1970-73 DATSUN 240Z (L24 ENGINE) 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
1970-72	146	2393	2x1-Bbl.	151@5600	145.7@4400	9.0-1	3.268	83	2.902	73.7
1973	146	2393	2x1-Bbl.	.....	.....	8.8-1	3.268	83	2.902	73.7

ENGINE IDENTIFICATION

Serial number stamped in rear right side of cylinder block at head contact surface. "L24" designates 2400 cc engine.

ENGINE REMOVAL

NOTE – It is recommended that engine and transmission be removed as a unit. Engine can then be separated from transmission assembly.

1) Scribe alignment marks on hood around hood hinges and remove hood from hinges. Drain cooling system, engine crankcase, and transmission. Disconnect battery. Remove radiator hoses, remove radiator.

2) Disconnect fuel line from fuel pump, remove heater hoses, and disconnect vacuum hoses, accelerator linkage, throttle control wire and choke control wire at carburetor side. Disconnect wiring from starter, alternator, ignition coil, oil pressure switch and thermal transmitter.

3) Remove clutch slave cylinder and return spring, disconnect speedometer cable, back-up light switch. Disconnect transmission control lever from control lever bracket and remove lever. Disconnect front exhaust pipe from exhaust manifold and disconnect center pipe from main muffler. Remove front pipe, pre-muffler, and center pipe assembly.

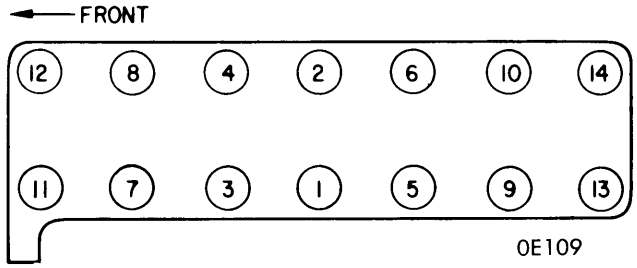
4) Disconnect propeller shaft from companion flange of housing. Jack transmission up a little and remove rear engine mounting crossmember. Remove bolts holding front engine mount brackets to engine mount insulators.

5) Attach engine hoist to hooks installed on engine cylinder head front and rear. As you begin to raise engine with hoist, gradually lower jack under transmission. Make sure engine tilts in order to clear body. Remove engine from vehicle. To install, reverse removal procedure.

CYLINDER HEAD REMOVAL

1) Drain cooling system and disconnect upper radiator hose. Remove spark plug wires and spark plugs. Remove fuel pump and disconnect fuel lines. Remove heater hoses.

2) Remove heat shield, disconnect vacuum hoses, accelerator linkage, and carburetor controls. Disconnect exhaust pipe from exhaust manifold. Remove intake manifold complete with carburetors, remove exhaust manifold. Remove thermostat housing.



CYLINDER HEAD TIGHTENING

3) Remove rocker cover. Remove fuel pump drive cam and camshaft sprocket. Remove oil pipe. Loosen cylinder head bolts and remove cylinder head.

NOTE – Special Tool ST17420001 may be used to support timing chain so that timing marks on crankshaft sprocket and timing chain will remain unchanged. This simplifies timing mark alignment.

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)
1970-71							
Intake	1.65 (42)	45.5°	45°	.055-.063 (1.4-1.6)	.3138-.3144 (7.970-7.985)	.0008-.0021 (.020-.053)	.413 (10.5)
Exhaust	1.30 (33)	45.5°	45°	.071-.087 (1.8-2.2)	.3128-.3134 (7.945-7.960)	.0016-.0029 (.040-.073)	.413 (10.5)
1972-73							
Intake	1.65 (42)	45.5°	45°	.055-.063 (1.4-1.6)	.3138-.3144 (7.970-7.985)	.0008-.0021 (.020-.053)	.433 (11)
Exhaust	1.30 (33)	45.5°	45°	.071-.087 (1.8-2.2)	.3128-.3134 (7.945-7.960)	.0016-.0029 (.040-.073)	.433 (11)

VALVE ARRANGEMENT

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

VALVE GUIDES CHECKING

1) Measure clearance between valve stem and valve guide with aid of micrometer and hole gauge. Check diameter of valve stem in three places; top, center and bottom.

1970-73 DATSUN 240Z (L24 ENGINE) 6 CYLINDER (Cont.)

