1971-72 PLYMOUTH CRICKET 4 CYLINDER

GENERAL SPECIFICATIONS										
Year	Displ.		Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore		Stroke	
	cu. ins.	cc					in.	mm	in.	mm
1971-72	76.16	1498	1x1-Bbl.	57@5000	74@3000	8.0-1	3.391	86.131	2.53	64.3
1972	76.16	1498	2x1-Bbl.	70@5400	75@3750	8.0-1	3.391	86.131	2.53	64.3

1971-72 – Cylinder blocks are identified by large letters cast on cylinder block just above engine mounting bracket on exhaust manifold side of engine.

LB "1500" – Large Bore.

ENGINE REMOVAL

NOTE – On cars equipped with automatic transmission, engine and transmission must be removed as a complete unit. On cars equipped with manual transmission, engine may be removed with transmission attached, or transmission may be unbolted and left in car when engine is removed.

1) Place heater control valve in hot position to open heater valve so that heater will drain. Drain radiator and cylinder block.

2) Disconnect battery, remove hood, remove throttle rod retainer holding throttle rod in plastic trunnion in carburetor throttle lever. Lift away throttle rod.

3) Disconnect choke cable, alternator leads, radiator hoses and heater hoses. Remove radiator attaching bolts and remove radiator. Remove fan blades, fan pulley and fan belt.

4) Disconnect leads from water temperature unit, oil warning light switch, distributor connections and coil leads. Disconnect fuel inlet line from fuel pump.

5) Disconnect starter lead from terminal and remove top starter attaching bolt and ground lead.

6) After completing steps 1) through 5), proceed as follows:

To Leave Transmission in Car (Man. Trans. Only) – 1) Remove transmission upper attaching bolts and jack up front of car and place on stands. Remove flywheel cover plate bolts and flywheel cover. Remove starter lower bolt and remove starter complete with splash guard. Remove lower transmission-to-engine bolts.

2) Disconnect exhaust pipe from manifold and remove two engine front mounting nuts inside front member. Attach lifting gear under two cylinder head nuts that hold heater hose support brackets.

3) Support weight of engine on lifting chain and support transmission weight with jack so that transmission front end will not lower after engine is removed. Lift engine so that threaded studs on front mountings come out of crossmember. Draw engine forward enough to clear transmission and lift out of car.

To Remove Engine And Transmission As Unit – 1) Place car on jack stands. Remove three screws holding gear lever in position and remove gear lever. Unbolt propeller shaft from rear axle flange and withdraw from transmission. Blank off transmission end to prevent loss of oil.

2) Disconnect speedometer cable, clutch cable, and back-up light wires. Remove four attaching bolts holding anti-roll bar to body frame underside. Remove engine rear mounting bolts. Use jack to lower weight of transmission. Lift engine up at angle and out of car.

INTAKE & EXHAUST MANIFOLD REMOVAL

NOTE – Intake and exhaust manifolds are bolted together and cannot be removed separately.

1) Remove air cleaner and two exhaust flange nuts. Remove flange and lower exhaust pipe, supporting it as needed.

2) Disconnect throttle linkage, fuel line, choke cable and vacuum advance hose at carburetor ends. Remove seven bolts and washers and three nuts and washers holding manifolds to cylinder head. Remove manifold with carburetor attached.

CYLINDER HEAD REMOVAL

1) Drain radiator and cooling system completely. Disconnect battery, remove air cleaner, disconnect radiator top hose, and remove rocker cover.

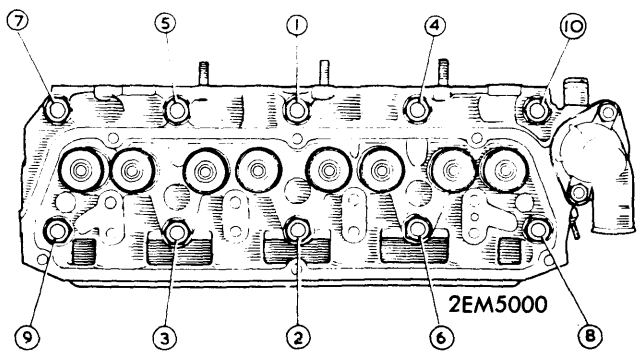
2) Disconnect lead from thermometer transmitter and disconnect spark plug wires. Disconnect heater hoses as required and remove eight rocker shaft assembly bolts. Remove bolts evenly and lift off rocker shaft as an assembly.

