1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES) 4 CYLINDER

GENERAL SPECIFICATIONS										
Year	Displ.		Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore		Stroke	
	cu. ins.	cc					in.	mm	in.	mm
L16 1968-73	62.8	1595	1x2-Bbl.	96@5600	110@3600	8.5-1	3.27	83	2.90	73.7
L18 1973	108.1	1770	1x2-Bbl.	.....	.....	8.5-1	3.35	85	3.07	78

ENGINE IDENTIFICATION

Engine number is stamped in rear right side of cylinder block at cylinder head contact surface. Number is preceded by engine model, L16 or L18.

ENGINE REMOVAL

1) Mark alignment marks on hood and hood hinges and remove hood. Drain cooling system, engine crankcase and transmission. Remove blow-by hose from rocker cover and remove air cleaner. Remove radiator grille and disconnect battery cables and remove battery. Disconnect ground cable at engine.

2) Remove upper and lower radiator hoses, loosen attaching bolts and remove radiator. *NOTE – If equipped with automatic transmission, remove torque converter cooling pipes from radiator.*

3) If equipped with heater, remove hoses at engine. On 510 and 620 models, remove engine fan and pulley. Disconnect fuel line from fuel pump and disconnect accelerator and choke control linkage and cables.

4) Disconnect wiring from starter, alternator, ignition coil, oil pressure switch and thermal transmitter. Remove clutch slave cylinder and return spring. Disconnect speedometer cable and disconnect flat attaching plug connector from back-up light switch.

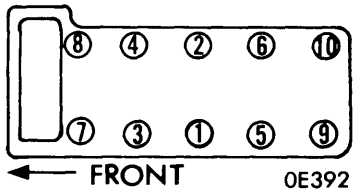
5) Disconnect transmission control shift rods and selector rods and remove cross shaft assembly by removing bracket from side member. On floor shift models, remove rubber boot and disconnect shift lever. Disconnect front exhaust pipe from exhaust manifold. On 510 and 610 models, disconnect center exhaust pipe from rear pipe and remove front pipe, pre-muffler and center pipe as an assembly.

6) Disconnect propeller shaft by disconnecting it from companion flange of gear carrier. On 620 models, disconnect propeller shaft center bearing bracket from third crossmember and remove propeller shaft. Plug rear of transmission to prevent oil leakage. Jack up transmission a little and remove rear engine mount crossmember by removing bolts of engine mount insulator. Remove crossmember and handbrake cable clamp.

7) Use suitable engine hoist and hook hoist to attachment points provided on engine. As engine is raised, lower jack a little at a time. Tilt engine up and remove from vehicle. To install, reverse removal procedure.

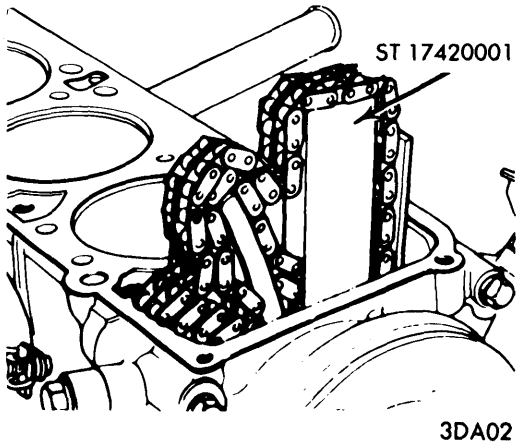
CYLINDER HEAD REMOVAL

Remove ignition coil, spark plug wires, and spark plugs. Remove distributor wiring, remove distributor. Remove thermostat housing, intake and exhaust manifolds, and fuel pump. Remove fan belt, pulley and water pump. Remove rocker cover. Disconnect fuel pump drive cam and camshaft sprocket. Remove cylinder head assembly.



CYLINDER HEAD TIGHTENING SEQUENCE

NOTE – Special Tool ST17420001 is available to support timing chain during cylinder head removal. Use of tool eases work needed for aligning timing marks when reinstalling timing chain.



SPECIAL TOOL (TIMING CHAIN SUPPORT)

1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES) 4 CYLINDER (Cont.)

