

## DASHER, RABBIT, RABBIT PICKUP & VANAGON 4-CYLINDER DIESEL

### ENGINE CODING

#### ENGINE IDENTIFICATION

Engine identification is stamped on left side of cylinder block on machined pad near No. 3 cylinder.

Engine Identification	
Application	Code
Vanagon .....	CS
All Others .....	CR

### ENGINE, CYLINDER HEAD & MANIFOLDS

#### ENGINE

**NOTE** — Manufacturer recommends that engine/transmission assembly be LOWERED out of Rabbit models as a unit.

**Removal (Rabbit & Pickup) — 1)** Disconnect ground strap at battery and open coolant expansion tank. Open heater valve and drain all coolant from system at thermostat flange. Remove radiator with fan. Remove alternator and detach fuel filter from body.

**NOTE** — Never drain coolant while engine is hot.

**2)** Disconnect wires for fuel shut-off solenoid, glow plugs, oil pressure switch and coolant temperature sensor. Disconnect hoses for heater and expansion tank. Remove fuel supply and return lines and disconnect accelerator cable with bracket from injection pump. Disconnect cold start cable.

**3)** On air conditioned vehicles, remove air conditioner compressor and mounting brackets and set out of way without disconnecting hoses. On all models, disconnect wires from starter and back-up light switch and ground from transmission mount. On manual transmission models, detach clutch cable and remove relay shaft lever.

**4)** Remove exhaust flex pipe nuts or spring clips. Disconnect drive shafts from drive flanges. Remove starter, horn, oil filter and front engine mount. Remove axle nuts and disconnect lower ball joints from bearing housings, then remove drive shaft while holding strut assembly away from vehicle.

**NOTE** — Remove axle nuts with vehicle sitting on ground.

**5)** Reconnect ball joints so vehicle may be lowered onto wheels. Remove complete rear mount. Remove right front wheel. Attach suitable sling (US 1105) to engine and lift slightly. On manual transmission models, remove relay shaft and gearshift lever rods.

**6)** On all models, remove bolts holding side mounts to body. Lower engine/transmission assembly to dolly. Raise vehicle to clear and remove assembly.

**Installation** — To install, reverse removal procedures noting that fuel supply and return union screws are not interchanged. Fuel return pipe union screw is marked "OUT" on hex. head.

**Removal (Dasher) — 1)** Disconnect battery ground strap and open heater valve. Drain cooling system by removing thermostat and remove thermostatic connector. Remove radiator with fan and shroud. Disconnect fuel supply and return lines at injection pump.

**2)** Detach accelerator cable and bracket from pump body. Disconnect cold start cable. Disconnect wires for fuel shut off solenoid, coolant temperature sensor, oil pressure switch, and glow plugs. Disconnect coolant and vacuum hoses. Disconnect clutch cable from bracket and lever on manual transmission models.

**3)** Loosen right engine mount at top and bottom. Remove alternator. Remove entire front engine mount and loosen left engine mount at top. Remove exhaust pipe from manifold and bracket from transmission. Remove starter. Remove engine/transmission bolts and flywheel cover plate bolts.

**4)** Install support bar under transmission and attach suitable engine sling (US 1105). Raise engine until assembly hits steering rack housing and remove left engine mount. Detach engine from transmission. Lift from vehicle while at the same time turning to clear body.

**Installation** — Ensure that dowel bushings fit block properly and install intermediate plate on bushings. (Use grease to stick plate to block.) Place starter on engine carrier before installing engine. Complete installation in reverse sequence of removal. Ensure that all mounts, cables and pipes are aligned and tightened without tension.

**Removal (Vanagon) — 1)** Disconnect battery ground cable. Remove top of air cleaner. Remove lower engine cover. Open coolant expansion tank cap. Disconnect lower hose from water pump at connecting pipe to radiator. Disconnect center hose from water pump.

**2)** Disconnect wiring from oil pressure switch, temperature sensors and glow plugs. Disconnect all remaining fuel, coolant, emission control and vacuum lines and position out of way. Disconnect accelerator cable from pump lever and bracket. Disconnect cold start cable.

