bolts to remove each rocker shaft assembly. Remove push rods. Mark and disconnect leads from spark plugs.

3) Remove 3 bolts attaching air conditioning compressor to left-hand cylinder head and bolts attaching air pump and alternator mounting bracket to right-hand cylinder head. On left-hand head removals, remove exhaust manifold bolts to gain access to head bolts. On right-hand head removals, disconnect exhaust front pipe from manifold.

4) Loosen and remove 14 cylinder head bolts, reversing the tightening sequence. See *Fig. 1*. Lift off cylinder head (also exhaust manifold on right-hand head removal). Remove and discard gasket.

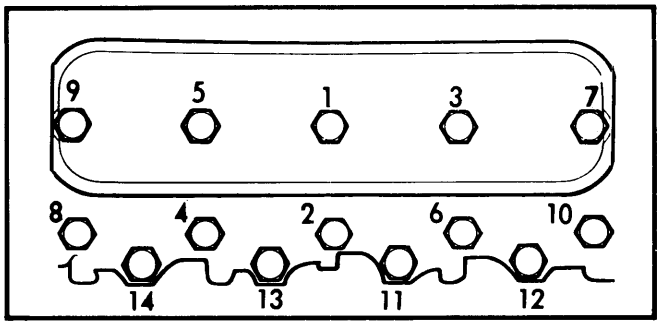

Fig. 1 Cylinder Head Bolt Tightening Sequence (Loosen in Reverse Order Shown)

5) Wash and wire brush cylinder head bolts in solvent (3M No. 2 or equivalent) to completely remove sealant. Examine bolts and replace any with signs of thread damage or elongation. Never install bolts more than 4 times.

Installation – **1)** Clean cylinder head and block mating surfaces. Install a new gasket with word, "TOP", up. DO NOT use sealant on gasket surfaces.

2) Position cylinder head over dowel pins in block. Coat threads of cylinder head bolts with lubricant-sealant (3M EC 776 or equivalent). Use various length bolts in proper locations, as follows:

Cylinder Head Bolt Locations

Application	Bolt Numbers
Long bolts	Nos. 1, 3 and 5
Medium bolts	Nos. 2, 4, 6, 7, 8, 9 and 10
Short bolts	Nos. 11, 12, 13, and 14

3) Tighten bolts evenly, a little at a time, in sequence shown in *Fig. 1*. Tighten bolts No. 1-10 to 65-70 ft. lbs. (9.0-9.7 mkg) and bolts No. 11-14 to 40-45 ft. lbs. (5.5-6.2 mkg).

TR8 V8 (Cont.)

VALVES

VALVE ARRANGEMENT

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

ROCKER ARM ASSEMBLY

Disassembly – Remove cotter pin from end of shaft and remove plain washer, wave washer, rocker arms, brackets and springs. See *Fig. 2*. Store components in correct sequence for reassembly.

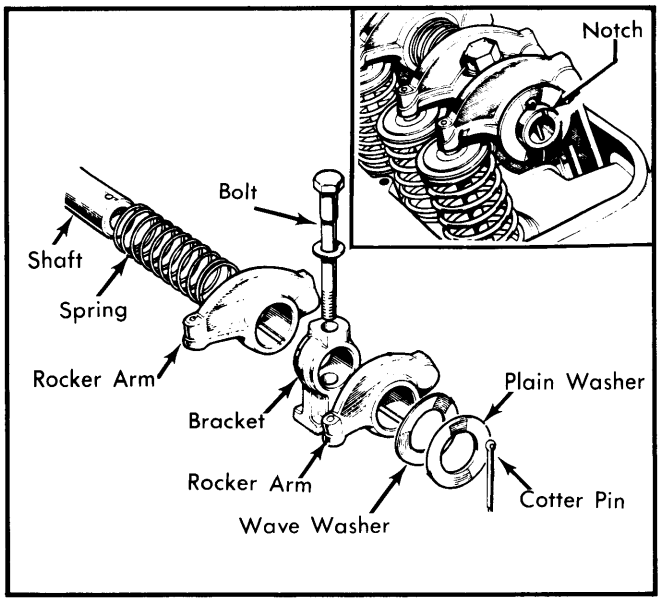

Fig. 2 Rocker Shaft Assembly Sequence (Inset Shows Notch on Shaft End)

Reassembly – 1) If new rocker arms are being installed, be sure to remove protective coating from each oil feed hole and push rod seat. Assemble plain washer against cotter pin in end of shaft. Install wave washer against plain washer.

NOTE – *Two different rocker arms are used and must be installed so that valve ends of arms slope away from brackets.*

2) Assemble rocker arms, brackets and springs in sets on rocker shaft. Compress springs and other components and install wave washer, plain washer and cotter pin in end of shaft.

3) Each rocker shaft is notched at one end and on one side only. The notch must be at top of shaft and toward front of the engine on right-hand side and toward rear of engine on left-hand side. See *Fig. 2*.

