1816 cc 4-CYLINDER

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 on the cylinder block, near the distributor.

ENGINE IDENTIFICATION CODE

Engine	Code
I-Mark	
G-180Z (1816 cc)	B
LUV & P'UP	
G-180Z (1816 cc)	N

ENGINE, CYLINDER HEAD & MANIFOLDS

ENGINE

Removal

1) Disconnect battery cables. Drain crankcase and cooling system. Remove air cleaner assembly. Disconnect accelerator cable and necessary linkages from carburetor.

2) Disconnect all coolant and fuel hoses attached to engine. Disconnect all necessary vacuum lines, electrical and ignition wiring attached to engine. Disconnect exhaust pipe at manifold. Remove radiator and cooling fan.

3) Disconnect drive shaft, slave cylinder (or clutch cable) and speedometer cable from transmission. If equipped with A/C or power steering, remove from engine and position aside.

4) Remove starter. Remove flywheel inspection cover and bell housing bolts. If equipped with automatic transmission, remove drive plate to torque converter bolts.

5) Support transmission. Attach hoist and lifting chain to engine. Remove front and rear engine mount nuts.

6) Ensure all necessary wiring, hoses, lines and linkages have been disconnected from engine. Separate engine from transmission and lift out of engine compartment.

Installation

To install engine, reverse removal procedure. Restore all wiring, linkages, cables, hoses and lines to their original locations.

INTAKE MANIFOLD

Removal

1) Disconnect battery ground cable. Drain cooling system. Remove air cleaner assembly. Remove EGR pipe from manifolds. If necessary, remove EGR valve and bracket assembly from intake manifold.

2) Disconnect all coolant and vacuum hoses attached to intake manifold. Disconnect fuel hose, accelerator cable, vacuum hoses and electrical wiring from carburetor.

3) Remove intake manifold and carburetor as an assembly.

Installation

Clean all gasket surfaces. Using new gasket, install intake manifold. Starting at middle of manifold and working outward, tighten manifold nuts in progressive steps. Install remaining components in reverse order of removal.

EXHAUST MANIFOLD

Removal

1) Disconnect battery ground cable. Remove EGR pipe clamp bolt at rear of cylinder head. Remove EGR pipe from manifold(s). Disconnect exhaust pipe support brackets. Disconnect exhaust pipe from manifold.

2) Remove exhaust manifold heat shield and heat stove tube. If equipped, disconnect oxygen sensor wire at exhaust manifold. Remove exhaust manifold.

Installlation

Clean gasket mating surfaces. Using new gasket, install and tighten exhaust manifold. Reverse removal procedures to install remaining components.

CYLINDER HEAD

Removal

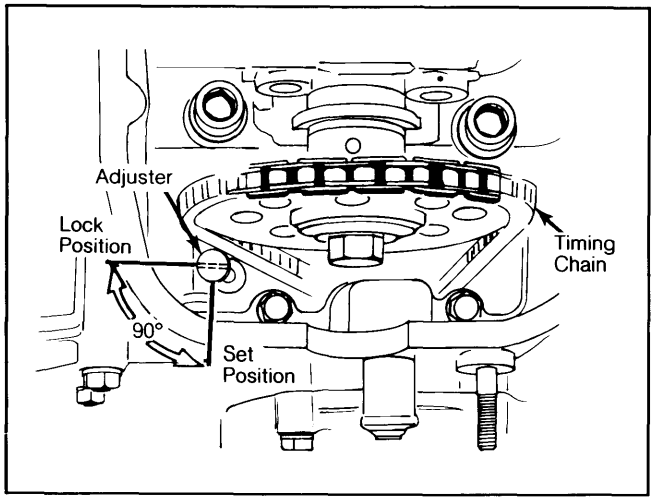
1) Drain cooling system. Disconnect EGR pipe clamp bolt at rear of cylinder head. Disconnect exhaust pipe from manifold. Disconnect all necessary coolant and vacuum hoses from intake manifold and cylinder head.

2) Disconnect all necessary linkages, cables and electrical wiring from carburetor. Disconnnect ignition wires from spark plugs.

3) Remove air cleaner assembly and cam cover. Rotate crankshaft to position No. 4 piston on TDC at end of compression stroke. Remove distributor cap and mark rotor-to-housing relationship.

