1700 cc 4 CYLINDER

IDENTIFICATION CODING

ENGINE IDENTIFICATION

Engine number is located on machined pad on engine block above fuel pump. Letter contained in code identifies engine by CID and carburetor type.

Application	Code
Omni & Horizon 105" 2-Bbl.	A

ENGINE REMOVAL

See Engine Removal at end of ENGINE Section.

CYLINDER HEAD & MANIFOLDS

INTAKE MANIFOLD

Removal & Installation – Disconnect all hoses and lines from air cleaner and remove air cleaner. Disconnect lines, hoses and linkage to carburetor and remove carburetor. Disconnect exhaust pipe at exhaust ball joint coupling. Remove bolts securing intake manifold to exhaust manifold and separate. Reverse removal procedure to install.

CYLINDER HEAD

Removal – Drain cooling system and disconnect necessary wires, hoses and linkage. Remove carburetor, intake and exhaust manifolds. Remove valve cover, camshaft bearing caps and camshaft. Remove valve lifters. Be sure to identify all parts removed for reinstallation in original position. Remove head bolts and head gasket.

Installation – Coat gasket with suitable sealer. Install gasket and head on block. Make sure marking on gasket "OBEN" is toward cylinder head. Insert bolts 8 and 10 to center head. Tighten bolts in sequence. After all bolts have been tightened to specification, turn another ¼ turn. *See Fig. 1.*

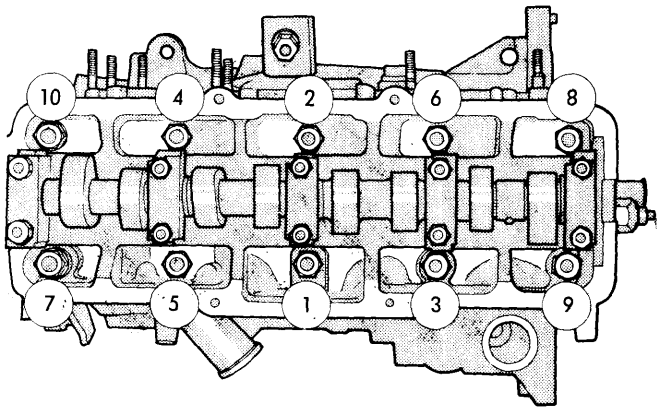

Fig. 1 Cylinder Head Tightening Sequence

VALVES

VALVE GUIDE SERVICING

Attach dial indicator to cylinder head and set at right angle to valve stem. Total play must not exceed .039" on intake and .051" on exhaust valve stems. If dial reading is excessive or stems are scuffed or scored, ream guides for installation of oversized valves. Guides must be reamed in steps starting from smallest to size desired.

VALVE SPRINGS

Dual chrome vanadium valve springs are installed for each valve. *See Fig. 2.*

NOTE – *Dual chrome vanadium valve springs are installed on each valve. See Fig. 2.*

Removal & Installation – Turn crankshaft until piston of cylinder concerned is TDC. Remove spark plug and install pressure air hose and adapter to apply continual pressure to cylinder. Using suitable valve spring tool L4419 (or equivalent), remove valve spring and stem seal. Reverse removal procedures to install.

VALVE STEM OIL SEAL

Steel-backed rubber valve stem seals are used on all valves.

NOTE – *Steel-backed rubber valve stem seals are used on all valves.*

Removal & Installation – Use seal protector from gasket set to prevent valve keeper grooves om cutting seal. Lubricate valve stem seal and using tool L-4421 (or equivalent), carefully push seal into valve guide.

MECHANICAL VALVE LIFTERS

Steel, bucket-type valve lifter surround and bear directly on the valve tips. A separate case-hardened steel disc, retained in the top of each lifter, serves as the cam lobe contact surface. These discs are selected for thickness, thereby insuring correct valve adjustment. *See Fig. 2.*

