SUPRA 5M-GE 6-CYLINDER

ENGINE CODING

ENGINE IDENTIFICATION

Engine number is stamped on a machined pad on the front, right side of engine block. Engine code is also printed on a sticker attached to cylinder head cover.

ENGINE IDENTIFICATION CODE

Application	Code
Supra (2759 cc)	5M-GE

ENGINE, MANIFOLDS & CYLINDER HEAD

ENGINE

Removal

1) Disconnect battery and drain cooling system. Remove hood and fan shroud. Remove radiator hoses, radiator, heater hoses and all oil cooler hoses. Remove oil pressure sending wire and alternator wiring.

2) Remove air cleaner and air intake ducting. Disconnect brake booster vacuum hose. Disconnect distributor primary wiring and coil secondary wiring.

3) Label and disconnect all fuel lines, vacuum hoses and electrical wiring running between engine and engine compartment.

4) Disconnect starter wiring and accelerator connecting rod. If equipped with manual transmission, disconnect clutch flexible hose from master cylinder tube, and cap hose end to prevent fluid leakage.

5) On all models, disconnect power steering feed hose. Raise front and rear of vehicle with jack and support on stands. Disconnect exhaust pipe from manifold, and remove exhaust pipe supports and insulator.

6) Disconnect speedometer drive cable and back-up light wiring. On manual transmission models, remove console box and gear shift lever.

7) On automatic transmission models, remove connecting rod swivel nut and disconnect control rod from shift lever. On all models, remove propeller shaft and plug rear of transmission to prevent oil leakage.

8) Take off rear engine undercover, and remove front engine mounts. Support transmission with jack, and remove rear engine mount and crossmember.

9) Lower jack supporting transmission and remove stands. Using an engine hoist, remove engine and transmission assembly from vehicle.

Installation

To install, reverse removal procedure. Check all fluid levels and linkage adjustments prior to starting engine.

INTAKE MANIFOLD

Removal

1) Disconnect battery and drain coolant. Remove No. 1 and No. 2 air valve hoses from air intake chamber. Remove air intake connector and throttle body hose.

2) Disconnect No. 1 and No. 2 water by-pass hoses from throttle body. Disconnect 2 PCV hoses from valve cover. Disconnect fuel hose from hose support.

3) Label and disconnect emission control hoses from the throttle body and air intake chamber. Remove air intake chamber bracket, EGR cooler and vacuum pipe.

4) Label and disconnect all wiring from air intake chamber and intake manifold. Disconnect cold start fuel hose from delivery hose.

5) Remove air intake chamber. Remove pulsation damper, No. 1 fuel pipe and water outlet housing. Remove bolts and lift off intake manifold.

Inspection

Check air intake chamber and intake manifold for surface warpage. Maximum surface warpage is .004" (.1 mm) for both. Replace if beyond limits.

Installation

Thoroughly clean all gasket surfaces and install new gasket. Install manifold assembly, and gradually torque bolts working from center outward. Install remaining components in reverse of removal procedure.

EXHAUST MANIFOLD

Removal & Inspection

Remove the 2 heat insulators. Disconnect oxygen sensor and exhaust pipe. Remove exhaust manifold and gasket. Maximum exhaust manifold surface warpage is .0295" (.75 mm). Replace if beyond limits.

Installation

Clean manifold and cylinder head mating surfaces. Install exhaust manifold and new gasket. Torque nuts to specifications.

CYLINDER HEAD

Removal

1) Remove intake and exhaust manifolds. Remove distributor and spark plug wires from cylinder head. Without disconnecting hoses, remove power steering pump bracket and set aside.

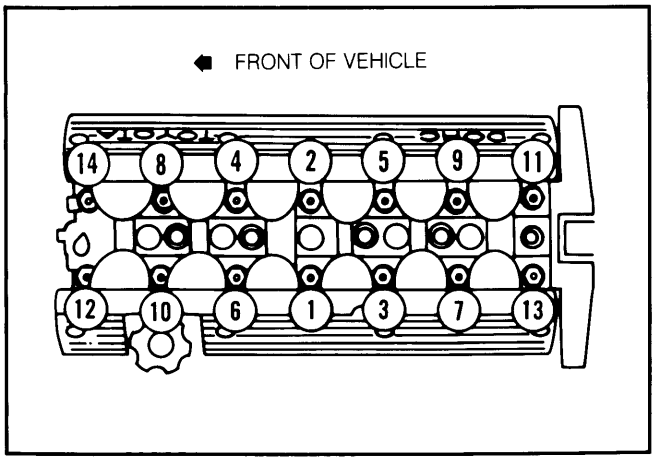
2) Remove timing belt and camshaft timing pulleys. See Timing Belt. Remove timing belt cover.

