

connecting rods are marked for reassembly.

3. Thoroughly clean and inspect all components. Coat pin with engine oil and heat piston to 158-176°F (70-80°C). Pin should push fit with thumb pressure through piston. If fit is too loose, replace piston and pin.
4. Check piston pin-to-connecting rod clearance. If more than .002" (.05 mm), replace bushing. Press bushing out and install new bushing with press and driver (09222-30010). Make sure to align bushing and connecting rod oil holes. Refinish new bushing with pin hole grinder.
5. Thoroughly lubricate all components before assembly. Position piston on connecting rod with notch in piston and front mark on connecting rod facing the same direction. Heat piston and install piston pin and circlips. See [Fig. 6](#).

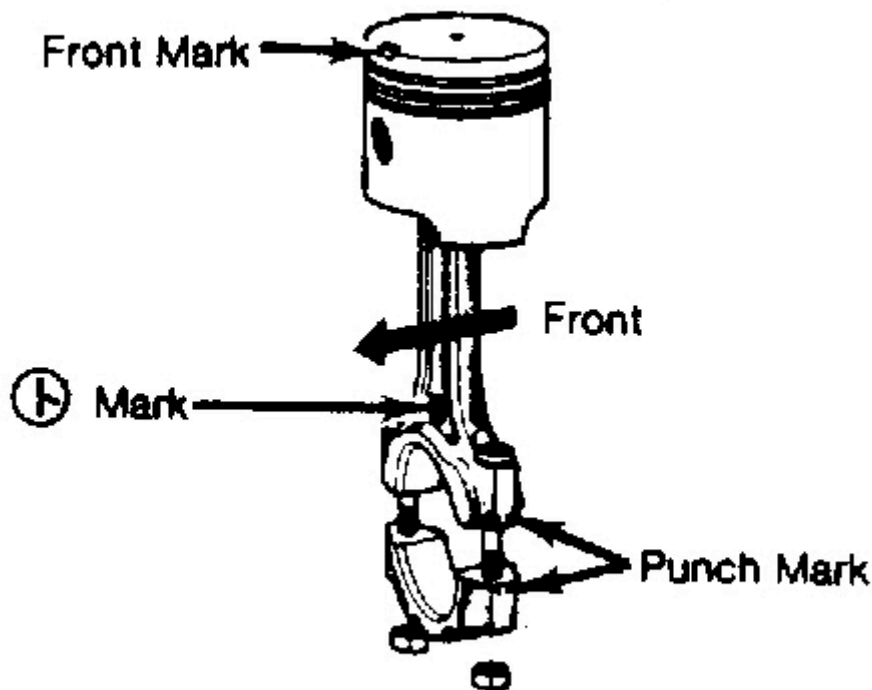


Fig. 6: Assembling Piston & Rod

NOTE: Notch must face forward.

CRANKSHAFT MAIN BEARINGS

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1. Thoroughly clean and inspect crankshaft. Blow out all oil passages with compressed air. Check crankshaft for runout at the center main bearing journal with a dial indicator. Replace crankshaft if runout exceeds limit of .0024" (.06 mm).
2. Measure main journals. If limit of .0004" (.01 mm) out-of-round or taper is exceeded, crankshaft must be reground or replaced. Main bearings are available in .002", .010", and .020" (.05, .25, and .50 mm) undersize.
3. Main bearing clearance is checked by the Plastigage method. If clearance is excessive, crankshaft must be ground to next undersize. The limit of bearing clearance on both main and connecting rod bearings is .004" (.1 mm).
4. Install bearing halves in crankcase and main bearing caps. Lubricate bearings and install crankshaft. Install main bearing caps with arrows toward front.
5. Tighten cap bolts in 2 or three steps. Tighten cap bolts in the following order: Bearing cap No. 3, 4, 2, 5 and 1. Install remaining components in reverse order of removal, noting proper alignment of timing marks. See **TIMING CHAIN**.

CONNECTING ROD BEARINGS

1. Measure connecting rod journals. If taper or out-of-round exceeds .0004" (.01 mm), crankshaft must be reground or replaced.
2. Connecting rod bearings are available in .010", .020", and .030" (.25, .50 and .75 mm) undersizes.
3. Make sure bearing halves and crankshaft journals are thoroughly clean. Check oil clearance by Plastigage method. Install connecting rod cap and tighten nuts to specifications.

THRUST BEARING ALIGNMENT

1. Check crankshaft end play with number 3 main bearing cap and original thrust washers installed. Pry crankshaft back and forth and measure clearance with a feeler gauge.
2. Standard clearance is .002-.009" (.04-.24 mm) with a maximum limit of .012" (.3 mm). Excessive clearance may be reduced with .002" (.125 mm) or .004" (.250 mm) oversize bearings. Install with grooves toward crankshaft.