**3)** Disconnect wire from fuel shut-off solenoid. Remove coolant reservoir. Remove oil fill cap and dipstick. Remove nuts from rear engine mounts (leave bolts in place). Remove all (7) engine/transmission mounting bolts. Remove bolts. Remove support member. Support engine with a crane and adapter (3058 or equivalent).

**4)** Remove nuts from front engine mount and remove engine mount bolts. Lower engine/transmission assembly until engine can be separated from transmission. Support transmission, remove engine from transmission and lower out of vehicle.

**Installation** — To install, reverse removal procedures noting that fuel supply and return union screws are not interchanged. Fuel return pipe union screw is marked "OUT" on hexagonal head.

#### CYLINDER HEAD & MANIFOLDS

**NOTE** — Cylinder head may be removed and installed with engine in vehicle. Complete removal and installation procedures for Vanagon not available from manufacturer.

## DASHER, RABBIT, RABBIT PICKUP &amp; VANAGON 4-CYLINDER DIESEL (Cont.)

**Removal** — 1) Remove air cleaner and ducting, then drain cooling system. Remove camshaft drive belt. Unbolt thermostat housing from water pump. Disconnect battery ground strap.

**NOTE** — Do NOT drain coolant while engine is hot.

2) Disconnect accelerator cable from injection pump. Detach fuel lines at injectors by unscrewing unions. Disconnect wire from glow plug bus, temperature sending wire and any other wires which could interfere with removal of cylinder head.

3) Remove spring clips holding exhaust pipe to manifold using clip remover tool (3059 or equivalent). Unbolt exhaust pipe support from engine/transaxle assembly (if equipped). From underneath vehicle, remove bolts and nuts holding exhaust manifold to cylinder head. Remove manifold from head.

4) Disconnect coolant hoses from head and remove any other hoses which may interfere with head removal. Remove cylinder head cover bolts and retaining plate. Carefully lift off cover and gasket. Loosen head bolts in reverse order of tightening sequence. See Fig. 2. Lift off head. Remove injectors and glow plugs to prevent damage while working on head.

5) Remove combustion chamber inserts by placing drift through injector hole and tapping out with hammer. Prior to installation, pre-chamber inserts must be reinstalled. When installing injectors, new heat shields must be installed between each injector and cylinder head. Place new shield in position with recess upward, toward injector. Tighten injector.

**NOTE** — Combustion chamber inserts are NOT supplied as spare parts on latest models. If inserts are damaged it will be necessary to replace cylinder head.

**Installation** — 1) Clean gasket surface and ensure that cylinder head and block are not warped. Maximum distortion of .004" (.010 mm) is allowed. If installing on original piston and block assembly select a new head gasket that has the same marks as the original.

2) To determine proper gasket, measure projection of piston above block when at TDC. Select proper gasket from following table:

Available Cylinder Head Gaskets		
Piston Projection in Inches (mm)	Gasket Thickness in Inches (mm)	Identification Notches
.025-.032 (.63-.82) ...	.055 (1.40) .....	1
.033-.036 (.83-.92) ...	.059 (1.5) .....	2
.037-.040 (.93-1.02) ..	.063 (1.6) .....	3

Gasket must be installed with word "OBEN" facing up.

**CAUTION** — Due to the aluminum construction of the head, do not use metal brushes or scrapers to clean gasket sealing surface or combustion chambers. Use solvent and wooden or plastic scrapers to remove foreign material. Do not mar piston tops when cleaning cylinder block. Ensure that all bolt holes and cylinder bores are absolutely free of debris prior to installing head or bolts.

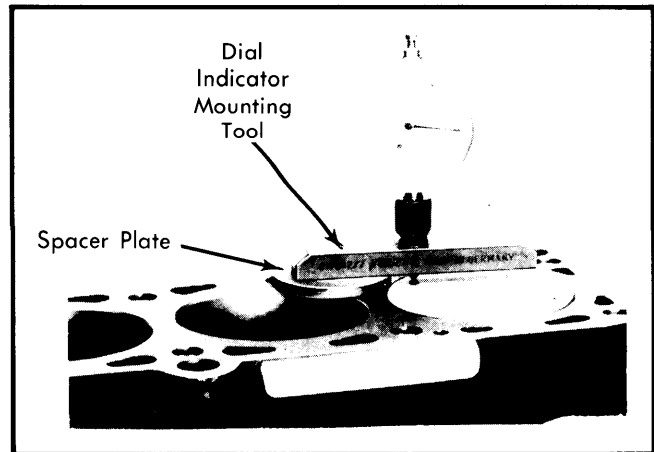


Fig. 1 Measuring Piston Projection

3) Lower head carefully onto gasket. Use guide pins (3070) or 2 of the outermost bolts and washers to keep gasket and head aligned with block. Tighten bolts in the sequence shown in Fig. 2 and in steps shown in table. To complete installation, reverse removal procedure.