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)
L16							
1968-72							
Int.	1.496 (38)	45.5°	45°	.055-.071 (1.4-1.8)	.315 (8.0)	.0006-.0018 (.015-.045)	.394 (10.0)
Exh.	1.299 (33)	45.5°	45°	.063-.079 (1.6-2.0)	.315 (8.0)	.0016-.0028 (.040-.070)	.394 (10.0)
1973							
Int.	1.654 (42)	45.5°	45°	.055 (1.4)	.3136-.3142 (7.965-7.980)	.0008-.0021 (.020-.053)	.413 (10.5)
Exh.	1.299 (33)	45.5°	45°	.051 (1.3)	.3128-.3134 (7.945-7.960)	.0016-.0029 (.040-.073)	.413 (10.5)
L18							
1973							
Int.	1.654 (42)	45.5°	45°	.055 (1.4)	.3136-.3142 (7.965-7.980)	.0008-.0021 (.020-.053)	.413 (10.5)
Exh.	1.378 (35)	45.5°	45°	.051 (1.3)	.3128-.3134 (7.945-7.960)	.0016-.0029 (.040-.073)	.413 (10.5)

VALVE ARRANGEMENT

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

VALVE STEM CLEARANCE

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.

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 tip moves about .0079" or more, clearance is beyond maximum limit of .0039".

VALVE GUIDE REPLACEMENT

1) Remove old guide with press and 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). Heat cylinder head to 302-392°F (150-200°C) and press new guide into cylinder head. Guide should extend .417" (10.6 mm) above valve spring seat.

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

VALVE SEAT INSERTS

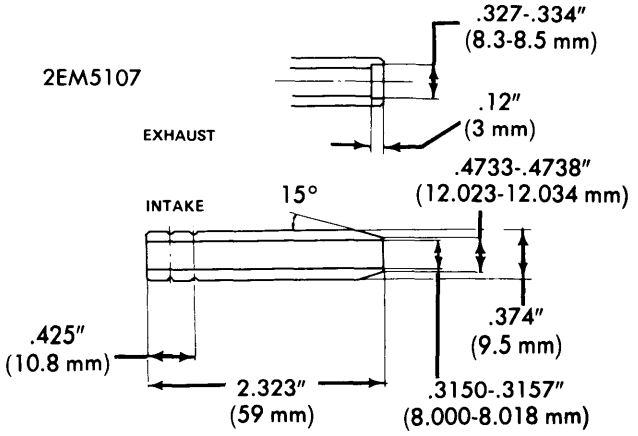
1) Check valve seats for pitting at valve contact surface. Valve seat inserts of .0197" oversize are available if necessary. To remove old inserts, bore out until old insert collapses. The depth stop on machine should be set so that boring cannot continue beyond bottom face of insert recess in cylinder head.

2) Machine cylinder head recess diameter to concentric circles to valve guide center so that insert will have correct fit. Heat cylinder head to 302-392°F and install insert making sure that it beds on bottom face of recess.

3) Valve seats should be cut or ground to correct face angle and seat width and to head diameter of valve to be installed.

VALVE SPRINGS

Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
All 1968-72			
Outer	2.047 (52)	64@1.53 (29@38.9)	105@1.21 (47.8@30.7)
Inner	1.766 (44.85)	27@1.38 (12.3@35)	56@.965 (25.5@24.5)
All 1973			
Outer	1.771 (44.98)	47@1.57 (21.3@40)	108@1.16 (49@29.5)
Inner	1.766 (44.85)	27@1.38 (12.3@35)	55@.965 (25@24.5)



VALVE GUIDES FOR L-16 ENGINE

1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES) 4 CYLINDER (Cont.)

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 Clearance Adjustment

Valve	Hot In. (mm)	Cold In. (mm)
Intake	.010 (.25)	.008 (.20)
Exhaust	.012 (.30)	.010 (.25)