4) Lock timing chain adjuster by depressing and turning automatic adjuster slide pin 90° clockwise. *See Fig. 1.*

Fig. 1: Locking Timing Chain Adjuster



5) Remove camshaft sprocket (with timing chain attached) and fuel pump drive cam. DO NOT allow sprocket and chain to separate. Rest sprocket and chain on chain damper and tensioner.

6) Disconnect air injection pump air hose and check valve at exhaust manifold. Remove cylinder head-to-front cover bolts.

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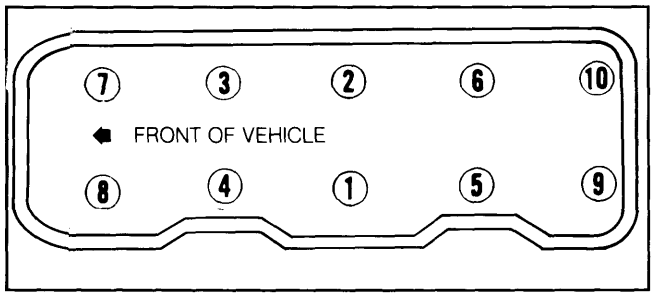
7) Starting with outer bolts and working inward, remove cylinder head bolts. Remove cylinder head with manifolds attached.

Installation

1) Clean gasket mating surfaces. Clean head bolts and threads in cylinder block. Install new head gasket with marking "TOP" upward, and install cylinder head.

2) Install and tighten head bolts in progressive steps to initial specification, then tighten to final specification. *See Fig. 2.* Install remaining components in reverse order of removal. Adjust valves.

Fig. 2: Cylinder Head Tightening Sequence



Tighten in progressive steps to 61 ft. lbs. (83 N.m), then tighten to 72 ft. lbs. (98 N.m).

CAMSHAFT

ENGINE FRONT COVER

Removal

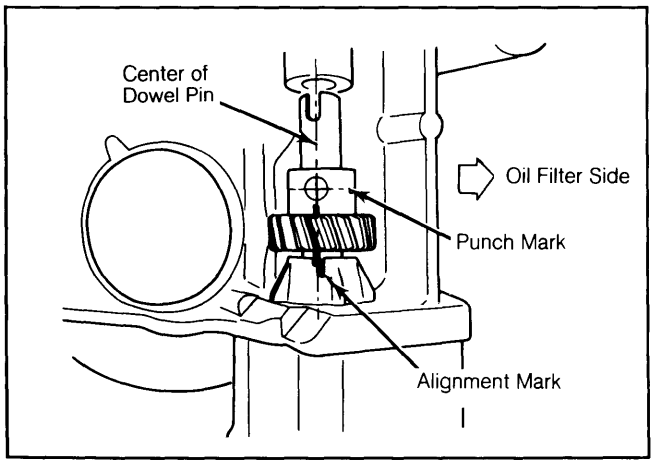
1) Remove cylinder head. Remove oil pan. Remove oil pump pickup tube. Remove all drive belts. Remove vibration damper assembly.

2) If A/C equipped, remove compressor and mounting brackets and position aside. Remove distributor. Remove front cover.

Installation

1) Clean gasket mating surfaces. Install new front cover gasket. Align oil pump drive gear punch mark with oil filter side of cover. Align center of dowel pin with alignment mark on oil pump case. *See Fig. 3.*

Fig. 3: Aligning Oil Pump for Front Cover Installation



Install front cover by engaging pinion gear with oil pump drive gear on crankshaft.

2) Position No. 1 and 4 pistons on TDC. Position punch mark on oil pump drive gear toward engine. Ensure slot at end of oil pump shaft (as viewed from top of front cover) is parallel with front face of cylinder block. Offset must be forward.

3) Install front cover by engaging pinion gear with oil pump drive gear on crankshaft. Install remaining components in reverse order of removal procedures.

FRONT COVER OIL SEAL

Removal

1) Disconnect negative battery cable. Drain cooling system. Disconnect radiator hoses and remove radiator.

2) Remove all drive belts. Remove fan. Remove vibration damper assembly. Using a screwdriver, carefully pry seal out of front cover.

