

LUV & P'UP 4-CYLINDER DIESEL

ENGINE CODING

ENGINE IDENTIFICATION

Engine identification code is 8th character of the Vehicle Identification Number (VIN). The VIN is stamped on a metal tab, located on top of instrument panel near lower left of windshield. Engine serial number is stamped on a machined pad, located at front of the cylinder block.

ENGINE IDENTIFICATION CODE

Engine	Code
P'UP & LUV C-223 (1816 cc)	S

ENGINE & CYLINDER HEAD

TRANSMISSION

Removal (4-WD Only)

1) Disconnect battery negative cable. Drain transmission oil. Remove transmission and transfer shift levers. Remove return spring from transfer shift lever. Remove starter. Disconnect exhaust pipe from manifold, then remove bracket at transmission.

2) Disconnect speedometer cable and ground cable. Disconnect rear propeller shaft at differential. Remove center bearing mount bolts, then remove 1st and 2nd rear propeller shafts together. On long wheel base 4-WD models, remove shafts separately.

3) Disconnect front propeller shaft at both ends. Remove return spring and clutch cable from clutch release lever. Remove flywheel cover. Remove rear transmission mount bolts. Raise engine and transmission, then remove transmission support crossmember.

4) Lower engine and transmission and support rear of engine. Remove transfer side case from transmission. Disconnect electrical wiring to transmission. Remove shift cover from top of transmission.

5) Remove transmission from engine. When removing transmission, turn side case surface downward and pull the case straight back until disengaged from clutch. Lift engine slightly and remove engine mounting bolts and nuts. Disconnect any remaining engine or transmission to chassis wiring, pull engine forward and carefully remove engine and transmission as an assembly.

Installation

To install transmission, reverse removal procedures. Install gear shift lever with transmission in neutral. Install transfer shift lever in position "4L" or "2H". Adjust clutch.

ENGINE

NOTE: On 4-WD models, transmission must be removed prior to removing engine. On 2-WD models, transmission and engine must be removed as a unit.

Removal

1) Remove hood. Disconnect battery cables. Remove cables, battery hold-down and battery. Drain engine cooling system, crankcase and transmission. Remove cover from under engine.

2) Remove air cleaner assembly. Disconnect all coolant hoses. Remove all drive belts. Remove fan, fan shroud, radiator grill and radiator. Disconnect accelerator control cable. If A/C equipped, disconnect compressor control cable.

3) Disconnect fuel hoses (or lines). Disconnect all transmission wiring. Disconnect vacuum hose at fast idle actuator and wire connector at fuel cut solenoid. Detach electrical connectors from sensing resistor, thermostat and A/C compressor.

4) Disconnect vacuum hoses from vacuum pump. Disconnect alternator wiring. Disconnect exhaust pipe from manifold and remove mounting bracket from engine backing plate. Remove all wiring from starter.

5) Working inside passenger compartment, remove transmission shift lever. Remove return spring and clutch cable from clutch release lever. Remove cable through stiffener bracket.

6) Disconnect speedometer and ground cables from transmission. Mark for reassembly, then remove propeller shaft. Remove 2 rear transmission mount bolts. Attach engine hoist and raise engine and transmission for clearance, then remove crossmember-to-frame bracket bolts.

7) On 2-WD models, remove transmission rear extension mounting nuts. Remove engine mounting bolt and nuts. Disconnect any remaining engine or transmission to chassis wiring. Pull engine forward, then carefully remove engine and transmission as an assembly.

Installation

Replace any rubber engine mounts showing signs of deterioration, separation or unusual wear. Reverse removal procedures to complete installation. Check all fluid levels. Adjust clutch.

CYLINDER HEAD

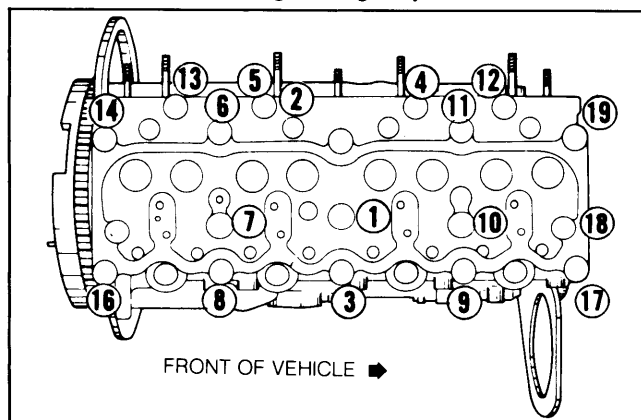
Removal

1) Drain cooling system. Remove air cleaner. Remove intake manifold. Disconnect exhaust pipe from exhaust manifold. Remove exhaust manifold.

