

1965-73 TOYOTA (M, 2M & 4M ENGINES) 6 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
1965-67 M	121.5	1988	1x2-Bbl.	110@5200	118@3600	8.8:1	2.95	75	2.87	75
1968-71 2M	137.5	2253	1x2-Bbl.	115@5200	127@3600	8.8:1	2.95	75	3.35	85
1972-73 4M	156.4	2563	1x2-Bbl.	122@5200	141@3600	8.5:1	3.15	80	3.35	85

ENGINE IDENTIFICATION

Engine number is stamped on right front of block on 1965-71 models and on left side of block below oil filter on 1972-73 models. Engine number is preceded by engine code.

Engine Codes

Application	Code
1965-67 Crown (1988 cc).....	M
1968-71 Crown (2253 cc).....	2M
1972 Crown (2563 cc).....	4M
1973 Corona Mark II (2563 cc).....	4M

► CHANGES, CAUTIONS, CORRECTIONS

See "Engine Notes" at end of article.

ENGINE REMOVAL

NOTE — Engine and transmission should be removed as assembly using engine hoist.

1) Remove hood and disconnect battery. Drain cooling system and remove radiator hoses, radiator and shroud (if equipped). Disconnect oil pressure sending unit wire lead, alternator wiring, distributor primary wiring and coil secondary wiring.

2) Disconnect heater hoses and oil cooler flex lines. Disconnect automatic transmission cooler lines (if equipped). Disconnect brake booster vacuum lines (if equipped). Remove air cleaner and disconnect starter wiring, water temperature sending unit wire lead, and fuel line.

3) Disconnect power steering lines (if equipped). Disconnect vacuum line, heater control cable and accelerator connecting rod. Disconnect clutch flex line from master cylinder tube (if equipped with manual transmission) and plug line from master cylinder. Disconnect pressure feed hose from steering gear housing (if equipped with power steering).

4) Raise front and rear of car with jack and support with stands. On 1965-71 models, remove right front engine mounting insulator bolts from frame.

5) Disconnect exhaust pipe and remove pipe supports. Disconnect speedometer drive cable and back-up light wiring, if equipped.

6) On manual transmission cars with column shift, remove low speed connecting rod, cross shaft, and gear shift rod. On automatic transmission cars with column shift, remove control rod and cross shaft and remove throttle link connecting first rod and second rod.

7) On manual transmission cars with floor shift, remove console box and gear shift lever. On automatic transmission cars with floor shift, remove connecting rod swivel nut and disconnect control rod from shift lever. Remove propeller shaft and install a suitable plug in rear of transmission to prevent fluid loss.

8) Remove rear engine undercover (if equipped) and remove engine mount front insulators. Remove engine mount rear insulator and rear support member while supporting transmission with jack.

9) Lower jack supporting transmission and remove stands. Using suitable engine hoist, remove engine and transmission assembly from vehicle. To install, reverse removal procedure.

INTAKE MANIFOLD

Removal — 1) Disconnect battery and drain coolant. Remove air cleaner and distributor cap. Remove radiator inlet hose and heater hoses. Disconnect temperature gauge sending wire and fuel line.

2) Disconnect vacuum hoses at carburetor and manifold, and remove accelerator connecting rod. Remove automatic choke stove inlet hose and outlet pipe. Remove water by-pass hose under manifolds, and remove manifold with carburetor attached.

Installation — Thoroughly clean all gasket surfaces and install new gaskets. Install manifold assembly and gradually tighten bolts working from center out. Install remaining components in reverse of removal procedure.

CYLINDER HEAD

Removal — 1) Remove intake and exhaust manifolds and remove water by-pass pipe. Remove cylinder head cover and place shop towel over camshaft timing gear to prevent bolt or washer from dropping into timing chain cover.

2) Remove attaching bolts and oil union between number one camshaft bearing cap and number one rocker arm assembly support. Loosen rocker shaft attaching bolts in sequence taking two or three steps and remove rocker arm assembly. See *Rocker Arm Assembly*.

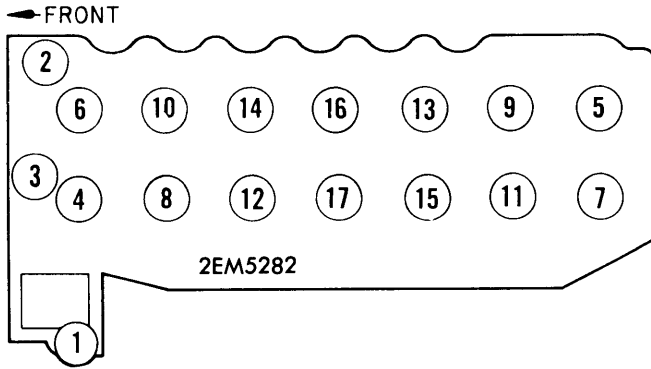
3) Remove timing chain tensioner, camshaft timing gear and camshaft. See *Camshaft Removal*. Loosen cylinder head bolts in two or three steps in sequence shown and remove cylinder head.

Toyota Engines

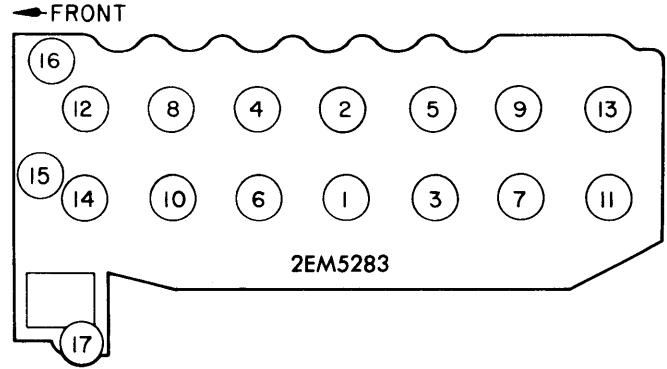
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CAUTION — Dowel pins are installed at front and rear of cylinder block. Do not slide cylinder head on block as locating dowels may cause damage to gasket surface.