Installation

Using seal installing tool, install new seal in cover. Coat seal lips with oil. Reverse removal procedure to complete installation.

TIMING CHAIN & SPROCKETS

Removal

Remove front cover. Remove timing chain from crankshaft sprocket.

Inspection

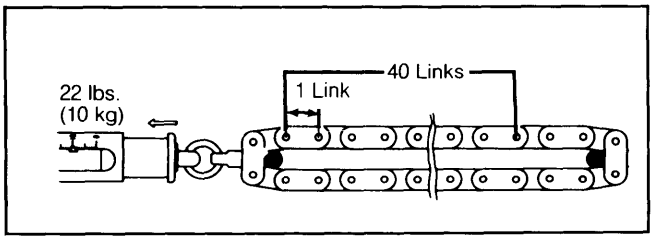
1) Check camshaft and crankshaft sprockets for wear or damage. If crankshaft sprocket replacement is required, remove using a puller.

2) Using tension measuring gauge, check timing chain for wear. Using 22 lbs. (10 kg) force, pull chain and measure stretch over a length of 40 chain links. *See Fig. 4.*

3) If distance measured exceeds 15.16" (385.0 mm), replace chain. Check automatic adjuster, tensioner guide rail and chain guide for wear. Replace as necessary.

4) Make sure that tensioner guide rail and automatic adjuster move freely on mounting pins. Pins and clips are replaceable. Ensure that oil jet in chain guide mounting is not plugged.

Fig. 4: Timing Chain Stretch Test



If measurement exceeds 15.16" (385.0 mm), replace timing chain.

Installation

1) Install timing sprocket, pinion gear (grooved side toward front cover), and Woodruff key. Turn crankshaft so that Woodruff key is facing upward (No. 1 and No. 4 pistons on TDC).

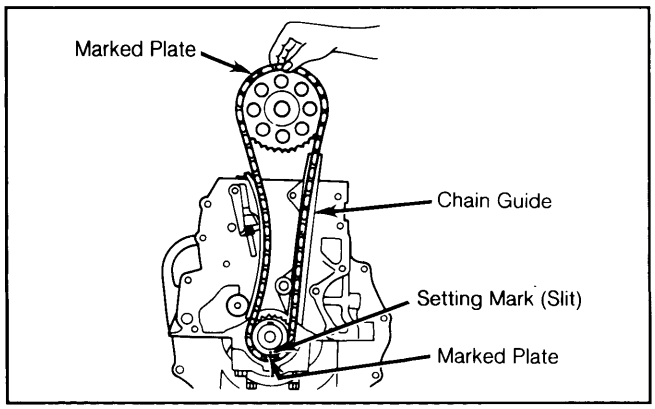
2) Timing chain has 2 marked link plates that are used for sprocket alignment purposes. The side of the chain with more links between the marked plates must be installed on the chain guide side of the engine.

3) Install chain on crankshaft sprocket, aligning one of the marked link plates with mark on crankshaft

sprocket. Position chain around camshaft sprocket, so second marked link plate aligns with triangular mark on camshaft sprocket.

4) Install camshaft sprocket on camshaft. Recheck that timing marks on sprockets are still aligned with marked plates. *See Fig. 5.* Install Remaining components in reverse order of removal.

Fig. 5: Aligning Timing Chain and Sprockets



Install timing chain with most links between marked plates towards chain guide side of engine.

CAMSHAFT

Removal

1) Remove cam cover. Remove fuel pump. Position No. 4 piston on TDC at end of compression stroke. Remove distributor cap and mark rotor position on housing.

2) Lock timing chain adjuster by depressing and turning automatic adjuster slide pin 90° in a clockwise direction. *See Fig. 1.* Ensure that chain is slack after locking adjuster.

3) Remove camshaft sprocket (with timing chain attached) and fuel pump drive cam. DO NOT allow sprocket and chain to separate. Rest sprocket and chain on chain damper and tensioner.

4) Remove rocker arm shaft and bracket assembly. Lift camshaft from cylinder head.

Inspection

Check camshaft journals and cams for wear or damage. Measure height of lobes with a micrometer and replace camshaft if measurement is less than 1.431" (36.35 mm). Use an oil stone to correct step wear or scoring to cam lobes.