4) On Vanagon, turn bolts an additional  $\frac{1}{2}$  turn after step No. 3 of table. Run engine to operating temperature. Stop engine and tighten bolts an additional  $\frac{1}{4}$  turn. After 1000 miles, retighten another  $\frac{1}{4}$  turn.

5) On all other models, run engine until warm and recheck final torque. After 1000 miles, loosen bolts  $30^\circ$  and retighten again to 66 ft. lbs. (90 N·m).

## Cylinder Head Bolt Tightening

Application	Ft. Lbs. (N·m)
Step No. 1	
Vanagon .....	29 (39)
All Others .....	35 (48)
Step No. 2	
Vanagon .....	43 (58)
All Others .....	50 (68)
Step No. 3	
Vanagon .....	54 (73)
All Others .....	66 (90)

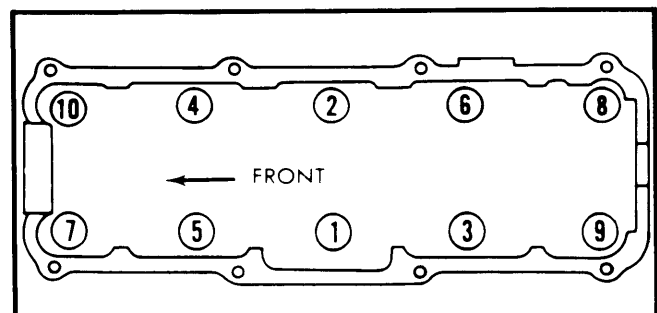


Fig. 2 Cylinder Head Tightening Sequence  
(Loosen in Reverse Order)

## DASHER, RABBIT, RABBIT PICKUP & VANAGON 4-CYLINDER DIESEL (Cont.)

### CAMSHAFT

#### TIMING BELT

**NOTE** — Sprockets do not have to be removed to replace drive belt.

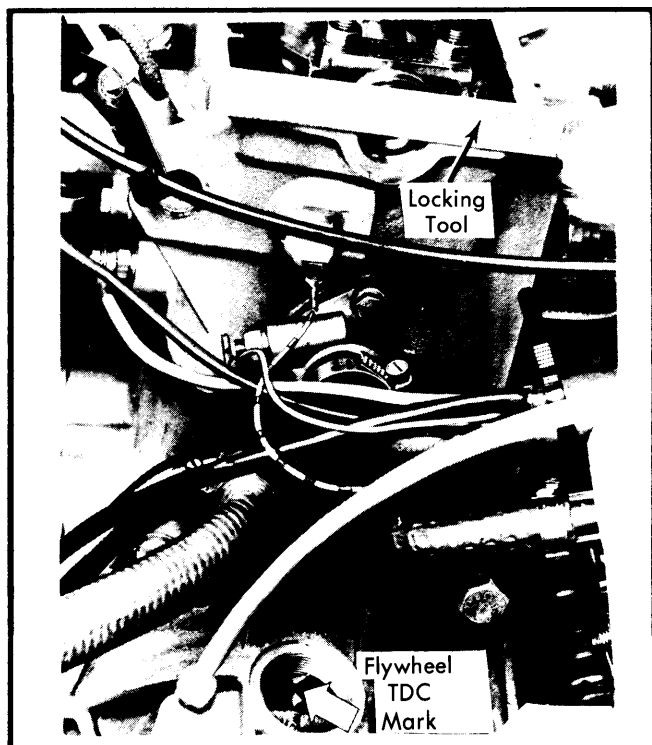
**Removal** — 1) Loosen alternator and remove V-belt. Remove crankshaft V-belt pulley. Remove air cleaner and ducting. Remove drive belt and cylinder head cover. Remove timing plug on top of bell housing. Rotate engine to bring No. 1 piston to TDC. Check that TDC mark on flywheel is aligned with reference.

