TYPE 1 1600 cc 4 CYLINDER

ENGINE CODING

ENGINE IDENTIFICATION

Engine identification is determined by first digits of serial number. Engine serial number is stamped on crankcase under generator support flange

Application	Engine Code
Type 1	
Fuel Injected	AJ

ENGINE, CYLINDER HEAD & MANIOLD

ENGINE

Removal – 1) Remove air cleaner. Drain oil. Disconnect hoses between fan housing and heat exchangers. Disconnect battery ground, coil wires, alternator, and oil pressure switch.

2) Disconnect fuel injection wiring harness from coil, injectors, crankcase, temperature sensors, air intake distributor and other related parts. Make sure to index mark each wire for reinstallation.

3) From under vehicle, disconnect starter electrical wires. Disconnect fuel line from pressure regulator and plug hose. Unhook back-up lights.

4) Disconnect throttle cable. Remove small cover plates over preheater pipe connections. On models equipped with automatic stick shift, disconnect lead and vacuum hose from control valve. Disconnect transmission lines and plug. Disconnect heater control cables. Disconnect heater ducting at front of heat exchangers.

5) On models equipped with automatic stick shift, remove four converter to drive plate bolts. Remove nuts from lower engine mounting studs. Place a jack under engine and raise until squarely seated against crankcase. Remove left side upper mounting bolt and right side nut and bolt. Slide engine rearward until clear. Lower jack and continue to pull engine to rear.

NOTE – *After engine has been removed, install a retainer to bell housing to keep torque converter in place.*

Installation – To install, reverse removal procedure and note: Lubricate transmission input shaft and clutch release bearing. Also, lightly lubricate starter (Bosch only) drive bushing with multi-purpose grease. Adjust clutch free play. Make sure ignition timing and accelerator control linkage are properly adjusted.

INTAKE MANIFOLD

Removal – 1) Remove fan housing. Disconnect preheating pipes at flanges. Remove injectors, intake air sensor and air intake distributor from crankcase.

2) Remove nuts holding manifold. Disconnect all air and vacuum hoses from air intake distributor. Be sure to index each item for reinstallation.

3) Disconnect exhaust line from EGR valve by removing mounting nuts. Lift off manifold with intake air distributor.

Installation – To install, reverse removal procedure and replace gaskets where necessary.

CYLINDER HEAD

NOTE – *Engine must be removed from vehicle, and manifolds removed, before removing cylinder heads. If cylinders are not to be removed, use retaining device to keep cylinders from pulling free.*

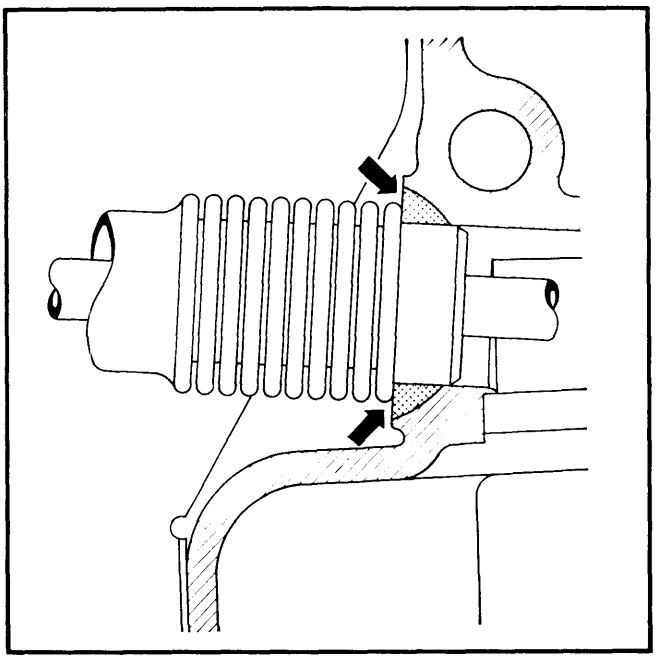

Fig. 1 Push Rod Tube Installation with Detail of Seal Fit

Removal – 1) Remove engine and intake manifold as previously outlined. Remove muffler and heat exchangers. Disconnect spark plug wires at spark plugs. Remove deflector cover plates from under cylinder cover plates and remove cylinder cover plates.

2) On fuel injected engines remove lower left side warm air duct. Remove bolt securing thermostat to bracket and unscrew thermostat from control rod. Disconnect rod from control lever at top.

3) Remove rocker arm cover with gasket and remove rocker arm assemblies. Remove push rods, keeping in order for reassembly. Loosen cylinder head nuts gradually working in sequence from outside toward center and remove cylinder head.

Installation – 1) Install new seals on pushrod tubes. Install cylinder head with new cylinder seals and position pushrod tubes with seams facing upward. Push head onto cylinders to hold pushrod tubes.

2) Install cylinder head washers and nuts to studs and tighten just enough to hold head and pushrod tubes in place. Uniformly tighten nuts in sequence shown in illustration "A" to 7 ft. lbs., then tighten in sequence shown in illustration "B" to required torque. Reverse removal procedure for remaining components. Adjust valves.

TYPE 1 1600 cc 4 CYLINDER (Cont.)

