

1968-70 DATSUN 2000 (U-20 ENGINE) 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
1968-70	120.92	1982	2x1-Bbl.	135@6000	132@4000	9.5-1	3.433	87.2	3.267	83

ENGINE IDENTIFICATION

Engine number and identification is stamped on right side of cylinder block. The first three digits indicate engine type (U-20).

ENGINE REMOVAL

NOTE — It is recommended that engine and transmission be removed as a unit.

1) Mark hinge location on hood and remove hood from hinges. Drain cooling system, disconnect battery and remove. Disconnect engine wire harness and engine to frame ground straps. Disconnect tachometer cable and high tension cables.

2) Disconnect radiator and heater hoses at engine. Remove radiator shroud screws, remove radiator and shroud. Disconnect accelerator linkage and disconnect fuel lines from fuel pump.

3) Disconnect exhaust pipe from exhaust manifold, disconnect speedometer cable and remove clutch operating cylinder. Disconnect propeller shaft and remove. Remove two bolts holding rear engine mount to frame crossmember bracket.

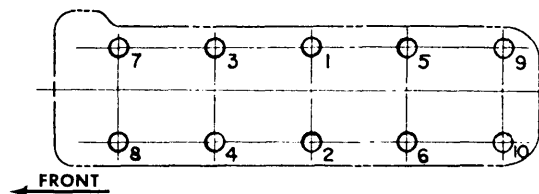
4) Remove bolts holding front engine mounts to frame brackets and using suitable engine hoist, raise engine. Disconnect starter wires and remove engine, tilting engine up in front to clear body work. To install, reverse removal procedure.

CYLINDER HEAD REMOVAL

1) Drain coolant and disconnect radiator and heater hoses. Remove air cleaner and disconnect fuel and vacuum lines at carburetors. Remove carburetors and intake manifold as an assembly.

2) Remove exhaust manifold and rocker arm cover. Disconnect camshaft sprocket at camshaft front end, and support sprocket temporarily to chain guide with a screw. Remove cylinder head front plate and upper chain tensioner.

3) Remove two nuts holding cylinder head to timing chain cover and remove cylinder head bolts. Remove cylinder head. To install, reverse removal procedure, tightening bolts to 43.3 ft. lbs. for 1st step, and then finally torquing bolts to 65.1 ft. lbs.



OE393 U-20 CYLINDER HEAD TIGHTENING

VALVES								
Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift	
U-20	Intake	1.811"	45.5°	45°	.055"	.3408-.3413"	.0006-.0017"
	Exhaust	1.417"	45.5°	45°	.0697"	.3396-.3402"	.0018-.0029"

VALVE ARRANGEMENT

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

VALVE GUIDE SERVICING

Valve stem to guide clearance is .0006-.0017" for intake valves and .0018-.0029" for exhaust valves. To replace valve guides, proceed as follows:

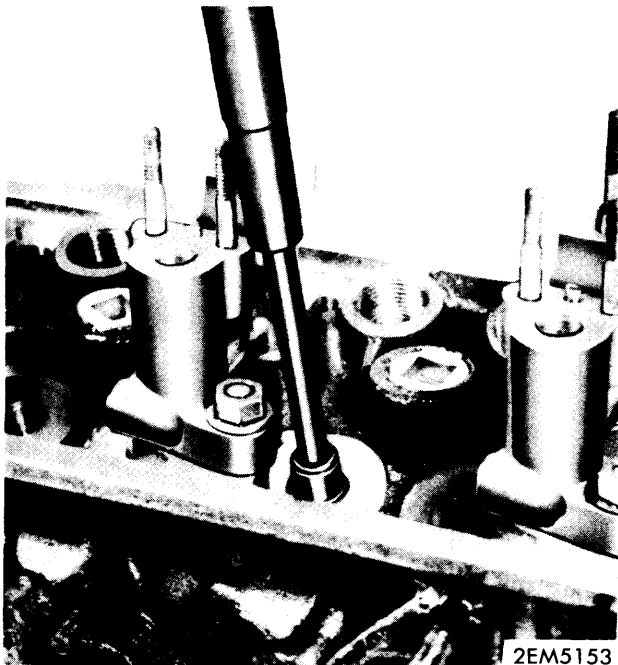
1) Rest cylinder head with machined face up. Drive valve guide down from combustion space with suitable size drift. To

replace guides, first heat cylinder head to 302-320°F.