2) Disconnect upper radiator hose from engine. Remove fan and fan shroud. Disconnect injection pipes. Remove nozzle holder retaining nuts, then remove nozzle holder assembly. Remove rocker arm shaft assembly.

3) Remove push rods. Remove joint bolt and disconnect the leak-off pipe. Loosen head bolts in reverse of tightening sequence. Remove cylinder head and gasket.

Fig. 1: Cylinder Head Tightening Sequence



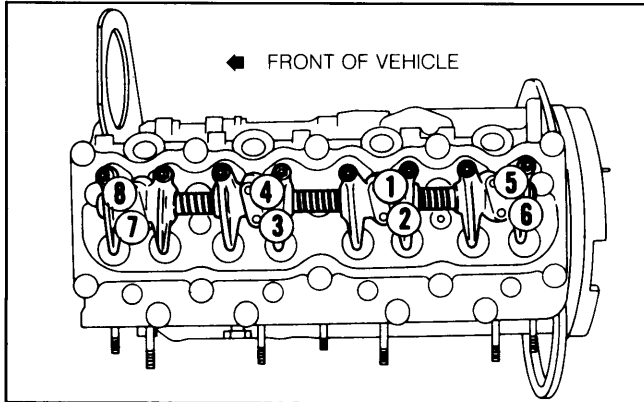
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Installation

Install new head gasket with "TOP" mark facing upward. Install and tighten cylinder head. See Fig. 1. Install push rods. Install and tighten rocker arm shaft assembly. See Fig. 2. Reverse removal procedure to complete installation.

Fig. 2: Rocker Arm Shaft Assembly Tightening Sequence



CAMSHAFT

TIMING BELT COVER

Removal

Drain cooling system. Remove battery. Remove fan and fan shroud. Disconnect radiator hoses at engine. Remove radiator grille and radiator. Remove all drive belts. Remove crankshaft pulley. Remove timing belt cover in 2 pieces.

Installation

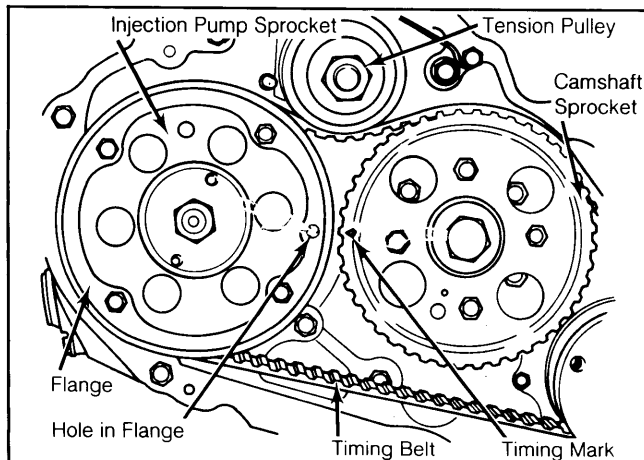
Install timing belt cover in reverse order of removal procedures.

TIMING BELT

Removal

1) Remove timing belt cover. Position No. 1 piston at TDC on compression stroke. Ensure injection pump sprocket and camshaft sprocket timing marks are aligned. See Fig. 3.

Fig. 3: Sprocket Alignment for Timing Belt Removal & Installation



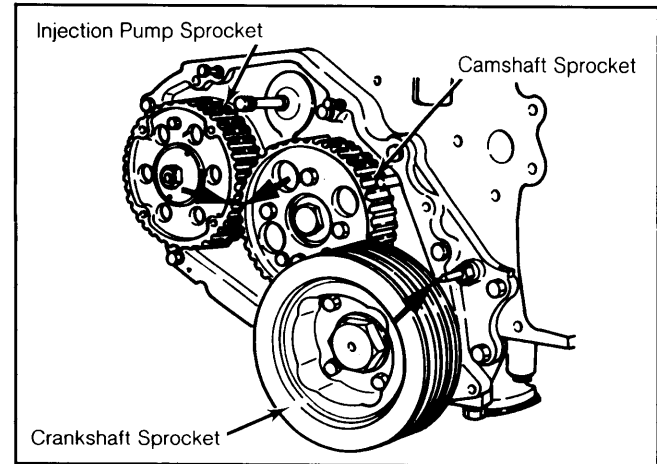
Timing pointer and crankshaft pulley timing mark must be aligned.