REAR MAIN BEARING OIL SEAL

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Removal & Installation

1. Oil seal may be replaced with engine in vehicle and crankshaft installed. Remove transmission, clutch assembly and flywheel. See appropriate Toyota article in CLUTCHES Section. Remove rear oil seal retainer. Drive old seal out of retainer.
2. Drive new seal into position with tool (09250-10011). Coat seal lips with multi-purpose grease and install seal assembly. Install flywheel and tighten to specifications. Install remaining components in reverse of removal procedure.

ENGINE LUBRICATION

CRANKCASE CAPACITY

The crankcase capacity is 3.7 qts. (3.5L) with filter and 3.2 qts. (3L) without filter.

OIL FILTER

The oil filter is a full flow type, mounted on outside of crankcase next to distributor.

NORMAL OIL PRESSURE

With engine at 212°F, normal oil pressure is 35.6-71.1 psi (2.5-5.0 kg/cm²) @ 3000 RPM.

OIL PRESSURE REGULATOR VALVE

The pressure regulator valve is a non-adjustable type, mounted in oil pump.

ENGINE OILING SYSTEM

Oil is circulated through the engine by pressure provided by a trochoid rotor type oil pump. Pump is mounted on bottom of crankcase and is driven by camshaft through the distributor drive. Oil is drawn from oil pan and is circulated through a full flow oil filter into the main oil gallery. Oil is then distributed to main and connecting rod bearing journals and camshaft bearing journals.

Cylinders and piston pins are lubricated by oil squirting from hole in connecting rod. Oil is supplied to timing chain by oil from timing chain tensioner. Oil flows

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from number 2 cam bearing journal to rocker arm shaft to lubricate rocker arms. Excess oil from rocker arm shaft lubricates valves and valve stems.