Installation — Install cylinder head and new gasket and tighten cylinder head bolts in sequence taking two or three steps. Reverse removal procedure for remaining components. See Camshaft Installation.



CYLINDER HEAD LOOSENING SEQUENCE

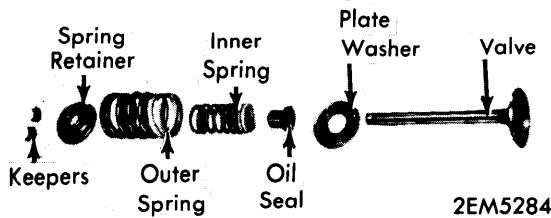


CYLINDER HEAD TIGHTENING SEQUENCE

VALVES								
Engine & Valve	Head Diam. In. (mm)	Face Angle	Seat Angle	Seat Width In. (mm)	Stem Diameter In. (mm)	Stem Clearance In. (mm)	Valve Lift In. (mm)	
1965-67 M	Int.	1.575 (40)	45°	45°	.055 (1.4)	.3140-.3143 (7.975-7.985)	.001-.002 (.02-.05)	.....
	Exh.	1.379 (34)	45°	45°	.055 (1.4)	.310-.3140 (7.960-7.975)	.001-.002 (.02-.05)	.....
1968-71 2M	Int.	1.575 (40)	45°	45°	.055 (1.4)	.3537-.3541 (8.985-8.995)	.002 (.06)	.....
	Exh.	1.339 (34)	45°	45°	.055 (1.4)	.3138-.3144 (7.970-7.985)	.003 (.07)	.....
1972-73 4M	Int.	1.575 (40)	45°	45°	.055 (1.4)	.3144-.3148 (7.985-7.995)	.006-.0018 (.015-.045)	.....
	Exh.	1.339 (34)	45°	45°	.055 (1.4)	.3138-.3144 (7.970-7.985)	.0010-.0024 (.025-.060)	.....

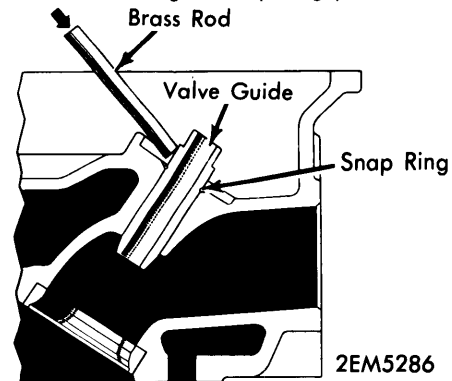
VALVE ARRANGEMENT

Left side are all intake. Right side are all exhaust.



VALVE COMPONENTS

2) To replace valve guide bushing, heat cylinder head to 176-212°F and position brass rod above guide bushing snap ring. Strike to break off bushing at snap ring portion.



BREAKING OFF VALVE GUIDE

VALVE GUIDE SERVICING

1) Measure clearance between valve stem and guide bushing. If clearance exceeds .002" (intake) or .003" (exhaust), replace bushing.

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NOTE — If tool 09201-60010 is used instead of the proper Tool 09201-41010, bushing will be damaged. It is important, therefore, to use correct tool.

4) Ream bushing to achieve clearance on intake valves of .0006-.0018". Exhaust valve stem clearance should be .0010-.0024". Guide bore finished measurements should be .315-.316".

VALVE STEM OIL SEALS

1) Install valve and plate washer, and install oil seal on valve guide by pressing with hands. Make sure there is a clearance of .0008-.020" between plate washer and oil seal. Use longer oil seal for intake valve and shorter seal for exhaust valve.

2) Install compression springs, valve spring retainer and install spring retainer locks using suitable spring compressor. Place valve springs in position with closed coil ends toward cylinder head.

VALVE SPRINGS			
Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
1965-71 M & 2M	Int. Inner	11.9@1.535 (5.4@39)	.....
	Int. Outer	67.8@1.654 (30.8@42)	.....
	Exh. Inner	11.4@1.543 (5.2@39.2)	.....
	Int. Outer	66.5@1.661 (30.2@42.2)	.....
1972-73 4M	Int. Inner	25.7@1.504 (11.7@38.2)	.....
	Int. Outer	63.1@1.642 (28.7@41.7)	.....
	Exh. Inner	24.6@1.520 (11.2@38.6)	.....
	Exh. Outer	59.4@1.657 (27.0@42.1)	.....

VALVE SPRINGS

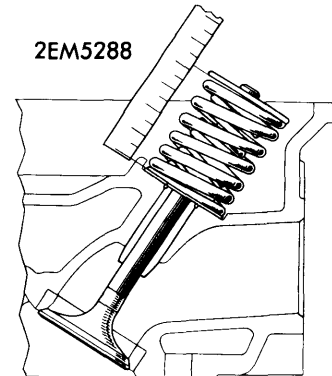
Removal — 1) With cylinder head removed, mark or identify valves to ensure that they are installed in original position. Using a suitable valve spring compressor, compress valve spring and remove valve keepers. Release valve spring compressor and remove retainer, spring and valve stem oil seal and plate washer.