2) Insert hole gauge in valve guide bore and measure at center. Subtract highest reading of valve stem diameter from valve guide bore to obtain clearance.

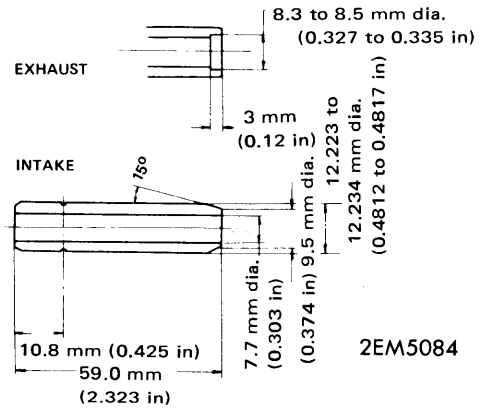
NOTE — As a quick check, a valve may be inserted into valve guide and moved either left or right (parallel with rocker arm). If its tip moves about .0079" or more, the clearance is beyond maximum limit of .0039".

VALVE GUIDE REPLACEMENT

1) Remove old guide with a press and a drift pin. Although this procedure may be carried out at room temperature, higher temperatures will aid removal.

2) Ream cylinder head side guide hole to provide interference fit of .0011-.0019" (.027-.049 mm). Press new valve guide into cylinder head with cylinder head heated to 302-392°F (150-200°C). Top of valve guide should extend above spring seat .516" (13.1 mm) for 1971-72 and .415" (10.5 mm) for 1973.

3) Ream bore of valve guides to .3150-.3157". Correct valve seat surface using new valve guide as axis.



VALVE GUIDES

VALVE SEAT INSERTS

Check valve seats for pitting at valve contact surface. Valve seat inserts of .0197" oversize are available if necessary.

VALVE SPRINGS

Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
1970-73			
Inner	1.76 (44.85)	20@1.38 (12.3@35.0)	56@.96 (25.5@24.5)
Outer	1.97 (49.98)	47@1.57 (21.3@40.0)	108@1.16 (49@29.5)

VALVE SPRING FREE LENGTH

Measure free length of each spring. Outer spring should have length of 1.97" and inner spring should have length of 1.76".

VALVE SPRING INSTALLED HEIGHT

With valves closed inner spring should have a height of 1.38" and outer spring should have a height of 1.57". See specifications for pressures with valves open and closed.

VALVE ADJUSTMENT

Loosen pivot locking nut and turn pivot screw until specified clearance is obtained with engine cold. Tighten pivot locking nut after adjustment and recheck clearance. Warm up engine. With engine stopped, measure valve clearance and reset to hot clearances if necessary.

Valve	Valve Clearance Adjustment Hot In. (mm)	Cold In. (mm)
1970-73		
Intake	.010 (.25)	.008 (.20)
Exhaust	.012 (.30)	.010 (.25)

PISTONS, PINS, RINGS

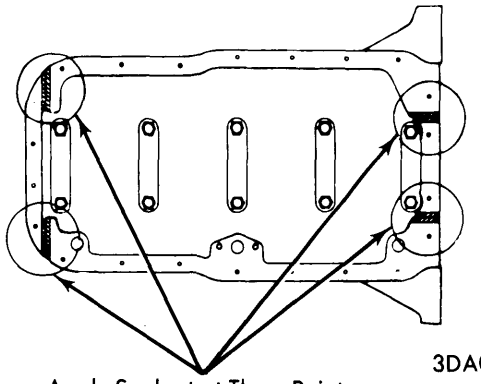
Engine	PISTONS	PINS		RINGS		
	Clearance In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Rings	End Gap In. (mm)	Side Clearance In. (mm)
1970-72	.0010-.0018 (.025-.045)	.0003-.0004 (.008-.010)	①.0006-.0013 (.015-.033)	No. 1	.009-.015 (.23-.38)	.0018-.0031 (.045-.078)
				No. 2	.006-.012 (.15-.30)	.0012-.0025 (.030-.063)
				Oil	.006-.012 (.15-.30)	....
1973	.0010-.0018 (.025-.045)	.00003-.0005 (.001-.013)	①.0006-.0013 (.015-.033)	No. 1	.009-.015 (.23-.38)	.0018-.0031 (.045-.080)
				No. 2	.006-.012 (.15-.30)	.0012-.0028 (.030-.070)
				Oil	.006-.012 (.15-.30)	....