3) Remove push rods, taking care not to draw tappets out of cylinder block. Push rods should be placed in suitable holder so that they can be replaced in original position.

4) Disconnect fuel feed line at fuel pump end, carburetor end and its clipped position. Disconnect carburetor controls. Disconnect exhaust pipe at flange on exhaust manifold. Cover open end of pipe and support pipe as needed.

5) Remove eight bolts and two nuts securing cylinder head to cylinder block. Lift off cylinder head with manifolds and carburetor still attached.

6) Inspect each tappet and its bottom face for wear or pitting. To install cylinder head, reverse removal procedure.



CYLINDER HEAD TIGHTENING SEQUENCE

1971-72 PLYMOUTH CRICKET 4 CYLINDER (Cont.)

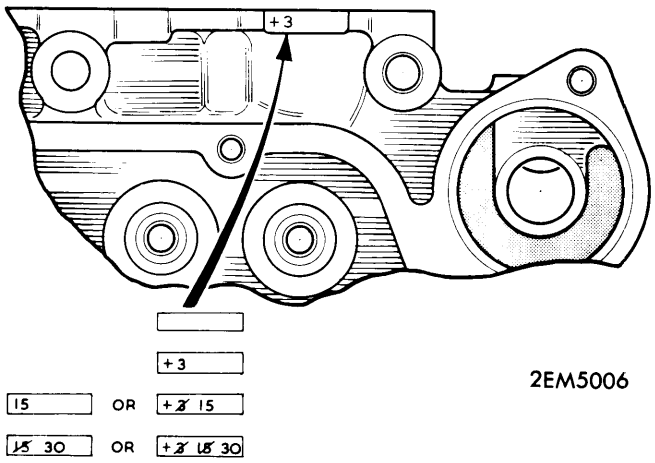
VALVES							
Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
1971 1x1-Bbl.							
Intake	1.420"	45°	45°	.075-.095"	.3110-3115"	.001-.0025"	.....
Exhaust	1.200"	45°	45°	.075-.095"	.3095-.3100"	.0025-.0040"	.....
1972 1x1-Bbl.							
Intake	1.448"	45°	45°	.075-.095"	.3110-.3115"	.001-.0025"	.....
Exhaust	1.223"	45°	45°	.075-.095"	.3095-.3100"	.0025-.0040"	.....
1972 2x1-Bbl.							
Intake	1.483"	45°	45°	.075-.095"	.3110-.3115"	.001-.0025"	.....
Exhaust	1.223"	45°	45°	.075-.095"	.3095-.3100"	.0025-.0040"	.....

VALVE ARRANGEMENT

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

VALVE GUIDE SERVICING

When guides are worn, standard or +.003" oversize guides may be reamed to +.015". Worn +.015" oversize guides may be reamed to +.030" to take valves with oversize stems. Proceed as follows:



VALVE GUIDE BORE IDENTIFICATION

1) Clean cylinder head by putting it in a degreaser or by cleaning guide bores with strong degreasing fluid. Do not attempt to ream bores unless bores have been thoroughly cleaned with degreasing fluid.

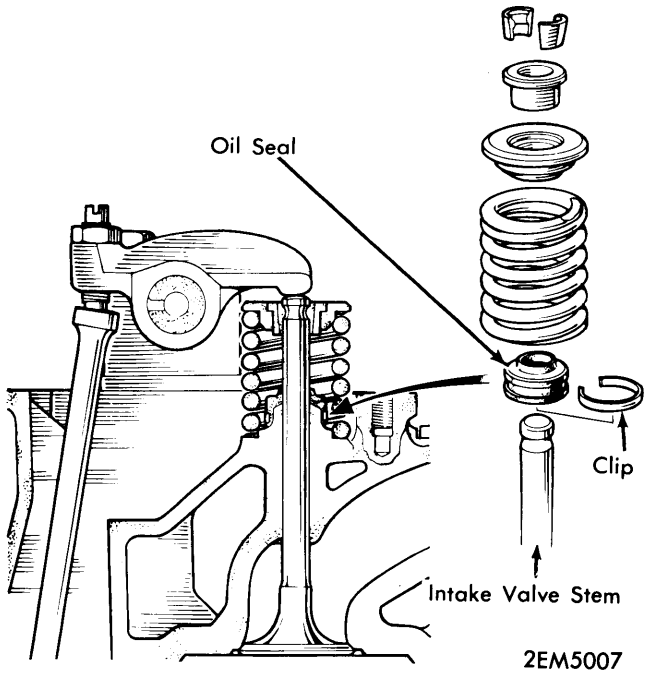
2) After reaming, upper ends of each exhaust valve guide boss must be finished with a smooth file to give a flat face about .030" wide across band inner and outer diameters.