VALVE GUIDE SERVICING

1) Using a valve guide remover (274401), drive old guides out from combustion chamber side. Install specified spacer for valve guide drift (605774) on valve spring seat in top of cylinder head. See *Fig. 3*.

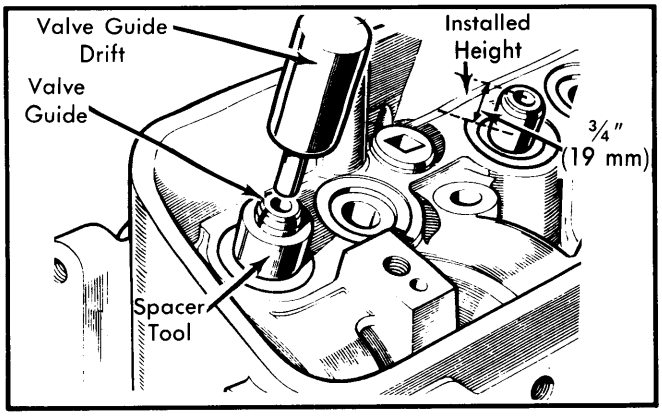

Fig. 3 Installing New Valve Guides

2) Lubricate new valve guide and insert into spacer. Using valve guide drift (600959), drive guide into cylinder head until drift bottoms against spacer. Installed guide should be 3/4" (19 mm) above step surrounding valve guide boss.

NOTE – *Valve guides for service have an outside diameter .001" (.02 mm) larger than bore to provide an interference fit.*

VALVE SEAT INSERTS

1) Remove old seats, if necessary, by grinding them until thin enough to be cracked and pried out. Heat cylinder head evenly to approximately 150°F (65°C). Press new insert into recess in cylinder head.

NOTE – *Outside diameter of standard intake valve seat inserts is 1.6825-1.6838" (42.735-42.768 mm). Exhaust valve inserts are 1.4350-1.4545" (36.918-36.994 mm). Inserts for service are available in 2 oversizes, having .010" (.25 mm) and .020" (.50 mm) larger outside diameters.*

VALVE SERVICING

Removal – With cylinder heads removed, use valve spring compressor (276102 or equivalent) to remove valve locks. Keep components in proper order for later installation. Clean combustion chambers with a soft wire bush. Clean valves and valve guide bores. Regrind or install new valves, as necessary. If valves must be ground to a knife-edge to obtain a true seat, install new valves.

Installation – Lubricate valve stems and guides with engine oil. Insert each valve into its guide. Position valve springs on cylinder head (install new springs if compression tests prove springs are weak). Locate cap over top of spring. Compress spring with spring compressor (276102) and install valve lock. Install cylinder heads after rocker arm assembly and valves have been checked for proper assembly and ease of operation.

HYDRAULIC TAPPET SERVICING

1) Drain cooling system and remove fresh air duct. Remove intake manifold and valve covers. Remove rocker shaft assemblies. Remove push rods and keep in sequence for later installation. Remove tappets and store them with their respective push rods.

TR8 V8 (Cont.)

NOTE – *If tappets cannot be removed from bore, remove camshaft and remove tappet from bottom of bore.*

2) Inspect hydraulic tappets for blow holes or scoring. Replace if badly scored or grooved, or if blow hole would permit oil leakage from lower chamber. Some wear is permitted just above lower end of tappet body. This results from side thrust of cam against tappet body as tappet moves vertically in its guide.

3) Inspect cam contact surface of tappets. A round wear pattern is normal, as tappets rotate. A non-rotating tappet will have a square wear pattern, requiring tappet replacement. Be sure new tappets rotate freely in cylinder block before completing reassembly.

4) Install new tappets also if area of push rod contact is rough or otherwise damaged. Replace any push rods having a rough or damaged ball end seat.

NOTE – *Tappet noise is normal after an overhaul, due to oil drainage from tappet assemblies. If noise is excessive, run engine at 2500 RPM for a few minutes to eliminate noise.*

PISTONS, PINS & RINGS

OIL PAN

Removal – **1)** Disconnect battery. Remove both cylinder heads and gaskets. Attach engine lifting brackets to second inboard cylinder head stud holes on each bank of block. Support engine weight (MS 53/3 supporting tool), so that 4 engine mounting nuts and bolts can be removed from subframe.

2) Raise engine about 1½" (38 mm). Raise vehicle and drain engine oil. Remove oil pan coupling plate bolts, oil pan bolts and oil pan. Remove oil pick-up strainer and oil pan baffle plate.

Installation – To install oil pan, reverse removal procedure.

PISTON & CONNECTING ROD ASSEMBLIES

NOTE – *Connecting rods and caps are not marked for reassembly reference. Be sure to mark caps for later reassembly to their respective rods. Also piston and rod assemblies must be marked for later assembly in their respective bores.*

Removal – Remove connecting rod caps. Screw guide bolts (605351) on to connecting rod bolts. Push connecting rod and piston assembly upward and remove from top of cylinder bore. Remove guide bolts.