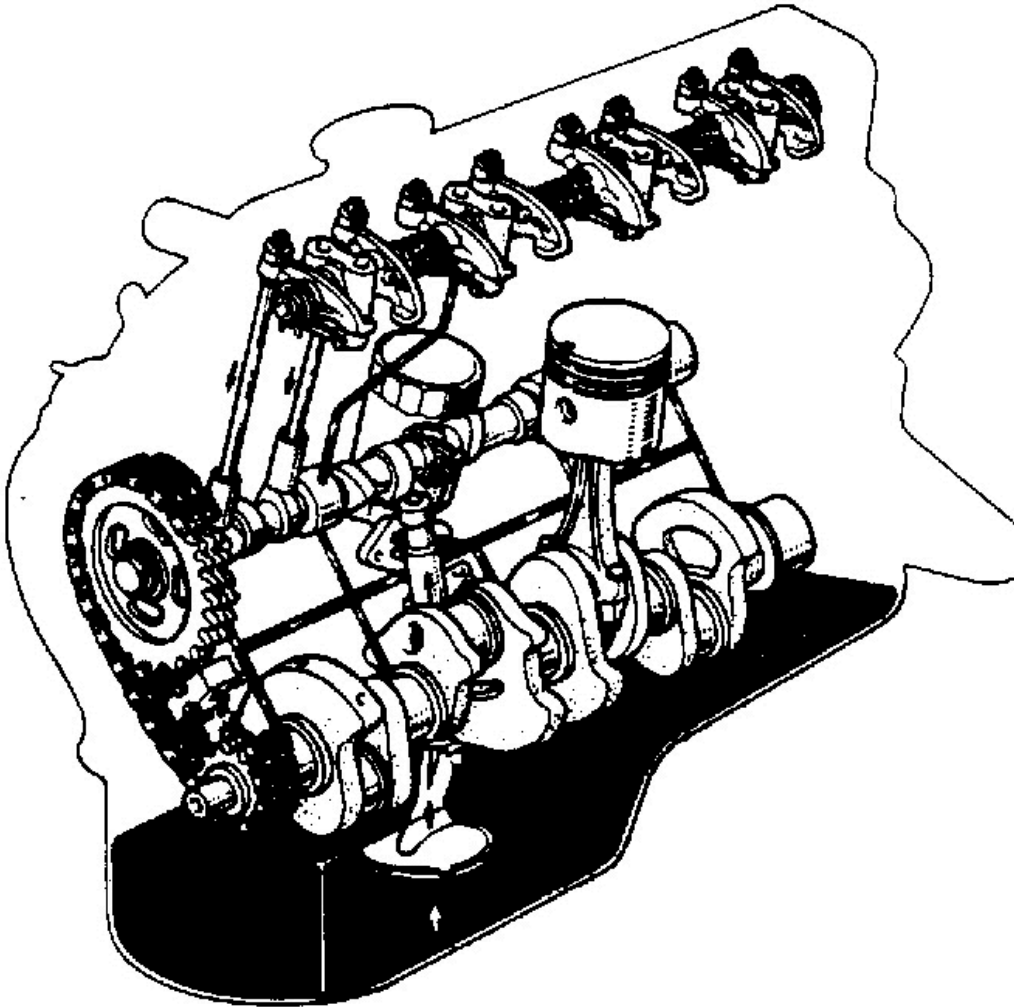


Fig. 7: Engine Oiling System

OIL PUMP

Disassembly

Remove oil strainer, pump cover and pressure regulator plug from side of pump body. Remove spring, piston and rotors from pump body. Thoroughly clean and inspect all components.

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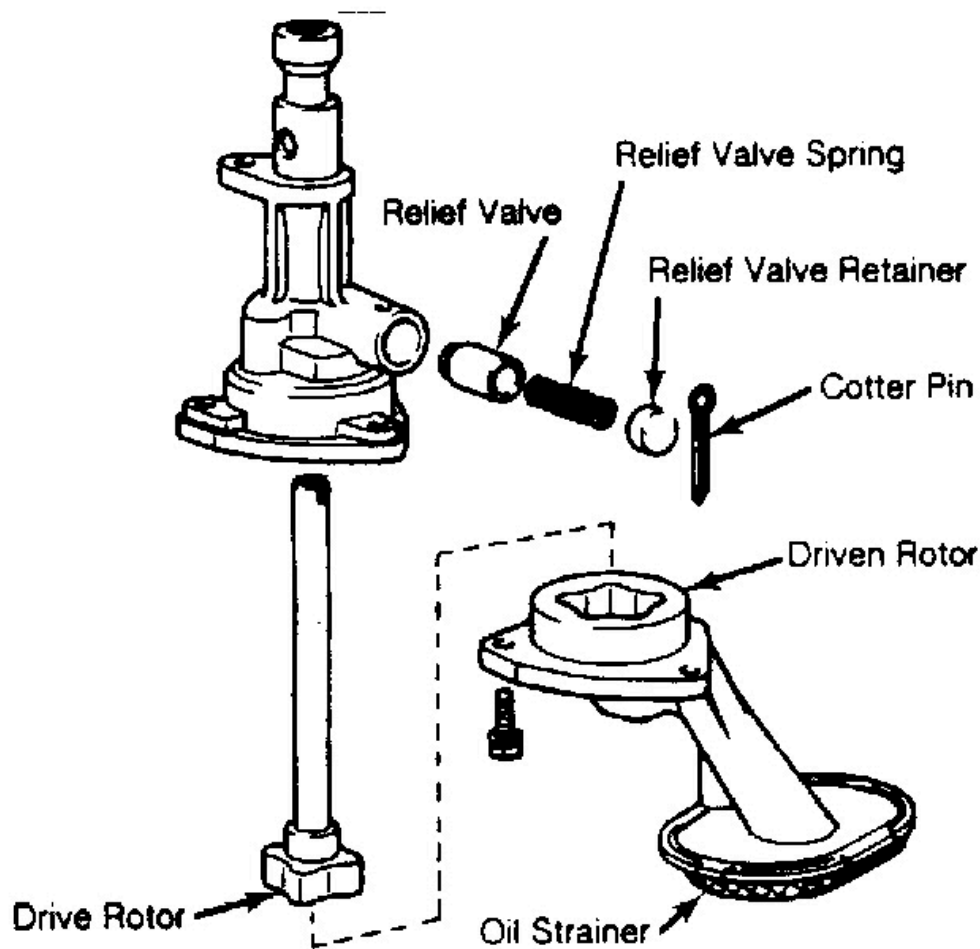


Fig. 8: Exploded View Of Oil Pump

Inspection

1. Check rotor tip clearance. If tip clearance is more than limit, replace rotors. Check clearance between drive rotors and cover using a straightedge and feeler gauge. If clearance exceeds limit, replace cover, pump body or rotors.
2. Check clearance between outer rotor and pump body with feeler gauge. If more than limit replace pump body or rotors. Check pressure regulator spring and piston for wear or damage. Replace as necessary.

Reassembly

To assemble pump, reverse disassembly procedure. Install rotors with punch marks toward body (upward). With pump assembled, submerge in clean motor

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oil and rotate drive shaft to check flow of oil from outlet port.