3) After guide bores have been reamed oversize, the previous size (stamped on cylinder head) should be overstamped with a chisel cut and the new oversize stamped on next to old stamping.

VALVE STEM OIL SEALS

Seals are available in two sizes. Seals for standard or +.003" oversize have plain exteriors, seals for +.015" and +.030" oversize have 15 or 30 on exterior top face.

NOTE — Oil seals are not fitted to exhaust valves.



VALVE STEM OIL SEAL

Valve Clearance Adjustment

Engine	①Intake	①Exhaust
1971-72 All	.008"	.016"

① — Set hot or cold.

VALVE SPRINGS			
		PRESSURE (LBS.)	
Engine	Free Length	Valve Closed	Valve Open
1971 1x1-Bbl.	1.758"	71-79@1.50"	183.5@1.14"
1972 1x1-Bbl.	1.745"	70@1.50"	176.7@1.14"
1972 2x1-Bbl.			
Outer	1.51"	53@1.34"	184@.916"
Inner	1.20"	17@1.005"	55@.560"

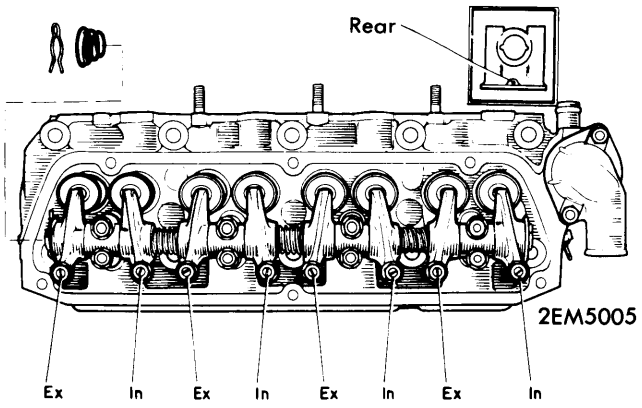
1971-72 PLYMOUTH CRICKET 4 CYLINDER (Cont.)

ROCKER SHAFT ASSEMBLY

Remove rocker cover and remove eight bolts securing rocker standards to cylinder head. Lift out rocker shaft assembly. To reinstall, reverse removal procedure and tighten bolts to specifications.

Disassembly – Remove spring clip from each end of assembly and remove any burrs on rocker shaft end grooves to prevent scoring of rocker bores when rockers are removed. Take off rockers, standards, springs, and take note of their position for reassembly.

Reassembly – Assemble rockers and components on rocker shaft. The rocker standards must be assembled onto rocker shaft with their rear end identifying boss toward rear end of cylinder head. This ensures that the front standard oil feed lines up to rocker shaft and cylinder oil feed holes.



ROCKER SHAFT ASSEMBLY

PISTONS, PINS, RINGS						
	PISTONS	PINS		RINGS		
Engine	①Clearance	Piston Fit	Rod Fit	Rings	End Gap	Side Clearance
1971-72 Single Carb	.0015-.0023"	②	③	1	.014-.018"	.0015-.0035"
				2 & 3	.010-.014"	.0015-.0035"
1972 Dual Carb	.0009-.0024"	②	③	1	.014-.018"	.0015-.0035"
				2 & 3	.010-.014"	.0015-.0035"

① – Measure 5/8" above lowest point of piston skirt.
② – Thumb press fit at room temperature.
③ – Free fit at room temperature.

OIL PAN REMOVAL

Raise front of car on hoist or on jack stands. Drain oil, loosen attaching screws and remove pan. Clean pan thoroughly and use new gasket for installation.

PISTON PIN REPLACEMENT

1) Remove circlip retaining piston pin in piston with circlip pliers. Scrape away carbon from outer ends of piston bosses. Warm assemblies, preferably in oil, and push out piston pins.

NOTE – Do not drive out tight fitting piston pins out of cold pistons.

2) Piston pin should be a finger push fit in piston and only just free in connecting rod bushing. It should be possible for connecting rod to just fall by its own weight when piston and connecting rod assembly is held horizontal.