2) Remove injection pump timing pulley flange bolts and remove flange. When removing tension spring, avoid using excess force on spring. Remove tension pulley and center. Remove timing belt. Ensure sprocket positions do not change.

Installation

1) Before installing timing belt, check that the timing marks on injection pump and camshaft sprockets are aligned, as well as crankshaft pulley and timing pointer. See Fig. 4. Install timing belt over crankshaft sprocket first, then camshaft sprocket and injection pump sprocket.

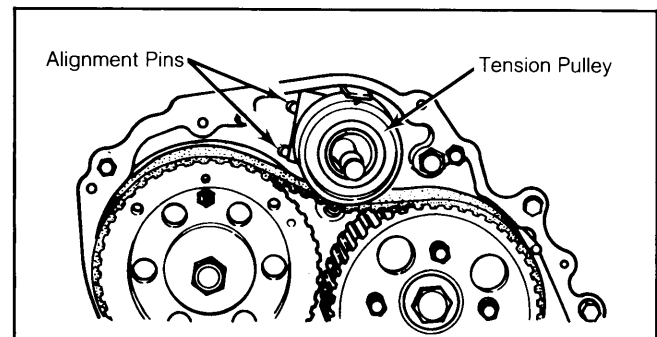
Fig. 4: Timing Mark Alignment



Heavy black arrows show points of timing mark alignment.

2) Install tension pulley center and tension pulley. The end of the tension pulley center must be in contact with 2 pins on the timing pulley housing. See Fig. 5. Hand tighten nut, install tension spring and tighten nut to 22-36 ft. lbs. (30-50 N.m).

Fig. 5: Tension Pulley Installation



Ensure end of tension pulley center is in contact with 2 pins.

3) Turn crankshaft 2 complete revolutions in direction of normal rotation. Further turn 90° past TDC. Loosen tension pulley nut completely and allow pulley to take up slack. Tighten nut.

4) Install and tighten injection pump pulley flange. Ensure hole in flange lines up with triangular timing mark on pump sprocket. See Fig. 3.

5) Turn crankshaft 2 turns more, bringing No. 1 cylinder to TDC on compression stroke. Check timing mark alignment.

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6) Check belt tension with tension tester (J-29771). Tension should be 33-55 lbs. (15-25 kg). Adjust valve clearance. Reverse removal procedure to complete installation.

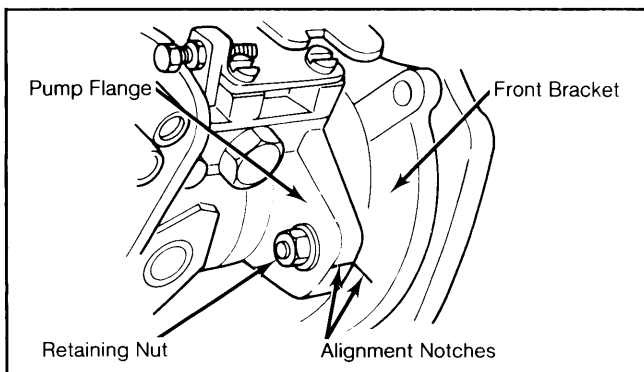
VALVE TIMING

To check for correct valve timing, refer to procedures explained in Timing Belt removal and installation.

INJECTION PUMP TIMING

1) Check that notched lines on injection pump flange and injection pump front bracket are aligned. See Fig. 6. With No. 1 cylinder at TDC on compression stroke, check timing mark alignment on sprockets. See Fig. 3.

Fig. 6: Injection Pump Alignment Marks



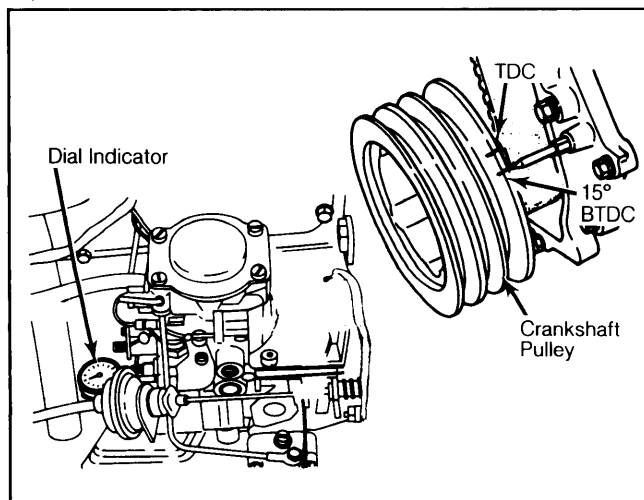
Ensure timing marks on pump and camshaft sprockets are also aligned.