① — Interference fit.

1970-73 DATSUN 240Z (L24 ENGINE) 6 CYLINDER (Cont.)

OIL PAN REMOVAL

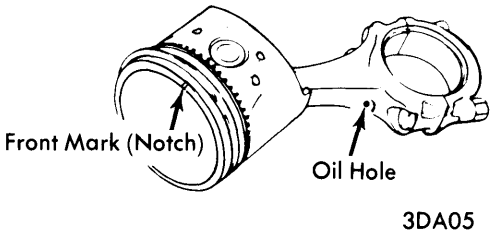
Loosen oil pan bolts and remove tie rod, if necessary. Remove oil pan. To install, reverse removal procedure using new oil pan gasket. Apply sealant to four mating surfaces as shown in illustration. Tighten oil pan bolts in crisscross pattern.



OIL PAN SEALING POINTS

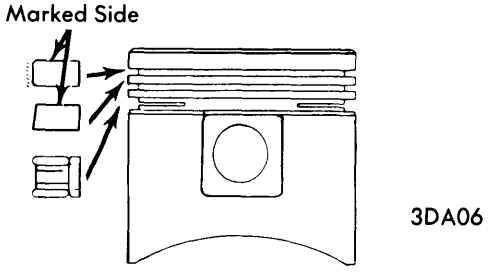
PISTON & ROD ASSEMBLY

Removal – Remove connecting rod nuts and bearing caps. Push piston and rod assembly out top of cylinder, using care not to damage any bearing surface. Retain all components in proper order for reassembly in original location.



PISTON & ROD ASSEMBLY

Installation – Reassemble piston and rod so that oil hole in connecting rod is facing right side of engine and notch on top of piston is facing forward. Install piston rings so gaps are 180° apart and 45° from center line of piston pin. Install connecting rods on original journal with rod and cap marks on same side. Tighten connecting rod nuts and check rod side play.



PISTON RING INSTALLATION

FITTING PISTONS

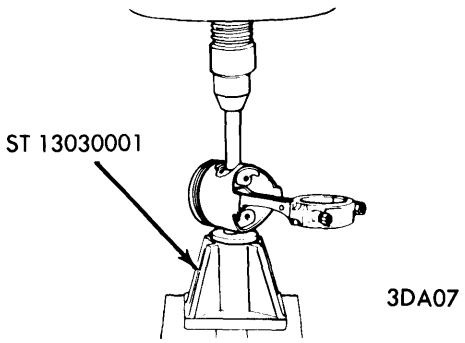
1) Measure cylinder bores for wear or taper at top, bottom and middle on thrust face and at 90° to thrust face. If excessive wear is found, rebore cylinder and install oversize pistons. Measure piston diameter .732" (18.6 mm) below center of piston pin bore.

Piston Diameters

Piston	In. (mm)
Standard	3.267-3.269 (82.99-83.04)
Oversize 1	3.276-3.278 (83.22-83.27)
Oversize 2	3.286-3.288 (83.47-83.52)
Oversize 3	3.296-3.298 (83.72-83.77)
Oversize 4	3.306-3.308 (83.97-84.02)
Oversize 5	3.326-3.328 (84.47-84.52)

2) When boring cylinders, use cylinder order of 1-5-3-6-2-4 to prevent heat distortion. Hone cylinder to final piston fit. If cylinder is worn beyond repair, new cylinder liners may be installed. New liners are fitted with an interference fit of .0031-.0035" (.08-.09 mm).

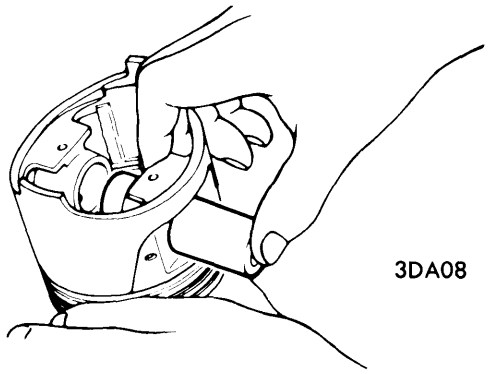
3) Measure piston ring end gap and side clearance. When measuring end gap, place ring at bottom of traveled part of cylinder bore and square ring in bore with head of piston.