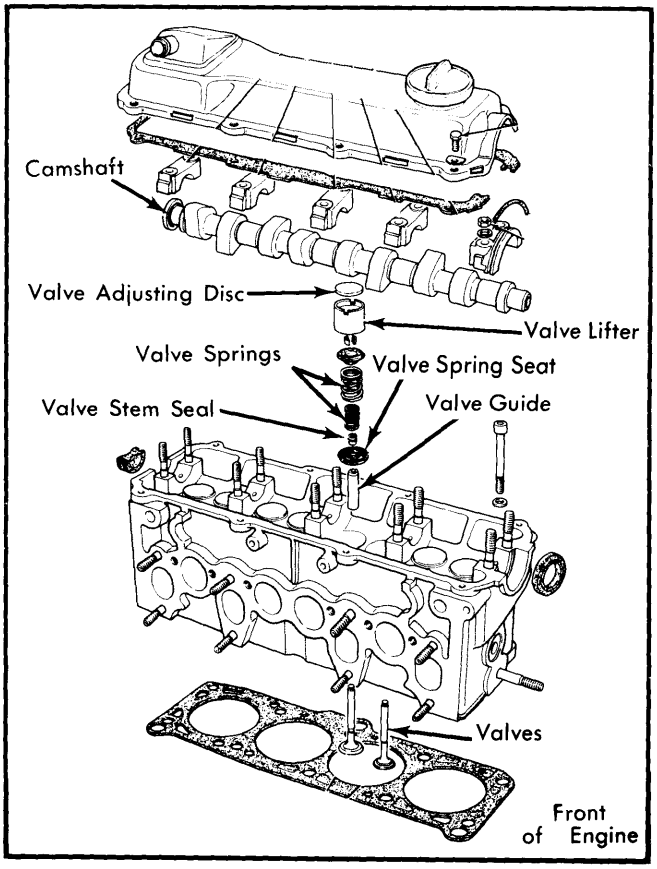

Fig. 2 Cylinder Head and Valve Assembly

1700 cc 4 CYLINDER (Cont.)

PISTONS, PINS & RINGS

OIL PAN

See Oil Pan Removal at end of ENGINE Section.

PISTON & ROD ASSEMBLY

Removal – 1) With cylinder head and oil pan removed, use ridge reamer to remove any deposits or ridge from upper portion of cylinder bore.

NOTE – *Piston must be at bottom of stroke and covered with cloth to collect cuttings.*

2) Inspect connecting rods and caps for cylinder identification and mark as necessary. Remove rod cap and push piston and rod assembly out top of block.

Installation – Lightly coat piston rings and cylinder walls with engine oil. Make sure ring gaps are properly spaced. "TOP" mark on lower piston ring and oil scraper ring must point toward piston crown. Using ring compressor, install pistons in cylinder with arrow pointing toward timing gear. *See Fig. 3.*

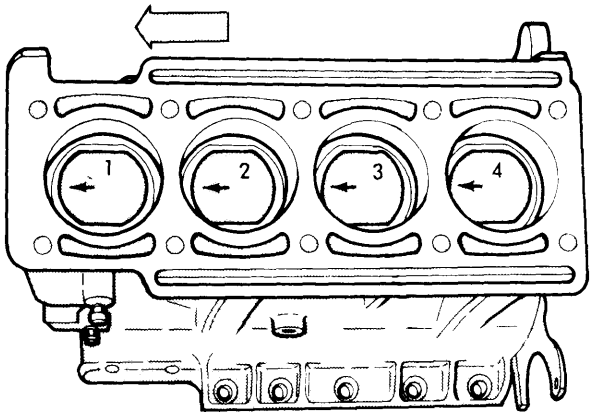

Fig. 3 Cylinder Block and Connecting Rod Assembly

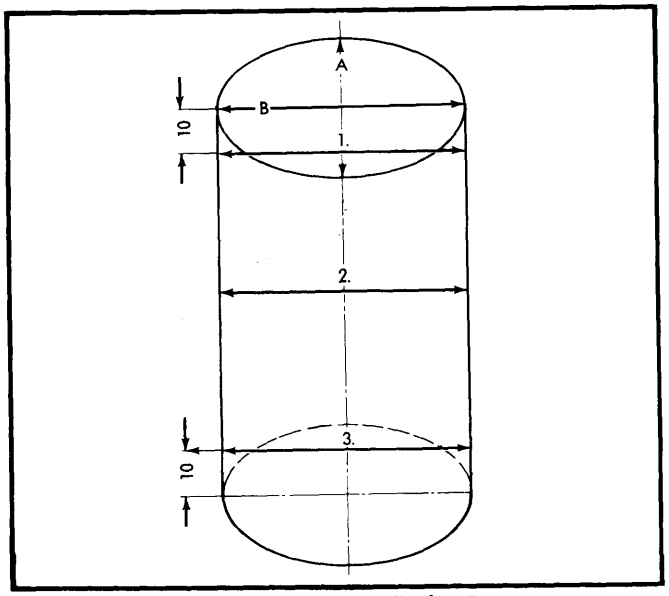

Fig. 4 Measuring Cylinder Bore.