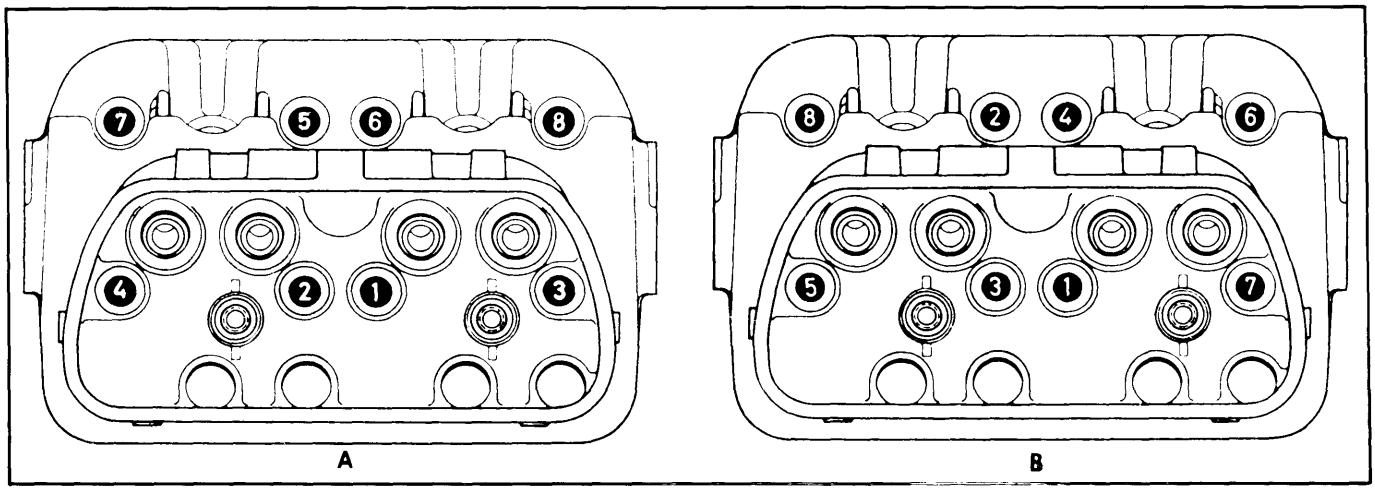

Fig. 2 Step One and Two for Cylinder Head Tightening Sequence – Volkswagen 1600 cc

VALVES

VALVE ARRANGEMENT

E-I-I-E (front to rear), both banks.

VALVE GUIDE SERVICING

1) Place valve in valve guide with stem flush with end of guide. With dial indicator, measure valve rock at valve head. If rock exceeds .031" replace valve guide or valve. Valve guide with inside machined shoulder is exhaust.

2) To replace valve guide, drill guide with shouldered drill to depth of 1½-2" using slow speed drill. Drive guides down through cylinder head with suitable tool. Drive oversize guide from top of cylinder head using press. Pressure required should be 2000-4000 lbs. Ream guides to proper fit.

VALVE STEM OIL SEALS

Coat valve stems with molybdenum-disulfide paste and insert in cylinder head. Slide valve stem seal ring over valve stem and install spring, retainer and keeper.

VALVE SPRINGS

NOTE – *Valve spring may be removed with cylinder head installed. Apply constant air pressure (minimum 85 psi) to cylinder through spark plug hole to hold valve in place while compressing spring.*

Removal – Remove cylinder head cover and rocker arm shaft. Install suitable valve spring compressor tool (VW311H with cylinder head removed, VW653/2 with cylinder head installed). Compress spring retainer and spring and remove valve keepers. Release compressor and remove spring retainer and spring.

Installation – Install valve, valve spring, valve stem seal ring and spring retainer.

NOTE – *Install spring with closely spaced coils against cylinder head.*

2) Compress spring with suitable compressor and install valve keepers.

ROCKER ARM ASSEMBLY

1) Remove valve cover. Remove nuts from rocker arm studs and remove rocker arm assembly. Remove clips from end of shaft and remove washers, rocker arms and shaft supports.

2) Inspect shaft, supports and rocker arms for wear. Inspect sides of rocker arms and supports for wear. Smooth sides with emery paper before installing if worn.

3) To assemble reverse removal procedure. Install new seals on rocker arm studs, and reverse removal procedure to install. Adjust valve clearance.

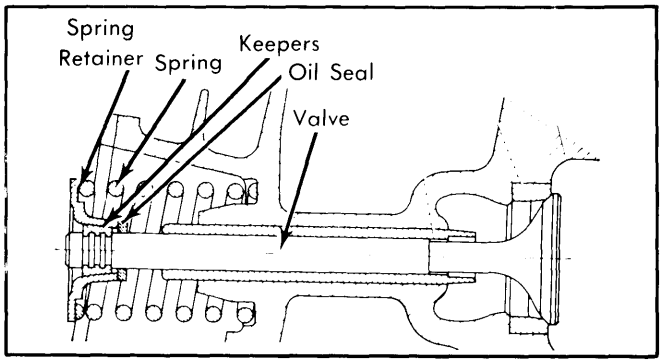

Fig. 3 Sectional View of Valve with Related Parts

VALVE CLEARANCE ADJUSTMENT

Perform adjustment with engine cold. Turn crankshaft until No. 1 cylinder is at TDC position and distributor rotor points to No. 1 cylinder position. Loosen lock-nut and adjust rocker arm adjusting screw until valve clearance is .006". Check clearance between adjusting screw and valve stem of both valves. Tighten lock nut. Turn crankshaft 90° while noting rotor travel. Adjust valves of Nos. 2, 3 and 4 in turn.

TYPE 1 1600 cc 4 CYLINDER (Cont.)