3) To prevent head warpage or cracking, cylinder head bolts must be removed in correct order. Loosen cylinder head bolts in 2 or 3 steps in reverse of tightening sequence. *See Fig. 1.*

Inspection

Using a feeler gauge and precision straightedge, check cylinder head for warping. Warpage limit for intake and exhaust manifold, head and camshaft surfaces is .0039" (.10 mm).

Fig. 1: Cylinder Head Tightening Sequence



Torque in 3 steps.

SUPRA 5M-GE 6-CYLINDER (Cont.)

Installation

1) Clean all gasket surfaces, and apply sealer to both front corners of block. Install new head gasket over dowels on block.

2) Clean all foreign matter from bolt hole, and place cylinder head on block. Torque cylinder head bolts in 3 steps. *See Fig. 1.*

3) Install new gasket and timing belt cover. Install timing belt and camshaft timing pulleys. See Timing Belt. Reverse removal procedure to complete assembly.

CAMSHAFT

ENGINE FRONT COVER

Removal

1) Engine front cover consists of 2 sections. Remove top section by removing 4 bolts and lifting off front of block.

2) Loosen and remove all drive belts. Remove crankshaft pulley bolt. Using a gear puller, remove the crankshaft pulley. Remove lower timing case cover section.

Installation

Thoroughly clean front covers and block mating surfaces. Use liquid sealer on front cover gaskets when assembling. Install crankshaft pulley and torque to 98-119 ft. lbs. (132-162 N.m).

ENGINE FRONT COVER OIL SEAL

Removal

Front cover oil seal may be replaced with front cover installed. Loosen and remove drive belts. Remove crankshaft pulley bolt, and remove crankshaft pulley using gear puller. Pry old seal out without damaging cover or retainer.

Installation

Apply engine oil to seal lip. Install front cover seal using seal driver. Install pulley and torque bolt to specifications. Install and tighten drive belts.

TIMING BELT & GEAR

NOTE: Check timing belt for cracks, damaged or missing teeth and excessive wear. Replace if necessary. DO NOT allow the belt to come in contact with oil, water or steam. DO NOT bend, twist or turn the belt inside out.

Checking for Tension

1) Remove top section of timing belt cover. Rotate cam pulleys inward with 15 ft. lbs. (20 N.m) of torque. All timing belt slack should be at the top between the pulleys. If possible, check for tension with engine cold.

2) Press down on belt between pulleys with 4.4-6.6 lbs. (2.0-3.0 kg.) of pressure. Belt deflection should be .16-.24" (4-6 mm) for a cold engine. Hot engine deflection should be .08-.16" (2-4 mm).

3) If tension is not within limits, rotate engine clockwise so as to move belt slack to idler pulley side of engine.

4) Loosen the idler pulley lock bolt, and allow spring to take up belt slack. Retorque bolt to 33-39 ft. lbs. (44-54 N.m). Check tension, and readjust if necessary.

5) Set No. 1 to TDC compression stroke. Match marks on camshaft pulleys must be aligned with those of the rear section of front engine cover. *See Fig. 2.*

6) Match holes of camshafts and housings must be aligned. See Valve Timing. Install front engine cover and run engine. After engine is warmed up, check for belt noise.

Removal

1) Remove all drive belts. Set No. 1 cylinder to TDC compression. Remove top section of engine front cover.

2) Loosen idler pulley set bolt, and relieve the timing belt tension. Using gear puller, remove crankshaft pulley. Remove lower section of engine front cover.

3) If timing belt is to be reused, place a rotation direction mark on the belt. Remove timing belt.

4) To remove camshaft timing pulley, hold pulley with a spanner wrench and loosen set bolt. Remove intake and exhaust valve covers.

CAUTION: BEFORE removing camshaft timing pulleys, note position of pulley and match pin on camshaft. Pulley may be installed in more than one position.

5) As crankshaft timing pulley is a press fit, a gear puller will be required for removal. Using a spanner wrench, hold oil pump drive shaft pulley and remove set bolt and pulley.

Inspection

Inspect drive belt for wear, cracks or damage to teeth. Check idler pulley bearing for smooth operation. Idler pulley tension spring free length must be 2.776" (70.5 mm) or less. If not as specified, replace spring.