2) Using locking tool (2065A for Vanagon, 2065 for other models) lock camshaft in position. Align tool by turning camshaft until one end of tool touches cylinder head. Measure gap at other end with feeler gauge. Insert feeler gauges of  $\frac{1}{2}$  thickness measured between tool and cylinder head at each end of tool.

3) Lock injection pump sprocket at TDC with special pin (2064). Loosen belt tensioner and remove timing belt from sprockets.

**CAUTION** — Do not turn camshaft or crankshaft with drive belt removed.

**Installation** — 1) Ensure that flywheel is still aligned with TDC mark. With camshaft and injection pump locked in place, loosen camshaft sprocket bolt  $\frac{1}{2}$  turn. Lightly tap camshaft gear loose from camshaft. Install drive belt so there is no slack between camshaft sprocket and injection pump and injection pump and crankshaft sprocket.



**Fig. 3** Flywheel TDC Mark and Camshaft Locking Tool

2) Tighten tension adjuster just enough to keep belt firmly in place. Remove injection pump locking pin. Adjust belt tension by turning tensioner until scale reads 12-13 on tension adjuster tool (VW 210). Tighten camshaft sprocket bolt and tensioner adjuster lock nut. Remove lock from camshaft.

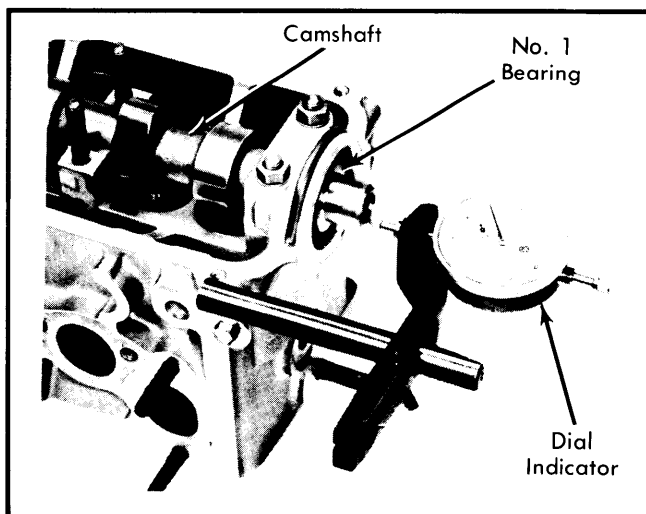
3) Turn crankshaft 2 revolutions in direction of engine rotation. Using a rubber hammer, strike belt once between camshaft sprocket and injection pump sprocket. Recheck belt tension and install remaining components in reverse order of removal. Check injection pump timing.

### CAMSHAFT

**Removal** — Remove timing belt. Loosen bearing caps in following sequence: 5, 1, and 3, then loosen caps 2 and 4 diagonally. Bearing caps are numbered front (sprocket end) to rear (flywheel end).

**Inspection** — 1) Number and remove cam followers, then reinstall camshaft using only end (1 and 5) bearing caps. Check axial play of camshaft with dial indicator. If play exceeds .006" (.15 mm), either head or camshaft is worn and must be replaced.

2) To measure camshaft bearing clearance, install caps one at a time and check with either a dial indicator or Plastigage. Check camshaft runout by installing shaft between centers and applying dial indicator at center bearing journal. Runout must not exceed .0004" (.01 mm) when camshaft is rotated.



**Fig. 4** Measuring Camshaft End Play

3) Inspect cam lobes, followers, and all bearing surfaces. Ensure that all oil passages are clean. Replace any components showing signs of pitting, galling or signs of seizure.

**Installation** — Lightly lubricate all components for assembly. Install cam followers in original bores with matching adjusting discs. Place camshaft and number 2 and 4 bearing caps in position with cam lobes of No. 1 cylinder pointing upward. Gradually tighten all 4 bearing cap nuts until camshaft is fully seated; then install caps 5, 3, and 1. Use seal installer (10-203 or equivalent) to install front oil seal and complete installation in reverse order of removal.

**DASHER, RABBIT, RABBIT PICKUP & VANAGON 4-CYLINDER DIESEL (Cont.)****VALVE TIMING**

See *TIMING BELT* procedures in this article.