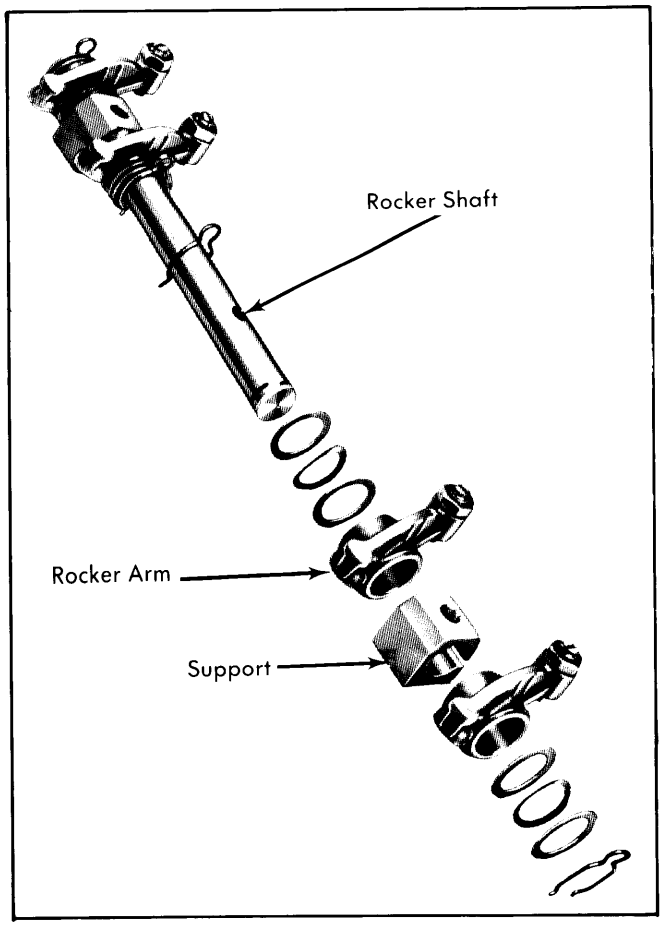

Fig. 4 Expanded View of 1600 cc Rocker Arm Assembly

PISTONS, PINS & RINGS

CYLINDERS

Removal – Remove engine and remove cylinder head. NOTE – *Mark cylinders to insure they are reinstalled in original position.* Remove deflector plates from bottom of cylinders and pull cylinders from pistons.

Installation – 1) Check seating surfaces of cylinders on both ends. Make sure seating areas are perfectly clean and true before installing cylinders. Stagger ring gaps 90° apart so that oil ring gap faces upward when cylinder is installed.

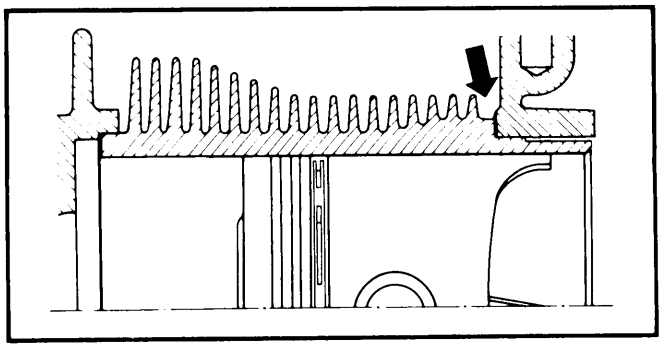

Fig. 5 Shows Correct Position of Cylinder Seal

2) Apply oil to cylinder, piston, rings and piston pin. Compress rings with suitable ring compressor (VW123). Install new sealing gasket on crankcase side and slide cylinder over piston.

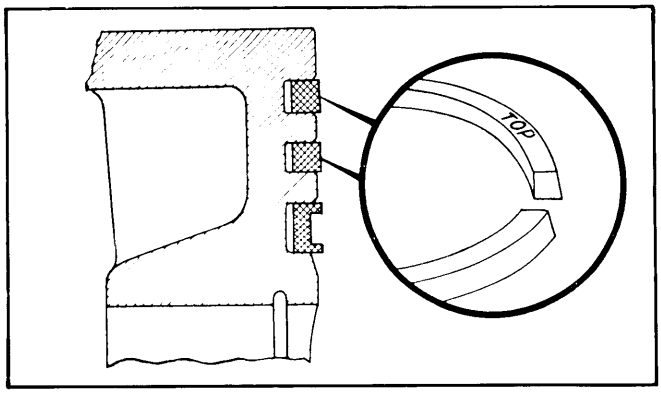

Fig. 6 Installation of Compression Rings 1 and 2

3) Make sure studs do not contact cooling fins when cylinder is completely seated against crankcase. Install cylinder deflector plates and remaining components in reverse of removal.

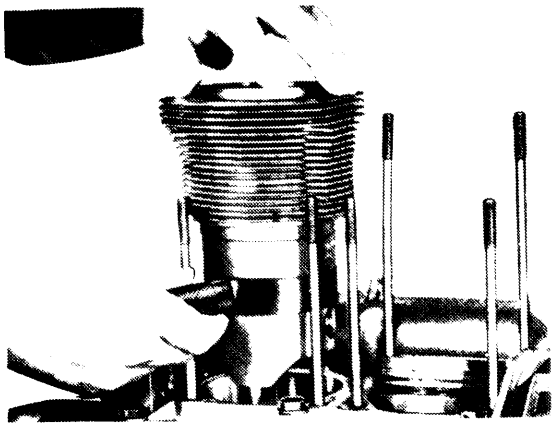

Fig. 7 Cylinder Installation

FITTING PISTONS

1) With piston and cylinder removed, measure clearance between piston and cylinder. Check piston size at bottom of skirt and 90° to piston pin. Check cylinder size at several points throughout cylinder, using largest reading to determine clearance.

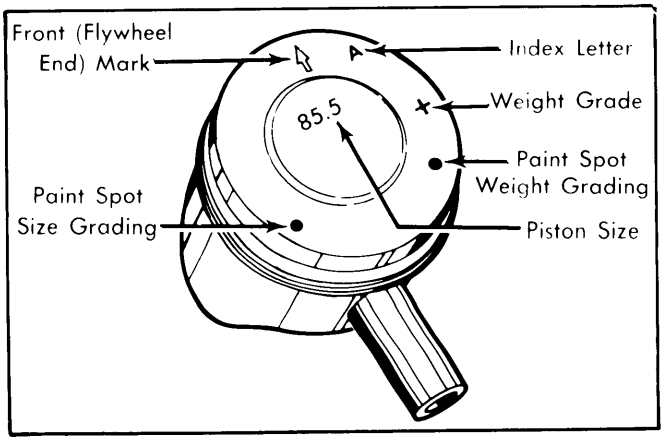

Fig. 8 Top View of Piston with Detail of Piston Markings

TYPE 1 1600 cc 4 CYLINDER (Cont.)