REMOVING PISTON PIN

PISTON PINS

Piston pin must be a tight press fit in connecting rod. Pressing force is 1-3 tons. Piston pin fit in piston is thumb push fit. When pressing pin into connecting rod, oil pin and install so that oil jet of connecting rod large end is directed toward right side of cylinder block.

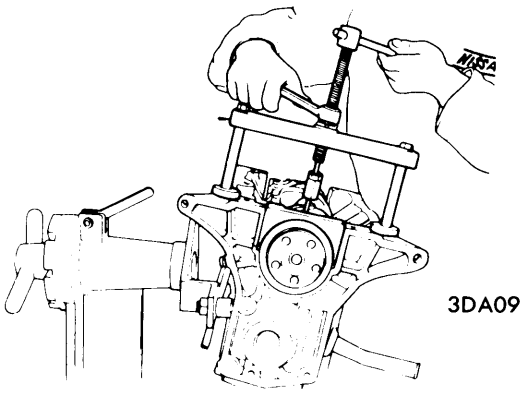


FITTING PIN IN PISTON

1970-73 DATSUN 240Z (L24 ENGINE) 6 CYLINDER (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)
1970-72	2.1631-2.1636 (54.942-54.955)	.0008-.0028 (.020-.072)	Center	.002-.007 (.05-.18)	1.9670-1.9675 (49.961-49.974)	.0006-.0026 (.014-.066)	.008-.012 (.2-.3)
1973	2.1631-2.1636 (54.942-54.955)	.0008-.0028 (.020-.072)	Center	.002-.007 (.05-.18)	1.9670-1.9675 (49.961-49.974)	.0010-.0022 (.025-.055)	.008-.012 (.2-.3)

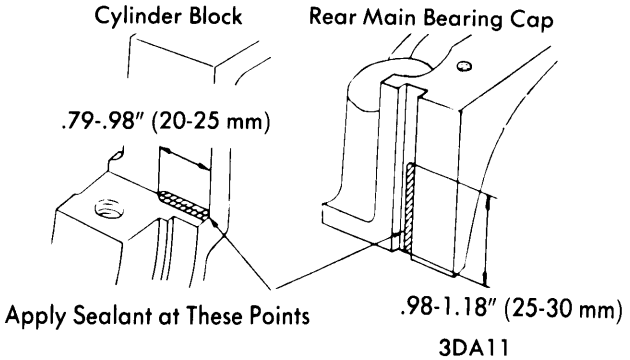


REAR MAIN BEARING CAP REMOVAL

NOTE — It is recommended that Special Tool ST1651S000 be used for removal of rear main bearing cap.

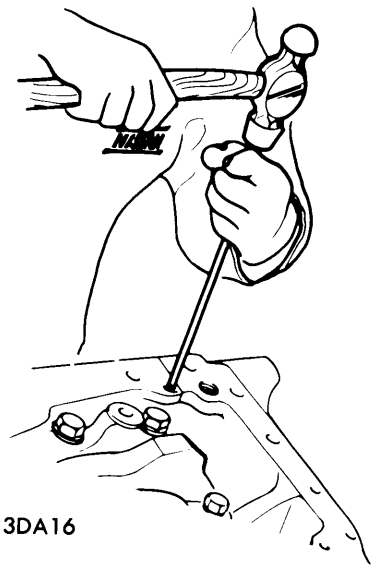
CRANKSHAFT REMOVAL

1) With engine removed from vehicle, cylinder head and oil pan removed, remove flywheel and end plate. Remove oil pump and its drive gear. Remove engine front cover, timing chain, chain tensioner and guide. Remove oil thrower, crankshaft worm gear and chain drive sprocket. Remove pistons and connecting rods and main bearing caps. Remove crankshaft.



REAR MAIN BEARING SEALANT

2) After installing crankshaft and bearings, apply sealant to each side of rear main bearing cap and each corner of cylinder block (see illustration). Tighten all bearing cap bolts gradually. Coat rear main bearing cap side oil seals with sealant and install with suitable drift.