Installation

1) Apply heavy coat of engine oil to camshaft journals and cylinder head bearing surfaces. Install camshaft in place. Position camshaft so mark on camshaft thrust flange is aligned with mark on No. 1 rocker arm shaft bracket.

2) Check that crankshaft pulley mark is aligned with TDC mark on front cover. Install remaining components in reverse order of removal. Check that valve timing is correct.

CAMSHAFT END THRUST

1) Remove rocker arm shaft assembly to relieve load on camshaft. With camshaft positioned in cylinder head, measure camshaft end play using a dial indicator.

2) If end play exceeds .008" (.20 mm), check camshaft thrust flange or thrust groove in head for wear. Replace worn components.

VALVES

VALVE ARRANGEMENT

Intake (Right side)
Exhaust (Left side)

ROCKER ARM SHAFT ASSEMBLY

Removal

1) Remove cam cover. Loosen rocker shaft brackets in progressive steps, working from ends toward center.

2) Disassemble rocker arm shaft assembly by removing springs from the shafts, then remove rocker arm brackets and rocker arms. Keep parts in order for reassembly.

Installation

1) Reassemble rocker arm shaft components in original positions. Cylinder number on upper face of brackets must point toward front of engine. Longer rocker shaft must be installed on exhaust side.

2) Heavily coat rocker arm shaft, rocker arms, and valve stems wth engine oil. Install rocker arm shaft assembly in reverse order of removal.

3) Hold rocker arm springs between the jaws of an adjustable wrench, to prevent damage to springs when tightening assembly.

VALVE GUIDES

Inspection

Measure valve guide and corresponding valve stem for wear. If stem-to-guide clearance is excessive, replace guides. Always replace valves when replacing valve guides.

Removal

Working from combustion chamber side of head, use valve guide driver tool (J-26512) to drive guide out towards top side of head. Remove lower spring seat.

Installation

Lubricate outside of new guide with engine oil. Working from top side of head, use valve guide driver tool (J-26512) to drive new guide into place until tool bottoms on cylinder head. Install lower spring seat and remaining valve components.

VALVE STEM OIL SEALS

Valve stem oil seal removal and installation procedures are explained in Valve Springs.

VALVE SEAT INSERTS

Removal

1) Weld end of welding rods to several points on inner face of valve seat insert, but away from aluminum alloy parts.

2) Allow cylinder head to cool so that contraction of insert takes place. Apply shock load to welding rods and pull out seats.

Installation

Clean insert recess in cylinder head. Heat seat area in cylinder head with steam to encourage expansion.

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Chill valve seat in dry ice, then install seat in head. Interference fit is .0031-.0047" (.078-.119 mm).

VALVE SPRINGS

Removal

1) Remove rocker arm shaft assembly. Remove spark plug of cylinder to be serviced. Install air hose and adapter into spark plug hole and apply air pressure.

2) Use valve spring compressor (J-26513) to remove keepers, retainer and spring. Remove valve stem oil seal and lower spring seat.

Inspection

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

2) Using a flat surface and steel square, check valve spring for out-of-round. Take measurement between top of spring and square, while slowly rotating spring. Out-of-round must not exceed 5/64".

Installation

Lubricate valve stem and lower spring seat. Install lower spring seat, then slide new seal over valve stem and onto guide. Ensure oil seal lip fits into groove in valve guide. Install remaining components.

VALVE CLEARANCE ADJUSTMENT

1) Ensure rocker arm shaft brackets are properly tightened. Cold valve clearances are .006" (.15 mm) for intake valves, and .010" (.25 mm) for 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

NOTE: To remove oil pan on Isuzu and LUV 4-wheel drive models, remove engine from vehicle.

Removal (LUV 4x2)

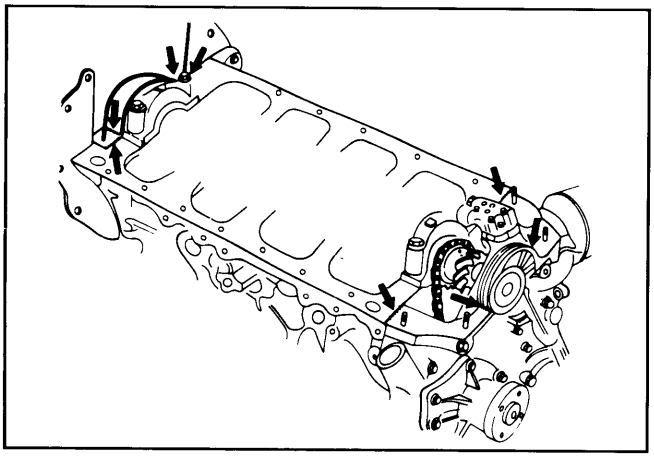
1) Disconnect battery ground cable. Drain engine oil. Remove front splash shield. Remove front crossmember.