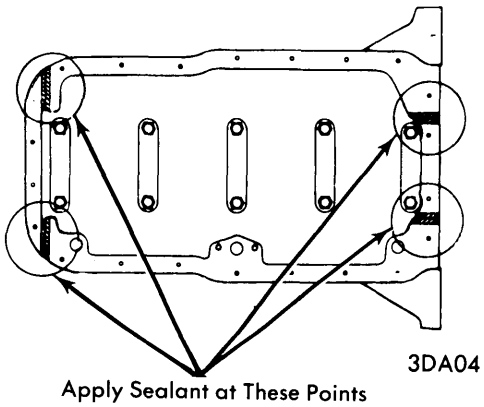
PISTONS, PINS, RINGS

Engine	PISTONS	PINS		RINGS		
	Clearance In. (mm)	Piston Fit In. (mm)	①Rod Fit In. (mm)	Rings	End Gap In. (mm)	Side Clearance In. (mm)
L16 1968-72	.0010-.0018 (.025-.045)	.0003-.0004 (.008-.010)	.0006-.0013 (.015-.033)	No. 1 No. 2 Oil	.009-.015 (.23-.38) .006-.012 (.15-.30) .006-.012 (.15-30)	.0018-.0031 (.045-.078) .0012-.0025 (.030-.063) .0010-.0025 (.025-.063)
1973	.0010-.0018 (.025-.045)	.0001-.0006 (.003-.015)	.0006-.0013 (.015-.033)	No. 1 No. 2 Oil	.010-.016 (.25-.40) .006-.012 (.15-.30) .012-.035 (.30-.90)	.0016-.0031 (.04-.08) .0012-.0028 (.03-.07) ....
L18 1973	.0010-.0018 (.025-.045)	.0001-.0006 (.003-.015)	.0006-.0013 (.015-.033)	No. 1 No. 2 Oil	.014-.022 (.35-.55) .012-.020 (.30-.50) .012-.035 (.30-.90)	.0018-.0031 (.045-.080) .0012-.0028 (.03-.07) ....

① – Interference fit.

OIL PAN REMOVAL & INSTALLATION

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.

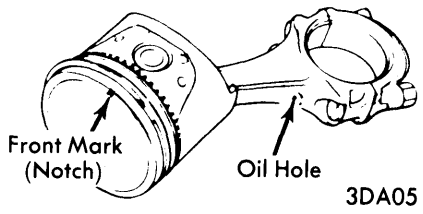


Apply Sealant at These Points

OIL PAN SEALING POINTS

PISTON & ROD ASSEMBLY

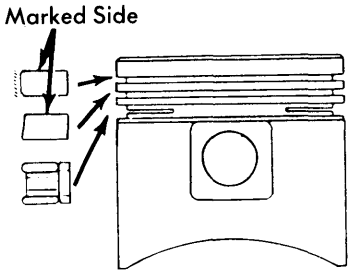
Removal – Remove connecting rod nuts and bearing caps. Push piston and rod assembly out top of cylinder, using care not to damage any bearing surface. Retain all components in proper order for reassembly in original location.



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.

1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES) 4 CYLINDER (Cont.)



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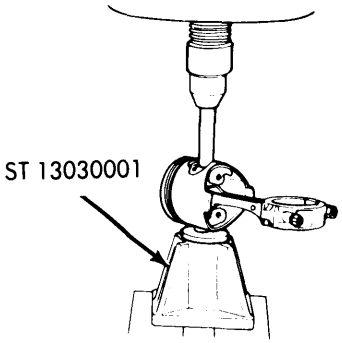
PISTON RING INSTALLATION



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REMOVING PISTON PIN

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-.787" (18.6-20 mm) below center of piston pin bore.

2) When boring cylinders, use cylinder order of 2-4-1-3 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 .0030-.0033" (.075-.085 mm).

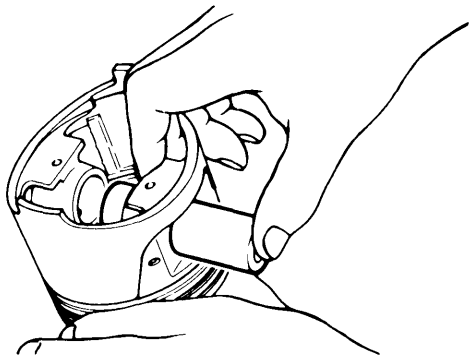
3) Measure piston ring end gap and side clearance, replace as necessary. Pistons are available in .020" (.50 mm) and .040" (1.0 mm) oversizes.

Piston Specifications

Application	Diameter In. (mm)
L16 Engine	
Standard	3.2673-3.2693 (82.99-83.04)
.020" O.S.	3.2862-3.2882 (83.47-83.52)
.040" O.S.	3.3059-3.3079 (83.97-84.02)
L18 Engine	
Standard	3.3461-3.3481 (84.99-85.04)
.020" O.S.	3.3649-3.3669 (85.47-85.52)
.040" O.S.	3.3846-3.3866 (85.97-86.02)

PISTON PINS

Piston pin must be a tight press fit in connecting rod, pressing force is 1-3 tons for 1968-72 engines and 1-1½ tons for 1973 engines. 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. Pin should be thumb push fit in piston.