INSTALLING REAR MAIN BEARING CAP SIDE SEALS

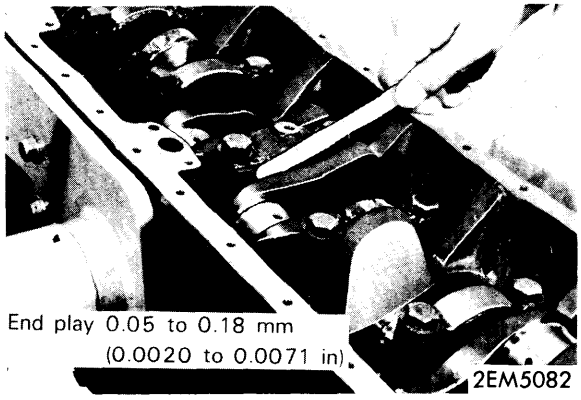
CHECKING CRANKSHAFT

1) Check shaft journals and crankpins for scars, wear or cracks. Taper and out of round of crank journals and crank pins should not exceed .0012".

2) Check crankshaft for bend. If bend exceeds .002" repair or replace. For measuring bend, use a dial indicator. Values are half as much as readings obtained when crankshaft is given a turn with gauge applied to center journal. Main bearings are available .010", .020", .030" and .040" (.25, .50, .75, 1.00 mm) undersize. Connecting rod bearings are available .0025", .005", .010", .020", .030" and .040" (.06, .12, .25, .50, .75, 1.00 mm) undersize.

3) Install crankshaft in block and measure end play. If it exceeds .012" (.3 mm), replace center main bearing. Check main drive shaft pilot bearing at rear of crankshaft for wear or damage. Replace if any defects are found.

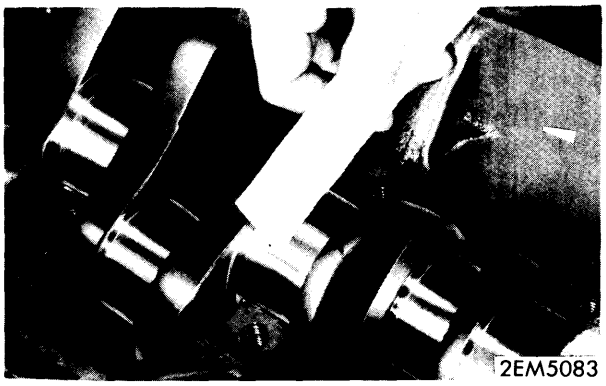
1970-73 DATSUN 240Z (L24 ENGINE) 6 CYLINDER (Cont.)



CRANKSHAFT END PLAY

MAIN BEARING & CONNECTING ROD BEARING CLEARANCE

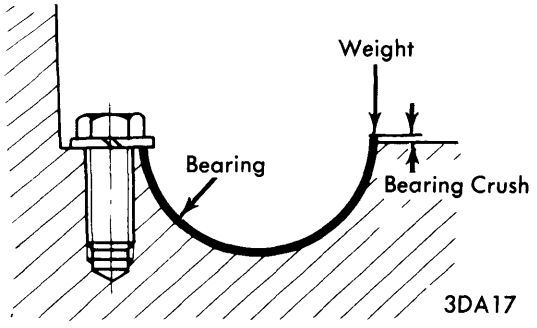
Check all bearings and bushings for wear or damage. Wipe off all oil or dirt and set main bearing on cap block. Cut a Plastigage to width of bearing and place in parallel with crank pin. Do not block oil hole. Install cap assembly and tighten bolts. Remove cap and measure width of Plastigage with Plastigage scale.



CHECKING BEARING CLEARANCE

BEARING CRUSH

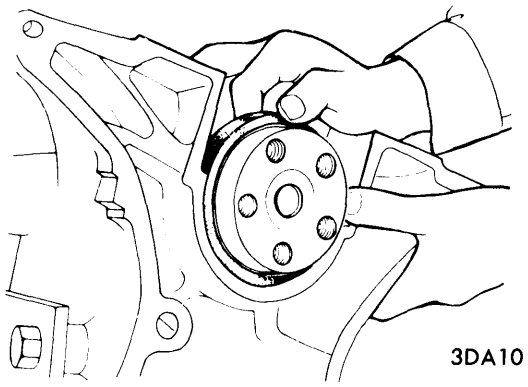
Set bearing on main bearing cap or cylinder block bearing recess. Lock one side of bearing and press other side so bearing back touches recess. Measure distance bearing extends above mating surface. Bearing crush of main bearings should be .0000-.0012" (.00-.03 mm) and connecting rod bearings should be .0006-.0016" (.015-.040 mm). If not as specified, replace bearing.



CHECKING BEARING CRUSH

REAR MAIN BEARING OIL SEAL

With cylinder block on bench or stand, oil seal may be installed with aid of suitable tool (ST15310000). Coat lip of seal with lithium grease.