2) Disconnect and lower relay rod at idler arm. Remove left-hand bell housing brace. Remove oil pan.

Installation

Clean gasket mating surfaces. Apply thin coat of non-hardening sealer to crankcase. *See Fig. 6.* Install oil pan. Reverse removal procedures to complete installation.

Fig. 6: Sealer Application Points for Oil Pan Installation



Apply non-hardening sealer to points indicated by arrows.

PISTON & ROD ASSEMBLY

Removal

1) Remove cylinder head and oil pan. Mark connecting rods and caps (on starter side of engine) for cylinder identification. Remove carbon deposits from upper part of cylinder wall.

2) Remove connecting rod caps. Using a wooden hammer handle, carefully push piston and connecting rod out top of cylinder block.

Installation

When installing piston and rod assembly, position piston so mark on piston head is facing front of engine and cylinder identification number on connecting rod is on starter side of engine.

FITTING PISTONS

1) Measure diameter of piston skirt 1.575" (40.00 mm) below piston head, at a point 90° to piston pin bore. Measure cylinder bore diameter near bottom of bore, where least wear occurs.

2) Difference between cylinder bore diameter and piston diameter must not exceed .0018-.0026" (.045-.065 mm). If clearance exceeds limits, replace pistons.

3) Measure weight of all assembled piston-to-rod assemblies. Variance in weight between assemblies must not exceed .42 oz. (.01 kg).

4) If weight correction is necessary, adjust by swapping parts between assemblies, other than piston and piston pin. Oversize pistons are available in .020" (0.5 mm) and .040" (1.0 mm).

PISTON CLASS

Piston Size	Piston Grade	Piston Diameter In. (mm)
Standard	A	3.3049-3.3053 (83.944-83.955)
Standard	B	3.3053-3.3057 (83.955-83.965)
Standard	C	3.3057-3.3061 (83.965-83.975)
Standard	D	3.3061-3.3065 (83.975-83.985)

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FITTING RINGS

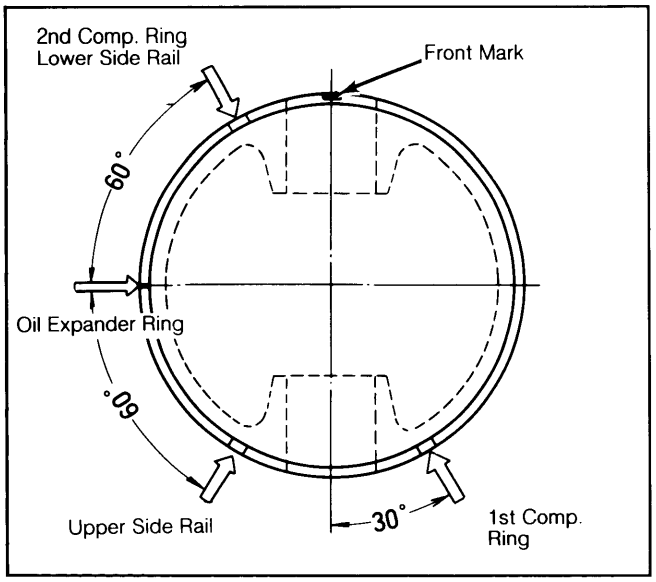
1) Position rings into cylinder bore at a point where bore diameter is smallest. Ring must be square in bore. Measure ring end gap with a feeler gauge.

2) Using a feeler gauge, check ring side clearance. Ensure rings turn freely in their ring grooves.

3) When installing rings on piston, ensure end gap is correct. *See Fig. 7.* Install oil control rings in this order: expander ring, lower side rail, then upper side rail.