Installation

1) Install oil pump drive pulley, and torque bolt to specifications. Install crankshaft timing pulley, idler pulley and idler pulley tension spring.

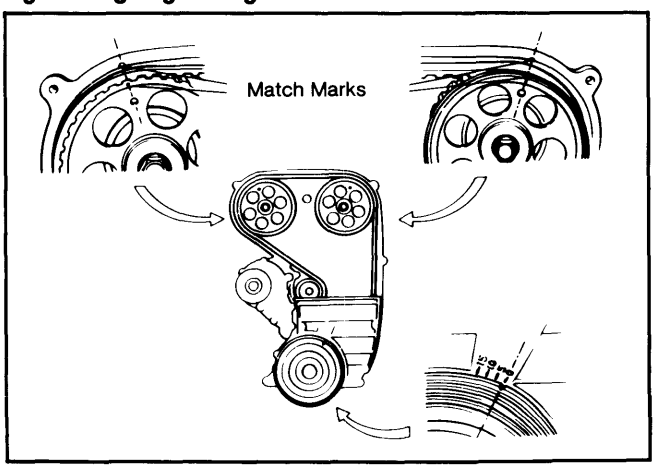
2) Install timing belt on crankshaft pulley, noting position of rotation direction mark if reusing old belt. Install lower section of engine front cover with gasket.

3) Install crankshaft pulley, and torque bolt to specifications. Place No. 1 cylinder on TDC.

4) Install camshaft timing pulleys and match pins in original position. Exhaust side pulley is installed with belt guide toward rear of engine. Belt guide of intake side pulley faces front of engine.

5) Align match marks of rear timing belt cover with those of the camshaft timing pulleys. *See Fig. 2.*

Fig. 2: Aligning Timing Belt



Check belt tension after alignment.

SUPRA 5M-GE 6-CYLINDER (Cont.)

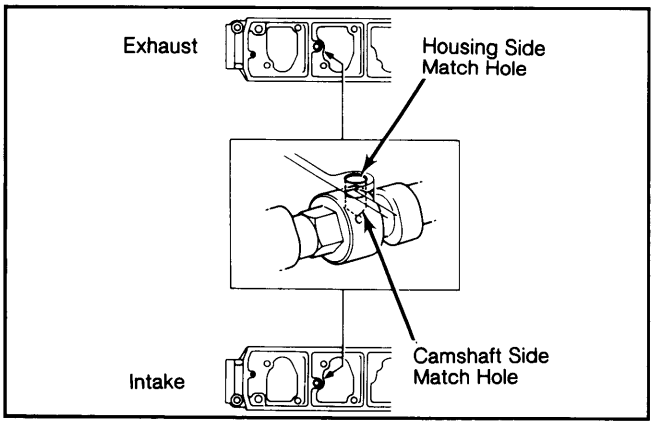
6) Install the timing belt. Adjust belt tension as described in Checking Tension. Match holes of camshafts and housings must be aligned. See Valve Timing. Reverse removal procedure to complete assembly.

VALVE TIMING

Match Hole Alignment

1) Align match hole of camshaft with that of camshaft housing by turning crankshaft pulley. *See Fig. 3.* Intake and exhaust camshafts should be aligned separately.

Fig. 3: Aligning Camshaft Match Holes



No. 1 cylinder set at TDC of compression stroke.

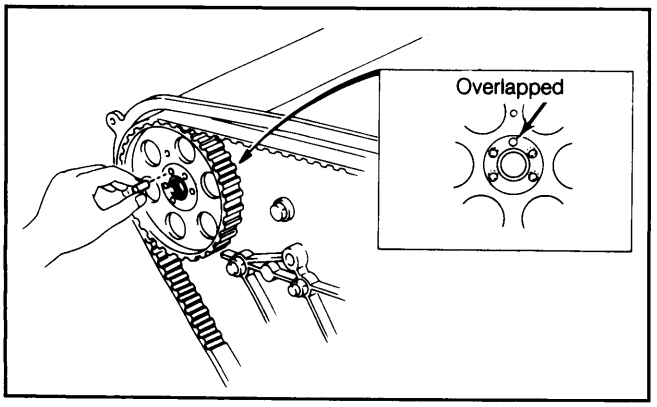
2) If the crankshaft pulley timing mark is within 5° of No. 1 cylinder TDC (compression stroke), no alignment is necessary. If crankshaft pulley mark is not within 5° of TDC, realign holes.

3) Using a spanner wrench, remove pulley set bolt. Never use timing belt tension to loosen or tighten set bolt.