2) Rest cylinder head with machined face down. Press new guides in from top of cylinder head. Exhaust guides must be inserted with small chamfer at top and intake valve guides should have taper ends at bottom.

3) Drive guides into combustion space until they are .518-.516" above machined surface of spring seat. Interference fit is .0009-.0020" for both intake and exhaust guides.

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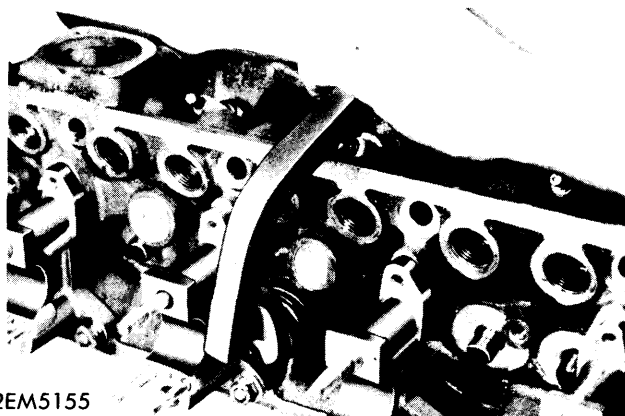
INSTALLING VALVE GUIDES

VALVE SPRINGS			
Engine	Free Length	PRESSURE (LBS.)	
		Valve Closed	Valve Open
U-20			
Outer	1.96"	71.1@1.62"	168.1@1.17"
Inner	1.91"	29.3@1.54"	65.8@1.09"

VALVE & VALVE SPRING INSTALLATION

1) Starting with No. 1 cylinder, place exhaust valve in port and place valve spring seat with lip seal and valve spring and cap in position.

2) Using suitable spring compressor, compress spring and install valve keepers. Make sure that keepers seat properly in valve stem groove. Assemble remaining valves and valve springs in cylinder head.

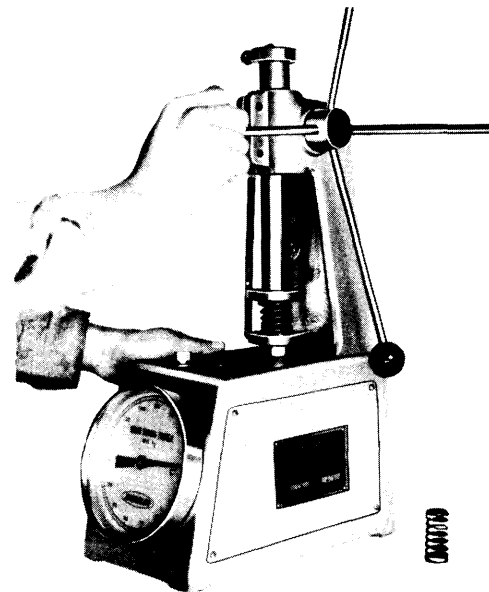


VALVE & VALVE SPRING INSTALLATION

VALVE SPRING FREE LENGTH & INSTALLED HEIGHT

1) Engine uses inner and outer springs. Free length of inner spring is 1.91" and outer spring is 1.96". With valves closed, installed height of inner spring should be 1.54" and outer should be 1.62".

2) With valves open inner spring should measure 1.09" and outer should measure 1.17". For spring pressures, see specifications.

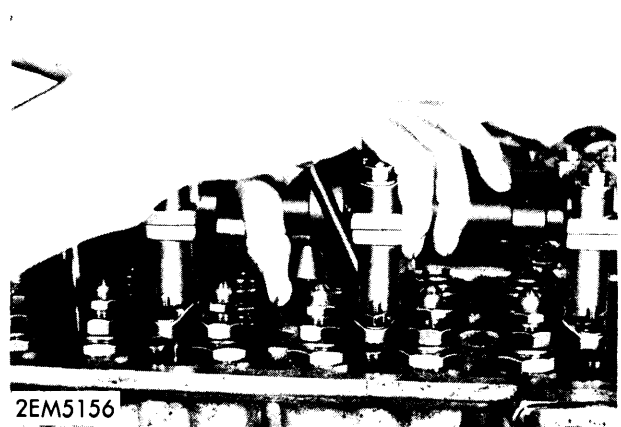


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TESTING SPRING PRESSURES

ROCKER ARM ASSEMBLY

Remove rocker arm cover and disconnect camshaft sprocket at camshaft front end. Support sprocket temporarily with a screw to camshaft chain guide. Remove camshaft and remove rocker arms.