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FITTING PIN IN PISTON

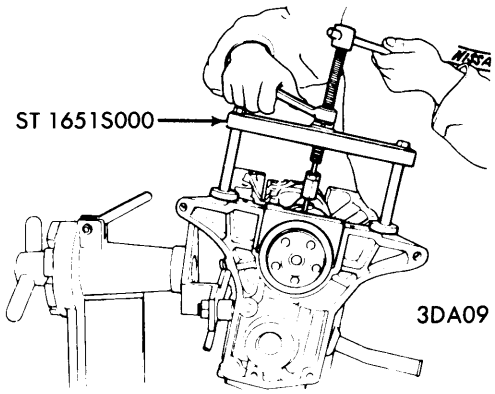
CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

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)
All 1968-72	2.1631-2.1636 (54.942-54.955)	.0008-.0028 (.020-.072)	No. 3	.002-.006 (.05-.15)	1.9670-1.9675 (49.961-49.974)	.0006-.0026 (.014-.066)	.008-.012 (.20-.30)
All 1973	2.1631-2.1636 (54.942-54.955)	.0008-.0024 (.020-.062)	No. 3	.002-.007 (.05-.18)	1.9670-1.9675 (49.961-49.974)	.0010-.0022 (.025-.055)	.008-.012 (.20-.30)

1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES) 4 CYLINDER (Cont.)

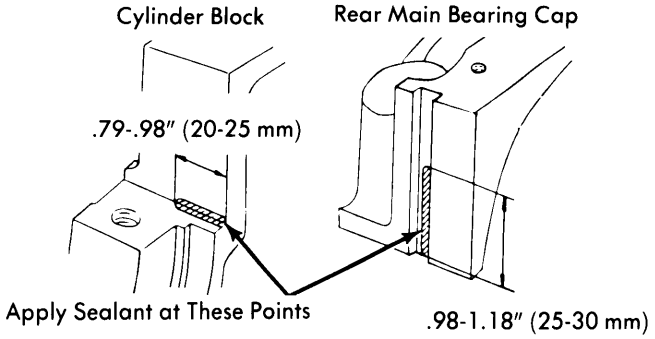
CRANKSHAFT REMOVAL

1) With engine inverted on work bench or engine stand, remove oil pan and oil strainer. Remove oil pump, drive gear, front cover, chain tensioner and timing chain.



REAR MAIN BEARING CAP REMOVAL

2) Remove oil thrower, crankshaft worm gear and chain drive sprocket. Remove piston and rods and take off connecting rod bearings making sure to keep them in correct order for reassembly. Remove flywheel. Using suitable tool (ST1651S000) remove rear main bearing cap. Remove rear oil seal and lift out crankshaft.

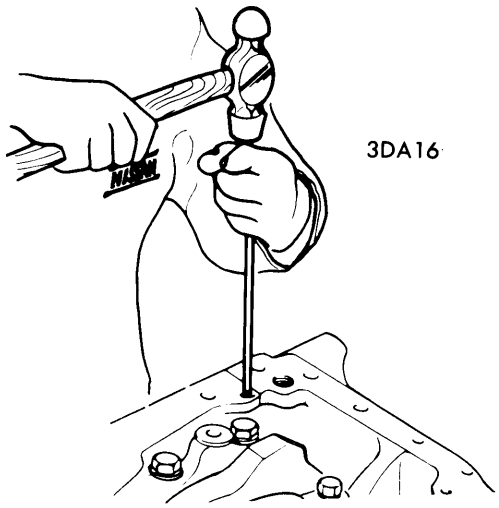


REAR MAIN BEARING SEALANT

3) 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.