2) Check valve spring squareness with a steel square. If outer springs are out of square more than .075" (1.9 mm) or inner spring is out of square more than .063" (1.6 mm), springs must be replaced. Check springs in a suitable spring tester. If spring tension is less than specified when spring is compressed to specified length, springs must be replaced.

Installation — To install valve springs, reverse removal procedure. Install new valve stem oil seals, making sure there is approximately .008-.020" (.2-.5 mm) clearance between seal and plate washer. Long seal is installed on intake valve and short seal is installed on exhaust valve.

VALVE SPRING INSTALLED HEIGHT

Check installed heights of valve springs and make sure both intake and exhaust have length of 1.504" for inner springs and 1.642" for outer springs.



VALVE SPRING INSTALLED HEIGHT

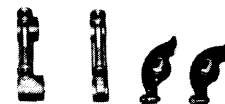
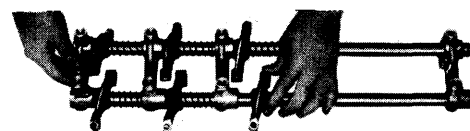
ROCKER ARM ASSEMBLY

1) To disassemble rocker arm assembly, remove two retaining screws and one spring retainer. **NOTE** — Mark all parts in order for correct reassembly. Remove supports, rocker arms, and tension springs from rocker shafts.

2) Inspect clearance between rocker shaft and rocker arm bushings. If clearance exceeds .004" (.10 mm), replace rocker arms or shaft. Inspect contacting surface of rocker arm with cam and replace rocker arm if worn excessively.

3) Rocker shafts have screw holes for retaining screws. Screw hole must face front. A retainer spring installing groove is provided on rocker shaft for exhaust. Rocker arms are marked "S" for intake and "E" for exhaust. Marks must face front.

4) Assemble rocker arm assembly in reverse of removal and install on cylinder head. Tighten bolts gradually in sequence shown, taking three or four steps. Install oil union between number one rocker shaft support and number one camshaft bearing cap.



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ROCKER ARM ASSEMBLY

VALVE CLEARANCE ADJUSTMENT

1) With No. 1 piston at TDC of compression stroke, adjust intake valves 1, 2, and 4 and exhaust valves 1, 3, and 5 to specified clearance.

2) Rotate crankshaft one complete revolution and align crankshaft damper V groove with timing chain cover "O" mark. Adjust intake valves 3,5, and 6 and exhaust valves 2,4, and 6 to specified clearance.

Valve Clearance Specifications

Application	Hot	Cold
Intake007" (.18 mm)	.006" (.15 mm)
Exhaust010" (.25 mm)	.008" (.20 mm)

Toyota Engines

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PISTONS, PINS, RINGS						
Engine	PISTONS		PINS		RINGS	
	Clearance In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Rings	End Gap In. (mm)	Side Clearance In. (mm)
1965-67 M	.0012-.0020 (.03-.05)	①	.0002-.0004 (.005-.011)	1	.0059-.0140 (.15-.35)	.0012-.0027 (.03-.07)
				2	.0059-.0140 (.15-.35)	.0008-.0024 (.02-.06)
				3	.0059-.0140 (.15-.35)	.0008-.0026 (.02-.065)
1968-71 2M	.001-.002 (.03-.05)	①	.0002-.0004 (.005-.011)	1	.006-.014 (.15-.35)	.0012-.0028 (.03-.07)
				2	.006-.014 (.15-.35)	.0008-.0024 (.02-.06)
				3	.008-.020 (.20-.50)	Zero Zero
1972-73 4M	② .002-.003 (.05-.07)	①	.0002-.0004 (.005-.011)	1	.006-.014 (.15-.35)	.0012-.0028 (.03-.07)
	③ .001-.002 (.03-.05)			2	.006-.014 (.15-.35)	.0008-.0024 (.02-.06)
				3	.008-.020 (.20-.50)	Zero Zero

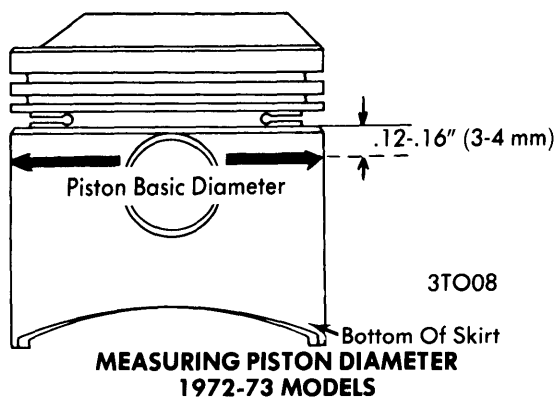
- ① — Pin should push through with light thumb pressure with piston at 122-144°F (50-60°C).
 ② — Measure directly below oil groove.
 ③ — Measured at bottom of skirt.

OIL PAN REMOVAL

- 1) Raise front and rear of car with jack and support car on stands. Drain engine oil. Disconnect steering relay rod from idler arm and pitman arm using tie rod end puller (Tool 09611-20013).
- 2) Remove exhaust pipe support bracket, flywheel housing undercover, engine rear undercover (left side) and remove oil pan. To install, reverse removal procedure.

FITTING PISTONS

- 1) With pistons and rod assemblies removed and cylinders clean of all oil and carbon, measure cylinder for wear, taper or out-of-round. If cylinders are worn more than .008" (.2 mm) or are tapered or out-of-round more than .0008" (.02 mm), cylinder block must be rebored for oversize pistons. Pistons are available .010" (.25 mm), .020" (.50 mm), .030" (.75 mm) and .040" (1.0 mm).