2) Disconnect injection pipe from pump and remove distributor head screw. Install static timing gauge (dial indicator) and set lift approximately .04" (1 mm) from the plunger.

3) Turn engine until No. 1 cylinder is 45-60° BTDC, then calibrate dial indicator to zero. Turn crankshaft pulley slightly in both directions and check that gauge indication is stable.

4) Turn crankshaft in normal direction of rotation until 15° BTDC timing mark is aligned with timing pointer. Dial indicator should read .020" (.5 mm).

Fig. 7: Injection Pump Timing Adjustment



5) If indicator reading is not correct, loosen the 2 injection pump flange retaining nuts and rotate housing until a correct reading is obtained. Tighten nuts and recheck reading.

CAMSHAFT

Removal

1) Remove engine from vehicle. Remove timing belt. Remove rocker arm shaft assembly and push rods. Install a 6 mm bolt through hole in camshaft sprocket and into threaded hole in housing to prevent turning of sprocket.

2) Remove sprocket bolts, then remove sprocket with a puller. Remove lifter cover and rocker oil feed pipe from side of engine. Remove lifters. Carefully remove camshaft from engine.

Installation

Coat camshaft lobes, journals and camshaft bearings with oil. Carefully install camshaft to avoid damage to bearings. Reverse removal procedure to complete installation.

CAMSHAFT BEARINGS

Remove and install bearings using camshaft bearing remover and installer tool. Be sure to align oil holes in bearings with those in cylinder block.

CAMSHAFT OIL SEAL

Removal

1) Remove timing belt. Install a 6 mm bolt through hole in camshaft sprocket and into threaded hole in housing to prevent turning of sprocket.

2) Remove sprocket bolts, then remove sprocket with a puller. Remove oil seal retainer. Remove oil seal.

Installation

Using seal installer, install oil seal into retainer until seated. Install remaining components in reverse order of removal.

CAMSHAFT END THRUST

Remove timing belt cover. Attach a dial indicator to cylinder block with indicator point on camshaft sprocket center bolt. Push camshaft rearward and zero dial indicator. Use a screwdriver to pry camshaft forward and record end thrust. Maximum end thrust is .008" (.20 mm).

VALVES

VALVE ARRANGEMENT

E-I-I-E-E-I-I-E

ROCKER ARM SHAFT ASSEMBLY

Removal

Remove rocker cover. Starting with the ends and working inward, remove rocker arm brackets attaching bolts. Remove rocker arm shaft assembly. If disassembly is necessary, keep parts in order.

Installation

To install, reverse removal procedures. Tighten attaching bolts evenly in sequence, commencing with inner bolts and working outward in a circular pattern. See Fig. 2.

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VALVE GUIDE SERVICING

Inspection

Using dial indicator method, check valve stem-to-guide clearance. Position dial indicator point about .40" (10 mm) above end of guide. Rock valve stem back and forth and measure movement. If movement exceeds .008" (.20 mm) replace valve guide and valve.

Removal

Working from combustion chamber side of cylinder head, drive out old guide with valve guide driver tool (J-26512).

Installation

Coat outer surface of guide with engine oil. Working from top side of head, drive guide into head with driver tool (J-26512). Guide should project from cylinder head .472" (12.0 mm). Always replace valve guide and valve as a set.

VALVE STEM OIL SEALS

Removal

Remove rocker arm shaft assembly. Position piston of cylinder concerned to TDC. Using spring compressor tool (J-29760), compress spring and remove valve locks. Release pressure and remove spring retainer and springs. Remove valve stem oil seal.

Installation

Apply engine oil to inner face of new oil seal and to valve stem. Install oil seal. Install inner and outer springs with green painted side (closed-coil end) toward cylinder head. Using spring compressor tool, install remaining components in reverse order of removal.

VALVE SEAT INSERTS

Removal

To remove seat, arc-weld a bead of metal around inner face of seat. Allow to cool a few minutes. Using screwdrivers, pry out valve seat.

Installation

Using arbor press, install new seat. Grind seat to correct width and angle. Lap valve and seat to complete installation.

VALVE SPRINGS

Removal & Installation

To remove and install valve springs, use procedures outlined in Valve Stem Oil Seal removal and installation.