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ROCKER ARM REMOVAL

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NOTE — When replacing rocker arms, it is recommended to install by pressing down valve springs after installation of camshaft.

VALVE CLEARANCE ADJUSTMENT

Set valve clearance by rotating rocker screw while checking clearance with feeler gauge. Screw is re-locked by tightening hexagon lock nut while holding screw against rotation. With engine hot, but not running, set exhaust valve clearance to .008" and intake valve to .012".

PISTONS, PINS, RINGS						
Engine	PISTONS	PINS		RINGS		
	Clearance	Piston Fit	Rod Fit	Rings	End Gap	Side Clearance
U-20	.0012-.0020"	.0002-.0005"	.0010-.0014"	1	.0098-.016"	.0016-.0029"
				2	.0060-.0118"	.0012-.0025"
				Oil	.0055-.0114"	.0010-.0025"

OIL PAN REMOVAL

Drain crankcase and unscrew bolts and nuts holding oil pan to cylinder block and timing chain cover. To install, reverse removal procedure and tighten bolts and nuts to 3.6 ft. lbs.

PISTON & ROD REMOVAL

Remove cylinder head, intake and exhaust manifolds and oil pan. Check connecting rod and piston for cylinder number

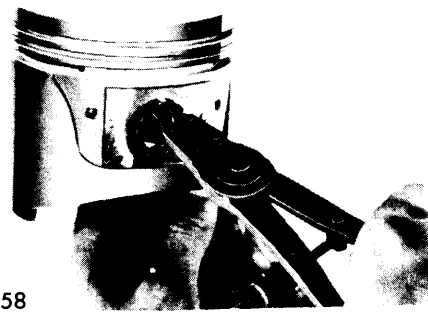
identification and mark them if necessary. Remove big end bearing caps and carefully remove connecting rod and piston assembly by pushing out. Reinstall bearing caps.

PISTON PIN REPLACEMENT

Remove circlips from recesses in piston pin bore. Push out piston pin and take off connecting rod. Connecting rod to piston pin should be a thumb push fit. To install, reverse removal procedure.



PISTON ASSEMBLY REMOVAL



PISTON PIN CIRCLIP REMOVAL

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS							
Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Bearing	Crankshaft Endplay	Journal Diam.	Clearance	Sideplay
U-20	2.4780-2.4785"	.0008-.0028"	#4	.002-.007"	2.0449-2.0454"	.0013-.0034"	.008-.012

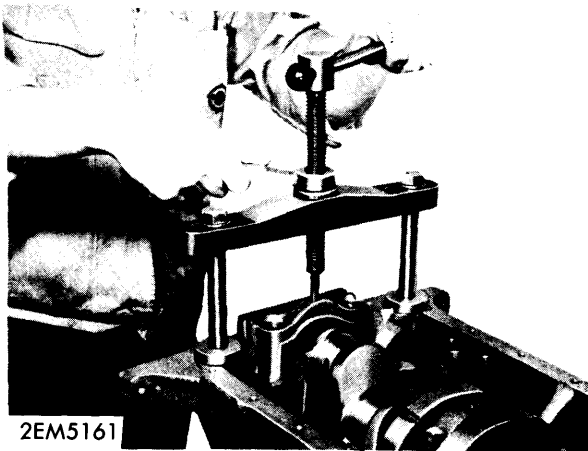
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MAIN BEARING REPLACEMENT

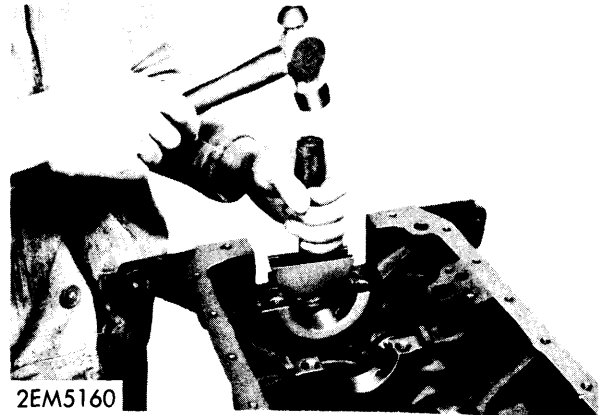
- 1) Remove oil pan and bearing cap of bearing to be replaced. Loosen all of the other bearing caps. Insert small pin in crankshaft oil hole. Head of pin should be large enough not to fall into oil hole, but thinner than thickness of bearing.
- 2) With pin in place, rotate shaft so that upper half of bearing will rotate in direction of crankshaft rotation. This will roll upper bearing shell out of engine.
- 3) Oil new upper bearing shell and insert plain end of shell between crankshaft and indented or notched side. Rotate bearing into place. Install new bearing shell in bearing cap and tighten all main bearing caps (except one replaced) to 65.1 ft. lbs. Check bearing clearance with Plastigage, remove Plastigage and tighten bearing cap. Install oil pan using new gasket and seals.