MAIN BEARING & CONNECTING ROD BEARING CLEARANCE

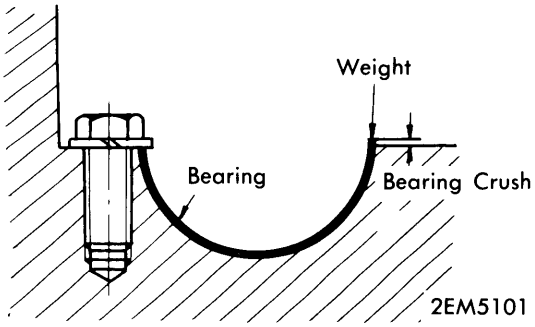
Check all bearings and bushings for wear or damage. Wipe off all oil or dirt and set main bearing on cap block. Cut a Plastigage to width of bearing and place in parallel with crank pin. Do not block oil hole. Install cap assembly and tighten to specified torque. Remove cap and measure width of Plastigage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



INSTALLING REAR MAIN BEARING CAP SIDE SEALS

BEARING CRUSH

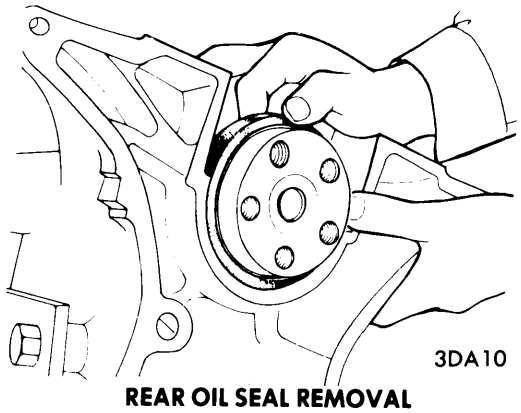
Set bearing on main bearing cap or cylinder block bearing recess. Lock one side of bearing and press other side so bearing back touches recess. Measure distance bearing extends above mating surface. Bearing crush of main bearings should be .0000-.0012" (.00-.03 mm) and connecting rod bearings should be .0006-.0018" (.015-.045 mm). If not as specified, replace bearing.



CHECKING BEARING CRUSH

REAR 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.



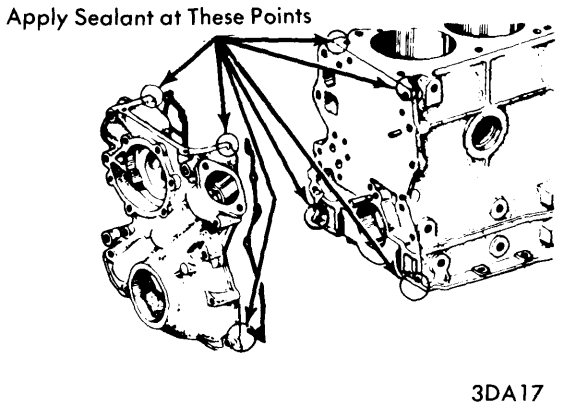
REAR OIL SEAL REMOVAL

1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES)
4 CYLINDER (Cont.)

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. Replace oil seal when cover is removed.



INSTALLING FRONT COVER

FRONT COVER OIL SEAL

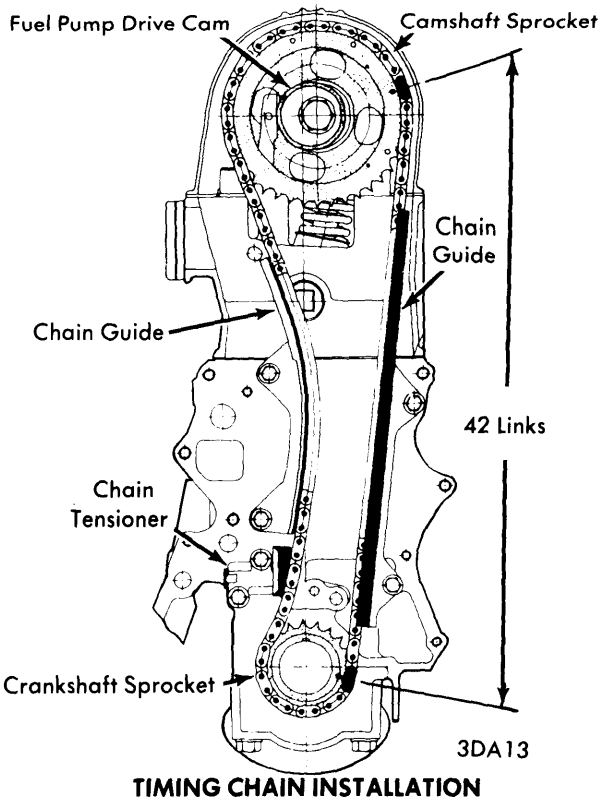
New front cover oil seal may be installed by pressing into front cover. Seal should be replaced whenever front cover has been removed.