FITTING PISTONS

With cylinder bores clean and dry, use dial indicator to check for wear and proper clearances. Cylinder out-of-round maximum clearance is .0016". Measurements must be taken 3/8" from top of bore in line with crankshaft and also 90° to crankshaft centerline. Also take measurements at center of cylinder and 3/8" from bottom of cylinder. *See Fig. 4.*

PISTON PINS

Removal & Installation – Use drift punch to remove piston pin circlip. Push pin from piston. Reverse removal procedures to reinstall.

CRANKSHAFT & ROD BEARINGS

MAIN & CONNECTING ROD BEARINGS

Connecting Rod Bearings – 1) Use Plastigage method to check rod bearings. Place Plastigage across full width of lower shell at the center of bearing cap. Tighten cap bolts to 45 ft. lbs.

2) Remove cap and determine amount of clearance by measuring width of compressed Plastigage with scale furnished on package. Side play should be .006-.025".

3) When fitting bearings, the following bearing inserts can be used together. A standard and .001" undersize, two .001" undersize and a .001" with a .002" undersize.

NOTE – *Do not use bearings together with more than .001" between them.*

Main Bearings – 1) Support weight of crankshaft with jacks or stand placed under counterweight adjacent to main bearing being checked.

2) Remove cap and shell. Place Plastigage across full width of shell. Install cap with shell and torque bolts to 85 ft. lbs.

3) Remove cap and determine amount of clearance by measuring width of compressed Plastigage with furnished gauge. Do not use shells with more than .001" difference. Reinstall bearings and caps. Torque to specifications.

4) Check crankshaft end play with dial indicator. Move crankshaft forward and backward. Take readings with pressure released from rods. If end play is less than .002", loosen No. 3 main bearing cap and reposition with bolts finger tight. Move crankshaft fore and aft before retorquing bolts. If end play exceeds .009", install new thrust bearing.

REAR MAIN BEARING OIL SEAL

Removal & Installation – Transmission must be removed. Pry old seal out with screwdriver. Using oil seal installing tool L-4455-1 (or equivalent), install new seal. Oil lip of seal lightly with engine oil and place over tool. Tap seal into place with plastic hammer.

1700 cc 4 CYLINDER (Cont.)

CAMSHAFT

CAMSHAFT OIL SEAL

Use oil seal removing tool L-4424 (or equivalent) to remove camshaft oil seal. To install, reverse removal procedure.

TIMING BELT

Removal – 1) Raise vehicle and remove inner fender shield. Remove "V" belt and idler pulley assembly. Remove lower plastic timing belt shield.

2) Lower vehicle and place jack under engine. Remove right motor mount through bolt and slightly raise engine. Loosen timing belt tensioner and remove timing belt.

Installation – 1) Remove spark plug and rotate crankshaft to TDC. Align timing mark on crankshaft and intermediate sprockets. See *Fig. 5*. Turn camshaft sprocket until mark on sprocket is lined up with cylinder head cover. See *Fig. 6*. Install timing belt and belt tension tool L-4502 horizontally on large hex of belt tensioner pulley and loosen lock nut.

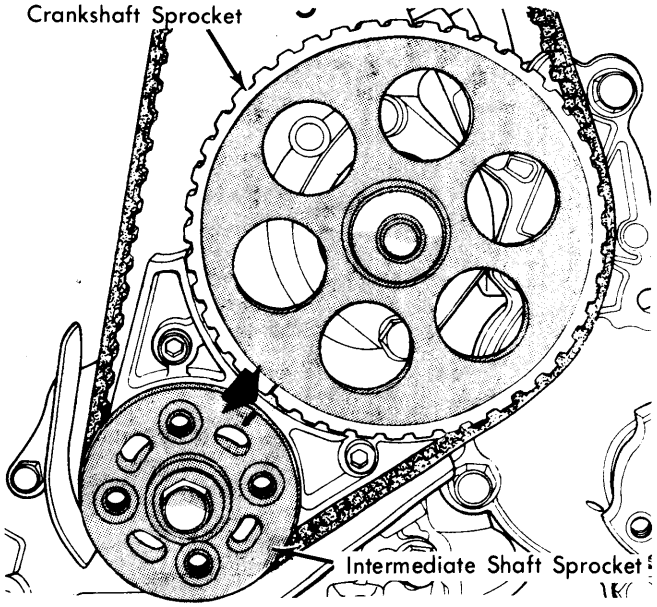

Fig. 5 Crankshaft and Intermediate Sprocket Alignment Marks.