2) If clearance exceeds .008" (.20 mm) replace piston and cylinder as a set. New piston must be of same weight grade as original or within 10 g of original piston weight. Piston size, weight and installation position are marked on top of piston.

NOTE – *Piston alone may be replaced with one of matching size. Only pistons of same size and weight grade should be installed in same engine.*

3) New piston rings are size graded to match piston-cylinder sets. Measure ring gap with ring installed approximately ¼" from bottom of cylinder.

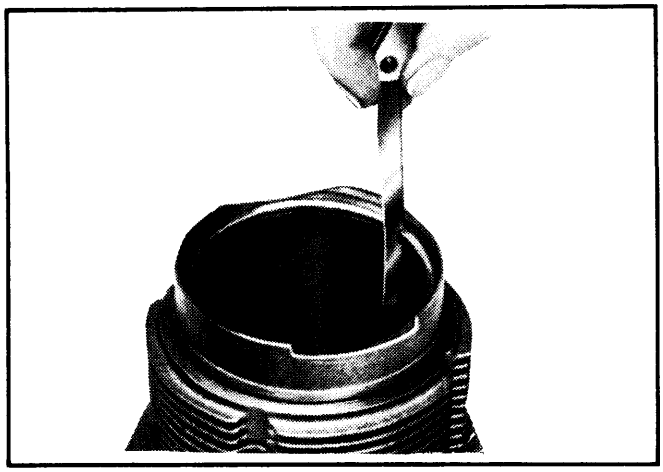

Fig. 9 Using a Feeler Gauge to Measure Ring Gap

4) Install rings on piston and measure ring side clearance using feeler gauge. If clearance exceeds .005" (.12 mm) on top ring or .004" (.10 mm) on second or oil ring, piston must be replaced.

PISTON PINS

Removal – Remove cylinders and mark pistons before removing for proper installation. Using suitable pliers (VW122b), remove piston pin circlips and push piston pin out of piston using suitable tool (VW207).

Installation – 1) Check fit of pin in piston. Piston pin should be light push fit with piston 68-167°F. If pin is too loose, both pin and piston must be replaced. Check clearance of pin in rod. If clearance exceeds .0016" (.04 mm) replace piston pin and rod bushing. See Piston Pin Bushing Replacement.

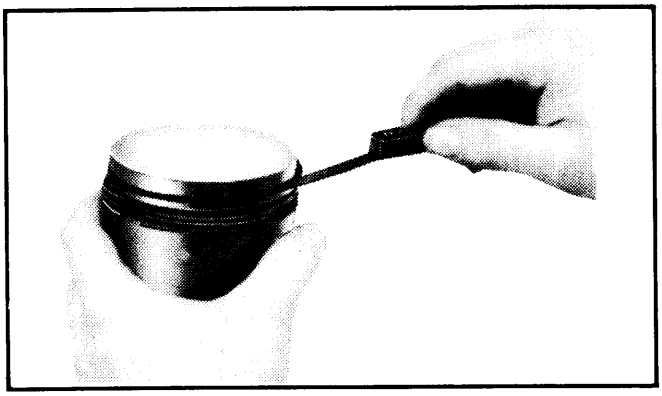

Fig. 10 Using a Feeler Gauge to Measure Ring Clearance

2) Install one circlip in piston on side facing flywheel. Position piston on connecting rod and push piston pin through piston. Replace remaining circlip. NOTE – *Piston may be heated to ease pin installation.* Replace remaining components in reverse of removal.

PISTON PIN BUSHING REPLACEMENT

1) At normal temperature, piston pin should push fit in connecting rod. If side clearance is felt with a new pin installed, bushing must be replaced and reamed to correct fit with a new piston pin.

2) Press bushing out using a suitable mandrel and components. Install new bushing using same procedure and tools used for removal.

3) Drill through oil holes in connecting rod. Use handreamer to fit pin into bushing. Bushing should be free of chatter marks when reaming is completed. Piston pin should push fit into bushing without oil. Clearance must be .0004-.0008" (.01-.02 mm).

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

CRANKCASE DISASSEMBLY

NOTE – *Crankcase must be taken apart to replace connecting rods, connecting rod bearings and main bearings. It is also necessary to disassemble crankcase to remove crankshaft, camshaft and camshaft bearings.*

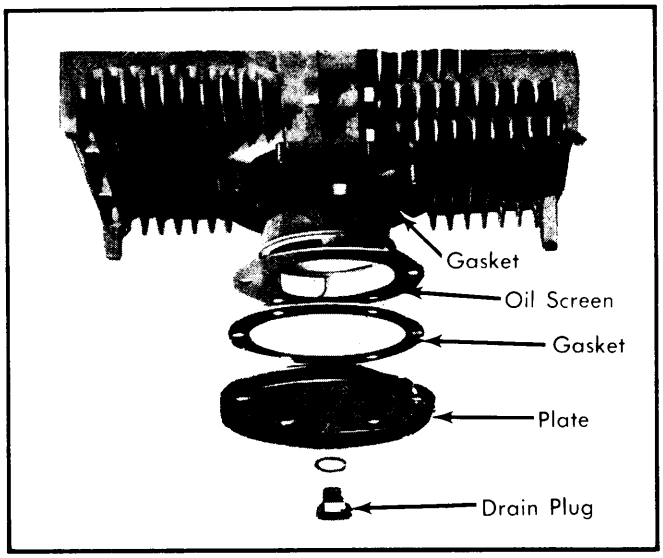

Fig. 11 Bottom View Showing Oil Strainer and Components

1) Remove engine from vehicle and remove cylinder heads, cylinders and pistons as previously outlined. Remove flywheel or drive plate, distributor, fuel pump, distributor drive, distributor drive washer and oil cooler.