4) Position compression rings so that "NPR" or "TOP" mark is upward. Oil control rings are not marked.

Fig. 7: Piston Ring Gap Spacing



Lower side rail and second compression ring share same gap position on piston.

PISTON PIN REPLACEMENT

Removal

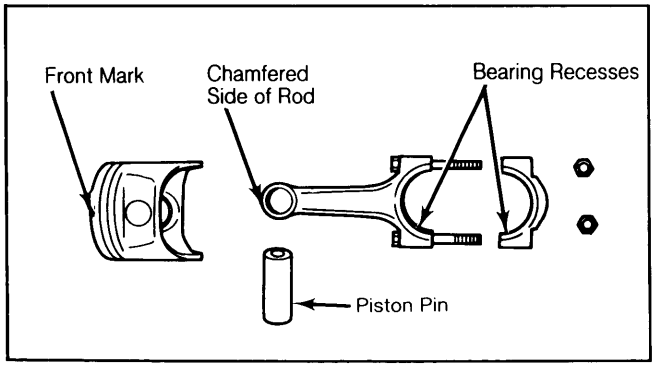
Using an arbor press and piston pin remover tool, press piston pin out of piston and connecting rod assembly.

Installation

1) Assemble connecting rod to piston with chamfer on rod's small end on same side as front mark on piston head. *See Fig. 8.*

2) Lightly oil pin bores in piston and rod. Press pin into piston and rod.

Fig. 8: Piston-to-Rod Relationship



Note position of bearing recesses.

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) Check clearances 1 at a time. With all bearing caps (except one being checked) tighted, check clearances using Plastigage method.

2) If clearances are excessive, install undersize bearings. Replacement bearings are available in standard, .010" (.25 mm) undersize and .020" (.50 mm) undersize.

3) To check crankshaft out-of-round, 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 .0038" (.097 mm), replace or correct crankshaft.

5) Install main caps so arrow on rear face of cap is turned to front of engine. Bearings should be well lubricated prior to installation. Tighten caps in progressive steps, in sequence of 3, 4, 2, 5 and 1.

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, new bearings must be installed. Replacement bearings are available in standard, .010" (.25 mm), and .020" (.50 mm) undersize.

CRANKSHAFT END THRUST

1) To check crankshaft end thrust, install bearings in cylinder block, then lay crankshaft in place. Install thrust bearing on both sides of No. 3 crankshaft journal.

2) 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 (Isuzu)

Remove starter. Remove transmission. Remove clutch assembly (if equipped). Remove flywheel. Pry oil seal from seal retainer.

Installation

Position new seal into place in retainer. Fill clearance between lips of seal with grease, and coat lips of seal with engine oil. Using seal installer tool, install seal into retainer. Reverse removal procedures to complete installation.

Removal (LUV)

Remove oil pan. Remove transmission. Remove clutch assembly (if equipped). Remove starter. Remove flywheel. Remove seal retainer. Pry seal out of retainer.

Installation

Using seal installing tool, install seal into retainer. Fill clearance between lips of seal with grease,

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and coat lips of seal with engine oil. Reverse removal procedures to complete installation.

ENGINE OILING

CRANKCASE CAPACITY

Isuzu

Capacity is 3.4 quarts (3.2L) without filter replacement; 3.8 quarts (3.6L) with filter replacement.

LUV

Capacity is 3.8 quarts (3.6L) without filter replacement; 4.2 quarts (4.0L) with filter replacement.

NORMAL OIL PRESSURE

Oil pressure should be approximately 57 psi (4 kg/cm²) at 2800 RPM.

OIL PRESSURE RELIEF VALVE

Oil pressure relief valve opens at approximately 57-71 psi (4-5 kg/cm²).