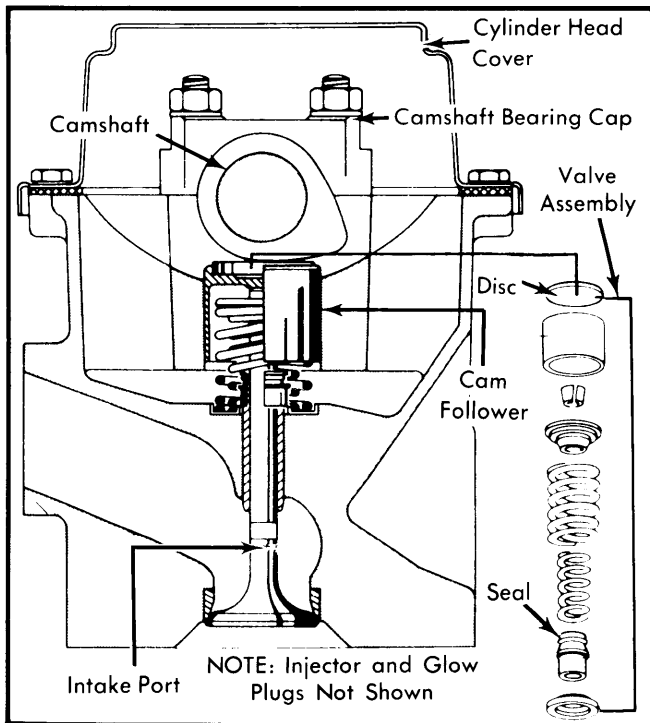
**INJECTION PUMP TIMING**

- 1) To check injection pump timing, set crankshaft to TDC on No. 1 cylinder and align marks on flywheel and clutch housing. Check marks on injection pump sprocket and mounting plate.
- 2) If timing needs adjustment, remove plug from injection pump cover and install adapter and dial indicator in place of plug. Preload dial indicator to .097" (2.5 mm).
- 3) Turn engine slowly counterclockwise until dial indicator needle stops moving. Zero indicator. Turn engine clockwise until TDC mark on flywheel is lined up with reference mark.
- 4) Check dial indicator against specifications listed in table. If out of adjustment, loosen bolts on mounting plate and support. Turn pump to adjust timing and tighten bolts.

Injection Pump Timing Specifications	
Application	Range in Inches (mm)
Dasher .....	① .033-.037 (.83-.93)
Rabbit & Rabbit Pickup	
With no paint dot .....	① .033-.037 (.83-.93)
With yellow paint dot .....	② .043-.047 (1.1-1.2)
Vanagon .....	① .031-.035 (.78-.88)
① — Set to .034" (.86 mm).	
② — Set to .045" (1.15 mm).	

**VALVES****VALVE ARRANGEMENT**

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



**Fig. 5 End View of Camshaft and Valve Assembly**

**VALVE GUIDE SERVICING**

- 1) To check for wear, insert NEW valve in clean valve guide until stem end is flush with spring end of guide. Use dial indicator to check that lateral (rocking) movement is no more than .051" (1.3 mm) when moved back and forth against indicator.
- 2) Prior to replacing worn guides, check that head is not cracked and that valve seats can be refaced. Press out old guides and coat new guides with oil. Press new guides in up to shoulder but do not use more than one ton of pressure once shoulder is seated. Hand ream guides to proper uniform diameter of .315-.316" (8.013-8.035 mm).

**VALVE STEM SEALS AND SPRINGS**

**NOTE** — It is possible to replace valve springs and seals with head installed provided camshaft and tappets are removed. Piston of cylinder concerned must be at top dead center position.

Use suitable spring compressor to depress spring and retainer. Remove keepers, then remove retainer and springs. Remove stem seal. Use protective sleeve over valve stem and install new seal. Complete assembly in reverse order of disassembly.

**VALVE CLEARANCE ADJUSTMENT**

1) Engine should be near operating temperature (coolant at about 95°F (35°C)). Rotate crankshaft so that cam lobes for No. 1 cylinder (curb side) point upward. Check intake and exhaust clearance between heel of cam lobe and follower.