CAMSHAFT			
Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
L16 1968-72	1.8878-1.8883 (47.949-47.962)	.0015-.0026 (.038-.067)	.262 (6.65)
L16 & L18 1973	1.8878-1.8883 (47.949-47.962)	.0015-.0026 (.038-.067)	.276 (7.0)

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.

NOTE — When installing timing chain, camshaft gear or crankshaft gear, make sure camshaft and crankcase keys point upward. Set timing chain so that mating marks match marks on crankshaft and camshaft sprockets. There are 42 chain links between the two timing chain marks.

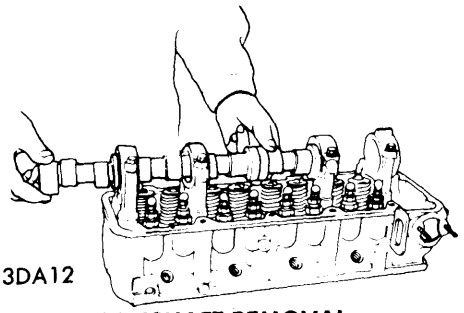


TIMING CHAIN INSTALLATION

CAMSHAFT REMOVAL

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

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



CAMSHAFT REMOVAL

VALVE TIMING				
	INTAKE		EXHAUST	
Engine	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
L16 1968-72	12°	48°	50°	8°
L16 & L18 1973	12°	48°	50°	26°

1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES) 4 CYLINDER (Cont.)

ENGINE OILING

ENGINE OILING SYSTEM

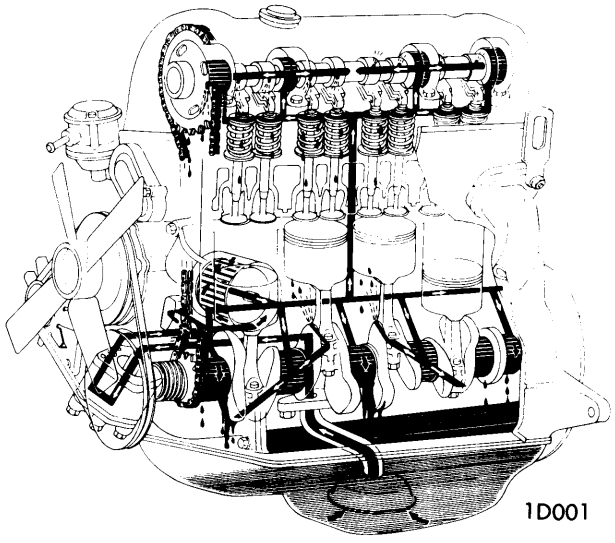
Crankcase Capacity – 4.5 qts. (4.3 ltr.) with filter.

Oil Filter – Full-flow, disposable cartridge.

Normal Oil Pressure – 14-17 psi (1.0-1.2 kg/cm²) for 1968-72 engines and 11-40 psi (.8-2.8 kg/cm²) for 1973 engines at idle. 50-57 psi (3.5-4.0 kg/cm²) at 2000 RPM. 71 psi (5.0 kg/cm²) maximum.

Pressure Regulator Valve – Non-adjustable relief valve, mounted in oil pump.

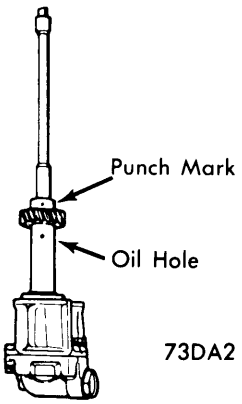
Oil drawn from oil pan passes through screen to oil pump and is delivered to full flow oil filter and to main oil gallery. Main oil gallery supplies oil to crankshaft main bearings and drilled passages in crankshaft. Oil sprayed from jet holes on connecting rods lubricates cylinders and piston pins. Oil from main gallery lubricates chain tensioner and timing chain. A center oil hole in 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.



