

TUNE-UP - 5-CYL

Article Text

1987 Volkswagen Quantum/Quantum Syncro
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Sunday, March 19, 2000 01:56AM

ARTICLE BEGINNING

1987 Volkswagen 5 Tune-Up
TUNE-UP

Quantum, Quantum Syncro

ENGINE IDENTIFICATION

Engine number is stamped on left side of engine just below cylinder head.

ENGINE CODE

AA

Application Code

Quantum

2.22L KX

Quantum Syncro

2.22L JT

AA

ENGINE COMPRESSION

Check compression with engine warm, all spark plugs removed and throttle wide open. Crank engine through at least 6 compression strokes per cylinder to determine engine compression.

COMPRESSION SPECIFICATIONS

AA

Application Specification

Compression Ratio

2.22L 8.5:1

Compression Pressure (1)

2.22L

Normal (New Engine) 130-174 psi (9-12 kg/cm²)

Minimum 100 psi (7 kg/cm²)

Max. Variation Between Cylinders

2.22L 29 psi (2 kg/cm²)

AA

VALVE CLEARANCE

All 5-cylinder engines are equipped with hydraulic valve lifters. No adjustment is necessary.

VALVE ARRANGEMENT

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

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SPARK PLUGS

SPARK PLUG TYPE

Application Bosch Champion

2.22L

Quantum W7DTC N8GY
Quantum Syncro WR7DS N8GY

SPARK PLUG SPECIFICATIONS

Application Gap In. (mm) Torque Ft. Lbs. (N.m)

All Models028-.032 (.7-.8) 14 (20)

HIGH TENSION WIRE RESISTANCE

Carefully remove ends of wire from spark plug and distributor. Using an ohmmeter, check resistance of wire while gently twisting wire. If resistance is incorrect or fluctuates from infinity to any value, replace wire.

HIGH TENSION WIRE RESISTANCE

Application Ohms

Coil Wire 1600-2400
Spark Plug Wire With Connectors 4600-7400
Spark Plug Connector 4000-6000
Spark Plug Suppressor 600-1400

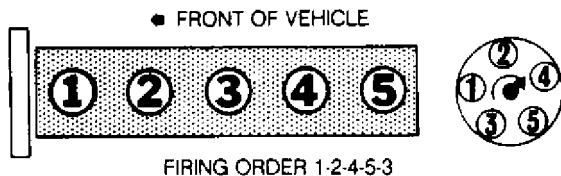


Fig. 1: Firing Order & Distributor Rotation

DISTRIBUTOR

All models are equipped with Bosch electronic, breakerless ignition system.

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IGNITION TIMING

2.22L

Ensure idle speed is set to specification and all accessories are off. Connect timing light. Adjust ignition timing with vacuum hoses connected. After adjustment ensure idle speed is within specification.

IGNITION TIMING (Degrees BTDC @ RPM)

Application	Degrees @ RPM
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2.22L

Quantum & Quantum Syncro	6 @ 750-850
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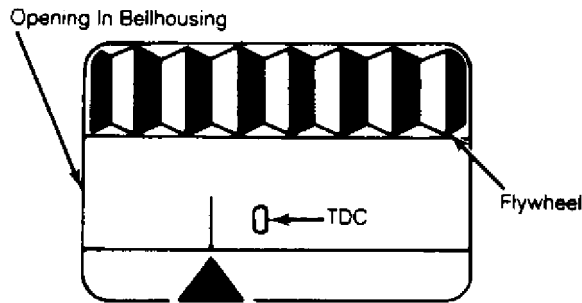


Fig. 2: Typical Ignition Timing Mark Location

IDLE SPEED & MIXTURE

IDLE SPEED

NOTE: Idle speed is electronically controlled and not adjustable on 2.22L engines.

IDLE SPEED & CO LEVEL SPECIFICATION

Application	Idle RPM	CO%
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2.22L	750-850	(1) .3-3.0
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(1) - Value given is checking value. Adjustment value is .6-1.0%.

IDLE MIXTURE & CO LEVEL

2.22L

1) With engine at normal operating temperature, turn off all electrical equipment, including A/C and radiator fan. If injection system has been opened or components replaced, run engine several times to 3000 RPM for about 2 minutes.

2) Disconnect crankcase breather hoses and plug openings.

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Vent hoses (from crankcase) to atmosphere. Remove cap from charcoal canister "T" located on right fender apron and vent to atmosphere. Connect Tester (VW 1367) and Cable Adapter (VW 1112). Depress "%" button on tester. Remove CO probe receptacle cap and connect CO meter. Ensure fit is snug to prevent exhaust leaks.

3) Connect multimeter with adapter to differential pressure regulator. Remove connector from regulator and connect Adapter (1315 A/1) to regulator. Connect multimeter to adapter and turn switch to "DCA 200 mA".