REAR MAIN OIL SEAL

- 1) Remove oil pan and using puller, remove rear bearing cap. Special Tool ST446 30000 is recommended for this purpose. Remove oil seal from groove of bearing cap and remove side oil seals using small screwdriver.

2EM5161
REAR MAIN BEARING CAP REMOVAL

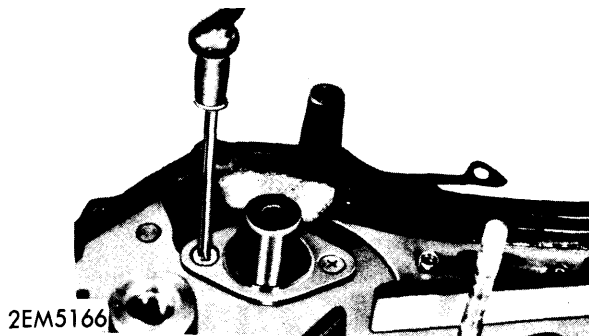
- 2) Place new seals in position so that both ends protrude above cap. Tap seal down into position with a smooth rounded tool. Cut off protruding ends of seal.
- 3) To replace upper half of seal, use needle nosed pliers to grasp end of seal. Pull seal upward while rotating crankshaft slowly in direction that seal is being removed.

2EM5160
REAR MAIN OIL SEAL INSTALLATION

- 4) To install new seal, fasten a length of wire or strong string to one end of new seal. Coat seal with engine oil and pass free end of wire or string up over crankshaft. Exert a steady pull on wire or string and at same time rotate crankshaft slowly in direction of the pull.
- 5) When installation is completed, trim ends of seal flush with engine block. Install bearing cap and tighten to 65.1 ft. lbs. Reinstall oil pan.

JACKSHAFT REMOVAL

Remove cylinder head, oil pan, timing chain cover, timing chains and sprockets. Remove distributor and drive gear. Remove fuel pump. Take out two set screws and washers which hold jackshaft locating plate to cylinder block and remove jackshaft. To install, reverse removal procedure.

2EM5166
REMOVING JACKSHAFT LOCATING PLATE**CRANKSHAFT REMOVAL**

- 1) Remove engine and transmission from car and separate engine and transmission. Mount engine on suitable stand and remove fan, fan pulley, water pump and cylinder head assembly.

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2) Remove vibration damper using suitable puller tool and remove oil pan, oil pump and timing chain cover. Remove chain tensioner and crank timing chain and sprockets. Remove connecting rod bearing caps with bearings and identify each for reinstallation.

3) Remove connecting rod and piston assemblies. Remove main bearing caps with bearings, and mark for reassembly. Remove crankshaft. To replace crankshaft, install upper bearings and position crankshaft in block.

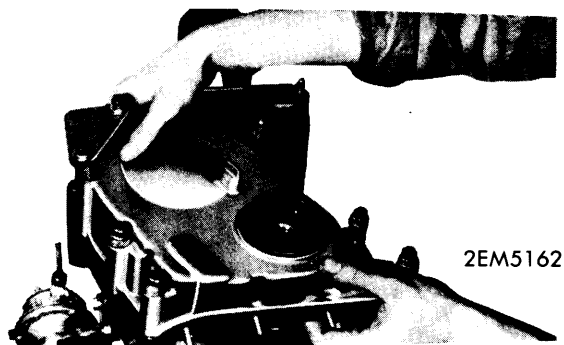
4) Use new seals in rear main bearing cap and install main bearing caps but do not tighten cap bolts. Install connecting rods with upper bearings installed, install bearing caps (with bearings) but do not tighten nuts.

5) Using a rubber mallet, strike both ends of crankshaft to center thrust bearing. Tighten main bearing caps to 65.1-ft. lbs. Check crankshaft free play (see specifications). Tighten connecting rod bearing caps to 65.1 ft. lbs.

6) Install key from old crankshaft keyway in crankshaft and install timing chain and sprockets, lower chain tensioner, timing chain cover, oil pump, pan and gasket. Install cylinder head assembly and replace vibration damper and water pump. Install fan pulley and fan and attach clutch and transmission to engine.