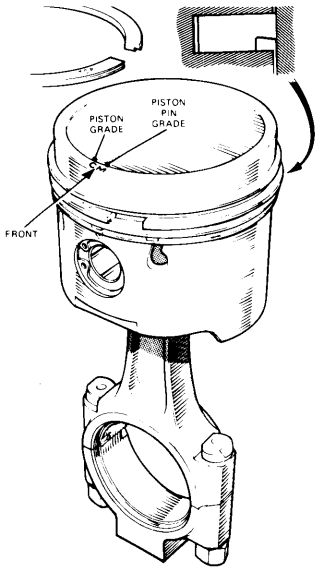
PISTON RING REPLACEMENT

Top Compression Ring – Ring is chromium plated, may be fitted either way up. It is Cargaph treated to aid seating. Dull grey faint red color must not be removed.

Second Compression Ring – Ring has a stepped periphery. Step must be fitted downward, widest face toward top of piston. Face is marked "TOP" to indicate proper fitting position.

Scraper Ring – Use care when fitting slotted type scraper ring as scraping edges are easily broken.

NOTE – When chromium rings must be replaced, it is necessary to remove glaze from cylinder bores by oil honing.



PISTON, ROD & PIN ASSEMBLY

1971-72 PLYMOUTH CRICKET 4 CYLINDER (Cont.)

PISTON & ROD INSTALLATION

1) Check that pistons and connecting rods are assembled correctly with grade identification numbers toward the front. Make sure that the .06" offset piston pin comes to right hand (thrust) side.

2) Insert connecting rods and pistons into cylinder bores from above. A suitable piston ring compressor (Tool C-385) should be used to facilitate insertion of pistons and to prevent piston ring breakage.

3) Tighten nuts to specifications. Self-locking nuts must not be used again if they can be screwed on with fingers.

CYLINDER LINERS

Cylinder liners are available and can be installed to rebuild damaged or worn cylinder bores that cannot be rebored to take the .030" oversize pistons. Liners should be installed in all cylinders and not singly as this could distort the adjacent cylinder bore.

1) Remove engine from chassis and disassemble. Measure external diameter of liners. Measure diameter of bores below piston ring travel.

2) Bore out cylinders to suit liners, allowing for interference fit of .002-.004". It is important that these figures are strictly adhered to.

3) DO NOT attempt finish boring until all liners have been installed. Lubricate outside of each liner and press in liners flush with top cylinder block. Liners have a "lead-in" at their lower ends.

4) When all liners have been pressed into position they should be bored and honed to give pistons correct clearance.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

	MAIN BEARINGS				CONNECTING ROD BEARINGS		
Engine	Journal Diam.	Clearance	Thrust Bearing	Crankshaft Endplay	Journal Diam.	Clearance	Sideplay
1971-72	2.1245-2.1252"	.0005-.0025"	No. 5	.002-.008"	1.9995-2.000"	.0009-.0024"	.007-.012"

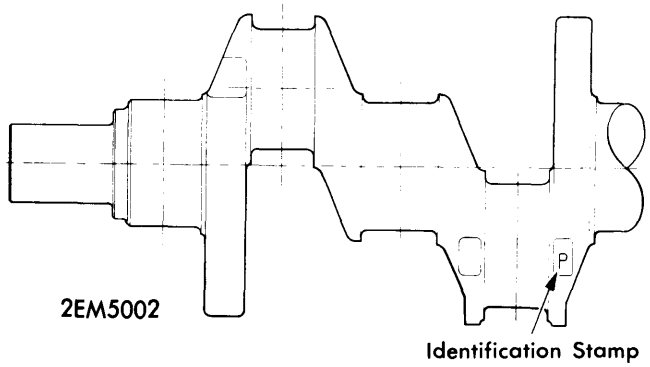
MAIN BEARINGS

All bearings are interchangeable except for number 3 bearing which has no oil grooves. Bearings are available in standard and undersize to a maximum .040" undersize. After main bearings have been installed and cap bolts torqued, check endplay of crankshaft at thrust bearing (No. 5).