4) Make sure that match holes of camshaft and housing are aligned. Using a magnet, remove the match pin from the hole of camshaft timing pulley. Set the No. 1 cylinder to TDC of compression stroke.

5) There are five holes on the camshaft and timing pulley. Select one overlapped hole, and insert the match pin into it. *See Fig. 4.*

Fig. 4: Aligning Camshaft & Pulley



No. 1 cylinder set to TDC of compression stroke.

6) If no hole overlaps, rotate crankshaft slightly so pin will fit into most closely overlapped hole. *See Fig. 4.* Install and torque pulley set bolt.

CAMSHAFT

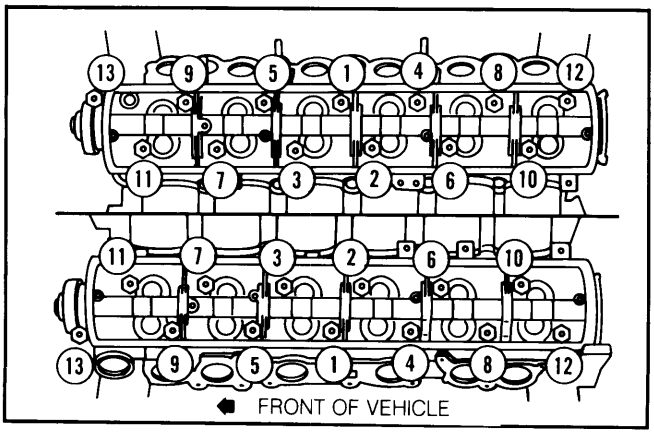
Removal

1) Remove air cleaner assembly, spark plug wires, distributor, and top section of engine front cover. Disconnect all air intake, water and fuel hoses that will interfere with removal of camshaft housings.

2) Relieve tension on timing belt. Using a spanner wrench, remove camshaft timing pulley set bolts. Noting position for reassembly, remove timing pulleys and match pins.

3) Remove valve covers. Loosen camshaft housings in reverse of tightening sequence. *See Fig. 5.* Lift off camshaft housings. Remove housing rear covers and pull out camshaft.

Fig. 5: Camshaft Housing Tightening Sequence



Torque in 3 steps.

Installation

Lubricate camshaft and housings journals, and place camshaft in position. Install housings on cylinder head, and torque to specifications in 3 steps. Complete assembly in reverse of removal procedure.

CAMSHAFT END THRUST

Attach dial indicator, and check end thrust at flange end. Maximum thrust is .012" (.30 mm). Specified standard thrust is .0020-.0098" (.05-.25 mm). If clearance is greater than maximum, replace the camshaft and/or housing.

CAMSHAFT BEARINGS

There are no camshaft bearings in the camshaft housings. If clearance is beyond limits, replace housing.

OIL PUMP SHAFT

Removal

1) Oil pump shaft can be removed with engine in vehicle. Turn engine to TDC for No. 1 cylinder. Drain cooling system, and remove radiator and fan. Remove all drive belts.

2) Remove top and bottom sections of engine front cover. See Engine Front Cover. Remove timing belt. See Timing Belt.

3) Using gear puller, remove crankshaft timing gear. Remove oil pump shaft pulley. Remove oil pressure regulator and water by-pass pipe.

4) Remove bolts along right half of water pump. Remove timing belt case with water pump. Remove

SUPRA 5M-GE 6-CYLINDER (Cont.)

thrust plate, and carefully pull oil pump shaft from engine block.

Inspection

1) Check end play between collar and thrust plate with feeler gauge. If beyond limits, replace thrust plate and collar.

2) Measure bearing bore diameter and journal diameter for oil clearance. If bearing replacement is necessary, replace bearings with Toyota tool No. 09233-41010.

OIL PUMP SHAFT SPECIFICATIONS

Application	In. (mm)
Thrust Clearance	
Standard	.002-.005 (.06-.13)
Maximum	.012 (.30)
Oil Clearance	
Standard	.0010-.0026 (.025-.066)
Maximum	.003 (.08)
Standard Journal Diameter	
Front	1.6126-1.6132 (40.959-40.975)
Rear	1.2976-1.2982 (32.959-32.975)

VALVES

VALVE ARRANGEMENT

Left Side — Intake valves.
Right Side — Exhaust valves.

VALVE SPRINGS

Removal

1) Remove air cleaner assembly and valve cover. Remove camshaft housings. See Camshaft. Keep ALL parts in order for installation. Remove rocker arms and lash adjusters.

