# 1982 Volkswagen 4 Tune-Up

## TUNE-UP

**Jetta, Quantum, Rabbit, Rabbit Pickup, Scirocco, Vanagon**

## ENGINE IDENTIFICATION

Engine can be identified by prefixes to engine serial number. On Vanagon, engine serial number is stamped on crankcase. On all other models, serial number is stamped on left side of engine near ignition distributor.

***ENGINE CODE***

| Application | Code |
|---|---|
| Jetta, Rabbit, Rabbit Pickup & Scirocco | EN |
| Quantum | WT |
| Vanagon | CV |

## ENGINE COMPRESSION

Check compression with engine warm, all spark plugs removed and throttle wide open.

**CAUTION: On models with electronic ignition, connect coil high tension wire to ground before cranking engine.**

***COMPRESSION SPECIFICATIONS***

| | |
|---|---|
| Compression Ratio | |
| Vanagon | 7.3:1 |
| All Others | 8.2:1 |
| Compression Pressure | |
| Vanagon | |
| Standard | 85-135 psi (6.0-9.5 kg/cm²) |
| Minimum | 71 psi (5.0 kg/cm²) |
| All Others | |
| Standard | 131-174 psi (9.0-12.0 kg/cm²) |
| Minimum | 102 psi (7.0 kg/cm²) |
| Maximum Variation | 44 psi (3.0 kg/cm²) |

## VALVE CLEARANCE

**1)** On Vanagon, no adjustment is needed as engine is equipped with hydraulic valve lifters. On all other models, valve clearance is the clearance between cam lobe and cam follower. It is adjusted by means of replaceable discs. Discs are available in 26 thicknesses from .119-.166" (3.0-4.25 mm). Discs most frequenty used are .140-.150" (3.55-3.80 mm).

**2)** To adjust, warm up engine to normal operating temperature. Using wrench on center bolt of cranshaft pulley, hand turn crankshaft clockwise until cam lobes for cylinder being tested are pointing upward. Use feeler gauge to check valve clearance.

**3)** Use special compression tool VW546 to press down cam follower, so that adjusting disc can be readily removed with special pliers US4476. When depressing cam followers, turn so that openings are at a 90° angle to cam.

***VALVE CLEARANCE SPECIFICATIONS***

| Application | Clearance In. (mm) |
|---|---|
| All Models Except Vanagon (Hot) | |
| Intake | .008-.010 (.20-.30) |
| Exhaust | .016-.020 (.40-.50) |

## VALVE ARRANGEMENT

Vanagon — E-I-I-E (Both banks)
All Others — E-I-E-I-I-E-I-E (Front-to-rear)

## SPARK PLUGS

***SPARK PLUG TYPE***

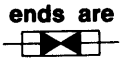
| Application | Bosch No. | Champion No. |
|---|---|---|
| Vanagon | W8CO | N288 |
| All Other Models | | |
| Federal | W7D | N8Y |
| Calif. | WR7DS | N8GY |

***SPARK PLUG SPECIFICATIONS***

| Application | Gap In. (mm) | Torque Ft. Lbs. (N.m) |
|---|---|---|
| All Models | .028 (.70) | 22 (29) |

## HIGH TENSION WIRE RESISTANCE

Remove distributor cap and disconnect high tension wires fom spark plugs (not distributor cap). Using an ohmmeter, measure resistance from cap terminal to other end of wire. If resistance is not to specifications, or fluctuates when wire is twisted gently, replace wire(s).

**NOTE: High tension wire resistance cannot be measured if wire ends are marked with the following symbol:** 

***WIRE RESISTANCE***

| Application | Ohms |
|---|---|
| All Models | 5000-7000 |

## DISTRIBUTOR

All models except Federal Vanagon use electronic breakerless ignition systems. No adjustments are required. Federal Vanagon models use conventional Bosch single point distributor. Set point gap so that dwell is 44-50°.

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## TUNE-UP (Cont.)