CRANKSHAFT IDENTIFICATION

Crankshafts installed in new engines have markings to identify journal sizes. Markings are as follows:

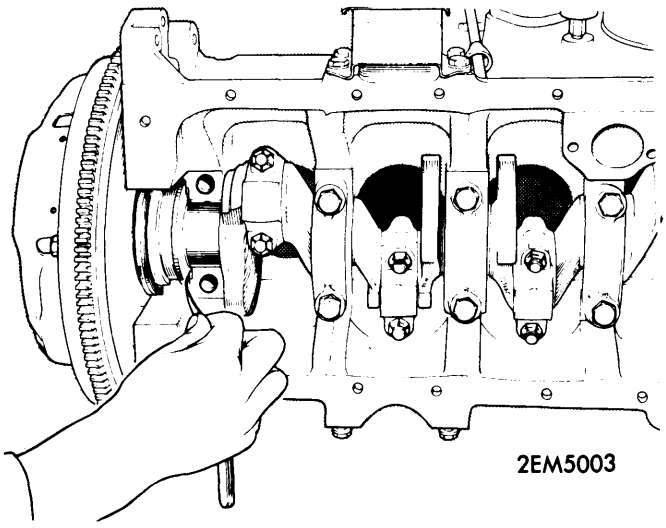
Crankshaft Marking	Rod Journal	Main Bearing Journal
Unmarked	Standard	Standard
M	Standard	-.010"
P	-.010"	Standard
PM	-.010"	-.010"



CRANKSHAFT JOURNAL IDENTIFICATION

CRANKSHAFT ENDPLAY

Endplay is taken at each side of upper half of rear main bearing by two semi-circular steel washers having copper lead bearing thrust faces. Washers are fitted with bearing faces towards crankshaft thrust faces and may be removed by pushing them around crankshaft rear journal after taking off the rear main bearing cap. Oversize .005" thrust washers are available for use with crankshafts which have had thrust faces reground at each side of rear main bearing journal.



MEASURING CRANKSHAFT ENDPLAY

1971-72 PLYMOUTH CRICKET 4 CYLINDER (Cont.)

REAR MAIN OIL SEAL REPLACEMENT

1) Disconnect battery, disconnect exhaust pipe from exhaust manifold flange, disconnect engine ground straps. Disconnect throttle operating shaft by removing small retaining clip at carburetor end.

2) Remove starter, transmission, clutch or converter housing and converter. Remove flywheel, converter plate and oil pan. Remove rear main bearing cap.

3) Remove seal by hand only. Do not use metal tools. Inspect journal for damage. If journal is damaged, replace crankshaft.

4) Check to make sure that surfaces are clean and free from burrs and then fit new side seals. Coat with sealer.

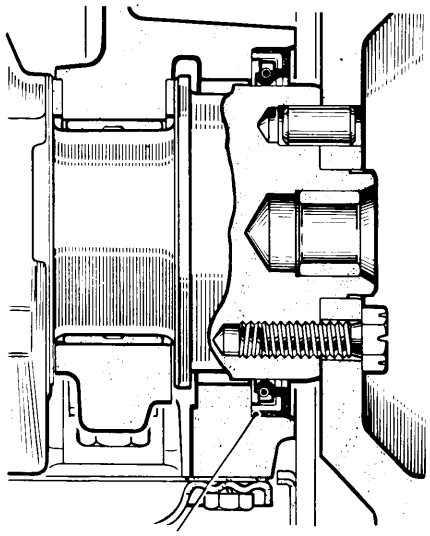
5) If necessary blunt sharp edges at bottom of rear main bearing location so that side seals are not cut when rear main bearing cap is installed.

6) Install rear main bearing cap, tighten the two bolts and then loosen them half a turn. Lubricate with multi-purpose lubricant. DO NOT grease outside of the seal or seal recesses.

7) Place seal in position with contracting spring toward front of engine. Keeping parallel with crankshaft flywheel face, carefully press seal into position with finger pressure.

8) Tighten rear main bearing bolts enough to bring bearing face onto cylinder block face. Check distance of oil seal face at four equally spaced points, starting from highest point. Measurements should be equal. If not equal, seal is not seated correctly.

9) Tighten rear main bearing cap bolts to specifications and reassemble engine.



2EM5013

Crankshaft Rear Oil Seal

REAR MAIN OIL SEAL

TIMING COVER REMOVAL

1) Drain radiator and cylinder block, disconnect battery, remove alternator, remove fan blades and fan belt. Remove radiator, remove crankshaft pulley retainer bolt and crankshaft pulley.

2) Remove water pump and jack up rear of car so that water in cylinder block drains forward out of water pump recess. Lower car onto floor and wipe cylinder block jacket dry before removing timing case.

3) Remove four oil pan screws below front of timing case, and loosen enough oil pan screws to allow front end of oil pan to come just clear of timing case lower face.

4) Remove timing case bolts, placing bolts through holes in piece of cardboard to mark their correct positions. Remove timing case.