2) Springs may be removed with cylinder head on or off vehicle. Using valve spring compressor, remove valve retainer locks, retainers, springs, spring seat and oil seal.

Inspection

Check valve springs for free length, installed tension, installed height and squareness. If spring is out of square more than .079" (2.0 mm), replace the spring.

Installation

Reverse removal procedure to install valve springs and camshaft housings. See Timing Belt for information on timing camshafts and adjusting belt tension.

VALVE SPRING INSTALLED HEIGHT

Measure valve spring free length with Vernier caliper. Using a spring tester, check load when spring is compressed to its normal installed height. See Valve Spring Installed Height table.

VALVE SPRING INSTALLED HEIGHT

Application	In. (mm)
Exhaust	1.69 (43.0)
Intake	1.57 (40.0)

VALVE STEM LENGTH

If the valve stem tip is worn, resurface with a valve grinder. DO NOT grind more than .020" (.5 mm). The overall valve length is 4.232" (107.5 mm) for intakes. The overall exhaust valve length is 4.319" (109.7 mm).

VALVE GUIDE SERVICING

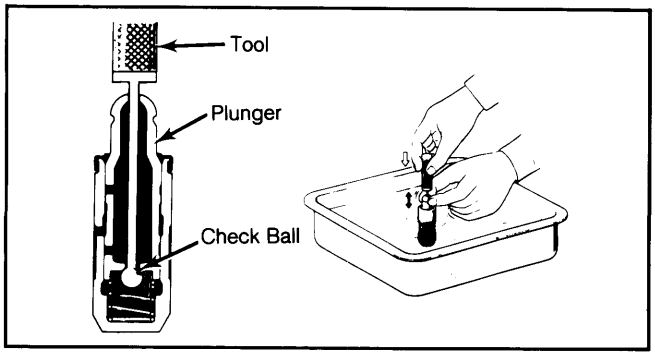
1) Break off valve guide bushing at snap ring, and remove snap ring. Heat cylinder head to approximately 194°F (90°C), and drive out bushing toward combustion chamber.

2) With cylinder head at approximately 194° (90°C), drive in new guide until the snap ring makes contact with the cylinder head. Hand ream guide bore to provide specified stem clearance.

HYDRALIC VALVE LIFTERS

1) Lifters should be checked for plunger stroke and leak-down. Tool must be made to depress the check ball for plunger stroke check. *See Fig. 6.*

Fig. 6: Checking Plunger Stroke.



Immerse lifter in light oil.

2) Immerse lifter in light oil, and depress the check ball. Slide plunger up and down several times. Replace lifter if stroke exceeds .020" (.50 mm).

CAUTION: DO NOT disassemble the hydraulic lifter.

3) Using a leak-down tester, measure the leak-down speed after checking that the plunger has been depressed about .08" (2 mm). Apply a pressure of 44.1 lbs. (20 kg.).

4) The leak-down time, with pressure applied, is 2-7 seconds for a distance of .04" (1 mm).

VALVE CLEARANCE ADJUSTMENT

The valve clearance is adjusted by use of hydraulic valve lifters.

PISTONS, RINGS & PINS

OIL PAN

Removal

1) Raise and support vehicle. Drain engine oil and coolant. Disconnect air connector pipe from air cleaner. Remove oil level gauge.

2) Disconnect upper radiator hose, and loosen fan belts. Remove clutch fan and shroud.

SUPRA 5M-GE 6-CYLINDER (Cont.)

3) Remove engine and flywheel housing undercovers. Remove exhaust pipe clamp and stiffener plates.

4) Remove motor mount bolts on both sides of engine. Place a jack under the transmission, and raise the engine approximately 2" (50 mm). Remove oil pan.

Installation

Clean oil pan and block thoroughly. Apply sealer to corners of new oil pan gasket. Install oil pan and gasket. Install remaining parts in reverse of removal sequence.

PISTON & ROD ASSEMBLY

Removal

1) With cylinder head and oil pan removed, remove connecting rod caps. Place a short length of hose over rod bolts to prevent damage to crankshaft. Keep all parts in order for reassembly.

2) Remove bearings. If there is a ridge at the top of cylinder, use a ridge reamer before removing piston and rod. Push piston and rod assembly up through cylinder head side.

Installation

1) Apply oil to piston and piston rings. Using ring compressor, install piston and rod assembly in cylinder block. Make sure notch on piston faces front.

2) Replace connecting rod caps with mating marks aligned. Torque nuts evenly in 2 or 3 steps, and check connecting rod side play. Reverse removal procedure to complete assembly.