Installation – **1)** Position applicable crankshaft journal at BDC. Place upper bearing shell in connecting rod. Retain by screwing guide bolt (605351) on connecting rod.

2) Insert connecting rod and piston assembly into its respective bore. Dome-shaped bosses on connecting rods must face toward front of engine for right-hand bank of cylinders and toward rear of engine for left-hand bank. See *Fig. 4*. When connecting rods are installed, dome-shaped bosses will face each other.

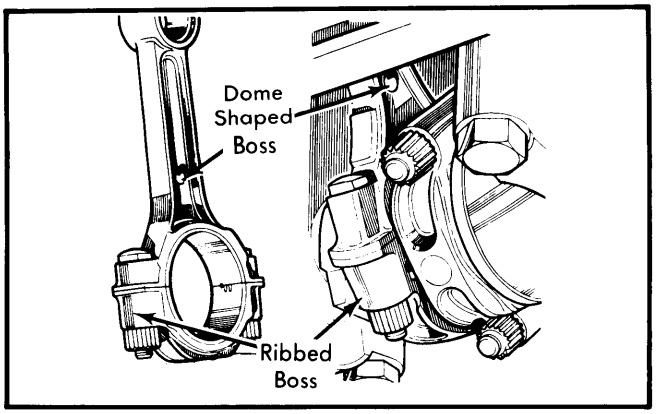

Fig. 4 Connecting Rod Positioning Marks

3) Position oil control piston rings so gaps are all on one side, between piston pin and thrust face. See *Fig. 5*. Ring rail gaps should be 1" (25 mm) to each side of expander ring gap.

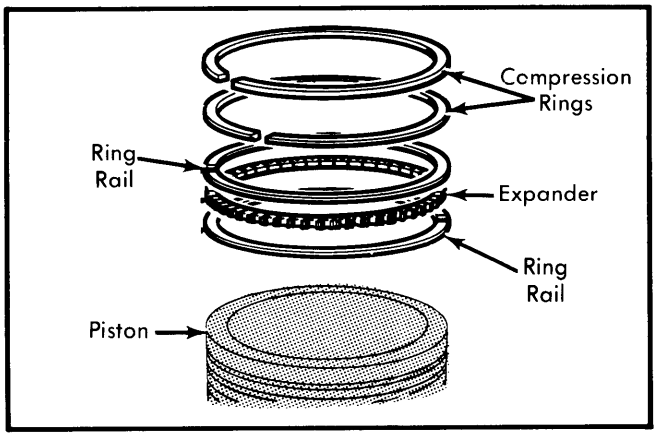

Fig. 5 Positioning Piston Rings

4) Position compression rings so their gaps are on opposite sides of piston, between piston pin and thrust face. Using a ring compressor, install piston and rod into its bore.

5) Install bearing lower shell into its connecting rod cap. Position cap and shell on its respective connecting rod, making sure ribbed edge of cap is toward front of engine on right-hand bank of cylinders and toward rear of engine on left-hand bank. See *Fig. 4*. Tighten connecting rod cap. Check for proper end play and free movement on crankshaft.

PISTON PINS

Removal & Installation – **1)** Install piston and connecting rod on pressing tool (605350). Using a drift from tool set, press pin from piston and rod.

2) Locate piston pin guide on pressing tool (605350). Position piston and connecting rod on tool. Insert piston pin into piston and over guide. Position drift on piston pin and press pin in until it strikes shoulder of guide.

3) Make sure piston moves freely on piston pin and that no damage occurred during pressing. Install assemblies in their respective bores.

TR8 V8 (Cont.)

FITTING PISTONS

1) If original pistons are to be reused, remove carbon and deposits from ring grooves and compare piston and cylinder diameters with specifications to assure proper clearances.

2) If new pistons are to be installed, a single .001" (.025 mm) oversize piston is available for service. This may require honing of bore to obtain proper clearances.

3) Check cylinder bore diameters at right angles to piston pin 3.5-4.0" (90-100 mm) from top. Check piston diameter at right angles to piston pin at bottom of skirt. Difference in diameters is piston clearance.

4) If new rings are to be installed without reboring, deglaze cylinder walls in a cross-hatch pattern so as not to increase bore diameter. Install compression rings in cylinder bore to check end gaps. Also install compression rings in their respective grooves (chrome ring in top groove, stepped ring in second groove), and check clearance in grooves.

PISTON RINGS

When installing rings, install expander ring in bottom groove, making sure ends touch each other, but do not overlap. Install one ring rail above and below expander ring. Install chrome compression ring in top groove and stepped ring in second groove, with marking "T" or "TOP" upward.

CRANKSHAFT & ROD BEARINGS

MAIN & CONNECTING ROD BEARINGS

Connecting Rod Bearings – 1) Position upper bearing shell into connecting rod and install on its respective crankshaft journal.