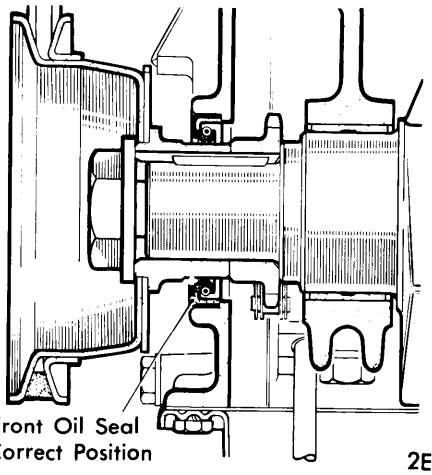
5) To install, reverse removal procedure, checking for any damage to gaskets or sealing surfaces. If oil pan gasket is damaged, it is necessary to pull oil pan and replace gasket.

TIMING COVER OIL SEAL REPLACEMENT

1) Oil seal can be driven out from inside timing case while case is supported as close as possible to seal bore on outside of case.

2) New seal should be pressed into timing case while case is supported on inside face below seal recess, by using a thick flat steel plate between arbor press and seal. Contracting spring side of seal should be to inside of timing case.

3) Apply multi-purpose lubricant to seal lip before refitting timing case. If oil was leaking from removed seal, check crankshaft pulley diameter that runs inside seal. This must be polished and free from scratches and burrs. Install new pulley if old one is damaged.



Front Oil Seal
Correct Position

2EM5004

TIMING COVER OIL SEAL POSITION

1971-72 PLYMOUTH CRICKET 4 CYLINDER (Cont.)

CAMSHAFT			
Engine	Journal Diam.	Clearance	Lobe Lift
1971-72			
#1	1.9345-1.9352"	.0013-.0030"	.....
#2	1.7470-1.7477"	.0013-.0030"	.....
#3	1.5595-1.5602"	.0013-.0030"	.....

CAMSHAFT REPLACEMENT

Camshaft may be removed and replaced with engine in place. It is necessary to first remove oil pan and oil pump.

Removal – 1) Drain radiator and cylinder block. Disconnect battery, remove front grille, disconnect throttle and choke cable, temperature element, distributor and alternator leads. Disconnect vacuum advance hose at carburetor end.

2) Disconnect top and bottom water hoses and heater hoses at engine ends, and remove radiator, fan blades and fan pulley. Disconnect exhaust pipe at exhaust manifold flange and remove rocker cover, rocker shaft, push rods and cylinder head.

3) Drain oil, remove alternator. Turn engine so No. 4 Cylinder is on TDC of firing stroke and remove distributor. Note position of oil pump distributor drive slots and remove oil pan and oil pump.

4) Remove engine mounting nuts inside front suspension crossmember. Remove timing cover, disconnect fuel lines from fuel pump and remove fuel pump.

5) Remove camshaft sprocket bolt and washer and remove timing chain tensioner. Pull camshaft sprocket from camshaft using suitable puller. Remove timing sprocket and chain.

6) Remove camshaft thrust washer and tappets. Place a block under front of cylinder block and use a jack to raise front of engine high enough to allow camshaft to be withdrawn through grille opening. Removal of camshaft is easier if a long stud is screwed into camshaft sprocket bolt thread.

Installation – 1) Oil camshaft journals and cams and carefully install camshaft until its thrust face is flush with cylinder block face against which thrust plate is bolted.

2) Install camshaft thrust plate. The endfloat of camshaft should now be checked. Endplay should not exceed .004-.009".

3) Complete installation by installing remaining items that have been removed.

CAMSHAFT BEARING REPLACEMENT

1) Remove engine, clutch, flywheel, cylinder head, tappets, timing sprockets, oil pan, oil pump and camshaft. Use a long drift to drive out rear camshaft bearing end cup.

2) Install proper size adapters and horseshoe washers, using suitable tool (No. C-3132A) at back of each bearing shell and drive out all bearing shells.

3) Each camshaft bearing has one or more oil holes. These holes must line up with oil feed drilling holes in camshaft bearing bores. All bearings are installed with their small "V" notch towards front end of cylinder block.

4) Install new bearings with suitable tool (C-3132A) by sliding bearing shell over proper adapter. Position center bearing in tool and install horseshoe lock and drive bearing shell into place.

5) Remove tool, check that oil feed holes match up, and that oil feed cross groove points to center of tappets next to center bearing.

6) Install remaining shell in the same way. Install front bearing so that two oil holes line up with two holes in bearing bore. Install rear bearing to the single oil hole in bearing bore. After bearings have been installed, a new oil seal cup should be driven into recess at rear end of rear camshaft bearing.