FITTING PISTONS

1) Measure at top, center and bottom of cylinder bore. Measure at 90° and parallel to crankshaft center. If measurements are not within specifications, rebore the cylinder. See Bore Diameter Specifications.

BORE DIAMETER SPECIFICATIONS

Application	Maximum Diameter In. (mm)
Standard Size Piston	3.2776 (83.25)
Oversize Piston	
.50 mm	3.2972 (83.75)
.75 mm	3.3071 (84.00)
1.00 mm	3.3169 (84.25)

2) If taper or out-of-round exceeds .0008" (.020 mm), cylinders must be rebored. Cylinders must be bored to achieve piston clearance of .0020-.0028" (.05-.07 mm).

3) Measure piston diameter at right angles to piston pin centerline, .98" (25 mm) from piston head. See Piston Diameter table.

PISTON DIAMETER SPECIFICATIONS

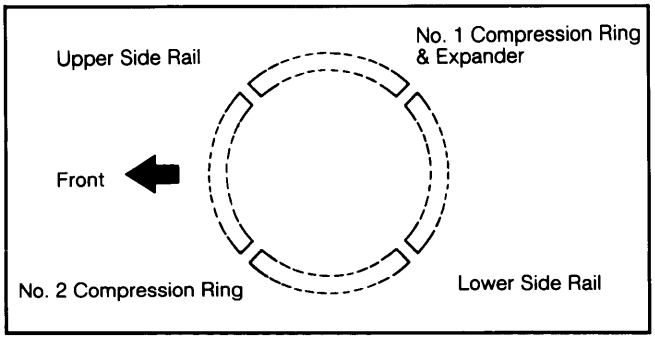
Application	Diameter In. (mm)
Standard	3.2650-3.2669 (82.93-82.98)
Oversize	
.50 mm	3.2846-3.2866 (83.43-83.48)
.75 mm	3.2945-3.2965 (83.68-83.73)
1.00 mm	3.3043-3.3063 (83.93-83.98)

4) Finish to final dimension by honing the last .0008" (.020 mm). Allow bore to cool after boring and honing to avoid erroneous readings while measuring.

FITTING RINGS

Check piston ring end gap at lowest part of cylinder. Measure ring groove clearance in piston. Replace rings if they will not meet specifications. Install rings with mark on side of ring facing upwards. Position piston ring gaps. *See Fig. 7.*

Fig. 7: Positioning Ring Gaps



Install piston with notch facing forward.

PISTON PIN REPLACEMENT

Removal

1) Try to move the piston back and forth on the piston pin. If any movement is felt, replace the piston and pin. To disassemble piston and rod, remove circlips in piston pin hole with needle nose pliers.

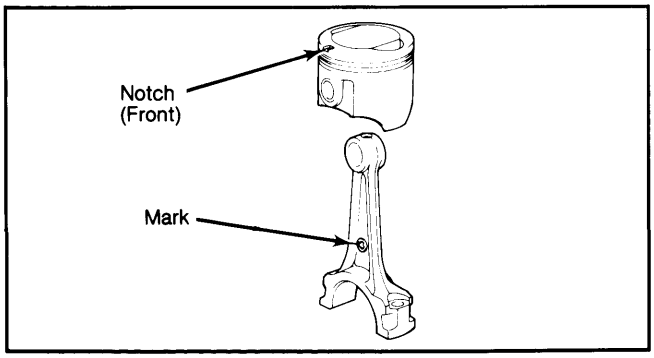
2) Heat piston to about 140°F (60°C), and remove pin by tapping lightly with plastic hammer. Keep piston, pin and rod together as a set.

Inspection

1) Check pistons and pins for wear or scoring. Inspect rod for bend or twist. The rod bend limit is .002" (.05 mm) per 3.94" (100 mm). The rod twist limit is .006" (.15 mm) per 3.94" (100 mm).

2) The oil clearance between piston pin and rod bushing must not be over .0006" (.015 mm). If clearance is greater than limit, replace rod bushing. Hone new rod bushing to .0002-.0004" (.005-.011 mm).

Fig. 8: Assembling Piston & Rod



Notch and mark must be aligned.

Installation

Install one circlip in piston, and heat to about 140°F (60°C). Align piston notch with rod mark. Coat piston pin with engine oil and push pin in with thumb. Install remaining circlip.