OIL PUMP CLEARANCE SPECIFICATIONS

Application	Specification In. (mm)	Limit In. (mm)
Rotor Tip Clearance	.002-.006 (.04-.16)	.008 (.2)
Rotor Side Clearance	.001-.004 (.03-.09)	.006 (.15)
Rotor-to-Body Clearance	.004-.006 (.10-.16)	.008 (.2)

COOLANT CAPACITY

The coolant capacity is 5.5 qts. (5.2L).

THERMOSTAT

Begins to open at 187°F (86°C) and fully opens at 212°F (100°C).

WATER PUMP

NOTE: Cooling fan is electrically driven and may run at any time the ignition is on, if coolant temperature is high. It may be necessary to remove fan and shroud to provide greater access to the water pump.

Removal

Remove air cleaner hose. Drain cooling system and loosen drive belt. Disconnect radiator and heater hoses at pump. Remove mounting bolts and take off water pump pulley and water pump.

Disassembly

1. Remove water pump plate. Press the pulley off the pump shaft. Heat the pump body to about 176°F (80°C). Press the bearing-shaft-impeller assembly out of the rear of the pump.
2. Press the impeller off of the pump shaft. Remove the seal from the pump shaft.

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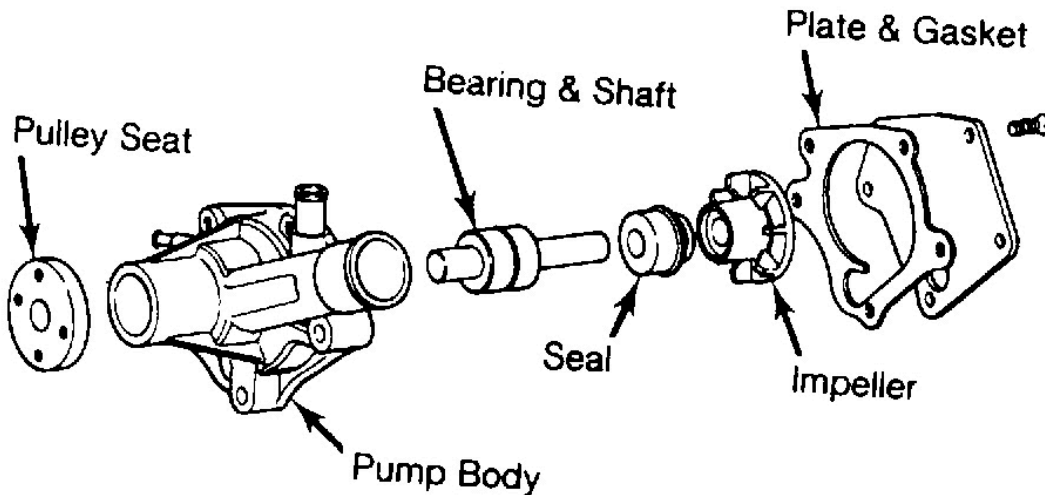


Fig. 9: Exploded View Of Water Pump

Reassembly

1. Heat pump body to 176°F (80°C). Press the bearing and shaft into the body. Bearing should be flush with the front edge of the neck of the body. Press in seal and impeller. Rear face of body and impeller should be flush.
2. Press pulley seat on pump shaft to specified depth. Pump shaft should protrude .283" (7.2 mm) above front face of pulley seat.

Installation

To install, clean mating surfaces, coat new gasket with sealer and install water pump.

NOTE: For information on cooling system capacities and other cooling system components, see **ENGINE COOLING SYSTEMS** article in this section.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Cylinder Head Bolts	40-47 (55-64)
Manifold Nuts	15-21 (20-29)

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Main Bearing Cap Bolts	40-47 (55-64)
Connecting Rod Cap Nuts	29-37 (39-50)
Camshaft Sprocket Bolt	40-47 (55-64)
Crankshaft Pulley Bolt	55-75 (75-102)
Flywheel Bolts	40-47 (55-64)
	INCH Lbs. (N.m)
Camshaft Thrust Plate Bolts	53-78 (6-9)

ENGINE SPECIFICATIONS**GENERAL SPECIFICATIONS****GENERAL SPECIFICATIONS**

Application	In. (mm)
Displacement	
Cu. In.	78.7
Liters	1.3
Fuel System	Fuel Inj.
HP @ RPM	58 @ 5200
Torque Ft. @ RPM	74 @ 3400
Compr. Ratio	9.5:1
Bore	2.95 (75.0)
Stroke	2.87 (73.0)

VALVE SPECIFICATIONS**VALVE SPECIFICATIONS**

Application	In. (mm)
Intake	
Head Diam.	n/a
Face Angle	44.5°
Seat Angle	(1) 45°
Seat Width	.043-.071 (1.10-1.80)
Stem Diameter	.3136-.3142 (7.965-7.980)
Stem Clearance	.0012-.0026 (.030-