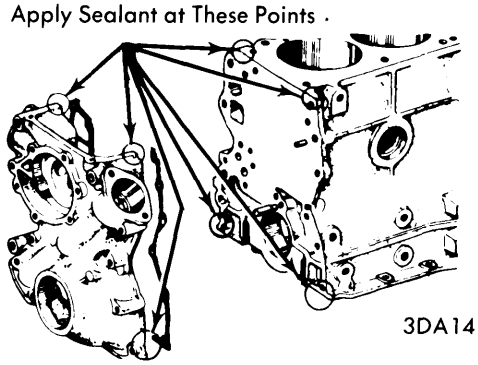


REAR OIL SEAL REMOVAL

ENGINE FRONT COVER

1) Drain cooling system, disconnect hoses and remove radiator from vehicle. Remove fan belt, fan, air pump belt and air pump. Remove wiring from distributor and remove distributor.

2) Remove fuel pump and thermostat housing. Using suitable puller, remove crank pulley. Remove front cover attaching bolts and remove engine front cover. To install, reverse removal procedure.



INSTALLING FRONT COVER

FRONT COVER OIL SEAL

New front cover oil seal may be installed by pressing into front cover. Seal should be replaced whenever front cover has been removed.

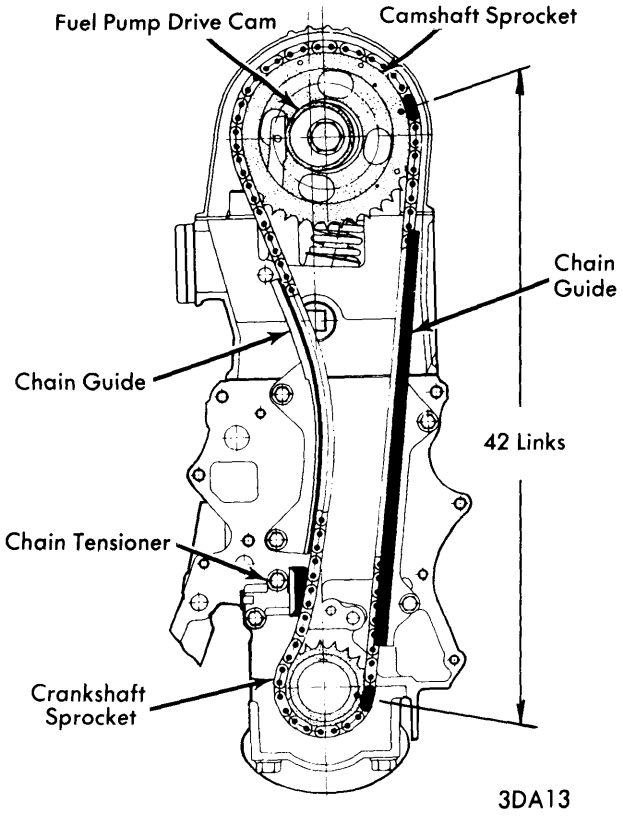
CAMSHAFT			
Engine	Journal Diam. In. (mm)	Clearance① In. (mm)	Lobe Lift In. (mm)
1970-73	1.8878-1.8883 (47.949-47.962)	.0015-.0026 (.038-.067)	.276 (7.0)

① – End Play is .003-.009" (.08-.23 mm).

1970-73 DATSUN 240Z (L24 ENGINE) 6 CYLINDER (Cont.)

TIMING CHAIN & GEARS

Remove engine front cover and camshaft drive sprocket and fuel pump cam. Remove timing chain, tensioner and chain guide. Remove oil thrower, crankshaft worm gear and crankshaft chain drive gear. To install, reverse removal procedure.

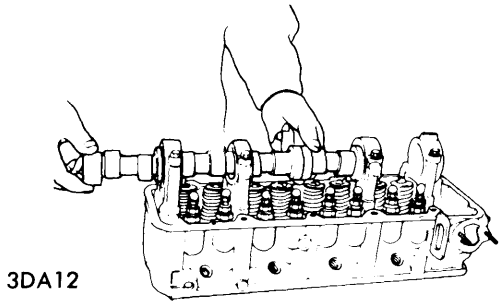


TIMING CHAIN INSTALLATION

NOTE – When installing timing chain, camshaft gear or crankshaft gear, make sure camshaft and crankshaft keys point upward. Set timing chain so that its mating marks match marks on crankshaft and camshaft sprockets on righthand side. There are 42 links between the two timing chain marks. Factory setting of camshaft sprocket is number one hole. If chain is excessively stretched, use number two or number three hole to achieve correct valve timing.