2) Use crankshaft pulley to rotate crankshaft 180° at a time and check No. 3, No. 4, and No. 2 clearance. If clearances are not within specifications, use thinner or thicker adjusting discs to increase or decrease clearance.

**CAUTION** — Do not turn engine by camshaft pulley as this will stretch drive belt. Use a wrench to turn crankshaft or push vehicle in 4th gear to move crankshaft/valve train.

3) Twenty-six different thicknesses of discs are available in increments of .0019" (.05 mm) from .1181" (3.0 mm) to .1673" (4.25 mm). To install, turn crankshaft about ¼ turn past TDC and press cam follower down with suitable tool (VW 546). Remove old disc with special pliers (VW 10-208) and insert new disc with etched thickness marking toward cam follower.

Valve Clearance Specifications	
Application	In. (mm)
Intake	
Hot .....	.008-.012 (.20-.30)
Cold .....	.006-.010 (.15-.25)
Exhaust	
Hot .....	.016-.020 (.40-.50)
Cold .....	.014-.018 (.35-.45)

**NOTE** — Cold settings are given for reference as initial settings to be used during cylinder head rework. Final adjustments are made at normal operating temperatures and should be checked after 1000 miles of operation.

**PISTONS, PINS & RINGS****PISTON & ROD ASSEMBLY**

**Removal** — Mark cylinder number on crown of each piston. If necessary, mark arrows pointing toward front of block on

## DASHER, RABBIT, RABBIT PICKUP & VANAGON 4-CYLINDER DIESEL (Cont.)

piston crowns. Remove rod cap bolts and force piston out top of cylinder using wooden hammer handle. Mark rods and bearing caps for proper installation.

**NOTE** — If ridge at top of cylinder prevents piston removal, use ridge reamer prior to further disassembly. DO NOT force piston out of cylinder.

**Installation** — Turn crankshaft so No. 1 journal is at BDC. Install piston/rod assembly until ring compressor contacts block. Guide rod over journal and use wooden handle of hammer to push piston into cylinder. Repeat with No. 4 piston and rod assembly ensuring that tabs on bearing halves engage notches in respective rod and cap. Tighten caps on rods 1 and 4, then rotate crankshaft 180° and install No. 2 and No. 3 piston/rod assemblies.

### PISTON PINS

**Removal** — Use needle-nose pliers to remove circlips. Press out pin and remove piston, noting direction piston is fitted to rod. If pin is too tight, heat piston to approximately 140°F (60°C) and then press out.

**Installation** — Check piston/pin fit for thumb push fit. Connecting rod/pin wear limit is .0015" (.04 mm). Connecting rod may be rebushed and honed to proper size if required. If pin is too loose in piston, replace both pin and piston.

### FITTING PISTONS

Measure cylinder at 3 points:  $\frac{3}{8}$ " (10 mm) from top and bottom, and at center of bore. Measure in line with and at 90° to thrust face. Cylinder wear limit is .0015" (.04 mm) out of round. If limit is exceeded, cylinders must be honed and new pistons fitted.

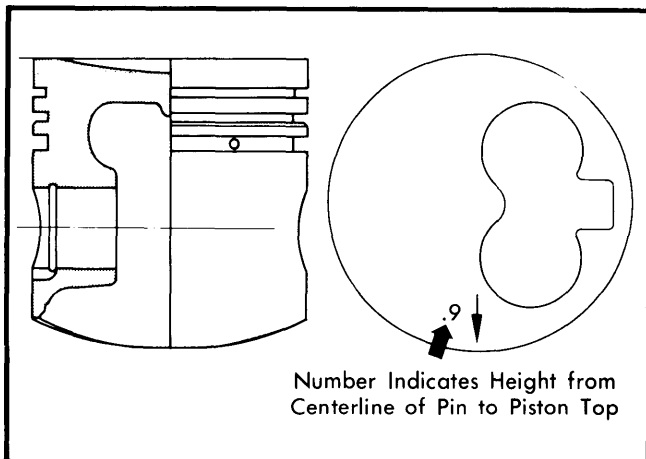


Fig. 6 Side and Top View of Diesel Piston

## CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

### MAIN & CONNECTING ROD BEARINGS

1) Push crankshaft toward one end and measure end play at No. 3 (thrust) bearing. Main bearing caps are numbered "1"

through "5" with "1" at drive belt end and "5" at flywheel end. Measure connecting rod end play (side play). Check all bearing clearances with Plastigage, tightening bearings to 26 ft. lbs. (35 N·m).