TAPPET REMOVAL

1) Remove rocker cover, rocker shaft assembly and push rods. Remove cylinder head. Lift out tappets. They should be numbered so they can be replaced in original positions.

2) Check tappet faces for pitting and wear. Replace if damaged or worn. To install, reverse removal procedure.

TIMING SPROCKET & CHAIN REPLACEMENT

1) Remove timing cover, turn crankshaft to bring timing marks together. Remove timing chain automatic adjuster and remove retainer bolt and plain washer from front end of camshaft.

2) Pull camshaft sprocket off with suitable puller and remove both sprockets and chain together. Crankshaft sprocket is not a tight fit.

3) When installing, turn No. 1 & No. 4 pistons to TDC so that key is to top of crankshaft and camshaft dowel is in position shown in illustration. Push crankshaft sprocket onto crankshaft far enough to allow timing chain to be fitted.

4) Place chain on crankshaft and camshaft sprockets so that dots on sprockets are in line while chain is in tension on driving side. Pull camshaft sprocket into position with attaching bolt and washer and push crankshaft sprocket against shoulder on crankshaft.

NOTE – DO NOT drive camshaft sprocket onto camshaft, this can damage camshaft thrust plate.

5) Tighten camshaft sprocket attaching bolt to specifications and install chain tensioner, timing cover and crankshaft pulley.

VALVE TIMING				
	INTAKE		EXHAUST	
Engine	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
1971-72 1x1-Bbl.	35°	69°	69°	23°
1972 2x1-Bbl.	44°	78°	69°	23°

1971-72 PLYMOUTH CRICKET 4 CYLINDER (Cont.)

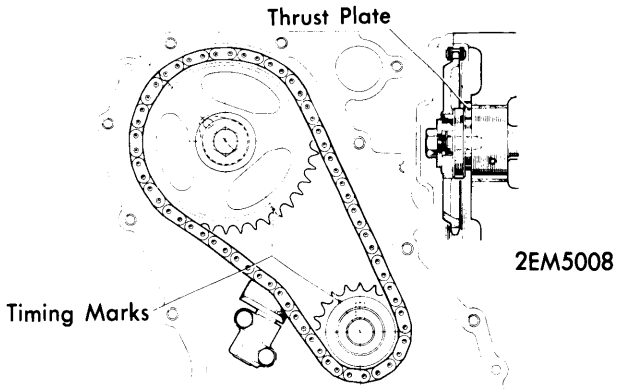
VALVE TIMING

1) Remove rocker cover and adjust No. 1 cylinder exhaust valve rocker clearance to .010" when cylinder is at TDC of firing stroke.

2) Turn engine until pointer on crankshaft pulley gives a position of about 60° BTDC. Continue turning engine slowly until No. 1 cylinder exhaust valve push rod becomes just free to turn. This occurs directly as the valve seats.

3) Mark on crankshaft should then be 22° BTDC (Single Carburetor) or 12° BTDC (Dual Carburetor). If valve timing is one tooth off, mark on crankshaft pulley will be 18° (3 1/2 spacing marks) before or after correct position.

4) Readjust No. 1 cylinder exhaust valve to its normal clearance.



TIMING MARKS ALIGNMENT

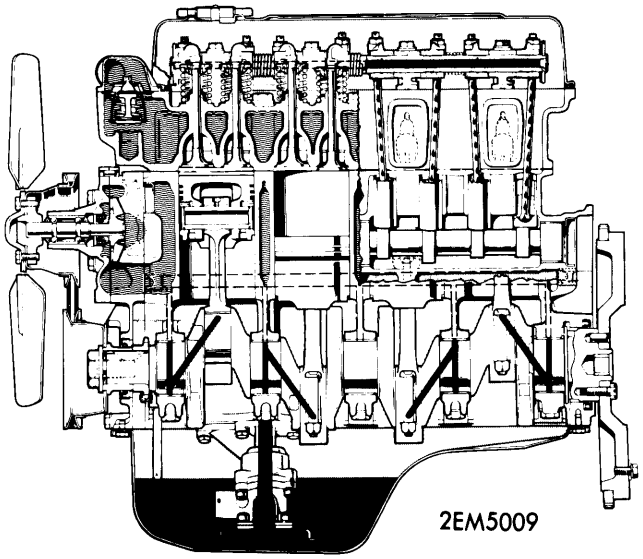
ENGINE OILING

Crankcase Capacity – 7 1/4 pts., 8 1/2 pts. with filter change.