2) Reset if necessary to have axis within 15° of horizontal. Turn engine clockwise from TDC two crank revolutions to TDC. Tighten lock nut on tensioner holding wrench in position.

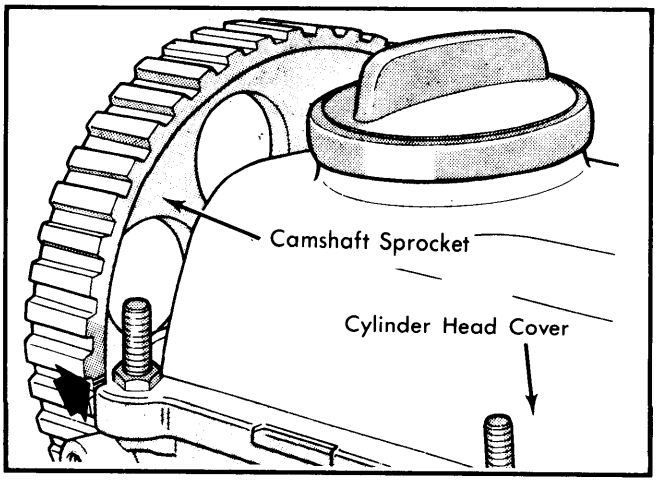

Fig. 6 Camshaft Alignment Marks

VALVE TIMING

See Mechanical Valve Lifters

ENGINE OILING

Crankcase Capacity – 4 quarts with or without filter change.

Oil Filter – Replace every second oil change.

Normal Oil Pressure – Minimum pressure 28 psi.

Pressure Relief Valve – Relief valve is staked and is not servicable.

OIL PUMP

Disassembly – Clamp pump lightly in vise with shaft down. Remove hex head mounting screws from cover. Push drive shaft up and remove shaft and gear assembly. Remove driven gear and pry deflector plate off to remove strainer.

Inspection – Check end play by placing straightedge across pump housing. With feeler gauge, measure between gears and straightedge. Limits are .001" minumum to .006" maximum. Also check gear backlash. Backlash should be within .002-.008", if not, replace gears.

Installation – Reverse removal procedures and install pump in engine.

ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS

Year	Displ.		Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore		Stroke	
	cu. ins.	cc					in.	mm	in.	mm
1978	105	1700 cc	2-Bbl.	75@5600	90@3200	8.2-1	3.13"	80	3.40"	86

1700 cc 4 CYLINDER (Cont.)

ENGINE SPECIFICATIONS (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)
1700 cc							
Int.	1.338 (34.0)	45°	45°	1.306 (33.20)	.314 (7.97)	.020 (0.5)	....
Exh.	1.220 (31.0)	45°	45°	1.212 (30.80)	.314 (7.97)	.027 (0.7)	.....

PISTONS, PINS, RINGS

Engine	PISTONS	PINS		RINGS		
	Clearance In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Rings	End Gap In. (mm)	Side Clearance In. (mm)
1700 cc	.0004-.0015 (.011-.039)	.....	.....	1	.012-.018" .30-.45 mm	.0016-.0028" .04-.07 mm
				2	.012-.018" .30-.45 mm	.0008-.002" .02-.05 mm
				3	.012-.018" .30-.45 mm	.0008-.002" .02-.05 mm

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)
1700 cc	2.096-2.126 (53.25-54.00)	.001-.003 (.03-.08)	No.3	.003-.007 (.07-.18)	1.782-1.811 (45.25-46.00)	.0004-.0025 (.010-.064)	.15 (.37)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Cylinder Head	60 (8.30)
Main Bearing Cap	47 (6.50)
Camshaft Bearing Cap	14 (1.94)
Rocker Arm Cover	3.7 (.42)
Oil Pump	
Long Bolts	14 (1.94)
Short Bolts	7.4 (.98)
Oil Pan	
Hex Head	14 (1.94)
Allen Head	7.4 (.98)