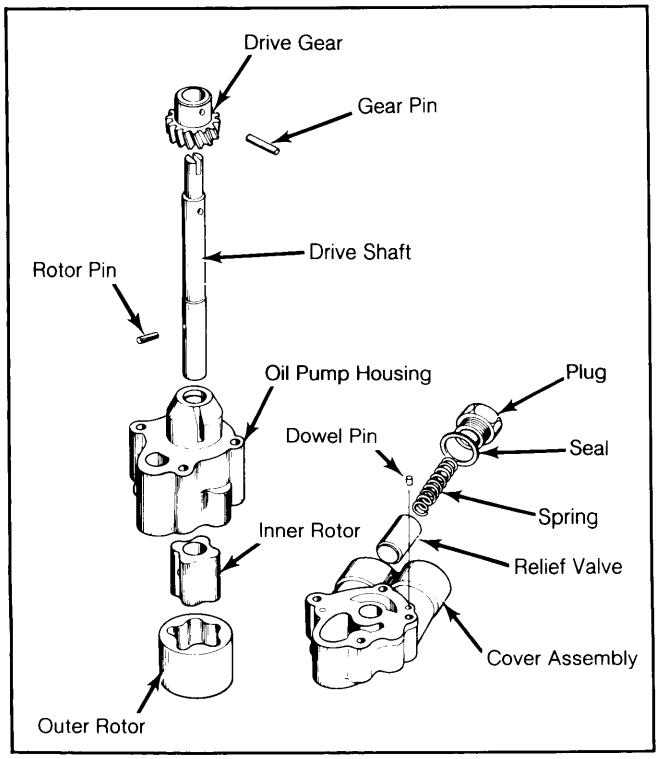
ENGINE OILING SYSTEM

Trochoid type oil pump is used. Pump delivers oil to main gallery, where it is routed to crankshaft journals. Through oil passages in crankshaft, oil is fed to connecting rod journals, connecting rods, and then to piston pins.

A branched oil passage from No. 3 crankshaft journal routes oil to the cylinder head. This oil flows through rocker arm shafts to lubricate rocker arm components. An oil well (located on upper face of cylinder head) provides lubrication to camshaft.

Timing chain and sprockets are lubricated by oil spray from oil jet on chain guide.

Fig. 9: Exploded View of Oil Pump Assembly



OIL PUMP

Removal

Remove cam cover. Remove distributor. Remove oil pan. Remove oil pickup tube from block, then remove tube from oil pump. Remove oil pump. *See Fig. 9.*

Inspection

1) Using a feeler gauge, measure tip clearance between inner and outer rotors. Replace oil pump if clearance is not within limits.

2) Using a feeler gauge, measure clearance between outer rotor and inner wall of pump housing. Replace oil pump if clearance is not within limits.

3) Install both gears in pump housing. Lay a straightedge over pump housing. Insert a feeler gauge between straightedge and rotors, and measure clearance over rotors. If clearance is excessive, replace oil pump.

OIL PUMP SPECIFICATIONS

Application	Measurement In. (mm)
Rotor Tip Clearance	.0079 Max. (.200)
Rotor-to-Pump Housing	.0098 Max. (.250)
Clearance Over Rotors	.0079 Max. (.200)

Installation

1) Align mark on camshaft with mark on No. 1 rocker arm shaft bracket. Align notch on crankshaft pulley with "O" mark on front cover. When the two sets of marks are aligned, No. 4 piston is at TDC on compression stroke.

2) Ensure alignment marks on oil pump inner and outer rotors are aligned. Prime oil pump. Engage oil pump drive gear with pinion gear on crankshaft, so alignment mark is turned rearward, and is away from crankshaft approximately 20° in a clockwise rotation. *See Fig. 10.*

3) When installing oil pump, make sure mark on drive gear is turned to rear side. Slot at end of drive shaft must be parallel with front face of cylinder block, and offset forward. *See Fig. 11.*

4) Install pump cover by fitting it to the dowel pins, then install mounting bolts. Install remaining components in reverse order of removal procedures.