2) Measure crankshaft journals to determine size and any out-of-round. Maximum allowable out of round is .0012" (.03 mm). Install main inserts with bearing half having oil groove into block. Lubricate bearings and install caps in original positions.

### Crankshaft Journal Diameters

Size	Main Bearing In. (mm)⓪	Rod Bearing In. (mm)⓪
Standard	2.125 (53.97)	1.810 (45.97)
1st US	2.115 (53.72)	1.800 (45.72)
2nd US	2.105 (53.47)	1.790 (45.47)
3rd US	2.095 (53.22)	1.780 (45.22)

⓪ — Journal diameter is  $\pm .0004$ " (.01 mm).

### REAR MAIN BEARING OIL SEAL

**NOTE** — Rear main bearing oil seal may be replaced with engine in vehicle. Transmission and flywheel must be removed.

**Removal** — Insert screwdriver between crankshaft and flywheel flange and inside lip of seal. Pry seal out.

**Installation** — Install guide sleeve tool 2003/2A (or equivalent) over crankshaft flange. Start new seal into recess in carrier. Remove guide sleeve. Fit drive plate 2003/1 (or equivalent) and seat seal by tightening bolts.

### FRONT MAIN BEARING OIL SEAL AND INTERMEDIATE SHAFT OIL SEAL

**NOTE** — Diesel engine intermediate shaft rotates counterclockwise and utilizes a different seal than the gas engine. Arrow pointing counterclockwise on seal indicates correct application for Diesel model.

**Removal** — Remove camshaft belt and crankshaft sprocket. On Vanagon, screw seal extractor 2085 (or equivalent) into seal to remove. On all others, pry seal from carrier using care not to damage carrier. Use seal extractor 10-219 (or equivalent) to remove seal.

**Installation** — Coat seal lips with oil and press into carrier until flush. Use special tool 10-203 (or equivalent). Remove steel sleeve from carrier and use aluminum part of the tool to drive seal in to a depth of .08" (2 mm) from front of carrier.

**NOTE** — Same procedures are used for intermediate shaft seal except that intermediate shaft sprocket is removed. Seal is pressed in only until flush with carrier.

## DASHER, RABBIT, RABBIT PICKUP & VANAGON 4-CYLINDER DIESEL (Cont.)

### ENGINE OILING

Crankcase Capacity		
Application	With Filter Change	Without Filter Change
Dasher .....	3.7 quarts	3.2 quarts
Rabbit & Rabbit Pickup .....	4.7 quarts	4.2 quarts
Vanagon .....	4.2 quarts	3.7 quarts

**Oil Filter** — Replaceable spin-on type.

**Normal Oil Pressure** — Minimum of 28 psi@2000 RPM and at normal operating temperature.

### ENGINE OILING SYSTEM

Gear type oil pump provides oil for pressure feed to crankshaft journals, camshaft bearings, and intermediate shaft. A larger, heavy-duty oil filter and revised oil pump drive are used in the Diesel. Other lubrication characteristics are similar to the spark ignition engines.

### OIL PUMP

**Removal** — Drain oil and remove oil pan. Remove pump mounting bolts and pump along with pick-up tube. Install in vise and remove pick-up tube.

**Inspection** — Check oil pump gear backlash with feeler gauge. Clearance should be between .002-.008" (.05-.20 mm). Measure pump gear end play using machinist's square and feeler gauge for .006" (.15 mm) clearance or less. If specifications are exceeded, replace gears or pump.

**Installation** — To install, assure that all mating surfaces are clean, install gaskets and reverse removal procedure.

### ENGINE COOLING

Cooling System Capacity	
Application	Quarts
Dasher .....	5.9
Rabbit & Rabbit Pickup .....	7.3
Vanagon .....	16.9

**Thermostat** — Begins to open at 185°F (85°C) on Vanagon and 176°F (80°C) on all others. Fully open at 221°F (105°C) on Vanagon and 201°F (94°C) on all others. Fan thermostat starts fan at 200-208°F (93-98°C).