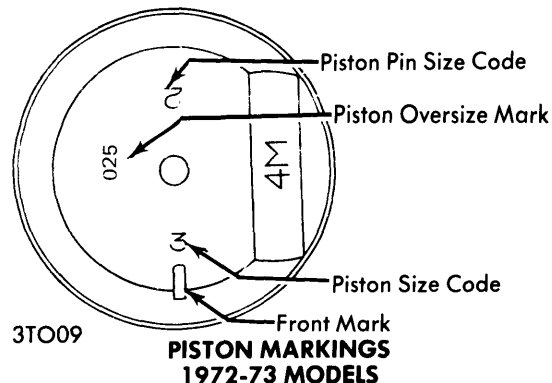


- 2) Measure piston diameter at right angles to piston pin and with piston pin removed. On 1965-71 engines, measure piston

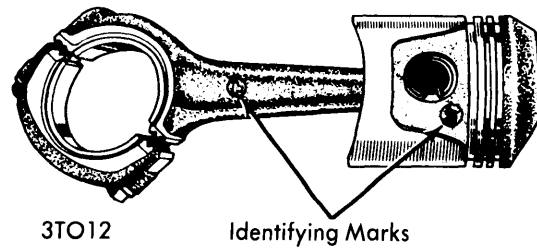
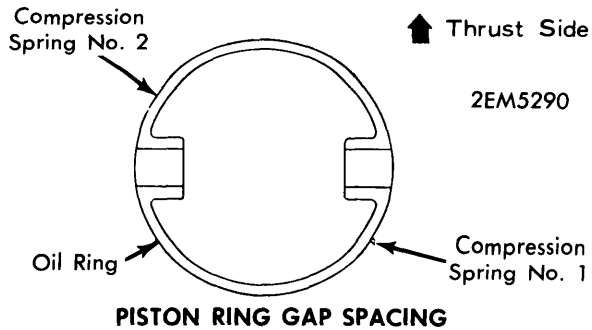
with micrometer positioned .30-.35" (8-9 mm) from bottom of piston skirt. On 1972-73 engines, measure piston with micrometer positioned .12-.15" (3-4 mm) from bottom of oil ring groove and at bottom of piston skirt. Piston should be slightly larger at bottom. If piston-to-cylinder clearance is excessive, cylinder block must be rebored and oversize pistons installed.

- 3) On 1972-73 engines, standard pistons are manufactured in five different grade classifications. Grade code is stamped in top of piston. Grade code starts at number zero and goes through number four. Each graduation in number indicates an increase of .0004" (.010 mm) in piston diameter. Also stamped in top of piston is oversize indication (if piston is not standard) and piston pin grade size code.

- 4) Check piston ring end gap in cylinder bore. Position ring at bottom of piston travel in cylinder bore and measure gap with a feeler gauge. If gap exceeds specifications, rings must be replaced. Check ring side clearance in ring groove of piston using a feeler gauge. If clearance is checked with new rings and clearance exceeds specifications, pistons must be replaced.



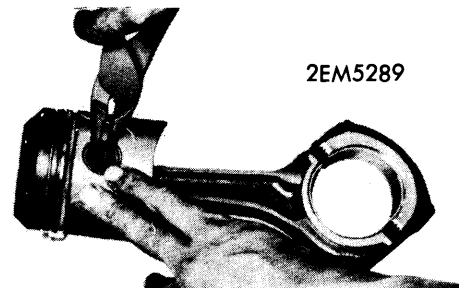
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PISTON PINS

Removal — Remove circlips, heat piston to 122-140°F (50-60°C) and push piston pin out of piston and connecting rod. Piston pin should push through connecting rod with slight thumb pressure with rod at room temperature. If fit is excessively loose, pin bushing in rod must be replaced and new bushing honed to correct clearance for piston pin. Pin should push through piston with slight thumb pressure with piston at room temperature. Replace both piston and pin if clearance is excessive.

Installation — Install one circlip in piston and heat piston to 122-140°F (50-60°C). Position piston on rod so that identifying mark on side of rod and on side of piston are facing in same direction. Lubricate and install piston pin. Install remaining circlip. Position circlips with open end down.



CRANKSHAFT MAIN & CONNECTING ROD BEARINGS							
MAIN BEARINGS				CONNECTING ROD BEARINGS			
Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Thrust Bearing	Crankshaft End Play In. (mm)	Journal Diam. In. (mm)	Clearance In. (mm)	Side Play In. (mm)
1965-67 M	2.3616-2.3622 (59.98-60.00)	.001-.003 (.02-.07)	Center	.002-.010 (.05-.25)	2.0466-2.0472 (51.98-52.00)	.001-.003 (.02-.07)	.0043-.0097 (.11-.25)
1968-71 2M	2.3616-2.3622 (59.98-60.00)	.0007-.0017 (.018-.042)	Center	.002-.010 (.05-.25)	2.0463-2.0472 (51.98-52.00)	.0006-.0020 (.015-.049)	.004-.010 (.11-.25)
1972-73 4M	2.3617-2.3672 (59.98-60.00)	.0012-.0021 (.030-.054)	Center	.002-.010 (.05-.25)	2.0463-2.0472 (51.98-52.00)	.0008-.0021 (.021-.053)	.006-.012 (.16-.30)

MAIN & CONNECTING ROD BEARINGS

1) With crankshaft removed, check runout with a dial indicator at number four journal. If runout exceeds .001" (.03 mm), crankshaft must be replaced. Check journals for taper or out-of-round. If journals taper or are out-of-round more than .0004" (.01 mm), crankshaft must be ground and undersize bearings installed.