2) Remove front pulley nut and remove pulley using suitable puller (VW203). Remove generator support housing and metal shroud from front of engine.

TYPE 1 1600 cc 4 CYLINDER (Cont.)

3) On all models remove oil pump cover and pull oil pump from crankcase using a suitable puller (VW201). Remove retaining plate and screen from bottom of motor. Remove nuts and bolts securing crankcase halves and separate.

CAUTION – *Use a rubber hammer to separate crankcase halves, do not insert any kind of tool between sealing edges.*

4) Remove camshaft and crankshaft. Remove crankshaft oil seal and cam plug. Remove number two bearing halves from both sides of crankcase and remove bearing dowel pins. Remove cam bearings if equipped. Remove oil pressure relief valve.

CRANKCASE ASSEMBLY

1) Thoroughly clean and inspect crankcase halves for wear or cracking. Assemble empty crankcase halves and tighten nuts to specifications. Measure crankshaft bearing bores with an inside micrometer. Specified diameter for bearing bores 1 through 3 is 2.1641-2.1649" (54.97-54.99 mm). Diameter for number 4 bearing bore is 1.5740-1.5748" (40.00-40.01 mm).

2) Flush out all oil passages and blow out with compressed air. Make sure oil suction tube and all studs are tight in crankcase halves.

3) Insert valve tappets and crankshaft bearing dowel pins. Install camshaft bearings if equipped. Install No. 2 bearing halves. Install crankshaft and connecting rod assembly, making sure bearings line up with dowel pins.

4) Install camshaft with "O" on cam gear centered between two teeth with punch marks on crankshaft gear. Install cam plug using sealer. Spread a thin coat of sealer on sealing edges of crankcase halves, making sure sealer does not enter oil passages.

5) Install "O" ring on large crankcase studs and push "O" ring into beveled portion of crankcase. Join crankcase halves together and lightly tighten nuts. Tighten M8 nut next to M12 nut near number 1 bearing then tighten all M12 nuts. Tighten remaining nuts and bolts.

6) Check crankshaft for freedom of movement. Install oil pressure relief valve. Install pistons, cylinders and cylinder heads as previously outlined.

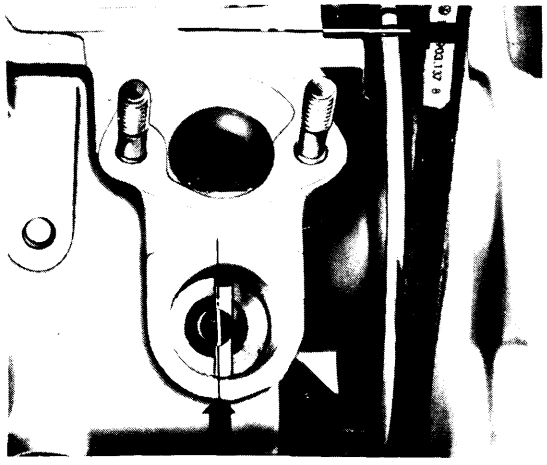

Fig. 12 1600 cc Distributor Drive Installation

7) On all models install all components except distributor and distributor drive in reverse of removal order. Set engine on number one firing position. Place distributor drive washer on a long screwdriver. Insert screwdriver into bottom of distributor hole, drop washer and center in bottom of hole with screwdriver.

8) Insert distributor drive with slot at 90° with crankshaft and small segment of slot toward pulley.

MAIN & CONNECTING ROD BEARING SERVICE

1) Split crankcase and remove crankshaft and connecting rod assembly as previously outlined. Attach crankshaft to a suitable holding fixture (VW310A).

2) Remove Woodruff key, oil thrower and number 4 bearing. Remove connecting rods and bearings. Remove snapring from end of crankshaft.

3) Press distributor drive gear, spacer and crankshaft gear from crankshaft. Remove number 3 bearing. Thoroughly clean crankshaft and blow out all oil passages with compressed air.

4) Check crankshaft for runout, maximum runout is .0011". Check crankshaft journals for out-of-round, maximum out-of-round is .0011". If excessive out-of-round conditions exist, crankshaft must be ground to next undersize.

5) Bearings for undersize crankshafts are available in .010, .020 and .030" undersize. Connecting rod bearing journals are also available in same undersizes.

6) Clean and inspect connecting rods. If bushing has been determined to be worn excessively, install new bushing. See *Piston Pin and Piston Pin Bushing Replacement*. Check connecting rod for twist and bending.

7) If connecting rod is replaced, make sure there is no more than 10 grams difference in weight between new and old connecting rods.

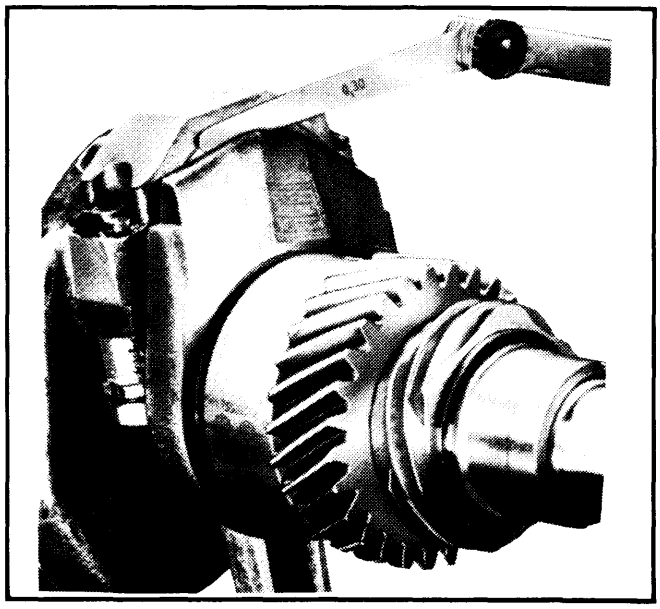

Fig. 13 Using a Feeler Gauge to Check Connecting Rod Side Clearance

TYPE 1 1600 cc 4 CYLINDER (Cont.)