***Fig. 1: Firing Order & Distributor Rotation (Vanagon)***

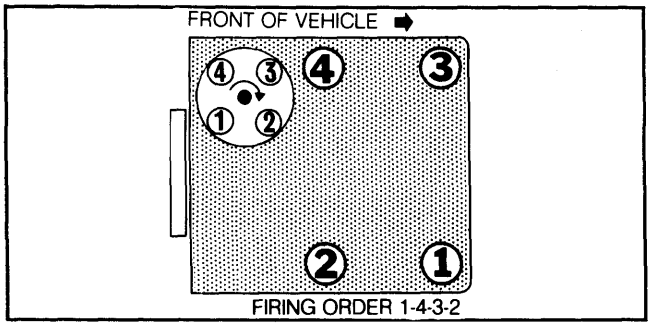
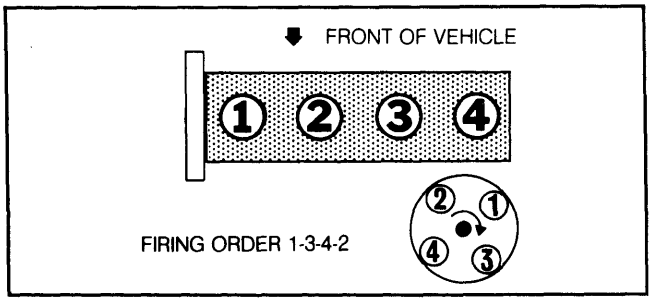



***Fig. 2: Firing Order & Distributor Rotation (All Except Vanagon).***




## IGNITION TIMING

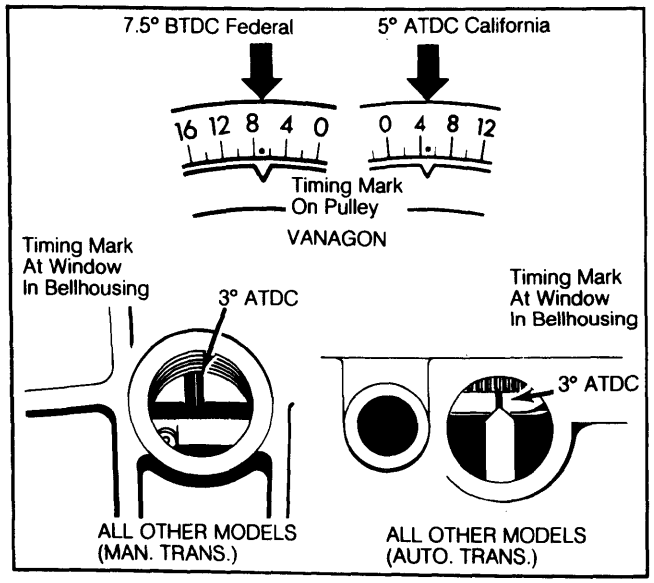
**California Vanagon**

Connect tachometer and timing light, making sure to connect test equipment at fuse 10, not from coil terminal 15 (+). Disconnect plugs from idle stabilizer (squeeze connector to loosen) and connect together. With engine at normal operating temperature and correct idle, check timing. If timing not to specifications, correct by turning distributor.

**Federal Vanagon**

Warm engine to normal operating temperature. Turn engine off. Disconnect and plug distributor vacuum lines. Connect timing light. Start engine. With engine at correct idle speed, check timing. If timing is not to specifications, correct by turning distributor.

***Fig. 3: Ignition Timing Mark Locations***




**All Other Models**

**1)** Warm engine to normal operating temperature. Turn engine off. Connect tachometer and timing light, following manufacturer's instructions.

**2)** Disconnect both plugs at idle stabilizer unit (squeeze connectors to loosen). Connect plugs together. Start engine. With engine at correct idle, check timing. If not to specifications, adjust timing by turning distributor.

***IGNITION TIMING***

| Application | Degrees@RPM |
|---|---|
| Vanagon | |
| Federal | [1] 7.5 BTDC@800-950 |
| Calif. | 5 ATDC@850-950 |
| All Other Models | 3 ATDC@850-1000 |

[1] — 850-1000 RPM on auto. trans. models.

## IDLE SPEED & MIXTURE

**NOTE: Mixture adjustment is NOT a part of normal tune-up procedure and should not be performed unless mixture control unit is replaced or vehicle fails emissions testing.**

**Vanagon**

**1)** With engine at normal operating temperature, connect CO tester at probe receptacle on exhaust pipe in front of catalytic converter. Connect a tachometer to engine.

**2)** Adjust idle screw until idle speed is correct. Check CO reading. On California models turn engine off and disconnect oxygen sensor plug. Disconnect idle stabilizer plugs and connect together.

**3)** On all models, remove intake air sensor. Center punch the plug in CO adjusting hole. Using a 3/32" drill bit, drill hole in center of plug 9/64-5/32" deep. Remove any metal shavings.

**4)** Screw in 1/8" sheet metal screw and remove plug with screw, using pliers. Reinstall intake air sensor. Start engine and adjust CO. Turn engine off and drive in new adjusting plug flush with air intake sensor. Reconnect other plugs and remove test equipment.