TIMING CHAIN COVER REMOVAL

1) Remove alternator, cylinder head, intake and exhaust manifolds. Remove fan, fan pulley and fan belt. Remove vibration damper and water pump.



2EM5162

TIMING CHAIN COVER REMOVAL

2) Remove all screws holding oil pan to timing chain cover and cylinder block. Remove oil pan. Remove timing chain cover. To install, reverse removal procedure.

CAMSHAFT			
Engine	Journal Diam.	Clearance	Lobe Lift
U-20			
#1-#4	1.1800-1.1802"	.0009-.0020"	.315"Ⓢ
#5	.9830-.9834"	.0008-.0019"	.315"Ⓢ

Ⓢ — .327" with Solex Carbs.

CAMSHAFT REMOVAL

Remove rocker arm cover and disconnect camshaft sprocket at camshaft front end. Support sprocket temporarily with a screw to camshaft chain guide. Remove camshaft and rocker arms.

VALVE TIMING				
Engine	INTAKE		EXHAUST	
	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
1968-70				
Solex Carbs.	30°	70°	70°	30°
S.U. Carbs.	18°	58°	58°	18°

TIMING CHAIN REMOVAL

1) Remove timing chain cover and lower chain tensioner. Remove jackshaft chain with crankshaft sprocket and jackshaft front sprocket together.



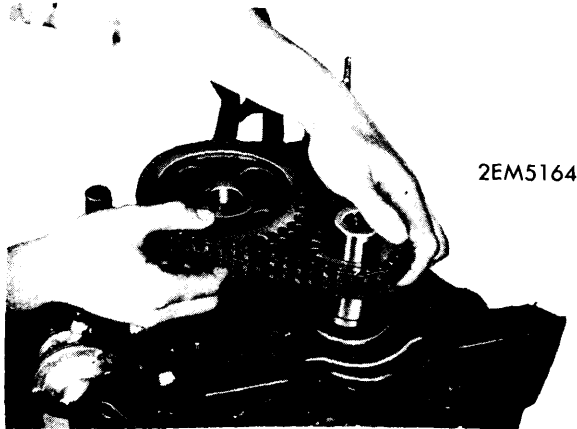
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TIMING CHAINS

2) Remove camshaft sprocket and install small screw to hold camshaft sprocket to timing chain guide in its original place. Remove jackshaft chain and rear sprocket. Remove all timing chain guides.

3) To replace, reverse removal procedure and align timing marks. Tighten jackshaft front sprocket bolt to 32.5-36.2 ft. lbs.

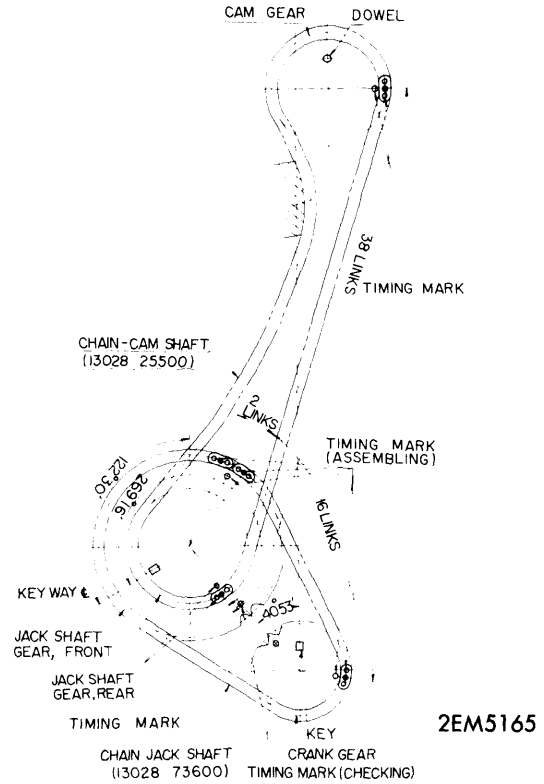
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TIMING CHAIN & SPROCKET REMOVAL

TIMING MARK ALIGNMENT

- 1) Place camshaft sprocket and rear jackshaft sprocket into camshaft chain, aligning timing marks of sprockets with those on timing chain.
- 2) Keep sprockets in this position and engage jackshaft sprocket keyway with key on jackshaft. Support camshaft sprocket temporarily to chain guide with a screw.
- 3) Place jackshaft front sprocket and crankshaft sprocket into jackshaft chain, aligning timing marks of sprockets with those on timing chain. Install timing chain and sprocket assembly, engaging each keyway with keys on jackshaft.
- 4) Push sprockets onto shafts as far as they will go and secure jackshaft sprocket with lockwasher and bolt. Tighten to 32.5-36.2 ft. lbs.