Inspection

1) Measure inner and outer valve spring free length. Test valve spring tension with a valve spring tester. Replace springs that fail tests. Always replace inner and outer springs as a set.

2) Using a flat surface and steel square, check valve spring for squareness. Take measurement between top of spring and square, while slowly rotating spring. Out-of-square must not exceed .04" (1.0 mm). Replace inner and outer springs as a set.

SWIRL CHAMBER REPLACEMENT

Removal

Measure chamber depth in head with straight edge and feeler gauge. If depth exceeds .0008" (.020 mm), chamber must be replaced. Use a small diameter drift (1/8 - 3/16") to drive out old chamber. Insert drift through injection nozzle hole to swirl chamber and drive out with hammer.

Installation

Install lock ball into groove in swirl chamber. Align lock ball in chamber with groove in cylinder head and drive in. Use press to seat chamber. A piece of metal should be placed between press and chamber to prevent damage. Grind face of swirl chamber flush with face of cylinder head to complete installation.

VALVE CLEARANCE ADJUSTMENT

1) Ensure rocker arm shaft brackets are properly tightened. Cold valve clearance is .016" (.40 mm) for intake and exhaust valves. Hot valve clearance is .015" (.37 mm) for intake and exhaust valves.

2) Turn crankshaft to position No. 1 piston on TDC at end of compression stroke. Adjust valve clearance of valves listed in Valve Clearances table.

3) Turn crankshaft 1 revolution to place No. 4 piston on TDC at end of compression stroke and adjust remaining valves.

VALVE CLEARANCES

Piston On TDC	Adjust Int. Nos.	Adjust Exh. Nos.
1	1, 2	1, 3
4	3, 4	2, 4

PISTONS, PINS & RINGS

OIL PAN

Oil pan removal and installation is performed with engine removed from vehicle.

PISTON AND ROD ASSEMBLY

Removal

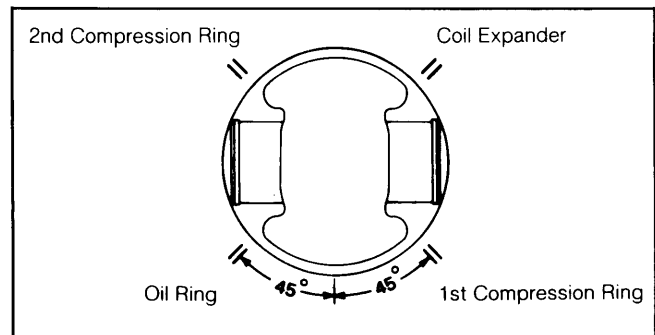
1) Remove engine from vehicle. Remove cylinder head. Remove crankcase and oil pan as an assembly. Detach oil pipe sleeve nut from crankcase. Remove 2 attaching bolts, then remove oil pump with oil pipe attached.

2) Remove carbon deposits from upper edge of cylinder wall. Remove rod cap. Push piston/rod assembly out top of cylinder block. Install rod cap on its respective piston/rod assembly.

Installation

1) Lightly oil rings, piston and cylinder wall. Make sure ring gaps are properly spaced. See Fig. 8. Make sure bearing halves are properly seated in connecting rod and cap.

Fig. 8: Piston Ring Gap Locations



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2) Install a ring compressor and compress rings. Install piston in cylinder. Ensure mark on piston head points towards front of engine. Install and tighten rod cap. Reverse removal procedures to complete installation.

FITTING PISTONS

1) Measure cylinder bore diameter at points 5/8" and 4 1/2" below cylinder block deck surface. Take measurements in line with and 90° to crankshaft centerline. If wear is excessive, cylinder should be bored for installation of oversize piston.

2) Measure piston diameter at right angle to piston pin. Subtract this figure from cylinder diameter to determine piston-to-cylinder wall clearance.

PISTON SPECIFICATIONS

Piston Size In. (mm)	Piston Diameter In. (mm)
Standard	3.454-3.455 (87.73-87.75)
.020 (.50) O/S	3.477-3.478 (88.33-88.35)
.040 (1.0) O/S	3.497-3.498 (88.83-88.85)

FITTING RINGS

1) Position rings into cylinder bore at a point where bore diameter is smallest. Ring must be square in bore. Measure ring end gap with a feeler gauge.

2) Using a feeler gauge, check ring side clearance. Ensure rings turn freely in their ring grooves. When installing rings on piston, ensure gaps are correct. See Fig. 8.