NOTE: If engine does not run with wire connected, connections in wire plug may be reversed.

4) Start and run engine at idle speed. With oxygen sensor connected, duty cycle should be 26-30% and idle speed should be 750-850 RPM. If duty cycle is not as specified, turn idle adjusting screw on throttle body. If RPM signal is displayed, check idle stabilizer unit. If duty cycle and RPM values are okay, continue with CO level adjustment.

NOTE: Only duty cycle is adjustable. Idle speed is controlled by an idle stabilizer valve.

5) Unplug oxygen sensor connector CO level should be .3-3.0% (checking value). If CO reading is okay, reconnect oxygen sensor and recheck duty cycle. If CO reading is not as specified, stop engine and remove boot from mixture control unit.

6) Center punch hole in CO adjusting screw plug and drill a 3/32" hole to a depth of 5/32". Do not drill completely through as adjustment screw will be damaged.

7) Install a 1/8" sheet metal screw and remove plug using pliers. Start engine and run at idle. Adjust CO level to .6-1.0% (adjusting value) by turning adjustment screw with Adjusting Wrench (P 377). See Fig. 3. DO NOT accelerate engine with adjusting tool in place or push down on tool. After each adjustment, remove adjusting tool and briefly accelerate engine before measuring current reading.

8) If CO value is not as specified, check oxygen sensor system. If CO value is okay, reconnect oxygen sensor connector and recheck duty cycle. If duty cycle is 26-30%, disconnect oxygen sensor connector. Observe differential pressure reading on multimeter. Current reading must be 8.5-12.5 mA at sea level, 8-12 mA at 1000 feet above sea level, and 5.5-9.5 mA at 4000 feet above sea level.

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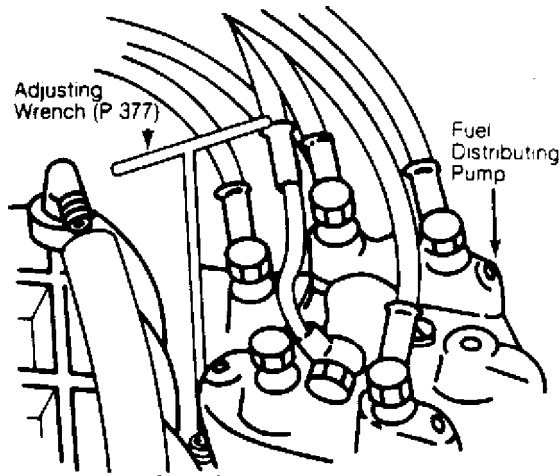


Fig. 3: Adjusting Idle Speed & Mixture

9) If current reading is not as specified, check altitude sensor. If current reading is okay, reconnect oxygen sensor and observe current reading on multimeter. If current does not fluctuate, check oxygen sensor. If current does fluctuate, turn engine off. Install new plug in mixture control unit and seat plug flush with unit. Remove all test equipment and reconnect all hoses and wiring.

COLD (FAST) IDLE RPM

Cold start valve operates on all Volkswagen models with 2.22L engines when engine coolant is less than 50°F (10°C).

FUEL PUMP

FUEL PUMP PERFORMANCE

AA

Application	Pressure		Volume in 30 sec.	
	psi (kg/cm ²)		Pints (Liters)	
2.22L	(1)	75-82 (5.2-5.8)	2.1 (1.0)

(1) - Minimum pressure after 10 minutes is 38 psi (2.7 kg/cm²).

AA

EMISSION CONTROL SYSTEMS

See EMISSIONS section.

IGNITION

DISTRIBUTOR

All models are equipped with Bosch electronic ignition.

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IGNITION COIL

FUEL SYSTEM

ELECTRICAL

[illegible]

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Application	Voltage
All Models	13.5-14.5
AA	

ADJUSTMENTS

BELT ADJUSTMENT	
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Application	(1) Deflection In. (mm)
All Belts	3/8-9/16 (10-15)
(1) - Measured with 20 lbs. (9 kg) pressure applied at midpoint of longest belt run.	
AA	

SERVICE INTERVALS

REPLACEMENT INTERVALS	
AA	
Component	Interval (Miles)
Air Filter	30,000
Fuel Filter	15,000
Oil Filter	15,000
PCV Valve	30,000
Oxygen Sensor	30,000
Spark Plugs	30,000
AA	

CAPACITIES

FLUID CAPACITIES	
AA	
Application	Quantity
Crankcase (Includes Filter)	
Quantum & Quantum Syncro	4.0 qts. (3.8L)
Cooling System (Includes Heater)	
All Models	8.5 qts. (8.0L)
Auto. Trans. (Dexron II)	3.2 qts. (3.0L)
Auto. Trans. Final Drive (SAE 90)	
Quantum & Quantum Syncro	1.6 qts. (1.5L)
AA	

END OF ARTICLE