TIMING MARKS ALIGNMENT

ENGINE OILING

ENGINE OILING SYSTEM

Forced feed system using gear type oil pump and full flow type oil filter. Oil galleries and holes form internal passages for lubricating oil.

Crankcase Capacity — 4.3 qts. with SU carburetors; 7.5 with Solex carburetors.

Oil Filter — Full flow type.

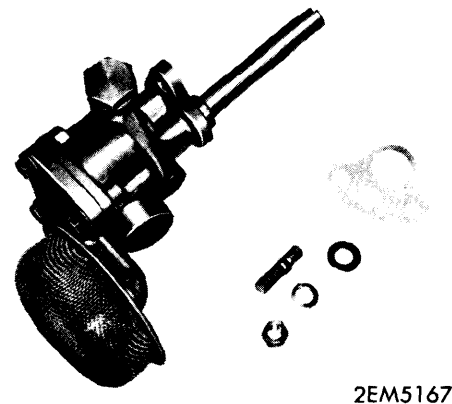
Normal Oil Pressure — Over 7.1 psi at idling (700 RPM). Over 65.27 psi at high speed (6000 RPM). Over 39.73 at mid speed range (2400 RPM).

Oil Pressure Relief Valve — Non-adjustable valve.

OIL PUMP

Oil pump is located at bottom of cylinder block and is held by a bolt and a stud nut. Pump is driven by distributor drive shaft assembly.

Disassembly — Remove oil pump from engine and remove four bolts and washers holding cover to pump body. Remove oil pump cover and remove oil strainer. Pull out oil pump drive gears and drive shaft. Remove relief valve cap screw and relief valve. To assemble, reverse disassembly procedure.



OIL PUMP

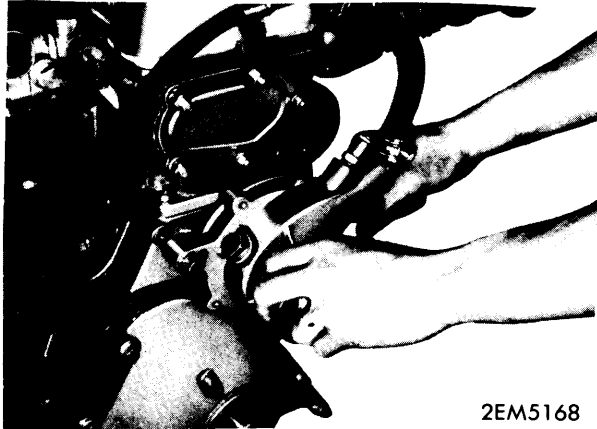
Oil Pump Specifications

Gear Side Clearance.....	.0016-.0043"
Tip Clearance (Gear to Cover).....	.0060-.0091"
Gear Backlash.....	.0118-.0157"

1968-70 DATSUN 2000 (U-20 ENGINE) 4 CYLINDER (Cont.) ENGINE COOLING

WATER PUMP REMOVAL

- 1) Drain cooling system and remove upper radiator shroud. Loosen alternator at adjusting bracket and pivot bolt and remove fan belt from fan pulley.
- 2) Remove fan, fan pulley and spacer. Remove four bolts holding water pump to front of engine. Remove water pump. To install, reverse removal procedure.



WATER PUMP INSTALLATION

Thermostat — Wax pellet type, 180°F thermostat. Fully opened at 203°F.

Cooling System Capacity — Approximately 9 qts.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Cylinder Head Bolts	
1st Step.....	43.4
2nd Step.....	62.9
3rd Step.....	65.1
Connecting Rod Big End Bolts	65.1
Main Bearing Cap Bolts.....	65.1
Camshaft Bearing Cap Bolts.....	① 13.0
Oil Pan	3.6
Crankshaft Pulley Bolt	144.6
Rocker Cover	4.3-5.1
Jackshaft Sprocket Screw.....	32.5-36.2
Flywheel Bolts	65.1
Camshaft Gear Nuts	13.0

① — Tighten M-8 nuts to 13.0 ft. lbs., M-6 nuts to 5.1 ft. lbs.