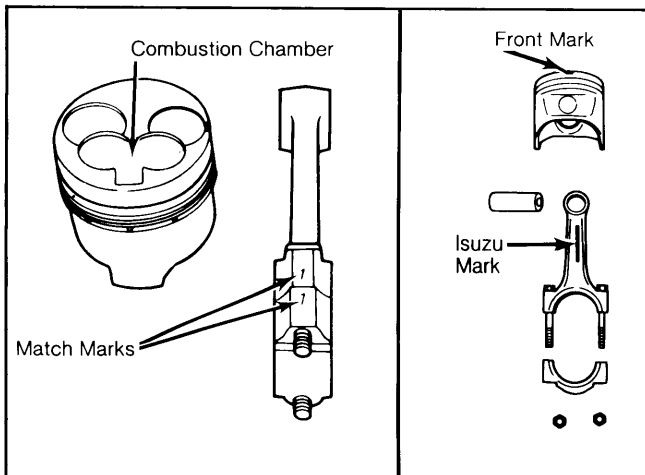
3) Install rings on piston in this order: expander ring, oil ring, 2nd compression ring then 1st compression ring. The "N" mark on compression rings must be upward.

PISTON PIN REPLACEMENT

Removal

To remove pin, use snap ring pliers and remove snap rings from piston. Use a brass rod to drive out pin. Piston pin bushings in rod's small end are replaceable.

Fig. 9: Positioning Rod to Piston



Note position of identification markings when installing rod to piston.

Installation

1) Heat piston to about 175°F (80°C). Assemble rod to piston so front mark on piston head and Isuzu mark on rod are on same side. Also, match marks on rod will be on combustion chamber side of piston head. See Fig. 9.

2) Coat pin with oil and install in piston and rod. Install snap rings to secure pin in place.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

NOTE: To check bearing clearances, remove engine from vehicle. Following procedures are performed with oil pan removed, and oil film removed from surfaces to be checked.

CRANKSHAFT MAIN BEARINGS

1) If necessary, mark all bearing caps for cylinder identification. Check clearances 1 at a time. With all bearing caps (except one being checked) tightened, check clearances using Plastigage method.

2) If clearances are excessive, replace crankshaft and bearings. Taper must not exceed .0010" (.025 mm). Crankshaft journals and crankpins cannot be reground.

3) To check crankshaft for straightness, place "V" blocks under crankshaft at No. 1 and No. 5 journals. Position dial indicator point on No. 3 journal.

4) Slowly turn crankshaft at least 1 full revolution, while recording runout. If runout exceeds .0024" (.060 mm), replace crankshaft and bearings.

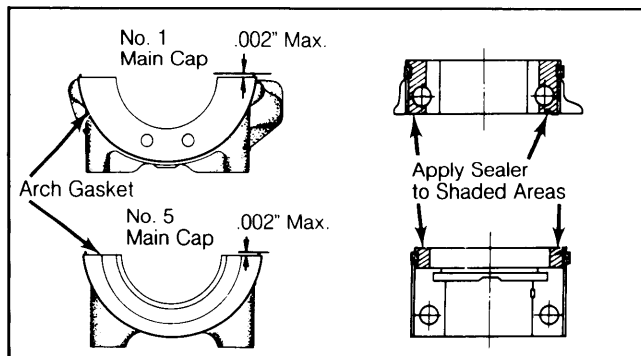
5) When installing thrust bearing (No. 3 journal), oil grooved thrust faces must be turned outward.

6) Install arch gaskets on bearing caps 1 and 5. Use liquid gasket sealer to hold gasket in place while installing caps. Gasket should not project more than .002" (.05 mm) from fitting face of cap. See Fig. 10.

7) Apply thin coat of silicone sealer to fitting face of bearing caps 1 and 5. See Fig. 10. Install all bearing caps. Ensure arch gasket protrusions fit properly, when installing bearing caps 1 and 5.

8) No. 2 and No. 4 bearing caps are identical. Install bearing cap with the mark "A" in the No. 2 position. Tighten caps in progressive steps, in sequence of 3, 4, 2, 5 and 1.

Fig. 10: Arch Gasket & Sealer Installation



Install bearing caps before sealer sets up.

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LUV & P'UP 4-CYLINDER DIESEL (Cont.)

CONNECTING ROD BEARINGS

1) After ensuring rod caps are marked for cylinder identification, remove rod caps. Use Plastigage method to check for proper clearance.

2) If not within limits, install new bearings if crankpin is not worn beyond limits.