NOTE – *Make sure rod is correctly installed as outlined in steps* **2)** *and* **5)** *of PISTON & CONNECTING ROD ASSEMBLIES.*

2) Install Plastigage (605238) across center of lower half of crankshaft journal. Install bearing on connecting rod cap and install cap to rod. Do not rotate crankshaft while Plastigage is installed.

3) Compare Plastigage reading with specified bearing clearance. If wear limit is exceeded, install new bearings.

Crankshaft Main Bearings – 1) With oil pan removed, remove bolts retaining main bearing caps 2, 3 and 4 complete with upper and lower bearing shells. Inspect caps, bearing shells and crankshaft journals for damage.

NOTE – *Do not remove all 5 main bearing caps at once, since weight of crankshaft would distort front and rear oil seals. Only caps 2, 3 and 4 are identified by number. Keep upper and lower bearing shells together as matched sets.*

2) Using Plastigage method, check main bearing clearances and replace bearings as necessary. Check crankshaft journals for out-of-round. If more than .0015" (.038 mm), grind crankshaft to next undersize or replace crankshaft.

3) Install upper bearing shell 3 (thrust bearing) to cylinder block. Upper shells have central oil hole and must be lubricated prior to installation. See *Fig. 6*. Install with locking slot end trailing. Then, install upper shells 2 and 4 in same manner.

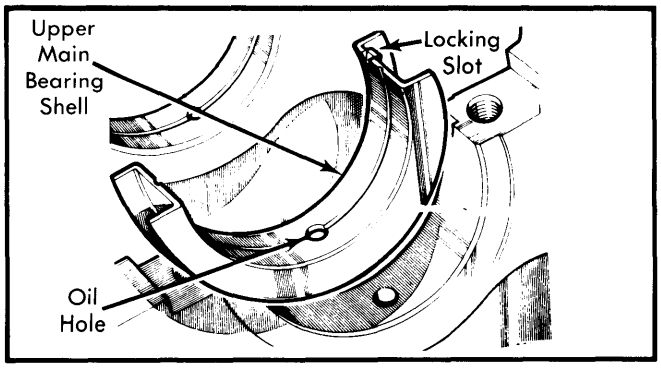

Fig. 6 Installing Upper Main Bearing Shell

4) Assemble lower shells to bearing caps, lubricate and install. Be sure all locking slots are together on right-hand side of engine. Tighten main bearing caps 2, 3 and 4 to specifications.

5) After main bearings 2, 3 and 4 have been checked and either reinstalled or replaced, remove main bearing caps 1 and 5 complete with lower bearing shells. Remove upper bearing shells. Discard main bearing side seals.

NOTE – *Main bearings 1 and 5 should be checked for proper clearance, using Plastigage method. Check crankshaft journals for damage and out-of-round in same manner as for bearings 2, 3 and 4.*

6) Install front upper bearing shell (with central oil hole) and place lower bearing shell in main bearing cap 1. Install to cylinder block. Be sure locking slots are together on right-hand side of engine. Tighten to specifications.

REAR MAIN BEARING & OIL SEAL

NOTE – *Oil seal is replaced with engine-transmission assembly removed, permitting removal of crankshaft. Seal may also be replaced with engine installed, by removing transmission, clutch and flywheel.*

1) With other 4 main bearing caps installed, install upper bearing shell in cylinder block. Install new side seals to rear main bearing cap. See *Fig. 7*. Do not cut seals to length, but permit them to extend 5/8" (1.5 mm) above bearing cap face.

2) Apply Hylomar PL 32M sealing compound (or equivalent) to rearmost half of rear main bearing cap or its cylinder block mating surface. Lubricate bearing half and side seals with clean engine oil.

3) Install rear main bearing cap snugly, but not completely, making sure it is squarely seated on cylinder block. Back off each main bearing cap bolt 1 turn.

4) Position seal guide (RO 1014) on crankshaft flange. Be sure oil seal guide and crankshaft journal are completely clean. Coat seal guide and oil seal journal with clean engine oil.

TR8 V8 (Cont.)

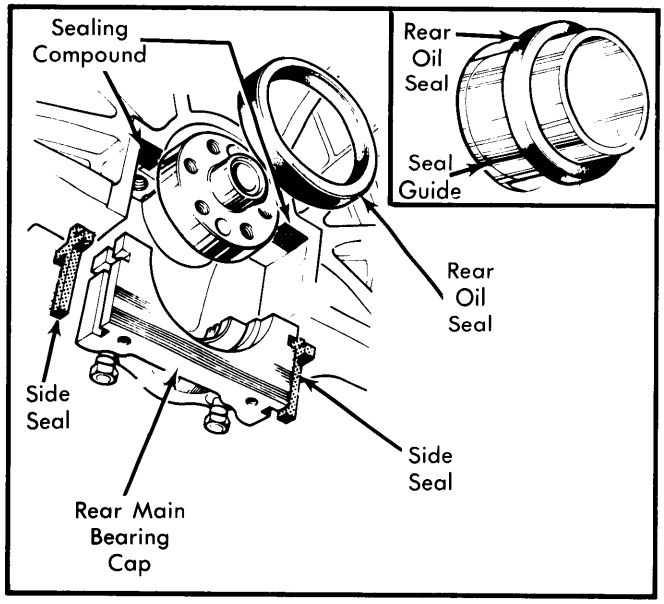

Fig. 7 Installing Rear Main Bearing Cap With Oil Seals

NOTE – *Be sure lubricant covers entire outer surface of oil seal guide, preventing lip from turning back during assembly. Do not handle oil seal lip at any time.*

5) Place oil seal on seal guide with lipped surface toward engine. By hand, push oil seal fully and squarely into recess formed in bearing cap and cylinder block, until it is seated against machined step in recess. Remove seal guide.