CAMSHAFT REMOVAL

Remove cylinder head. Remove valve rocker spring. Loosen valve rocker pivot lock nut and remove rocker arm by pressing down on spring. Use care not to lose valve rocker guide. Remove camshaft. Do not let camshaft scratch cam bushing during removal.



CAMSHAFT REMOVAL

CAMSHAFT BEARINGS

NOTE – Do not remove camshaft bearings unless necessary. If bearings are removed, bearing centers will be out of alignment and proper reassembly will be difficult without center boring.

Measure inner diameter of camshaft bearing and outer diameter of camshaft journal. If wear or damage is found inside bracket, replace cylinder head assembly.

VALVE TIMING

Engine	INTAKE		EXHAUST	
	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
1970-71	16°	44°	54°	18°
1972-73	16°	52°	54°	14°

ENGINE OILING

Crankcase Capacity – 4.25 qt. (4 ltr.). 5.25 qt. (5 ltr.) with oil filter.

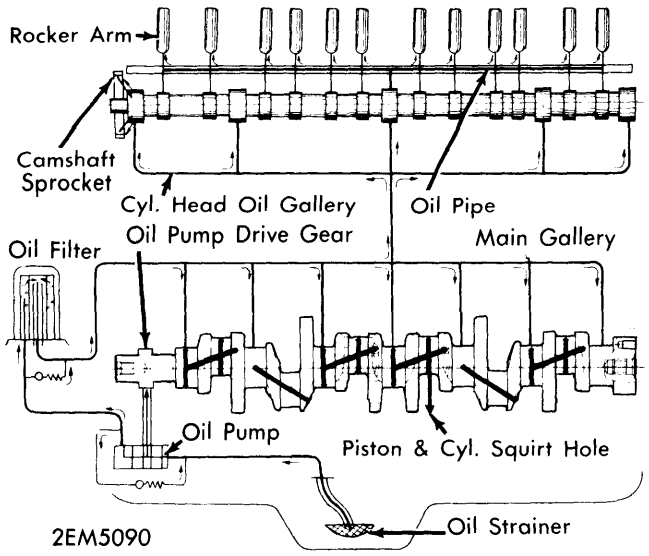
Oil Filter – Full flow type with disposable cartridge.

Normal Oil Pressure – 1970-72; 14-17 psi (1.0-1.2 kg/cm^2) at idle and 50-57 psi (3.5-4.0 kg/cm^2) at 2000 RPM. 1973; 14-17 psi (1.0-1.2 kg/cm^2) at idle (Man. Trans.), 10-13 psi (0.7-0.9 kg/cm^2) at idle (Auto. Trans.) and 50-57 psi (3.5-4.0 kg/cm^2) at 2000 RPM.

Pressure Relief Valve – Non-adjustable relief valve, mounted in oil pump, opens at 54-60 psi (3.8-4.2 kg/cm^2) for 1970-72 models and 53-61 psi (3.7-4.3 kg/cm^2) for 1973 models.

1970-73 DATSUN 240Z (L24 ENGINE) 6 CYLINDER (Cont.)

ENGINE OILING (Cont.)



OILING SYSTEM

ENGINE OILING SYSTEM

Oil drawn from oil pan passes through a screen to oil pump. Oil is delivered to full flow oil filter and to main oil gallery. Main oil gallery supplies oil to crankshaft main bearings and drilled passages in crankshaft. Oil sprayed from jet holes on connecting rods lubricates cylinders and piston pins. Oil from main gallery lubricates chain tensioner and timing chain. A center oil hole in the crankshaft center bearing feeds camshaft bearings on cylinder head. Valve rocker mechanism is lubricated through oil gallery in camshaft and through a small channel at base circle portion of each cam. Rocker arms and valves are lubricated intermittenly through small holes or oil pipe.