**Rabbit Carbureted Model**

**1)** Run engine until oil temperature is a minimum of 176°F (80°C). Be sure choke is fully open. Remove PCV valve from valve cover. Turn off all electrical equipment.

**2)** Connect tachometer, timing light and dwell meter to engine. Be sure dwell meter is connected to test receptacle on left strut tower. Start engine and accelerate to 2000 RPM for 5 seconds. Check idle speed and dwell. Dwell will fluctuate between 18-45°.

**3)** If adjustment is necessary, disconnect both idle stabilizer plugs and connect plugs together. Remove vacuum advance and retard hoses at distributor and plug hoses.

**4)** On vehicles with air conditioning, turn on air conditioner. Set control to maximum cold and fast fan speed. Set idle speed using idle adjusting screw. Turn off air conditioner. Set idle speed using hex nut on vacuum solenoid. *See Fig. 4.* On vehicles without air conditioner, set idle with idle adjusting screw.

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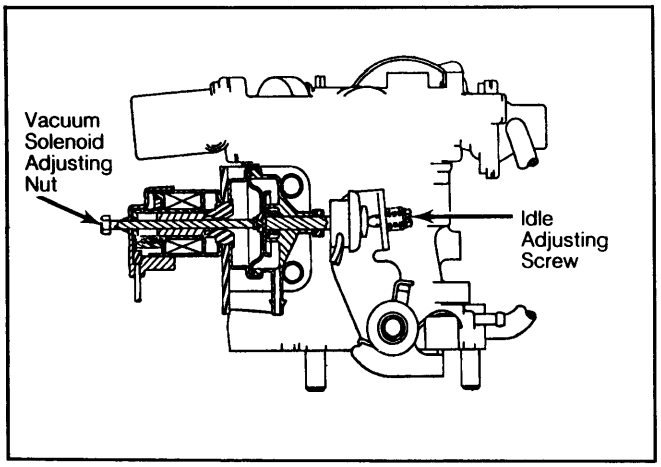
## TUNE-UP (Cont.)

**5)** If dwell is incorrect, remove carburetor and tamper-proof plug from idle mixture screw. Reinstall carburetor and adjust idle mixture screw to obtain 28-50° dwell. Install new tamper-proof plug.

**6)** Once idle has been adjusted, shut engine off, disconnect test equipment and reconnect all hoses.

***Fig. 4: Idle Speed and Vacuum Solenoid Adjustment***




*Carbureted Rabbit models only.*

**All Other Models**

**NOTE: The CO meter is no longer used to adjust the idle mixture. Instead, mixture is adjusted using the VW 1367 dwell meter. The CO meter is used only to verify that oxygen sensor system operates properly.**

**1)** Remove both connectors from idle stabilizer and connect them together. Run engine until oil temperature is above 176°F (80°C). Disconnect and plug PCV hose so fresh air can enter system. Turn off all electrical equipment.

**2)** On Rabbit and Scirocco models, remove charcoal canister vent hose at elbow below intake boot. On Quantum models, remove cap from "T" piece in charcoal canister vent hose near right fender well.

**3)** Connect CO meter to CO test point on engine using adapter hose (US 4492). Start engine and briefly accelerate. Check idle speed and adjust if necessary by turning idle speed screw on CIS throttle plate housing. Check ignition timing and adjust if necessary.

**4)** Remove plug from air sensor housing. Insert adjusting tool (P377) and adjust dwell with mixture adjusting screw. The dwell reading will fluctuate. Adjust so reading displays 38-52°. If dwell does not fluctuate check oxygen sensor system.

**5)** Check CO value. If value is too high, check for leaks in intake system and exhaust system. Also check fuel system for a malfunction. Reconnect tester and recheck idle speed. Adjust if necessary. Stop engine, reconnect PCV hoses, charcoal canister hose and idle stabilizer.

***IDLE SPEED AND CO% LEVEL***

| Application | Idle RPM | CO% |
|---|---|---|
| Vanagon | | |
| Federal | | |
| Man. Trans. | 800-950 | 0.5-1.5 |
| Auto. Trans. | 850-1000 | 0.5-1.5 |
| Calif. | 850-950 | 0.3-1.1 |
| Rabbit w/Carb. | [1] 820-900 | |
| All Others | 880-1000 | 0.3-1.2 |

[1] — When adjusting only. When checking, 850-1000 RPM.