6) Tighten rear main bearing cap to specifications and check crankshaft end play. Complete reassembly or installation of engine-transmission assembly.

CAMSHAFT

TIMING GEAR COVER

NOTE – *If not equipped with air conditioning, disregard references to such components.*

Removal – 1) Disconnect battery, drain cooling system and turn crankshaft so No. 1 cylinder is at TDC. Remove crankshaft pulleys, alternator drive belt tension strap and radiator bottom hose (from water pump). Remove air intake left-hand hose on carbureted engines to gain access to power steering bolts. Remove power steering pump.

2) Disconnect electrical lead from oil pressure switch. On carbureted models, loosen air pump belt tension and remove air pump and belt. Disconnect heater inlet hose from water pump and outlet hose from rear of timing gear cover. Remove water pump.

3) Remove electrical leads from distributor, ballast resistor and coil. Remove distributor cap and set it aside. Disconnect vacuum pipe from distributor capsule. Remove top radiator hose from thermostat housing.

4) Remove timing gear cover bolts and single nut and washer. Remove 2 bolts securing oil pan to cover. Loosen 2 adjacent oil pan bolts. Remove timing gear cover, complete with distributor, oil pump and filter. See *Fig. 8*. Remove gasket. Clean bolt threads with solvent (3M No. 2).

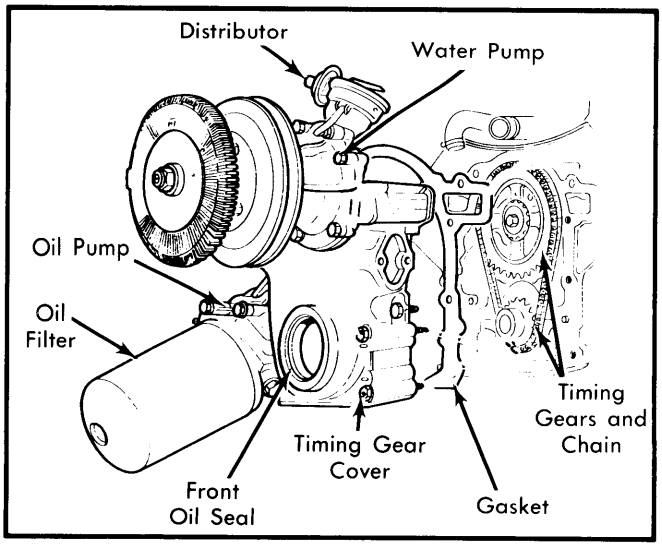

Fig. 8 Removing Timing Gear Cover Assembly

Installation – 1) To install, reverse the removal procedure. Be sure cylinder block and cover mating surfaces are clean. Coat both sides of new gasket with Hylomar PL 32M (or equivalent) and position on block or cover. Apply lubricant-sealer (3M EC 776 or equivalent) to threads of timing gear cover bolts.

2) Set distributor rotor arm to approximately 30° BTDC and install cover on cylinder block. Tighten bolts and nut with washer to specifications. Complete reversal of removal procedure.

TIMING GEAR COVER OIL SEAL

Removal – 1) Remove crankshaft pulleys. Remove fan and viscous coupling on non-air conditioned models. Screw extractor tool (18G 1328) into seal.

2) Turn center bolt clockwise to remove seal. Remove seal from extractor and discard seal.

Installation – 1) Clean seal housing in cover. Lubricate outside diameter of seal with clean engine oil. Using care not to damage seal, start seal into cover.

2) Fit adapter (18G 1291/5) to main tool (18G 1291/4) and screw bolt into crankshaft. Turn lock nut clockwise, drawing seal in until flush with cover. Remove tool and adapter. Lubricate seal lip with engine oil and install crankshaft pulleys.

TIMING CHAIN AND GEARS

Removal – With timing cover removed and No. 1 piston at TDC, remove distributor drive gear. See *Fig. 9*. Remove spacer and both gears with chain, keeping components assembled.

CAUTION – *Do not rotate engine shafts if rocker shafts are installed, as damage could result.*

TR8 V8 (Cont.)