CRANKSHAFT END THRUST

Using a feeler gauge, measure crankshaft end thrust between thrust bearing and thrust face of crankshaft. Move crankshaft fully endwise and measure clearance between crankshaft thrust face and thrust bearing. If clearance is greater than .012" (.30 mm), replace thrust bearings.

REAR MAIN BEARING OIL SEAL

Removal

Remove engine from vehicle. If equipped, remove clutch cover and disc. Remove flywheel. Remove rear oil seal.

Installation

Coat seal lip with engine oil. Using seal installer tool, install new seal. Reverse removal procedures to install remaining components.

CRANKSHAFT FRONT OIL SEAL

Removal

Remove camshaft oil seal retainer. Hold crankshaft from turning and remove crankshaft pulley. Using a puller, remove crankshaft sprocket. Remove front oil seal dust cover, then remove oil seal.

Installation

Coat seal lip with engine oil. Using seal installer, install oil seal. Install remaining components in reverse order of removal.

ENGINE OILING

CRANKCASE CAPACITY

P'UP

Capacity is 5.1 quarts (4.8L) with oil filter replacement; 4.2 quarts (4.0L) without filter replacement.

LUV

Capacity is 5.5 quarts (5.2L) with oil filter replacement; 5.1 quarts (4.8L) without filter replacement.

NORMAL OIL PRESSURE

Normal oil pressure for all models is 50-60 psi (3.5-4.5 kg/cm²), at high engine speeds.

ENGINE OILING SYSTEM

2-WD models use a rotor-type oil pump and 4-WD models use a gear-type oil pump. Oil drawn from crankcase passes through a strainer, then to oil pump.

Oil is delivered to full flow oil filter, oil cooler, and main oil gallery. By-pass valves are incorporated into oil filter and oil cooler.

Main oil gallery supplies oil to lubricate crankshaft, main and connecting rod bearings. Oil gallery feeds oil to vacuum pump and camshaft. From camshaft, oil is routed to feed rocker arm shaft assembly and upper valve train components.

Oil is fed from oil gallery to oil jet pipe, which sprays oil from below pistons to lubricate cylinder walls

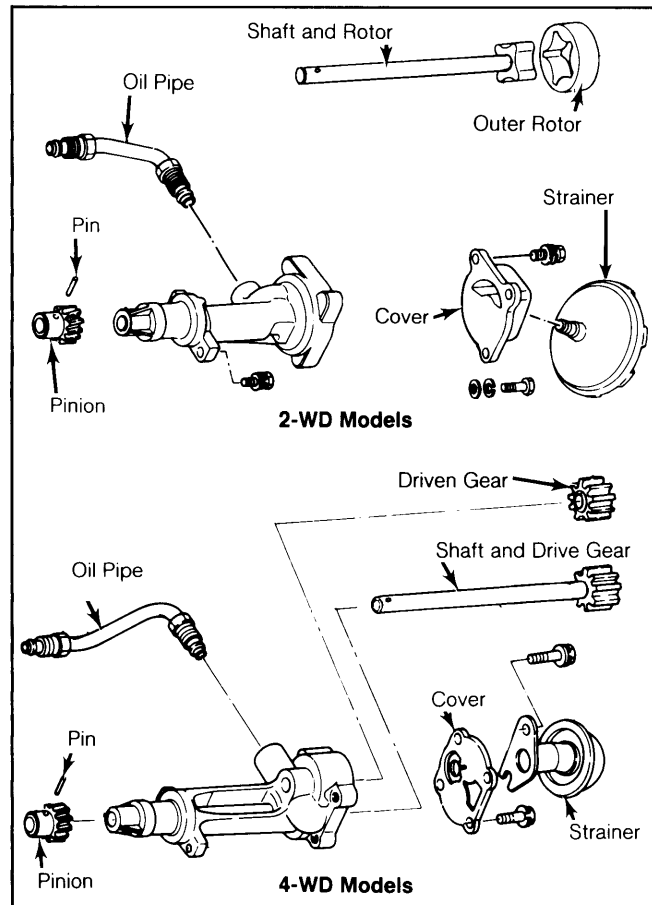
and piston pins. Oil spray from oil jets also aids in piston cooling.

OIL PUMP

Removal

To remove, first remove oil pan and crankcase. Remove oil pipe sleeve nut and the 2 bolts holding pump in place. Remove oil pump.

Fig. 11: Oil Pump Assemblies



Thoroughly clean all parts prior to measuring clearances.

Inspection (2-WD Models)

1) Disassemble oil pump and clean all parts thoroughly. Inspect for signs of unusual wear or damage.