Fig. 10: Installing Oil Pump

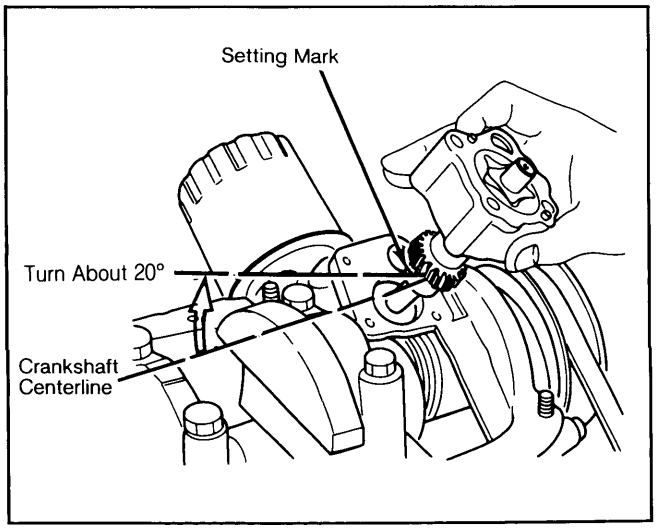


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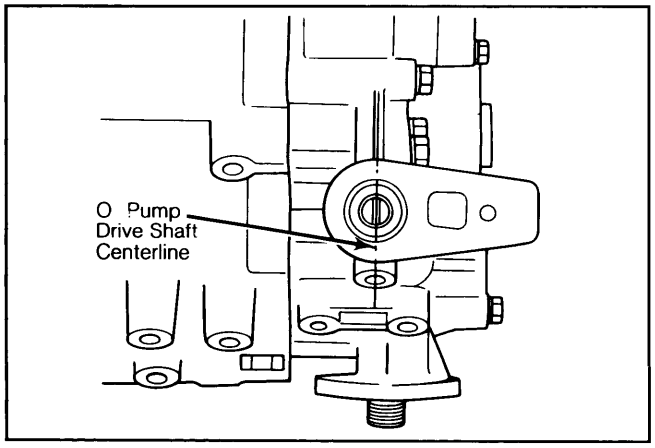
Fig. 11: Checking Oil Pump Drive Shaft Alignment



ENGINE COOLING

THERMOSTAT

Thermostat opens at about 180°F (82°C).

COOLANT CAPACITY

Coolant capacity is 7.4 quarts (7.0L).

RADIATOR CAP

Radiator cap pressure relief valve opens at 15 psi (1.1 kg/cm²).

WATER PUMP

Removal

1) Disconnect negative battery cable. Remove lower cover and drain cooling system. On models without A/C, remove fan. Remove water pump.

2) If A/C equipped, remove fan and air pump drive belt. Remove fan, fan pulley, and air pump drive pulley. Remove fan set plate and pulley. Remove water pump.

Installation

Clean gasket mating surfaces. To install water pump, reverse removal procedures. Adjust belt tensions and fill cooling system.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Camshaft Sprocket	58 (79)
Connecting Rod Caps	43 (58)
Cylinder Head	
Step 1	61 (83)
Step 2	72 (98)
Flywheel	69 (94)
Intake Manifold	16 (22)
Main Bearing Cap	72 (98)
Rocker Arm Shaft Bracket Nuts	16 (22)

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	110.8	1816	1x2-Bbl.	80@4800	95@3000	8.5:1	3.31	84.0	3.23	82.0

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)
1816 cc							
Intake	1.59 (40.3)	45°	45°	.047-.063 (1.19-1.60)	.310 Min. (7.88)	.0009-.0022 (.023-.056)	.....
Exhaust	1.34 (34.0)	45°	45°	.047-.063 (1.19)	.309 Min. (7.85)	.0015-.0031 (.034-.079)	.....

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)
1816 cc	.0018-.0026 (.045-.066)	Press Fit	.0024 (.061)	1 & 2	.012-.018 (.30-.46)	.....
				Oil	.008-.035 (.20-.89)	.....

Isuzu & LUV Engines

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ENGINE SPECIFICATIONS (Cont.)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

	MAIN BEARINGS				CONNECTING ROD BEARINGS		
Engine	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)
1816 cc	2.205 (56.01)	.0008-.0025 (.020-.063)	No. 3	.012 (.30)	1.929 (48.99)	.0007-.0030 (.017-.076)	.014 (.35)

CAMSHAFT

Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
1816 cc [1]	1.3362-1.3368 (33.94-33.95)	.0016-.0035 (.041-.089)	.....

[1] — Maximum end play is .008" (.20 mm).

VALVE SPRINGS

		PRESSURE Lbs. @ In. (Kg @ mm)	
Engine	Free Length In. (mm)	Valve Closed	Valve Open
1816 cc			
Inner	1.78 (45.2)	22 @ 1.5 (10 @ 38.6)	.....
Outer	1.85 (47.0)	37 @ 1.61 (17 @ 40.9)	.....