ENGINE OILING SYSTEM

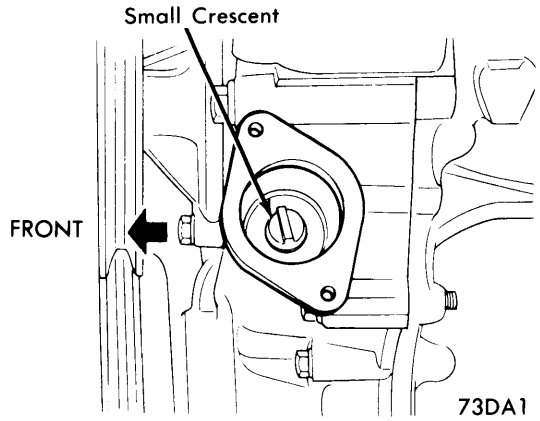
OIL PUMP

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



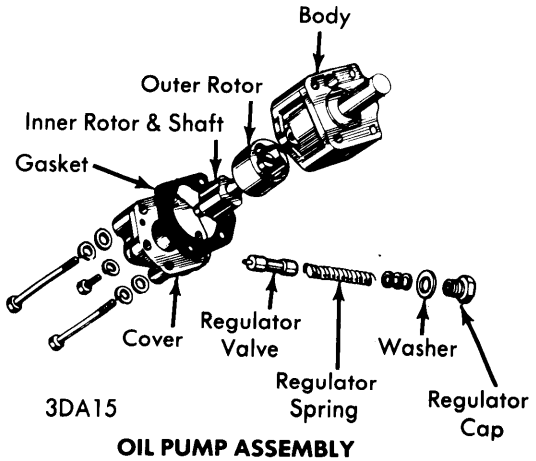
OIL PUMP TIMING MARKS

1) Separate body cover from oil pump body by unscrewing attaching screws. Take out pump drive and driven gears from pump body.



OIL PUMP DRIVE SHAFT INSTALLATION

2) Clean parts with cleaning solvent, and inspect for wear or damage. Make sure clearances are to specifications. Pump is serviced as an assembly only. Replace pump if any part is worn or damaged.



OIL PUMP ASSEMBLY

1968-73 DATSUN 510, 521, 610 & 620 (L16 & L18 ENGINES) 4 CYLINDER (Cont.)

ENGINE OILING (Cont.)

3) Rotate engine until number one piston is at TDC. Fill pump housing with oil and align punch mark on shaft with hole in pump (see illustration). Using a new gasket, install oil pump and drive shaft assembly so that tongue is positioned at 11:25 o'clock. Small crescent will be facing forward (see illustration). Check drive gear engagement through distributor mounting hole.

Oil Pump Clearances

Application	In. (mm)
Inner-to-Outer Rotor	.0020-.0047 (.05-.12)
Tip Clearance	.0047 (.12) Max.
Outer Rotor-to-Body	.0059-.0083 (.15-.21)
Relief Valve Spring (Free Length)	2.067 (52.5)

ENGINE COOLING

Thermostat – Opens at 180°F (82°C).

Cooling System Capacity – Model 510, 6.8 qts. (6.4 ltr.) with heater; model 610, 6.9 qts. (6.5 ltr.) with heater; models 521 and 620, 6.3 qts. (6 ltr.) 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.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Cylinder Head Bolts	
1968-72	
1st Step	33 (4.5)
2nd Step	40 (5.5)
1973	
1st Step	29 (4.0)
2nd Step	43 (6.0)
3rd Step	47-62 (6.5-8.5)
Connecting Rods	
L16 Engine	
1968-72	20-24 (2.7-3.3)
1973	23-27 (3.2-3.8)
L18 Engine	33-40 (4.5-5.5)
Flywheel Bolts	
1968-72	69-76 (9.5-10.5)
1973	100-115 (14-16)
Main Bearing Caps	33-40 (4.5-5.5)
Camshaft Gear Bolts	87-115 (12-16)
Oil Pan Bolts	
1968-72	3-5 (0.4-0.7)
1973	4-7 (0.6-0.9)
Oil Pump Bolts	
1968-72	11-15 (1.5-2.1)
1973	8-11 (1.1-1.5)
Oil Strainer	6-10 (0.8-1.2)
Crankshaft Pulley Bolt	
1968-72	115-130 (16-18)
1973	87-115 (12-16)
Rocker Arm Nuts	36-43 (5.0-6.0)
Manifold Nuts	4-7 (0.6-0.9)