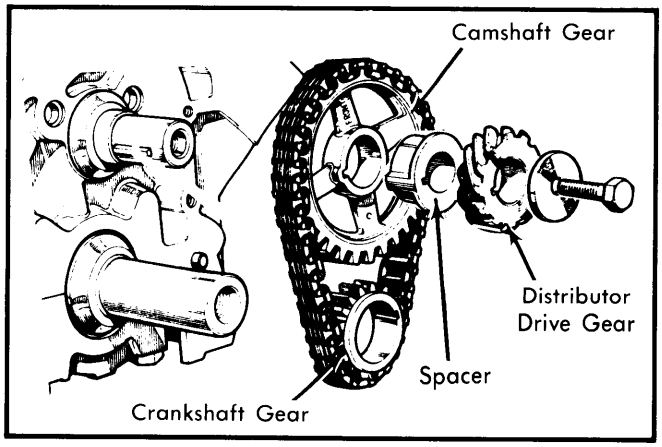

Fig. 9 Timing Chain and Gear Assembly

Installation – **1)** If crankshaft and/or camshaft have not been rotated, proceed to step **3)**. If rotation has occurred (and with rocker shaft assemblies removed) set No. 1 piston at TDC. Temporarily install only camshaft gear on shaft with word, "FRONT", facing away from engine. *See Fig. 10.*

2) Turn camshaft until timing mark on gear is at lower 6 o'clock position. *See Fig. 10.* Remove camshaft gear without disturbing camshaft. Place camshaft and crankshaft gears in chain so their timing marks align.

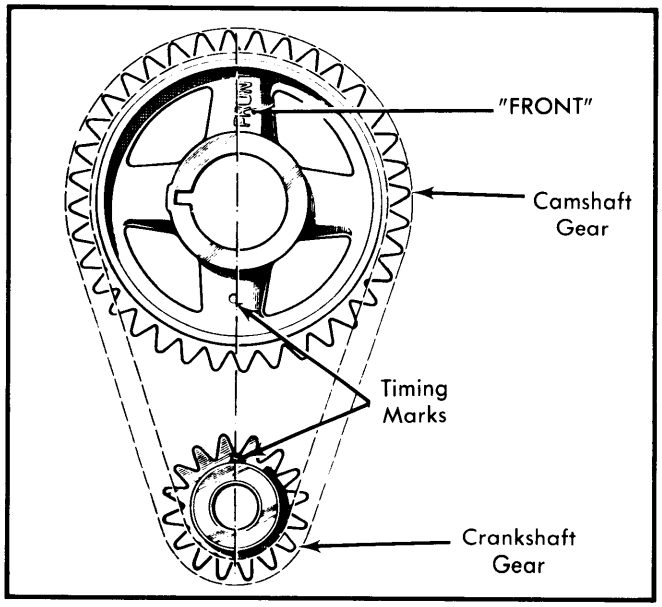

Fig. 10 Setting Valve Timing

3) Engage chain and gear assembly on camshaft and crankshaft key locations. Check that camshaft key is parallel to shaft axis for proper lubrication of distributor drive gear. Diameter of shaft including key should not exceed 1.187" (30.15 mm).

4) Again, check timing marks for proper alignment. Install spacer with flange toward front. Install distributor drive gear, making sure annular grooved side is to the rear (toward spacer).

5) Tighten distributor drive gear (camshaft) bolt and install timing gear cover.

VALVE TIMING

See *TIMING CHAIN AND GEARS*

CAMSHAFT

Removal – Remove intake manifold, timing chain and gears, valve covers and rocker shaft assemblies. Remove push rods and tappets, identifying them for later reassembly. Carefully remove camshaft from cylinder block.

Installation – Lubricate 5 camshaft journals and carefully insert camshaft into cylinder block. Install timing chain and gears, timing gear cover and cover oil seal. Install 8 tappets and push rods, rocker shaft assemblies, intake manifold and gasket. Install remaining components removed from engine or vehicle, as required for intake manifold removal.

ENGINE OILING

Crankcase Capacity – 5.4 quarts with filter. Normal drain and refill, 4.7 quarts.

Oil Filter – Disposable, full-flow type.

Pressure Relief Valve – Non-adjustable. Located in oil pump.

Normal Oil Pressure – 35 psi (2.46 kg/cm^2) at 2400 RPM.

Oil Pump

A high capacity gear-type pump, driven by distributor shaft, which is geared to distributor drive gear on camshaft. Pump takes oil from pan, through a strainer and pumps it through oil filter to lubricate engine components.

Removal – Remove oil filter. Disconnect electrical lead from oil pressure switch. Remove bolts attaching oil pump cover assembly to timing gear cover. *See Fig. 11.* Lift off cover and gasket and slide out oil pump gears.

