

TUNE-UP

Jetta
Rabbit
Rabbit Pickup
Scirocco
Vanagon

ENGINE IDENTIFICATION

Engine code prefixes are placed in the following locations:

Vanagon — Engine serial number is stamped on crankcase below breather.

All Other Models — Engine serial number is stamped on left side of engine near ignition distributor.

Engine Code

Application	Code
Jetta, Rabbit, Rabbit Pickup & Scirocco	EN
Vanagon	CV

COMPRESSION PRESSURE

Check compression with engine warm, all spark plugs removed and throttle wide open. Maximum variation permitted between cylinders is 44 psi (3.0 kg/cm²).

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

Compression Pressure Specifications

Application	Standard Pressure psi (kg/cm ²)	Minimum Pressure psi (kg/cm ²)
Vanagon	87-131 (6.0-9.0)	73 (5.0)
All Others	131-174 (9.0-12.0)	102 (7.0)

VALVE CLEARANCE

Vanagon — No adjustment is needed as engine is equipped with hydraulic valve lifters.

All Other Models — 1) The clearance between cam lobe and cam follower is adjusted by means of replaceable discs. Discs are available in 26 thicknesses from .119-.166" (3.0-4.25 mm). Discs most frequently used are .140-.150" (3.55-3.80 mm).

2) Warm up engine to normal operating temperature. Using wrench on center bolt of crankshaft 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 tool VW546 to press down cam follower, so that adjusting disc can be readily removed with tool US4476. When depressing cam followers, turn so that openings are at 90° angle to cam.

Valve Clearance Specifications①

Application	Intake In. (mm)	Exhaust In. (mm)
All Models (Exc. Vanagon)010 (.25)	.018 (.45)

① — Set with engine warm

VALVE ARRANGEMENT

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

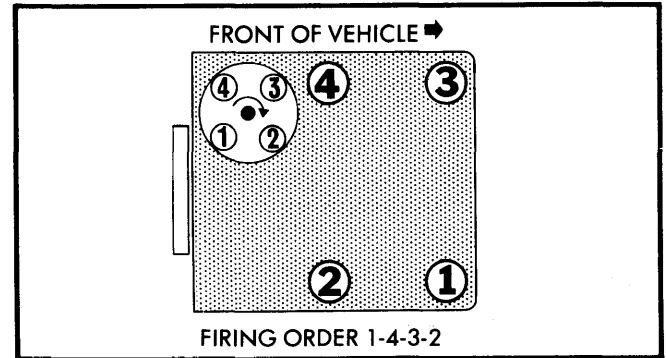


Fig. 1 Firing Order & Distributor Rotation (Vanagon)

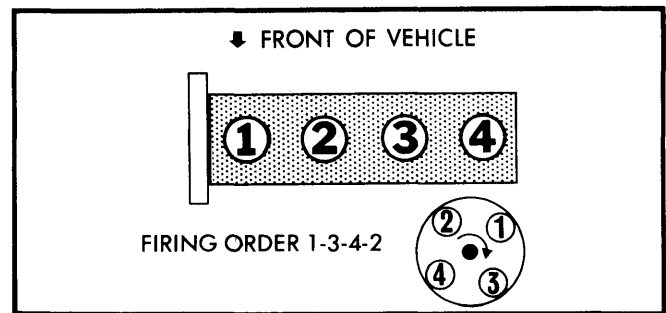


Fig. 2 Firing Order & Distributor Rotation (All Except Vanagon)

SPARK PLUGS

Application	Gap In. (mm)	Torque Ft. Lbs. (N·m)
Vanagon026 (.65)	22 (29)
All Other Models028 (.7)	22 (29)

Spark Plug Type

Application	Bosch	Champion
Vanagon	W8CO	N288
All Other Models		
Federal	W7D	N8Y
Calif.	WR7DS	N8GY

HIGH TENSION WIRE RESISTANCE

Remove distributor cap and disconnect high tension wires from 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:

TUNE-UP (Cont.)

Resistance (Ohms) Per Wire

Application	Ohms
All Models	5000-7000

DISTRIBUTOR

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

Distributor Specifications

Application	Federal	California
Vanagon		
Point Gap	Elec. Ign.	Elec. Ign.
Dwell Angle	15-50°	15-50°
All Other Models		
Point Gap		
Dwell Angle	15-50°	15-50°

IGNITION TIMING

Vanagon Breaker Point Ignition – Connect tachometer and timing light. Warm engine to normal operating temperature and check idle speed. Adjust timing with vacuum disconnected and plugged. Connect test equipment at fuse 10, not from coil terminal 15(+).

All Other Models Electronic Ignition – 1) Warm engine to normal operating temperature. Turn engine off. Connect tachometer and timing light, following manufacturer's instructions.