2) Bearings are available in .010" (.25 mm), .020" (.50 mm), .030 (.75 mm) and .040" (1.0 mm) undersize. Check both main and connecting rod bearing clearances using the Plastigage method. If clearance exceeds specifications, crankshaft must be ground for undersize bearings. Check connecting rod side clearance using a feeler gauge. If clearance exceeds .012" (.3 mm), connecting rod must be replaced.

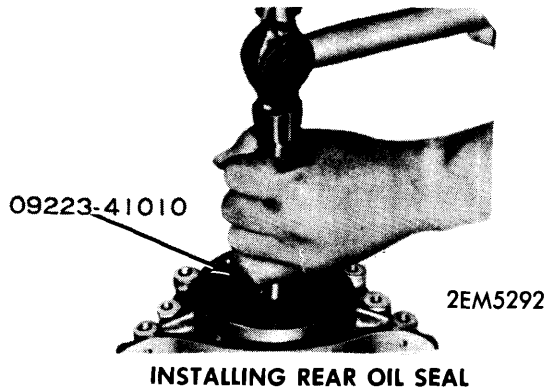
THRUST BEARING ALIGNMENT

Measure crankshaft endplay at center main bearing using a feeler gauge. If endplay exceeds .012" (.3 mm), thrust washers must be replaced with oversize thrust washers to obtain specified endplay. Standard thrust washer thickness is .1152-.1171" (2.93-2.98 mm). First oversize is .1177-.1197" (2.99-3.04 mm) thick and second oversize is .1201-.1220" (3.05-3.10 mm). When installing thrust washer, position grooved side of thrust washer toward thrust surface of crankshaft.

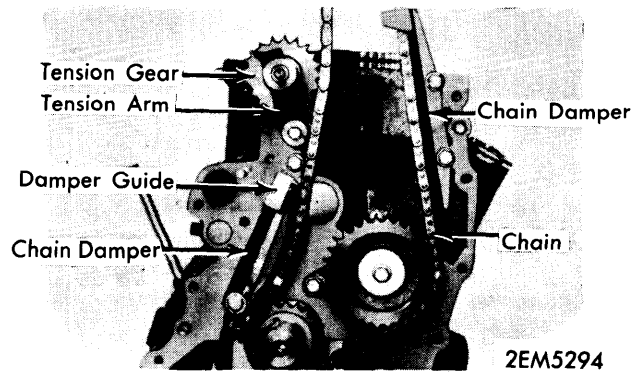
REAR MAIN OIL SEAL

Inspect oil seal lip and replace if worn or damaged. Pry old seal out without damaging cover or retainer. Install seal using suitable oil seal replacer (Tool 09223-41010). After installing, lightly apply multipurpose lubricant to lip of seal.

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INSTALLING REAR OIL SEAL



REMOVING TIMING CHAIN

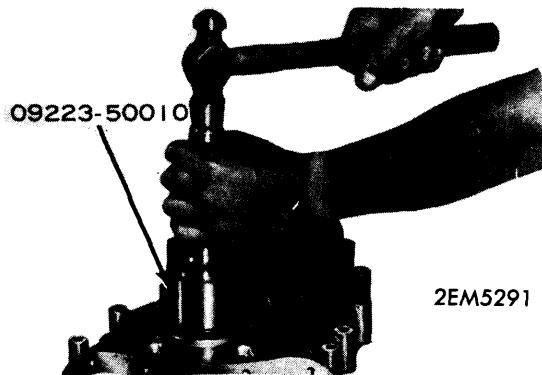
Installation - 1) Rotate crankshaft so that "O" mark on crankshaft sprocket is facing toward oil pan (see illustration). Now align oil pump drive sprocket mark with crankshaft sprocket mark (see illustration). Install tension sprocket assembly positioning straight pin 1.5" (38 mm) from cylinder block surface.

ENGINE FRONT COVER

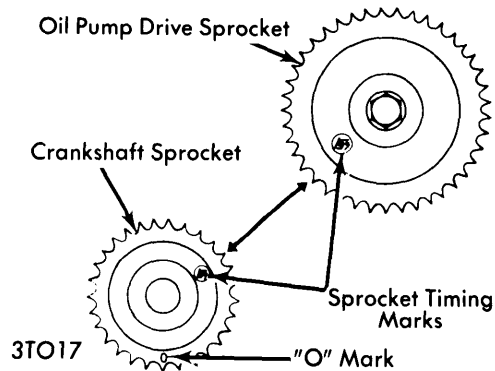
Remove crankshaft damper attaching bolt and remove damper using suitable puller, (Tool 09213-41010). Remove oil pan and remove front cover bolts and front cover.

ENGINE FRONT COVER OIL SEAL

Inspect oil seal lip and replace if worn or damaged. Pry old seal out without damaging cover or retainer. Install seal using suitable oil seal replacer (Tool 09223-50010). After installing, lightly apply multipurpose lubricant to lip of seal.



FRONT COVER OIL SEAL



TIMING MARK ALIGNMENT

2) While pulling chain tight, position over sprockets, making sure chain is aligned with teeth on sprockets. Install chain vibration dampers and chain guide. Install crankshaft slinger and engine front cover. Pull up on chain to make sure it is still aligned with sprockets and tie chain tight against vibration damper.