2) With rotors installed in pump, lay a straightedge over pump housing. Use a feeler gauge to measure clearance between rotors and straightedge. If clearance over rotors is excessive, replace rotor set.

3) Using a feeler gauge, measure clearance between inner and outer rotors. If clearance is beyond limits, replace rotor set.

4) Using feeler gauge, measure clearance between outer rotor and pump housing. If clearance is excessive, replace entire pump assembly.

5) Check clearance between rotor shaft and pump body. If beyond limits, replace entire pump assembly.

Inspection (4-WD Models)

1) Using a feeler gauge, check clearance between pump body inner wall and tip of each gear. If clearance is beyond limits, replace entire gear set.

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2) With gears installed, lay a straightedge over pump housing. Use a feeler gauge to measure clearance between gears and straightedge. If gear-to-cover clearance is excessive, replace entire pump assembly.

Installation

Reverse removal procedures to install.

OIL PUMP SPECIFICATIONS

Application	¹ Clearance In. (mm)
2WD	
Clearance Over Rotors .....	.006 (.15)
Inner-to-Outer Rotor Clearance .....	.006 (.15)
Outer Rotor-to-Pump Housing .....	.011 (.27)
Rotor Shaft-to-Pump Housing .....	.008 (.20)
4WD	
Gear Tip-to-Housing Clearance .....	.006 (.15)
Gear-to-Cover Clearance .....	.004 (.09)

¹ — Clearances given are wear limits.

ENGINE COOLING

THERMOSTAT

Thermostat opens at approximately 180°F (82°C), and is fully open at approximately 203°F (95°C).

COOLING SYSTEM CAPACITY

Cooling system capacity is 7.4 quarts (7.0L).

RADIATOR CAP

Radiator cap pressure relief valve opens at 15 psi (1.05 kg/cm²).

WATER PUMP

Removal

Drain cooling system and remove battery, fan, fan shroud and upper radiator hose. Remove drive belts and fan pulley. Remove water pump retaining bolts (5) and remove pump.

Installation

Clean gasket mating surfaces. Using new gasket, install water pump in reverse order of removal.

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	136.6	2238	Fuel Inj.	.....	.....	21:1	3.46	88	3.62	92

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)
2238 cc Intake	45°	45°	.047-.059 (1.20-1.50)	.310-.315 (7.88-8.00)	.0015-.0027 (.039-.068)	.....
Exhaust	45°	45°	.047-.059 (1.20-1.50)	.309-.315 (7.85-8.00)	.0025-.0037 (.064-.093)	.....

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)
2238 cc	2.3591-2.3594 (59.92-59.93)	.0011-.0033 (.029-.085)	No. 3	.0018 Max. (.300)	2.0835-2.0839 (52.92-52.93)	.0016-.0047 (.040-.120)

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ENGINE SPECIFICATIONS (Cont.)

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)
2238 cc	.0062-.0070 (.157-.177)	.0002 (.004)	.0003-.0008 (.008-.020)	No. 1	.008-.016 (.20-.40)	.002-.003 (.05-.07)
				No. 2	.008-.016 (.20-.40)	.001-.002 (.03-.06)
				Oil	.008-.016 (.20-.40)	.0008-.0021 (.020-.054)

VALVE SPRINGS

Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (Kg @ mm)	
		Valve Closed	Valve Open
2238 cc	1.89 (47.9)	12-14@1.45 ¹ (5.5-6.3@37.0)	.....
		Outer	1.86 (47.3)	43-49@1.54^{1} (19.7-22.2@39.0)	.....

¹ — Compressed height as measured in spring tension tester.

CAMSHAFT

Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
2238 cc	1.87-1.89 (47.6-48.0)	.0047 Max. (.002)	.....

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Cylinder Head	
Step 1	40-47 (54-64)
Step 2	
New Bolt	54-61 (76-85)
Used Bolt	61-69 (85-97)
Camshaft Sprocket	72-87 (101-122)
Connecting Rod	58-65 (81-91)
Crankshaft Sprocket	124-151 (174-211)
Engine Rear Plate	55-67 (77-94)
Flywheel	65-72 (91-101)
Main Bearing Caps	116-130 (162-182)
Manifolds (Intake & Exhaust)	10-17 (14-24)
Injection Pump Timing Pulley	42-52 (59-73)
Oil Jet Pipe (1)	24-27 (34-38)
Oil Jets	22 (31)
Oil Cooler	54-61 (76-85)
Rocker Arm Shaft Assembly	9-17 (12-23)
Tension Pulley	78-95 (109-133)