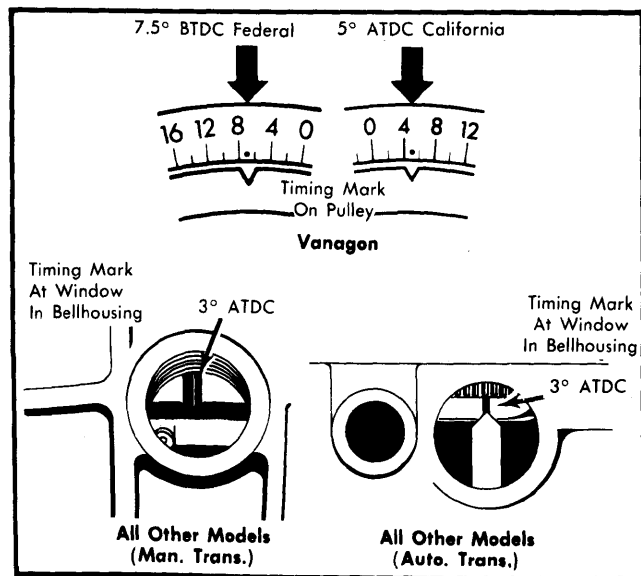


Fig. 3 Ignition Timing Mark Locations (All Models)

2) Disconnect both plugs at idle stabilizer unit (squeeze connector to loosen). Connect plugs together. Check idle speed, then adjust timing by turning distributor.

Ignition Timing Specifications

Application	RPM	Timing
Vanagon [Ⓢ]		
Federal	800-950	7.5° BTDC
Calif.	850-950	5° ATDC
All Other Models	850-1000	3° ATDC

[Ⓢ] – All electrical equipment off.

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 to specifications. Check CO reading. If not to specifications, turn engine off and disconnect oxygen sensor plug. Disconnect idle stabilizer plugs and connect together.

3) Remove intake air sensor. Center punch plug in CO adjusting hole. Using a 3/32" (2.5 mm) drill bit, drill hole in center of plug 9/64-5/32" (3.5-4.0 mm) deep. Clean up any metal shavings.

4) Screw in 1/8" (3.0 mm) sheet metal screw into plug and remove plug with screw, using pliers. Reinstall intake air sensor. Start engine and adjust CO to specifications. Turn engine off and drive in new adjusting hole plug flush with air intake sensor. Reconnect all other plugs and remove test equipment.

All Other Models – 1) With engine at normal operating temperature, disconnect and plug PCV hose. Turn air conditioner and all accessories off.

2) Connect a tachometer, timing light and CO meter (to test receptacle) to engine. Check timing and, if necessary, adjust to specifications by turning distributor. Check idle speed and, if necessary, adjust to specifications by turning idle speed screw on CIS throttle plate housing.

3) Check CO reading. If not to specifications, remove boot on mixture control unit. Center punch plug in CO adjusting hole. Using a 3/32" (2.5 mm) drill bit, drill hole in center plug 9/64-5/32" (3-4 mm) deep. Clean up any metal shavings.

4) Screw in 1/8" (3 mm) sheet metal screw and remove plug with screw, using pliers. Reinstall boot on mixture control unit. Start engine and adjust CO to specifications by using 3 mm allen wrench inserted into CIS housing by fuel distributor.

TUNE-UP (Cont.)

Idle Speed & CO Level

Application	Idle Speed	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
All Others		
With Idle Stab.	①880-1000	②0.3-1.2
Without Idle Stab.	850-1000	②0.3-1.2
① — By-pass idler stabilizer by connecting plugs together.		
② — Federal Pickup CO reading is 0.5-0.9%.		

5) Turn engine off and drive in new adjusting hole plug flush with mixture control unit. Reconnect other plugs and remove test equipment.

EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

GENERAL SERVICING

IGNITION

DISTRIBUTOR

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

FUEL SYSTEMS

FUEL INJECTION

Vanagon — All models use Bosch AFC Electronic Fuel Injection.

Jetta, Rabbit, Rabbit Pickup & Scirocco — All models use Bosch Continuous Injection System (CIS).

ELECTRICAL

BATTERY

Application	Standard Amp. Hr.	Optional Amp. Hr.
Vanagon	54
Rabbit Pickup	54
All Other Models	45	54

Battery Location — Battery is located under right front seat on Vanagon models, and in engine compartment on all other models.

STARTER

All models are equipped with Bosch starters.

ALTERNATOR

Application	Rated Amp. Output*
Rabbit & Rabbit Pickup	55 & 65
Rabbit Convertible, Jetta & Scirocco	45 & 65
Vanagon	65

ALTERNATOR REGULATOR

Bosch & Motorola — Non-Adjustable; integral with alternator.

BELT ADJUSTMENT

Application	① Deflections
All Models4-.6" (10-15 mm)
① — Deflection is with thumb pressure, about 16.5 lbs. (7.5 kg), applied midway on longest belt run.	

FILTERS

Filter	Service Interval (Miles)
Oil Filter	Replace every 15,000
Air Filter	Replace every 30,000
Fuel Filter	Replace every 15,000

CAPACITIES

Application	Quantity
Crankcase (Including Filter)	
Vanagon	3.7 qts.
All Other Models	4.7 qts.
Cooling System	
Vanagon	AIR
All Other Models	4.9 qts.
Man. Transaxle (SAE 80W-90)	
Vanagon	3.7 qts.
All Other Models	
4-Speed	1.6 qts.
5-Speed	2.1 qts.
Auto. Transaxle (Dexron)	
.....	3.2 qts.
Auto. Transaxle Differential (SAE 90)	
Vanagon	3.0 pts.
All Other Models	1.6 pts.
Fuel Tank	
Rabbit Pickup	15.0 gals.
Vanagon	15.9 gals.
All Other Models	10.0 gals.