3) Install cylinder head and camshaft. **CAUTION** - Care must be taken not to rotate crankshaft while installing components. Install camshaft sprocket making sure it is correctly positioned. See Valve Timing. Reverse removal procedure to install remaining components.

CRANKSHAFT TIMING GEAR REPLACEMENT

To remove crankshaft timing gear, remove timing chain and using suitable puller (Tool 09950-00010) pull gear from crankshaft. To install, use suitable installation tool (Oil Seal Replacer Tool 09214-41010) to drive gear onto crankshaft.

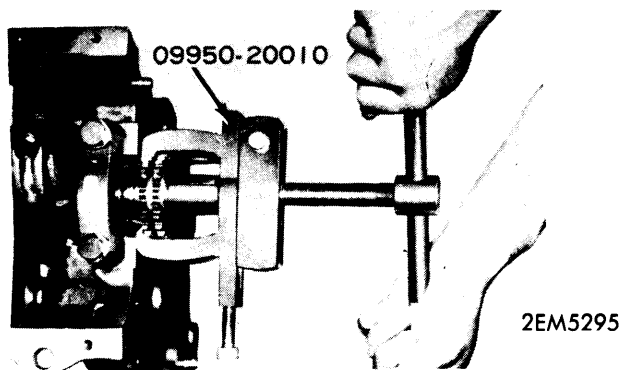
CAMSHAFT			
Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
1965-73 All	1.3371-1.3378 (34.98-35.00)	.0005-.0025 (.012-.064)	①

① - See Cam Lobe Lift.

TIMING CHAIN

Removal - Remove valve cover and rocker arm assembly. Remove timing chain tensioner. Straighten lock plate and remove camshaft timing gear bolt and gear. **NOTE** - Bolt is left-hand thread. Remove crankshaft pulley bolt and remove pulley and damper using a suitable puller (09213-41013). Remove camshaft, cylinder head, oil pan and front engine cover. Remove timing chain vibration dampers, damper guide, crankshaft oil slinger and timing chain.

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REMOVING CRANKSHAFT TIMING GEAR

CAMSHAFT

Removal — Remove valve cover and rocker arm assembly. Remove timing chain tensioner sprocket. Straighten lock plate and remove camshaft sprocket bolt. **NOTE** — Bolt is left-hand thread. Remove camshaft bearing caps and remove camshaft. Mark or identify bearings and caps to ensure that they are installed in original positions.

Installation — To install camshaft, reverse removal procedure, making sure caps and bearings are installed in original position. Bearing caps are numbered on top of casting and must be installed in order starting from front of engine. Make sure camshaft sprocket is correctly installed. See *Valve Timing*.

TIMING CHAIN TENSIONER ADJUSTMENT

NOTE — Some models are not equipped with an adjustable chain tensioner.

Turn crankshaft pulley clockwise slightly to stretch chain slightly. Loosen chain tensioner lock nut and tighten adjusting screw then back screw off two turns and tighten lock nut. Run engine for a short time. If chain is excessively noisy, back off adjusting screw 1/2 turn more.

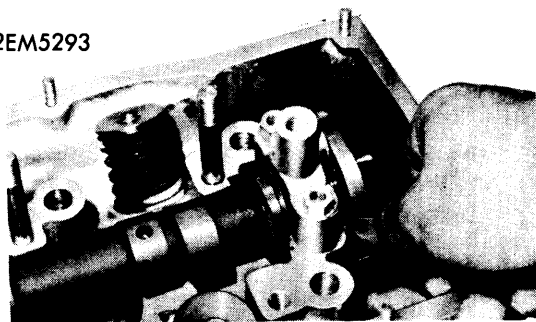
CAMSHAFT BEARINGS

Inspect bearings for wear or damage. Check that oil clearance does not exceed .004". When checking clearance use Plastigage method. Tighten bearing caps to 12-17 ft. lbs. Bearings are available in standard, .005", .010", and .020" undersizes.

CAMSHAFT END THRUST

To measure end thrust, use feeler gauge with camshaft installed on cylinder head. If end thrust exceeds .012", replace cam bearing No. 2. Specified end thrust should be .0022-.0061".

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CAMSHAFT END PLAY

CAM LOBE LIFT

Measure height of cam. If height is less than following specified limits, camshaft must be replaced.

Engine	Intake	Exhaust
M	1.549-1.553"	1.511-1.515"
2M	1.535"	1.496"
4M	1.587"	1.587"

VALVE TIMING				
Engine	INTAKE		EXHAUST	
	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
M&Early 2M	10°	54°	50°	14°
Late 2M	16°	48°	46°	8°
4M	18°	46°	52°	12°

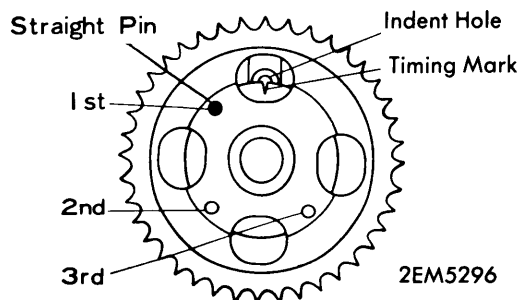
VALVE TIMING

1) With timing sprockets, timing chain, timing chain cover and crankshaft pulley installed, align "V" groove on crankshaft pulley with graduation on chain cover. Check to see if timing mark in camshaft flange is within indent hole in camshaft front bearing cap. Look through opening in camshaft sprocket.

2) If timing mark is off of mark to left, remove camshaft sprocket retaining bolt and rotate camshaft sprocket clockwise until straight pin on camshaft flange fits in straight pin hole number 2 in camshaft sprocket. If "V" groove is still off mark, repeat procedure and try number 3 hole in camshaft sprocket. If "V" groove is still off mark, chain must be replaced.