8) Main bearing clearance is checked by the Plastigage method. Place a piece of Plastigage wire across crankshaft journal. Install bearings on crankshaft and install crankshaft in empty crankcase halves. Bolt crankcase together at specified torque. Do not turn crankshaft. Separate crankcase and remove crankshaft. Remove bearings and compare flattened wire to scale on Plastigage package. Compare to specified clearance.

9) If clearance is more than specified, crankshaft can be ground to .010", .020" and .030" undersize. Replacement bearings of appropriate size must be used. This same procedure is used when determining connecting rod bearing clearance.

10) Install bearing halves in rod and rod cap. Install on crankshaft with numbers on rod and rod cap together and with forged mark on rod up when crankshaft is installed. Tighten rod bolts or nuts to specifications. Check rod side clearance.

11) Oil and install number 3 bearing on crankshaft with dowel pin hole toward flywheel. Press on crank gear, spacer and distributor drive gear. Install snap ring. Oil and install number 4 bearing with groove toward oil thrower. Install oil thrower and Woodruff key.

12) Oil and install number 1 bearing and install crankshaft in crankcase as previously outlined.

THRUST BEARING ALIGNMENT

1) Crankshaft endplay must be adjusted with crankshaft oil seal removed. Install two shims, flywheel gasket (paper or metal) and flywheel.

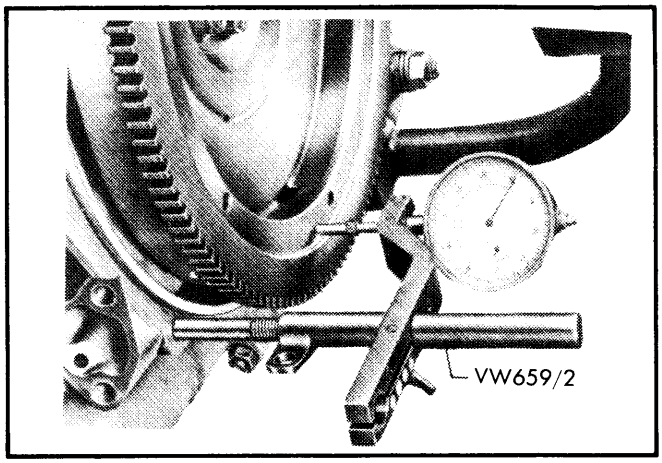

Fig. 14 Checking Crankshaft End Play with Dial Gauge

2) Correct end play is .0028-.0051" and must not exceed .006". Mount dial indicator to crankcase so back and forth movement of crankshaft can be determined. Rock crankshaft back and forth and determine thickness of third shim.

3) Install third shim, oil seal, and flywheel with gasket. Recheck end play. Following shim sizes are available:

Millimeter Marking (Etched in Shim)	Inch Equivalent
0.24 mm	.0094"
0.30 mm	.0118"
0.32 mm	.0126"
0.34 mm	.0133"
0.36 mm	.0142"

MAIN BEARING OIL SEAL SERVICE

1) Remove flywheel and pry out old seal. Clean recess in crankcase and coat with a thin film of sealer.

2) Install a new seal using a suitable installer (VW240D). Make sure seal is squarely seated in recess.

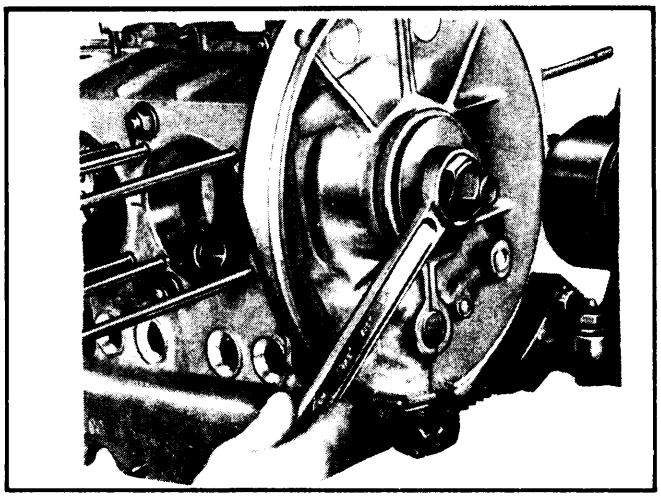

Fig. 15 Crankshaft Oil Seal Installation with Special Tool

3) Lubricate contact surface or seal and install flywheel. Tighten flywheel retaining nut to specification.

CAMSHAFT

CAMSHAFT

1) Split crankcase and remove camshaft as previously outlined. Clean camshaft and inspect riveted joint between camshaft and gear.

2) Inspect camshaft lobes and bearing journals for excessive wear. Maximum wear for bearing journals is .0015". Check camshaft runout on number 2 bearing journal. Maximum runout is .0016".

3) Check backlash between camshaft and crankshaft gears. Correct backlash is 0-.002". If backlash is incorrect, camshafts with different pitch radius are available. Pitch radius is stamped on inner face of gear.

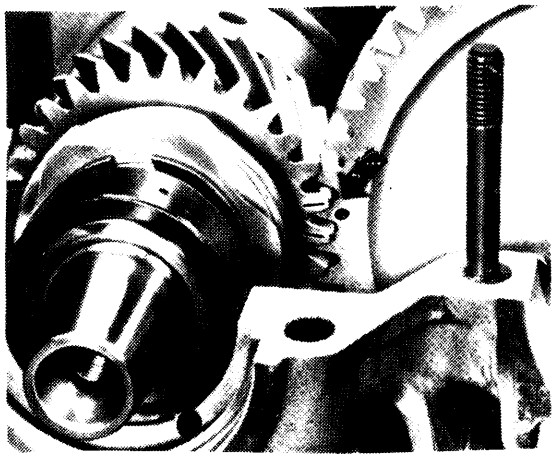

Fig. 16 Correct Position of Camshaft Timing Gear

TYPE 1 1600 cc 4 CYLINDER (Cont.)