**Radiator Cap** — 11-16 psi for Vanagon, 17-19 for all others.

**CAUTION** — Never drain the coolant while the engine is hot. Cylinder head or engine block could warp if not allowed to cool prior to draining.

### WATER PUMP

**Removal** — Drain cooling system. Disconnect battery ground cable and unplug alternator wires. Remove alternator and bracket. Disconnect thermostat housing and hoses from water pump. Remove bolts holding pump to camshaft belt cover and engine block and remove pump.

**Installation** — To install, reverse removal procedure and use new "O" ring in recess in pump mounting flange.

**NOTE** — Do NOT use sealer between water pump mounting flange and engine block.

### TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Timing Belt Tensioner Lock Nut .....	33 (45)
Intermediate Sprocket Bolt .....	33 (45)
Crankshaft Sprocket Bolt .....	⓪81 (110)
Water Pump Pulley Bolts .....	15 (20)
Crankshaft Pulley Bolts .....	15 (20)
Main Bearing Cap Bolts .....	48 (65)
Flywheel-to-Crankshaft Bolts .....	55 (75)
Connecting Rod Caps .....	33 (45)
Camshaft Sprocket Bolt .....	33 (45)
Camshaft Bearing Cap Bolts .....	15 (20)
Cylinder Head Bolts .....	See Text
Manifolds-to-Cylinder Head .....	18 (25)

⓪ — Vanagon 110 ft. lbs. (150 N·m).

### ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS										
Year	Displ.		Carburetor	HP at RPM <sup>⓪</sup>	Torque (Ft. Lbs. at RPM) <sup>ⓑ</sup>	Compr. Ratio	Bore		Stroke	
	cu. ins.	cc					in.	mm	in.	mm
1981 Diesel	97.0	1588	Fuel Inj.	52@4800	71.5@3000	23:1	3.012	76.5	23.40	86.40

⓪ — Vanagon 48@4200 RPM.

ⓑ — Vanagon 71.5@2000 RPM.

## DASHER, RABBIT, RABBIT PICKUP & VANAGON 4-CYLINDER DIESEL (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)	
1588 cc Diesel	Intake	1.338 (40)	45°	45°	.079 (2.0)	.314 (7.97)	.051 (1.30)	.....
	Exhaust	1.220 (31.0)	45°	45°	.095 (2.4)	.313 (7.95)	.051 (1.30)	.....

PISTONS, PINS, RINGS						
Engine	PISTONS		PINS		RINGS	
	Clearance <sup>①</sup> In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Rings	End Gap In. (mm) <sup>②</sup>	Side Clearance In. (mm) <sup>③</sup>
1588 cc Diesel	.001 (.03)	Push Fit	.0004-.0008 (.01-.02)	No. 1	.012-.020 (.30-.50)	.002-.004 (.06-.09)
				No. 2	.012-.020 (.30-.50)	.002-.003 (.06-.08)
				No. 3	.010-.016 (.25-.40)	.001-.002 (.03-.06)

- ① - Wear limit .028" (.07 mm). ② - Wear Limit .039" (1.0 mm).  
③ - Wear limit Nos. 1 and 2, .008" (.20 mm), No. 3, .006" (.15 mm).

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS							
Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam. In. (mm)	Clearance In. (mm) <sup>①</sup>	Thrust Bearing	Crankshaft End Play In. (mm) <sup>②</sup>	Journal Diam. In. (mm)	Clearance In. (mm) <sup>③</sup>	Side Play In. (mm)
1588cc Diesel	2.124-2.125 (53.96-53.98)	.001-.003 (.03-.08)	No. 3	.003-.007 (.07-.17)	1.880-1.881 (47.76-47.78)	.0011-.0035 (.028-.088)	.014 (.37)

- ① - Wear Limit .007" (.17 mm). ② - Wear Limit .015" (.37 mm). ③ - Wear Limit .0047" (.12 mm).

VALVE SPRINGS			
Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
1588 cc Diesel	Inner	46-51@.719 (21-23@18.3)	.....
	Outer	96-106@.875 (43.5-48@22.3)	.....

CAMSHAFT			
Engine	Journal Diam. In. (mm)	Clearance In. (mm) <sup>①</sup>	Lobe Lift In. (mm)
1588 cc Diesel	.....	.0008-.002 (.02-.05)	.....

- ① - End play .006" (.1 mm)