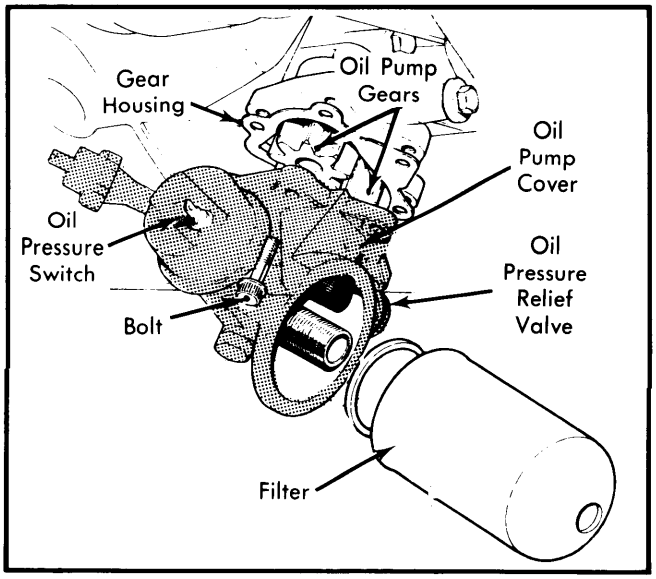

Fig. 11 Removing Oil Pump Cover from Housing

TR8 V8 (Cont.)

Inspection – Clean gears and inspect for wear or scoring. Replace worn gears. Remove oil pressure relief valve and inspect parts for wear. Replace spring if sides of spring are worn. Be sure valve moves freely in its bore, but has no side movement.

NOTE – *To check pump gears and housing for wear, install gears and shaft into timing gear cover. Place straightedge across face of gears and insert feeler gauge between straightedge and cover. If clearance is less than .0018" (.05 mm), check timing gear cover gear housing for wear.*

Installation – **1)** Lubricate and install pressure relief valve assembly. Fully pack oil pump gear housing with petroleum jelly (no other grease is suitable). Install oil pump gears, so petroleum jelly is forced into every cavity between teeth of gears.

CAUTION – *Unless pump is fully packed as indicated, pump may not prime itself upon reassembly and engine start-up. Use care when removing oil filter to replace filter immediately. If not replaced quickly, oil can drain from pump requiring pump removal and priming.*

2) Place a new gasket on oil pump cover and position cover on timing gear cover. Install and tighten bolts evenly and alternately. Connect electrical lead to oil pressure switch and install new oil filter. Check oil level in crankcase and bring to proper level.

ENGINE COOLING

Thermostat – Opens at 190°F (88°C).

Cooling System Capacity – 11.5 quarts with header tank; 10.5 quarts with expansion tank.

Radiator Cap – 15 psi (1.05 kg/cm²).

WATER PUMP

Removal – **1)** Disconnect battery and drain cooling system. Remove left-hand top hose from thermostat housing and other hoses from water pump.

2) Remove 4 bolts common to water pump and timing gear cover. Remove remaining 6 water pump bolts. Move air pump drive belt adjusting strap aside. Lift off water pump and gasket.

Installation – **1)** Clean water pump and timing gear cover mating surfaces. Grease gasket lightly and position on timing gear cover. Clean threads of mounting bolts and smear them with lubricant-sealant (3M EC 776).

2) Be sure 2 dowels are free of burrs. Install water pump over dowels and install bolts. Tighten evenly. Replace all hoses previously removed, install coolant and connect battery cables.

THERMOSTAT

Removal – Disconnect battery. Drain only radiator by disconnecting bottom hose. Remove top hose from thermostat housing. Remove 2 bolts and lift thermostat housing cover from intake manifold. See *Fig. 12*. Remove thermostat and gasket.

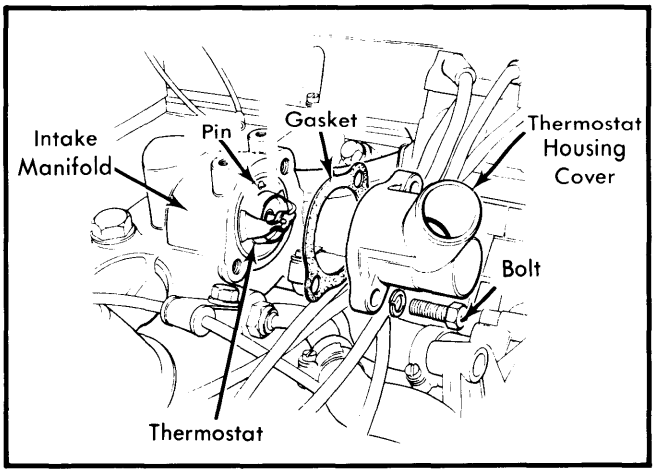

Fig. 12 Removing Thermostat and Gasket

Inspection – Note number stamped on thermostat, indicating temperature at which thermostat should be fully open. Place thermostat and a thermometer in water and heat, noting temperature at which thermostat opens. Install or replace, as necessary.