SUPRA 5M-GE 6-CYLINDER (Cont.)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

MAIN BEARINGS

1) Check crankshaft runout with dial indicator. If runout exceeds .0024" (.060 mm), replace crankshaft. The taper and out-of-round limit for main and rod journals is .0008" (.02 mm).

2) Check main bearing clearance using Plastigage. If required, crankshaft may be reground for undersize bearings. Bearings are available in .002" (.05 mm), .010" (.25 mm) and .020" (.50 mm) undersize, as well as standard.

CONNECTING ROD BEARINGS

1) Measure connecting rod side play with dial indicator. If greater than .012" (.30 mm), rod must be replaced. Wipe off bearing journal, then check clearance with Plastigage.

2) If clearance exceeds .003" (.08 mm) and cannot be corrected with .002" (.05 mm) undersize bearings, or if taper or out-of-round exceeds .0008" (.020 mm), grind crankshaft to next undersize.

3) Connecting rod bearings are available in .002" (.05 mm), .010" (.25 mm) and .020" (.50 mm) undersize.

THRUST BEARING ALIGNMENT

1) Measure crankshaft end play with center (number 4) main bearing and cap installed. If clearance exceeds .012" (.30 mm), replace thrust washers to achieve standard clearance of .0020-.0098" (.050-.248 mm).

2) Standard thickness of thrust washer is .115" (2.92 mm) with .005" (.13 mm) and .010" (.25 mm) oversizes available.

NOTE: Install thrust washers with oil grooves facing outward.

REAR MAIN OIL SEAL

1) Rear main oil seal may be replaced without removing oil pan. Remove transmission and flywheel for access to seal.

2) Inspect oil seal lip and replace if worn or damaged. Pry old seal out without damaging cover or retainer. Install seal, using replacer tool (09223-41010). Apply multipurpose lubricant to seal lip.

ENGINE OILING

CRANKCASE CAPACITY

The crankcase capacity is 5.4 qts. (5.1L) with filter, 4.9 qts. (4.6L) without filter.

OIL FILTER

The oil filter is a full-flow, spin-on type.

NORMAL OIL PRESSURE

Oil pressure at idle should be more than 4.3 psi (.3 kg/cm²). At 3000 RPM oil pressure is 35.6-71.1 psi (2.5-5.0 kg/cm²).

OIL PRESSURE RELIEF VALVE

The oil pressure relief valve is a nonadjustable type located in the oil pump. There is also an oil pressure regulator valve for the hydraulic lifters. It is located on top of the engine in front of No. 1 spark plug.

ENGINE OILING SYSTEM

System is force-feed type, with a full-flow filtering unit. Pressure is delivered by a gear-driven oil pump. From filter oil travels through cylinder block passages by which internal components are lubricated.

OIL PUMP

Removal

Raise vehicle and remove oil pan. See Oil Pan. Unbolt and remove oil pump.

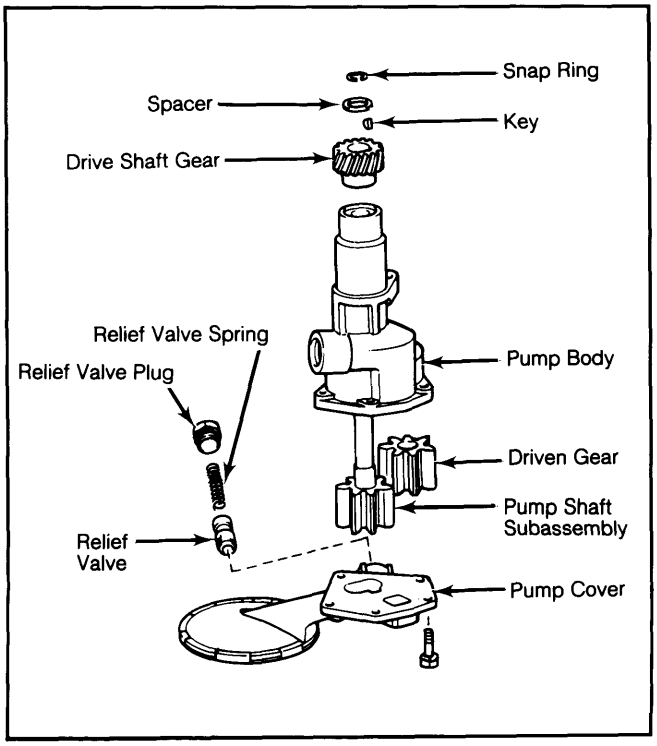
Disassembly

Disassemble pump by removing (in order) snap ring, spacer, drive shaft gear, Woodruff key, pump cover, pump shaft sub-assembly, driven gear, relief valve plug, gasket, spring and relief valve.