## FAST (COLD) IDLE

**NOTE: This procedure applies to Rabbit models with carburetor only.**

**1)** With engine oil temperature at least 176°F (80°C), and ignition timing and idle speed adjusted, start engine and run at idle. Set fast idle speed screw on second step of fast idle cam.

**2)** Disconnect purge valve. Disconnect vacuum hose at EGR and plug. Adjust fast idle speed screw as necessary to obtain correct fast idle. Reconnect purge valve and EGR hose.

***FAST IDLE SPEED***

| Application | RPM |
|---|---|
| Carbureted Models | 2800-3200 |

## FUEL PUMP

**1)** To test fuel pump on Vanagon, connect ammeter in series with pump and current supply. Turn on ignition. Open air sensor flap. Ammeter should read 6.5-8.5 amps.

**CAUTION: Do not touch positive connection to ground.**

**2)** On all other models, disconnect fuel output line and apply 12 volts to fuel pump.

***FUEL PUMP PERFORMANCE***

| Application | Pressure psi (kg/cm²) | Volume in 30 sec. Pints (Liters) |
|---|---|---|
| Vanagon | 33-39 (2.3-2.7) | [1] |
| All Others | 68-78 (4.8-5.5) | 8.4 (1.0) |

[1] — Information not available from manufacturer.

## EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

# 1982 Volkswagen 4 Tune-Up

## GENERAL SERVICING

## IGNITION

### DISTRIBUTOR

All models except Federal Vanagon use Bosch electronic breakerless ignition systems. Federal Vanagon models use conventional Bosch single point distributor.

### IGNITION COIL

***RESISTANCE (Ohms)***

| Application | Primary | Secondary |
|---|---|---|
| All Models | .52-.76 | 2400-3500 |

## FUEL SYSTEMS

### CARBURETOR

Some Rabbit models use a Carter TYF 1-barrel carburetor.

### FUEL INJECTION

Vanagon models use Bosch AFC fuel injection (California models have oxygen sensor). All other models use Bosch Lambda CIS fuel injection with oxygen sensor.

## ELECTRICAL

### BATTERY

***BATTERY SPECIFICATIONS***

| Application | Amp. Hr. Rating |
|---|---|
| All Models | [1] 54 |

[1] — Some Jetta models use 45 amp. hour battery.

### STARTER

All models are equipped with Bosch starters.

### ALTERNATORS

All models are equipped with Bosch or Motorola alternators with integral voltage regulators.

***ALTERNATOR SPECIFICATIONS***

| Application | Rated Amp. Output |
|---|---|
| Jetta & Scirocco | |
| Without A/C | 45 |
| With A/C | 65 |
| Quantum | |
| Without A/C | 65 |
| With A/C | 75 |
| Rabbit & Rabbit Pickup | |
| Without A/C | 55 |
| With A/C | 65 |
| Vanagon | 65 |

### ALTERNATOR REGULATOR

All models are equipped with Bosch or Motorola alternator regualtors. Regulators are not adjustable.

## SERVICE SPECIFICATIONS

***BELT ADJUSTMENT***

| Application | [1] Deflection In. (mm) |
|---|---|
| All Models | .4-.6 (10-15) |

[1] — Deflection is measured with moderate thumb pressure applied midway on longest belt run.

***REPLACEMENT INTERVALS***

| Component | Miles |
|---|---|
| Oil Filter | 15,000 |
| Air Filter | 30,000 |
| Fuel Filter | |
| Quantum & Scirocco | 60,000 |
| All Other Models | 15,000 |
| Spark Plugs | 30,000 |

***FLUID CAPACITIES***

| Application | Quantity |
|---|---|
| Crankcase (Including Filter) | |
| Vanagon | 3.7 qts. (3.5L) |
| All Other Models | 4.7 qts. (4.4L) |
| Cooling System | 4.9 qts. (4.6L) |
| Man. Transaxles (SAE 80W-90) | |
| Vanagon | 7.4 pts. (2.2L) |
| All Other Models | |
| 4-Speed | 3.2 pts. (1.5L) |
| 5-Speed | 4.2 pts. (2.0L) |
| Auto Transaxle (Dexron) | 6.4 pts. (3.0L) |
| Auto Transaxle Differential (SAE 90) | |
| Vanagon | 3.0 pts. (1.4L) |
| All Other Models | 1.6 pts. (0.8L) |
| Fuel tank | |
| Rabbit Pickup | 15.0 gals. (56.8L) |
| Vanagon | 15.9 gals. (60.2L) |
| All Other Models | 10.0 gals. (37.9L) |