Installation – Clean gasket mating surfaces, and install thermostat with pin at 12 o'clock position. See *Fig. 12*. Install new gasket and position thermostat housing cover. Install and tighten bolts evenly. Connect hoses and battery.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Camshaft Sprocket	40-45 (5.5-6.2)
Vibration Damper	190-210 (26.3-29.0)
Intake Manifold	25-30 (3.5-4.2)
Intake Manifold Clamp	10-15 (1.4-2.1)
Exhaust Manifold	10-16 (1.4-2.2)
Cylinder Head	
Bolts 1 through 10	65-70 (9.0-9.7)
Bolts 11 through 14	40-45 (5.5-6.2)
Rocker Shaft Bracket	25-30 (3.5-4.2)
Connecting Rod Cap	35-40 (4.8-5.5)
Rear Main Bearing	65-70 (9.0-9.7)
Other Main Bearings	50-55 (6.9-7.6)
Flexible Plate-to-Crankshaft	50-60 (6.9-8.3)
Flywheel-to-Crankshaft	55-60 (7.6-8.3)
Oil Pan	
Rear	17-18 (2.3-2.5)
Others	8-9 (1.1-1.2)
Oil Pump	9-10 (1.2-1.4)
Pressure Relief Valve	30-35 (4.2-4.8)
Starter Motor	30-35 (4.2-4.8)
Timing Gear Cover	20-25 (2.8-3.5)
Power Steering Pump	20-25 (2.8-3.5)
Water Pump and Timing Gear Cover	20-25 (2.8-3.5)
Alternator-to-Cylinder Head	
3/8" Bolt	23-25 (3.2-3.5)
5/16" Bolt	17-18 (2.4-2.5)
A/C Compressor Bracket-to-Head	19-20 (2.6-2.8)
A/C Compressor-to-Bracket	
3/8" Set Screw	28-30 (3.9-4.2)
3/8" Stud	23-24 (3.2-3.4)

TR8 V8 (Cont.)
ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS

Year	Displ. cu. ins.	Displ. cc	Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore in.	Bore mm	Stroke in.	Stroke mm
1980	215.0	3528	①175CDSET	133@4750	.....	8.15:1	3.50	88.9	2.80	71.1
	215.0	3528	②Fuel Inj.	148@4750	.....	8.15:1	3.50	88.9	2.80	71.1

① — Twin 1-Bbl. side-draft carburetors. ② — Lucas digital electronic.

VALVES

Engine & Valve	Head Diam. In. (mm)	Face Angle	①Seat Angle	②Seat Width In. (mm)	③Stem Diameter In. (mm)	④Stem Clearance In. (mm)	Valve Lift In. (mm)
3528 cc							
Intake	1.565-1.575 (39.8-40.0)	45°	46°	.060 (1.575)	.3402-.3412 (8.6-8.7)	.0010-.0030 (.02-.07)	.39 (9.9)
Exhaust	1.348-1.358 (34.2-34.5)	45°	46°	.060 (1.575)	.3397-.3407 (8.6-8.7)	.0020-.0004 (.05-.10)	.39 (9.9)

① — Plus ¼ degree. ② — Wear Limit .078" (2.0 mm).
③ — Measured at valve head. Diameter increases .0005" (.012 mm) away from head.
④ — Measured at top of guide. Subtract .0005" (.012 mm) for bottom of guide clearance.

VALVE TIMING

Engine	INTAKE Open (ATDC)	INTAKE Close (ABDC)	EXHAUST Open (BBDC)	EXHAUST Close (ATDC)
3528 cc	30°	75°	68°	37°

VALVE SPRINGS

Engine	Free Length	PRESSURE (LBS.) Valve Closed	PRESSURE (LBS.) Valve Open
3528 cc	.....	66.5-73.5 @ 1.577"	.....
	.....	123.5-136.5 @ 1.350"	.....
	.....	168.5-183.5 @ 1.187"	.....

PISTONS, PINS, RINGS

Engine	PISTONS Clearance In. (mm)	PINS Piston Fit In. (mm)	PINS Rod Fit In. (mm)	RINGS Rings	RINGS End Gap In. (mm)	RINGS Side Clearance In. (mm)
3528 cc	①.0007-.0013 (.018-.033) ②.0016-.0028 (.04-.08) ③.0296-.0350 (.73-.88)	.0001-.0003 (.002-.007)	Press Fit	No. 1	.017-.022 (.44-.57)	.003-.005 (.08-.13)
				No. 2	.017-.022 (.44-.57)	.003-.005 (.08-.13)
				Oil	.015-.055 (.38-1.40)	....

① — At bottom of skirt. ② — At top of skirt. ③ — At top land.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS Journal Diam. In. (mm)	MAIN BEARINGS ①Clearance In. (mm)	MAIN BEARINGS Thrust Bearing	MAIN BEARINGS Crankshaft End Play In. (mm)	CONNECTING ROD BEARINGS Journal Diam. In. (mm)	CONNECTING ROD BEARINGS ①Clearance In. (mm)	CONNECTING ROD BEARINGS Side Play In. (mm)
3528 cc	2.2992-2.2997 (58.39-58.41)	.0009-.0024 (.023-.061)	No. 3	.004-.008 (.10-.20)	2.0000-2.0005 (50.80-50.81)	.0006-.0022 (.015-.055)	.006-.014 (.15-.37)

① — Wear limit .003" (.08 mm).