Inspection

Check oil pump for signs of wear or scoring. Measure body and side clearance. Measure gear backlash.

Fig. 9: Exploded View of Oil Pump



Reassembly

After inspection is finished, reassemble pump. Check pump operation by immersing inlet tube in engine oil. Turn pump shaft counterclockwise and check for oil discharge.

Installation

Install oil pump. Clean gasket from oil pan and block. Install oil pan with new gasket and reverse removal procedure.

SUPRA 5M-GE 6-CYLINDER (Cont.)

OIL PUMP SPECIFICATIONS

Application	Wear Limit In. (mm)
Body Clearance	.0008 (.20)
Gear Backlash	.035 (.90)
Side Clearance	.006 (.15)

ENGINE COOLING

COOLANT CAPACITY

The coolant capacity is 11.6 qts. (10.9L).

THERMOSTAT

Wax pellet type, begins to open at 186-194°F (86-90°C) and should open to more than .32" (8 mm) at 212°F (100°C).

WATER PUMP

Removal

1) It is not necessary to remove complete water pump housing to service water pump. Pump cover may be removed from housing and housing may be left on cylinder block.

2) Drain cooling system. Loosen and remove drive belts and fan shroud. Remove 8 pump bolts and take off pump assembly.

Installation

Install water pump with water drain hole positioned downward. Use new gasket and reverse removal procedure.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Camshaft Housing	15-17 (20-24)
Camshaft Timing Pulley	48-54 (65-75)
Connecting Rod Cap	31-34 (42-46)
Crankshaft Pulley	98-119 (133-162)
Cylinder Head	
12 mm Bolts	55-61 (75-83)
Exhaust Manifold	26-32 (35-45)
Flywheel	51-57 (69-78)
Intake Manifold	15-17 (20-24)
Main Bearing Caps	72-78 (98-106)

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS

Year	Displacement		Fuel System	HP@RPM	Torque Ft. Lbs.@RPM	Compr. Ratio	Bore		Stroke	
	Cu. In.	cc					In.	mm	In.	mm
1982	168.4	2759	Fuel Inj.	145@5600	155@4400	8.8:1	3.27	83	3.35	85

VALVES

Engine Size & 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)
2759 cc							
Intake	.....	44.5°	45°	.047-.063 (1.2-1.6)	.3138-.3144 (7.970-7.985)	.0010-.0024 (.025-.060)	.....
Exhaust	.....	44.5°	45°	.047-.063 (1.2-1.6)	.3136-.3142 (7.965-7.980)	.0012-.0026 (.030-.065)	.....

PISTONS, PINS, RINGS

Engine	PISTONS	PINS		RINGS		
	Clearance In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Ring No.	End Gap In. (mm)	Side Clearance In. (mm)
2759 cc	.0020-.0028 (.050-.071)	.....	.0002-.0004 (.005-.011) limit .0006 (.015)	No. 1	.0083-.0146 (.21-.37)	.0012-.0028 (.03-.07)
				No. 2	.0067-.0209 (.17-.53)	.0008-.0024 (.02-.06)
				Oil	.0079-.0276 (.20-.70)	

SUPRA 5M-GE 6-CYLINDER (Cont.)

ENGINE SPECIFICATIONS (Cont.)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	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)
2759 cc	2.3617-2.3627 (59.988-60.012)	.0013-.0023 (.034-.058)	No. 4	.002-.010 (.05-.25)	2.0463-2.0472 (51.976-52.000)	.0008-.0021 (.021-.053)	.012 (.30)

VALVE SPRINGS

Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (Kg @ mm)	
		Valve Closed	Valve Open
2759 cc	1.886 (47.9)	69.0-76.1@1.575 (31.3-34.5@40.0)	.....

CAMSHAFT

Engine	Journal In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
2759 cc			
No. 1	1.4944-1.4951 (37.959-37.975)	.0010-.0026 (.025-.066)	.....
No. 2	1.6913-1.6919 (42.595-42.975)		
No. 3	1.7110-1.7116 (43.595-43.475)		
No. 4	1.7307-1.7313 (43.959-43.975)		
No. 5	1.7504-1.7510 (44.459-44.475)		
No. 6	1.7700-1.7707 (44.959-44.975)		
No. 7	1.7897-1.7904 (45.459-45.475)		

VALVE TIMING

Engine	INTAKE		EXHAUST	
	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
2759 cc	15°	53°	56°	12°