OIL PUMP

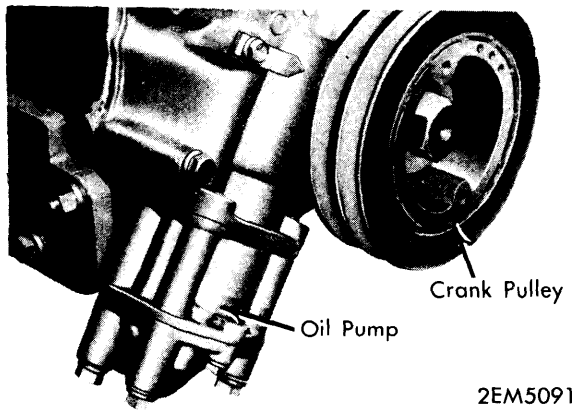
Oil pump assembly is installed to bottom of front cover by four bolts. Pump is driven by distributor drive shaft. Pump is rotor type. To remove, first remove distributor. Drain engine oil and remove splash shield board. Remove oil pump body together with drive spindle. To disassembly, proceed as follows:

1) Separate body cover from oil pump body by unscrewing one attaching bolt. Take out pump drive and driver gears from pump body.

2) Clean parts with cleaning solvent, and inspect for wear or damage. Make sure the following clearances are to specification.

Oil Pump Specifications

Application	In. (mm)
Inner Rotor-to-Outer Rotor	
Side Clearance	
1970-72	.0020-.0047 (.05-.12)
1973	.0016-.0031 (.04-.08)
Tip Clearance	.0047 (.12) Max.
Outer Rotor-to-Body	
Clearance	.0059-.0083 (.15-.21)
Relief Valve Spring	
Free Length	2.24 (57)



OIL PUMP INSTALLATION

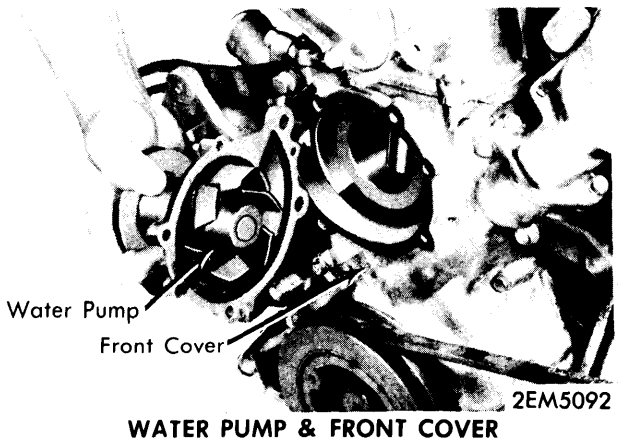
ENGINE COOLING

Thermostat – Opens at 180°F (82°C).

Cooling System Capacity – Approximately 2.5 gal. (with heater).

WATER PUMP

Centrifugal type pump with aluminum body. To remove, drain cooling system and remove fan belt, fan, and pulley. Remove pump attaching bolts and remove water pump.



WATER PUMP & FRONT COVER

1970-73 DATSUN 240Z (L24 ENGINE) 6 CYLINDER (Cont.)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Cylinder Head Bolts	
1970-71	
1st Step	33 (4.5)
2nd Step	47 (6.5)
1972	
1st Step	47 (6.5)
2nd Step	54 (7.5)
1973	
1st Step	29 (4.0)
2nd Step	43 (6.0)
3rd Step	47-61 (6.5-8.5)
Connecting Rod Nuts	
1970-72	20-24 (2.7-3.3)
1973	33-40 (4.5-5.5)
Flywheel Bolts	
1970-72	101 (14)
1973	101-123 (14-17)
Main Bearing Cap Bolts	33-40 (4.5-5.5)
Camshaft Gear Bolt	
1970-72	36-43 (5.0-6.0)
1973	87-116 (12-16)
Oil Pan Bolts	
1970-72	3-6 (0.4-0.8)
1973	4-7 (0.6-0.9)
Oil Pump Bolts	
1970-72	11-15 (1.5-2.1)
1973	8-11 (1.1-1.5)
Oil Strainer	
1970-71	6-9 (0.8-1.2)
1972-73	3-4 (0.4-0.6)
Crankshaft Pulley Bolt	
1970-72	116-130 (16-18)
1973	87-116 (12-16)
Front Cover Bolts	
Large Diameter	7-12 (1.0-1.6)
Small Diameter	3-6 (0.4-0.8)
Rocker Pivot Lock Nuts	36-43 (5.0-6.0)
Rocker Shaft Bracket Bolts	13-14 (1.8-2.0)
Manifold Nuts	6-9 (0.8-1.2)