3) When straight pin is installed in number 2 hole, valve timing will advance 6° more than if installed in number 1 hole. Valve timing will be advanced 6° more if installed in number 3 hole.

NOTE — Valve timing is ±6° when timing groove aligns with indent hole.



VALVE TIMING

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ENGINE OILING

Crankcase Capacity – 4.6 qts. Add approximately .85 qts. with filter.

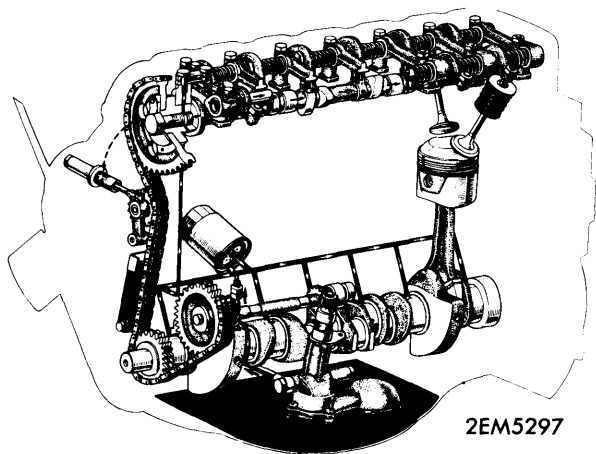
Oil Filter – Full flow spin-on type.

Normal Oil Pressure – 57 psi.

Pressure Relief Valve – Located in oil pump, valve opens at pressure of 57-71 psi. Check relief valve spring free length. Free length should be 2.173".

ENGINE OILING SYSTEM

System is force feed with full flow filtering system. Pressure is delivered by a trochoid type oil pump on M and early 2M models. On later 2M models and all 4M models a gear type oil pump is used. Oil pumped is fully filtered by oil filter and then travels through oil passages within cylinder block to lubricate engine internal components.



ENGINE OILING

OIL PUMP

Removal – Raise front and rear of car and support on stands. Drain engine oil. Disconnect steering relay rod from steering idler arm and pitman arm using suitable tie rod end puller (Tool 09611-20013). Remove exhaust pipe support bracket, flywheel housing undercover, engine left rear undercover. Remove oil pan. Remove oil pump outlet pipe, remove oil pump.

Installation – To install oil pump, reverse removal procedure.

Disassembly & Repair (Trochoid Type) – 1) Remove pump cover, relief valve plug, gasket, spring and relief valve from pump body. Remove snap ring. After removing drive shaft gear and Woodruff key, remove oil pump shaft and driven rotor from pump body.

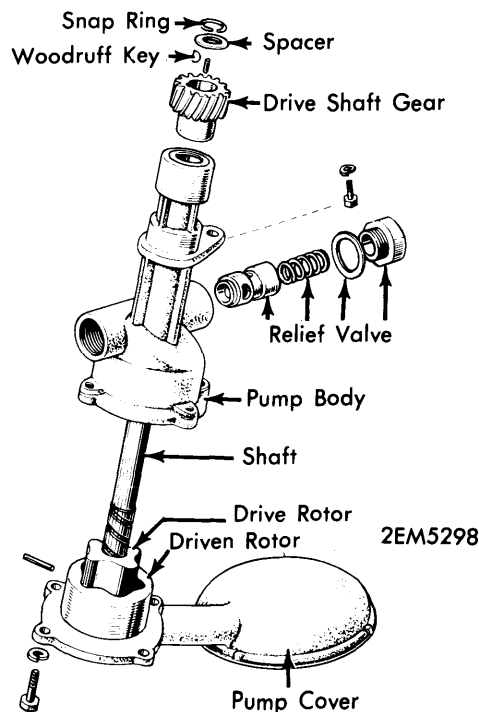
2) Clean each part and replace any worn or damaged parts. If oil pump shaft or rotor requires replacement, replace as a set.

3) Measure tip clearance and if it exceeds .008", replace rotors. When replacing, specified clearance is .004-.006". Measure side clearance between rotor and cover. If clearance exceeds .006", replace rotor or pump body. When replacing, specified clearance is .001-.003".

4) Measure clearance between driven rotor and body. If clearance exceeds .008", replace rotor or pump body. When replacing, clearance should be .004-.006".

5) To reassemble, reverse disassembly procedures.

NOTE – Make sure that marks stamped on drive rotor and driven rotor are facing toward pump cover side (toward bottom of engine).



TROCHOID TYPE OIL PUMP

Disassembly & Repair (Gear Type) – 1) Remove pump cover, gear, relief valve plug, gasket, spring, and relief valve from oil pump body. Remove snap ring and spacer. After removing drive shaft gear and Woodruff key, remove oil pump shaft from pump body.

1965-73 TOYOTA (M, 2M & 4M ENGINES) 6 CYLINDER (Cont.)

ENGINE OILING (Cont.)