CAMSHAFT END THRUST

Camshaft end play is checked with camshaft installed in crankcase half. Measure back and forth movement of camshaft with a dial indicator. If end play exceeds .0062", replace camshaft or camshaft bearings. Correct end play is .0016-.0051".

VALVE TIMING

Install camshaft with "O" stamped in tooth on outside of camshaft gear between two teeth with punch marks on crankshaft gear.

ENGINE OILING

Oil Capacity – 2.6 qts.

Normal Oil Pressure – 28 psi at 2500 RPM

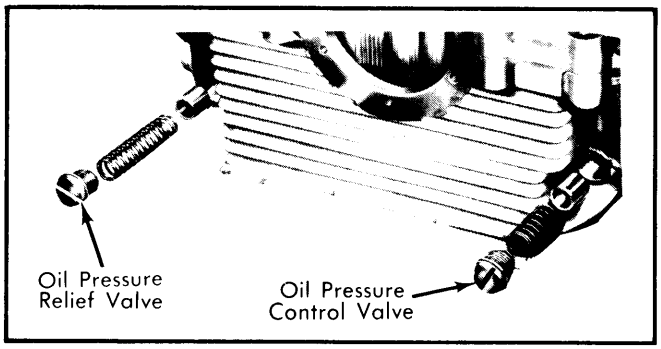

Fig. 17 Oil Pressure Regulator Valves Location

Pressure Regulator Valves – Oil pressure relief valve, used to protect oil cooler from excessive pressure, is located in crankcase to rear of oil pan. Oil pressure control valve, used to control oil pressure to bearings, is located in crankcase forward of oil pan. Oil pressure relief spring should have length of 1.73" at 12.3-16.0 lbs. load. Oil pressure control spring should have length of .795" at 6.8-8.4 lbs. load.

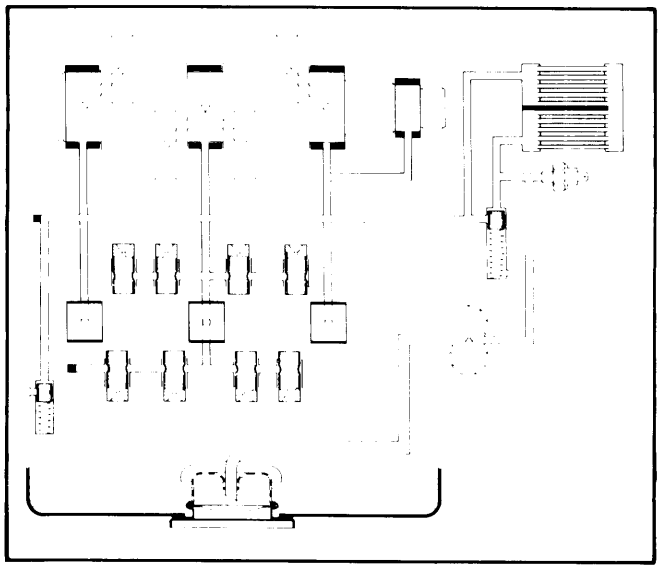

Fig. 18 Engine Lubrication Circulation Diagram

ENGINE OILING SYSTEM

Full pressure lubrication system with gear type oil pump. Oil pump is mounted at front of engine and driven by the camshaft. Oil is pumped through oil cooler into oil passages. Crankshaft main and connecting rod journals oil through cross drilled holes in crankshaft. Oil is pumped to camshaft through oil passages that also lubricate valve tappets. Oil flows through tappets and into push rods to lubricate rocker arms and shafts. Valves and valve stems are lubricated by splash oil. Excess oil flows back into crankcase through push rod tubes. Cylinder walls, pistons and piston pins are oiled by splash oil.

OIL PUMP REPLACEMENT

W/Man. Trans. – 1) Remove crankshaft pulley and metal shroud from behind pulley.

2) Remove oil pump cover and gears. Pull pump housing from crankcase using a suitable puller (VW201). Check gear backlash and endplay.

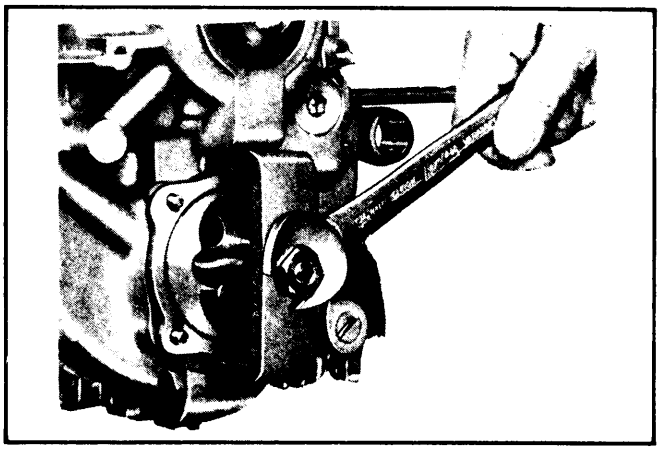

Fig. 19 Removing Oil Pump with Puller Tool

3) Inspect pump body mating surfaces for wear or damage. Install pump body and gasket (without sealer) in crankcase. Insert a suitable pilot in housing in place of gear.