Oil Pressure – 50-60 psi

ENGINE OILING SYSTEM

Force feed type using rotor type pump and full-flow oil filter. Lubrication of engine parts is accomplished by pressure supply of oil from submerged oil pump, mounted in right side of crankcase. Pump is driven through skew gears from camshaft. Oil drawn through the screen is pumped through oil pump and passes to main gallery. From oil gallery the oil is distributed into the oilways, drilled in main bearing support webs of cylinder block. Oil is delivered to all main and camshaft bearings, timing gear and chain, and rocker and valve assembly.



ENGINE OILING SYSTEM

OIL PUMP REPLACEMENT

1) Remove distributor cap and turn engine until distributor rotor is pointing to No. 4 cylinder firing position and crankshaft pulley TDC pointer lines up with timing cover TDC line.

2) Remove distributor and oil pan. Remove three attaching bolts at oil pump mounting flange and remove pump.

3) When installing pump, reverse removal procedure, checking that engine is still at No. 4 cylinder TDC firing position, and that oil pump driven gear meshes correctly with helical driving gear on camshaft.

OIL PUMP DISASSEMBLY

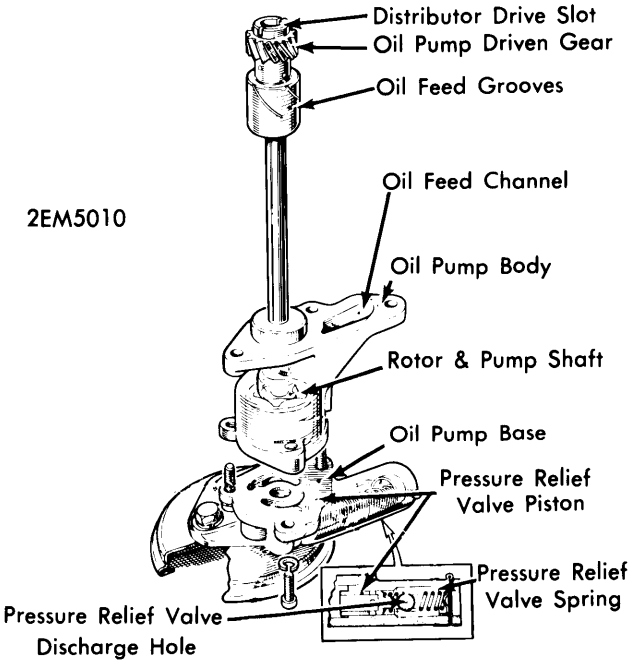
1) Invert pump and remove three screws attaching base plate to pump body. Lift out outer rotor ring taking care not to drop it and note that chamfered end comes toward drive gear end of pump.

2) Remove all traces of oil from inside of pump body and both rotors. Replace outer rotor with chamfered end towards gear end of pump.

3) End clearance between inner and outer rotor ring and pump body should be .001-.003" when measured with a feeler gauge and a straight edge.

4) Side clearance between top of lobes on inner and outer rotor should be .001-.006".

5) Clearance between outside of outer rotor and pump body must not be greater than .008" and not less than .005".



OIL PUMP

1971-72 PLYMOUTH CRICKET 4 CYLINDER (Cont.)

ENGINE COOLING

Cooling System Capacity – 15 1/2 pts. including heater.

Thermostat – 180°F, by-pass port closed at 203°F.

WATER PUMP REPLACEMENT

1) Drain radiator and cylinder block and loosen alternator, mountings, and remove fan belt.

2) Remove fan assembly and fan pulley. Remove five bolts holding pump to timing case, noting position of the two longer lower bolts.

3) Lift pump out of timing case. Pump is located by two dowels and may be tight on the dowels. To install, reverse removal procedure using new gasket.

Application	Torque (Ft. Lbs.)
Camshaft Plate	9
Camshaft Sprocket Bolt	34
Connecting Rod Nuts	29
Chain Cover Link Bolt	9
Bolts	13
Crankshaft Pulley Bolt	50
Cylinder Head Bolts & Nuts	56
Cylinder Head Studs in Cylinder Block	14
Engine Mounts	17
Flywheel-to-Crankshaft Bolts	40
Intake & Exhaust Manifold Bolts & Nuts	16
Intake & Exhaust Manifold Studs in Cylinder Head	10
Main Bearing Cap Bolts	55
Spark Plugs	12
Valve Rocker Mounting Bolts	17