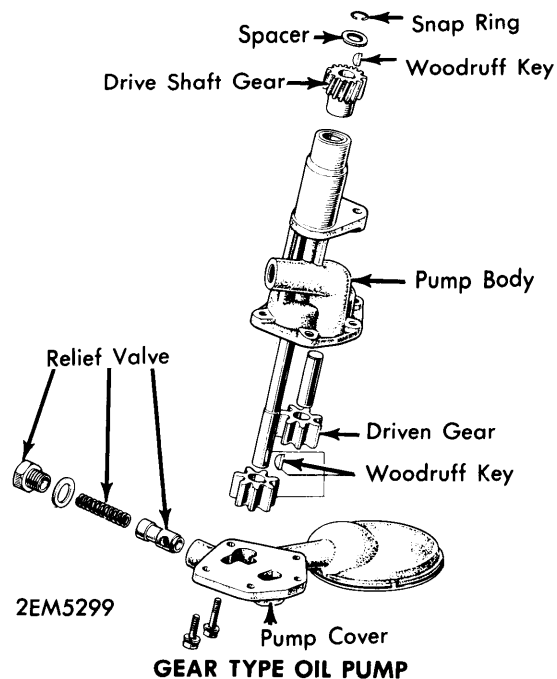
2) Clean each part and replace any worn or damaged parts. Inspect pump shaft and if diameter is less than .547", replace shaft. Make sure that clearance between driven shaft and body is .0006-.0022".

3) Measure clearance between gear teeth and body with a feeler gauge. If clearance exceeds .0079", replace gear. When replacing, clearance should be .0012-.0024".

4) Remove driven gear and install pump shaft with drive gear into pump body. Press gear toward center of pump body and measure clearance between gear teeth and pump body. Clearance should not exceed .0079".

5) Measure backlash between drive gear and driven gear. It will be necessary to use a narrow blade feeler gauge. Make sure that backlash does not exceed .035".

6) Measure side clearance between gear and cover and if clearance exceeds .0059", replace gear or pump body. To reassemble, reverse disassembly procedures.

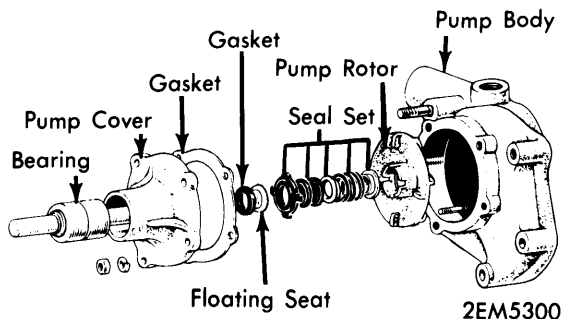


ENGINE COOLING

WATER PUMP

NOTE — It is not necessary to remove entire water pump housing to service water pump. Water pump cover may be removed from pump housing with housing left on cylinder block.

Removal — Remove bolts and remove fan shroud. Remove fan belt and four water pump cover bolts. Remove cover complete with coupling and fan assembly.



WATER PUMP

Rotor or Seal Replacement — Remove fan and using press and suitable tool (SST 09236-36010), push out rotor from rotor end. Remove seal set from rotor, remove seat and gasket from cover.

Bearing Replacement — 1) Remove rotor and heat cover to about 176°F. Using a press and suitable tool (SST 09623-36010), force bearing out of cover.

2) Place bearing on suitable tool (SST 09236-36010) and place tool into service hole at coupling center. Using press, force bearing out from coupling end.

3) With cover heated to about 176°F, force bearing in using press and suitable tool (SST 09236-36010). Do not attempt to install by pressing bearing shaft. Press in until bearing end surface is flush with cover end surface.

4) Place gasket and seat into cover and press onto bearing. Coat contact surfaces of seat and thrust washer with 1 or 2 drops of silicone oil. Do not use other lubricants.

5) Using suitable tool (SST 09236-36010), press coupling onto bearing. Coat coupling case mounting surface with liquid sealer and install coupling case. Fill with silicone oil and install pump.

Thermostat — Wax pellet type, begins to open at 177°F, fully opened at 182°F.

Cooling System Capacity — Approximately 10 qts. Add 1 qt. with heater.

Toyota Engines

1965-73 TOYOTA (M, 2M & 4M ENGINES) 6 CYLINDER (Cont.)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Cylinder Head	
8 mm Bolts	13 (1.7)
10 mm Bolts	57 (8.0)
Connecting Rod Cap Bolts	33 (4.5)
Main Bearing Cap Bolts	76 (10.5)
Camshaft Bearing Cap Nuts	15 (2.0)
Camshaft Sprocket Bolt	50 (7.0)
Front Engine Cover	
8 mm Bolts	10 (1.3)
10 mm Bolts	18 (2.5)
Intake Manifold	
1965-71 Engines	25 (3.5)
1972-73 Engines	19 (2.6)
Exhaust Manifold	
1965-71 Engines	21 (3.0)
1972-73 Engines	15 (2.0)
Crankshaft Pulley Bolt	
1965-71 Engines	47 (6.5)
1972-73 Engines	73 (10.0)
Rocker Arm Shaft Support Bolts	27 (3.8)
Flywheel Bolts (Man. Trans.)	44 (6.0)
Drive Plate Bolts (Auto. Trans.)	
1965-71 Engines	45 (6.3)
1972-73 Engines	40 (5.5)

ENGINE NOTES

1973 MODELS W/4M - CAMSHAFT LUBRICATION CHANGE — Engines produced from December 1972 use an oil lubrication tube to lubricate camshaft and rocker arms rather than an oil feed method previously used.

1973 MODELS W/4M - ROCKER ARM CHANGE — Engines produced from February 1973 have an oil hole drilled in top of rocker arm to increase oil flow to valve stem end of rocker arm.

1973 MODELS W/4M - CRANKSHAFT REAR OIL SEAL CHANGE — Engines produced from January 1973 have threaded rear oil seal replacing the original seal used. This new seal helps prevent oil leakage in this area. New seal is interchangeable with old seal.