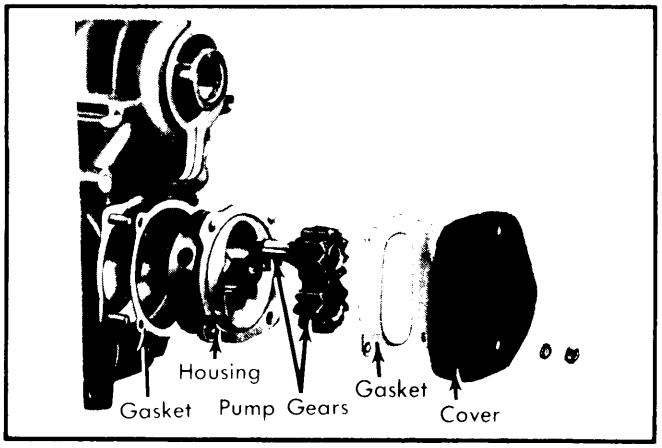

Fig. 20 View of Partially Disassembled Oil Pump

4) Rotate crankshaft 360° twice to center pump body with slot in camshaft. Remove pilot and install gears. Inspect cover and machine flat if necessary. Use new gasket (without sealer) and install cover. Tighten bolts and install remaining components as previously outlined.

TYPE 1 1600 cc 4 CYLINDER (Cont.)

W/Auto Stick Shift – Apply same procedures as outlined above, noting the following: Remove Woodruff keys to avoid damage to intermediate plate seals. If intermediate plate or front cover are damaged, replace complete oil pump.

Oil Pump Specifications

Application	Measurement
Gear Backlash	0-.008" (0-.20 mm)
End Play Without Gasket (Max.)	.004" (.10 mm)

ENGINE COOLING

COOLING SYSTEM

Engine is cooled by a radial fan mounted on end of generator and inside of upright shroud. Fan draws air in through large hole in fan shroud. Air is then directed over finned cylinders and cylinder heads by deflector plates. A thermostat is mounted under cylinders number one and two. Thermostat operates by opening and closing deflector plates in fan shroud.

AIR DUCTS, FAN HOUSING & CONTROL FLAPS

Partical Removal – 1) Remove alternator drive belt. Remove air cleaner and intake air sensor. Remove accelerator cable from guide tube. Remove alternator mounting bracket. Disconnect ignition cables, any hoses, air ducts, or wires that might prevent fan housing upward movement.

2) Remove oil cooler cover bolt and bolt holding fan housing to oil cooler flange. Take off cover and air duct. Remove screws from each end of fan housing. Remove thermostat. Pry off spring clip, separate connecting link from left control flap. Raise fan housing and remove intake manifold and alternator.

NOTE – *For complete removal of components, continue with remaining procedures. It is easier to remove remaining components with engine removed.*

3) Remove fresh air to heat exchangers distributing hoses. Remove crankshaft pulley cover plate and preheater rear cover plates. Free lower air ducting from crankcase and heat exchangers.

4) Slide alternator mounting bracket off support stand. Remove fan housing screws, lift up fan housing and remove. Both control flaps can be removed by unhooking return spring and removing mounting screws in lower part of fan housing.

Installation – To install components, reverse removal procedure.

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
1977 Type 1										
AH	96.9	1584	Fuel Inj	46@4000	72@2000	7.3-1	3.36	85.5	2.72	69
AK	96.9	1584	Fuel Inj	46@4000	72@2000	7.3-1	3.36	85.5	2.72	69

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)
1600 cc							
Int.	1.40 (35.6)	44°	45°	.051-.063 (1.3-1.6)	.3126-.3130 (7.94-7.95)	.009-.011 (.23-.27)	.....
Exh.	1.26 ①(32.1)	45°	45°	.067-.079 (1.70-2.00)	.3114-.3118 ②(7.91-7.92)	.009-.011 (.23-.27)	.....

① – Carburetor engines. Fuel injection engines 1.19" (30.2 mm).

② – Carburetor engines. Fuel injection engines .3508-.3512" (8.91-8.92 mm)

TYPE 1 1600 cc 4 CYLINDER (Cont.)

ENGINE SPECIFICATIONS (Cont.)

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)
1600 cc	.0016-.0024 (.041-.061)	①	.0004-.0008 (.010-.020)	1	.012-.018 (.20-.45)	.0028-.0039 (.07-.10)
				2	.012-.018 (.30-.45)	.0020-.0028 (.05-.07)
				3	.010-.016 (.25-.40)	.0012-.0020 (.030-.050)

① – Push fit with piston heated to approximately 176°F.

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)
1600 cc							
Journal No. 1	2.1641-2.1649 (54.97-54.99)	.0016-.004 (.04-.10)	No. 1	.003-.005 (.069-.131)	2.1646-2.1654 (54.98-55.00)	.0008-.0028 (.02-.07)	.004-.016 (.10-.40)
2	2.1641-2.1649 (54.97-54.99)	.001-.0035 (.03-.09)					
3	2.1641-2.1649 (54.97-54.99)	.0016-.004 (.04-.10)					
4	1.5740-1.5748 (39.98-40.00)	.002-.004 (.05-.10)					

VALVE SPRINGS

Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
1600 cc Int. & Exh.	.....	117-135@1.22 (53-61@31.0)	.....

CAMSHAFT

Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
1600 cc	.9839-.9843 (24.99-25.00)	.0008-.002 (.02-.05)	....

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Cylinder Head	23 (3.2)
Connecting Rod	22-25 (3.0-3.5)
Crankcase Halves (8 mm)	14 (2.0)
Crankcase Halves (12 mm)	18 (2.5)
Rocker Shaft-to-Cylinder Head	14-18 (2.0-2.5)
Oil Pump-to-Crankcase	14 (2.0)
Oil Drain Plug	25 (3.5)
Oil Strainer-to-Crankcase	5 (.7)
Flywheel-to-Crankshaft	253 (35.0)
Clutch-to-Flywheel	18 (2.5)
Converter-to-Driveplate	18 (2.5)
Engine-to-Transmission	22 (3.0)
Generator Pulley	40-47 (5.5-6.5)
Crankshaft Pulley	29-36 (4.0-5.0)
Fan Nut	40-47 (5.5-6.5)