

D - ADJUSTMENTS - 4-CYL

Article Text

1993 Volkswagen Passat

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Wednesday, March 22, 2000 10:04PM

ARTICLE BEGINNING

1993 ENGINE PERFORMANCE
Volkswagen On-Vehicle Adjustments

Passat GL 2.0L 4-Cylinder

ENGINE MECHANICAL

Before performing any on-vehicle adjustments to fuel or ignition systems, ensure engine mechanical condition is okay.

VALVE CLEARANCE

NOTE: All models use hydraulic lifters. No adjustments are required.

IGNITION TIMING

NOTE: See ENTERING SELF-DIAGNOSTICS in the G - TESTS W/CODES article in this section for additional scan tester operating instructions.

4-CYLINDER IGNITION TIMING

Passat GL (2.0L)

1) Start and warm engine to normal operating temperature. Ensure engine oil temperature is 176°F (80°C). Ensure A/C and electrical loads are off, including cooling fan.

2) Connect Engine Analyzer (VAG 1367) and Inductive Pick-Up (VAG 1367/8) to engine. Connect Scan Tester (VAG 1551) to Data Link Connectors (DLC) located in center console, in front of shift lever. Ensure no Diagnostic Trouble Codes (DTC) are stored.

3) Ensure throttle cable is properly adjusted. Valve must vibrate or hum. Connect CO tester using Adapter (VAG 1363/3) on CO tap tube. DO NOT remove oxygen sensor. Ensure exhaust system has no leaks.

4) Start engine and let it run for 2 minutes at closed throttle. Operate scan tester and observe display. Press "1" button to select RAPID DATA TRANSFER function. Press "0" and "1" buttons to select ENGINE ELECTRONICS function. Press "Q" button to enter input.

5) Press right arrow button, then "0" and "4" buttons to select INITIATE BASIC ADJUSTMENT function. Press "Q" button to enter input. Press "0" button twice to select INPUT DISPLAY GROUP 00. Press "Q" button to enter input.

6) Scan tester will display SYSTEM IN BASIC ADJUSTMENT 1 through 9. The Engine Control Module (ECM) should limit engine speed to 2000 RPM and activate fuel evaporative solenoid valve.

7) Channel 9 display value should be "5". If any other value is displayed, READ MEASUREMENT BLOCK function on scan tester and note ignition timing. Timing should be 4-8 degrees BTDC.

8) If necessary, loosen distributor and adjust timing. Timing

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mark location is on flywheel. Timing pointer is on timing hole on transaxle housing. Check idle speed and CO level (fuel mixture). If ignition timing, idle speed and fuel mixture are okay, press right arrow button. Press "0" and "6" buttons to select END OUTPUT function. Press "Q" button to enter input.

NOTE: Idle speed is not adjustable. If CO level is incorrect, proceed to step 9).

9) Turn ignition off. Disconnect both crankcase breather hoses and vent to atmosphere. Ensure insert remains in breather hose. Disconnect differential pressure regulator, located on fuel distributor unit. Connect Digital Volt-Ohmmeter (DVOM) with Test Harness (VAG 1315A/1) to differential pressure regulator and wiring harness. See Fig. 1.

10) Turn ignition on. Current on DVOM must be 90-110 milliamps (positive polarity). If not, reverse test leads. Start engine and allow it to idle. Using Wrench (VAG 1315/3), adjust control current to 0.0-2.5 milliamps (current will fluctuate). If reading is incorrect, check oxygen sensor control. See OXYGEN SENSOR CONTROL in the I - SYSTEM/COMPONENT TESTS - 4-CYL article. Erase fault (DTC) codes.

CAUTION: DO NOT push down on wrench. DO NOT accelerate engine while wrench is over adjustment screw. Remove wrench after each adjustment and briefly increase engine speed before reading DVOM.

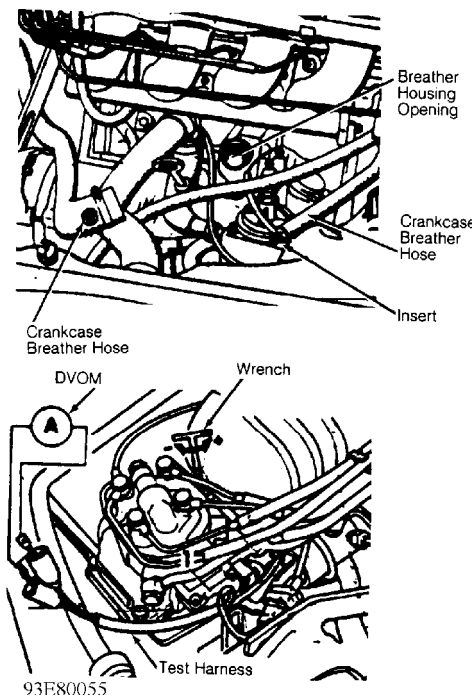


Fig. 1: Adjusting CO Level (Passat GL 2.0L)
Courtesy of Volkswagen United States, Inc.

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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.

NOTE: Ensure fuel system pressure is correct before attempting idle speed or mixture adjustment.

4-CYLINDER IDLE SPEED & MIXTURE ADJUSTMENT

Passat GL (2.0L)

See 4-CYLINDER IGNITION TIMING under IGNITION TIMING above in this article.

THROTTLE BODY

THROTTLE BODY ADJUSTMENT

CAUTION: Throttle limiting (stop) screw is set by manufacturer and should NOT be moved. If screw is accidentally turned, perform throttle body adjustment.

If stop screw for basic throttle adjustment has been moved, replace throttle body.

AIRFLOW SENSOR

Passat GL (2.0L)

1) Remove upper section of air filter housing and air filter. Check rest position of airflow sensor plate from upper edge of plate to bottom cone edge of venturi. Upper edge of sensor plate must be 0.044-0.075" (1.1-1.9 mm) below cone edge of venturi. Turn adjustment nut if necessary. See Fig. 2.

2) With airflow sensor rest position correctly adjusted, check free play between control plunger and sensor plate lever. Check free play on side of sensor plate closest to fuel distributor.

3) Crank engine for 10 seconds. Using a magnet on sensor plate bolt, lift plate slightly until resistance is felt. Minimum free play should be 0.02" (0.50 mm). Maximum free play, to edge of venturi, is 0.12" (3.0 mm).

4) To adjust free play, ensure idle speed and CO level are okay. Using Wrench (VW 674/2), adjust sensor plate free play by turning control plunger stop screw. See Fig. 2.

5) Distance from top of stop screw and hex nut collar must be 0.024" (0.60 mm). Re-check sensor plate free play, idle speed and CO level. See IDLE SPEED & MIXTURE.

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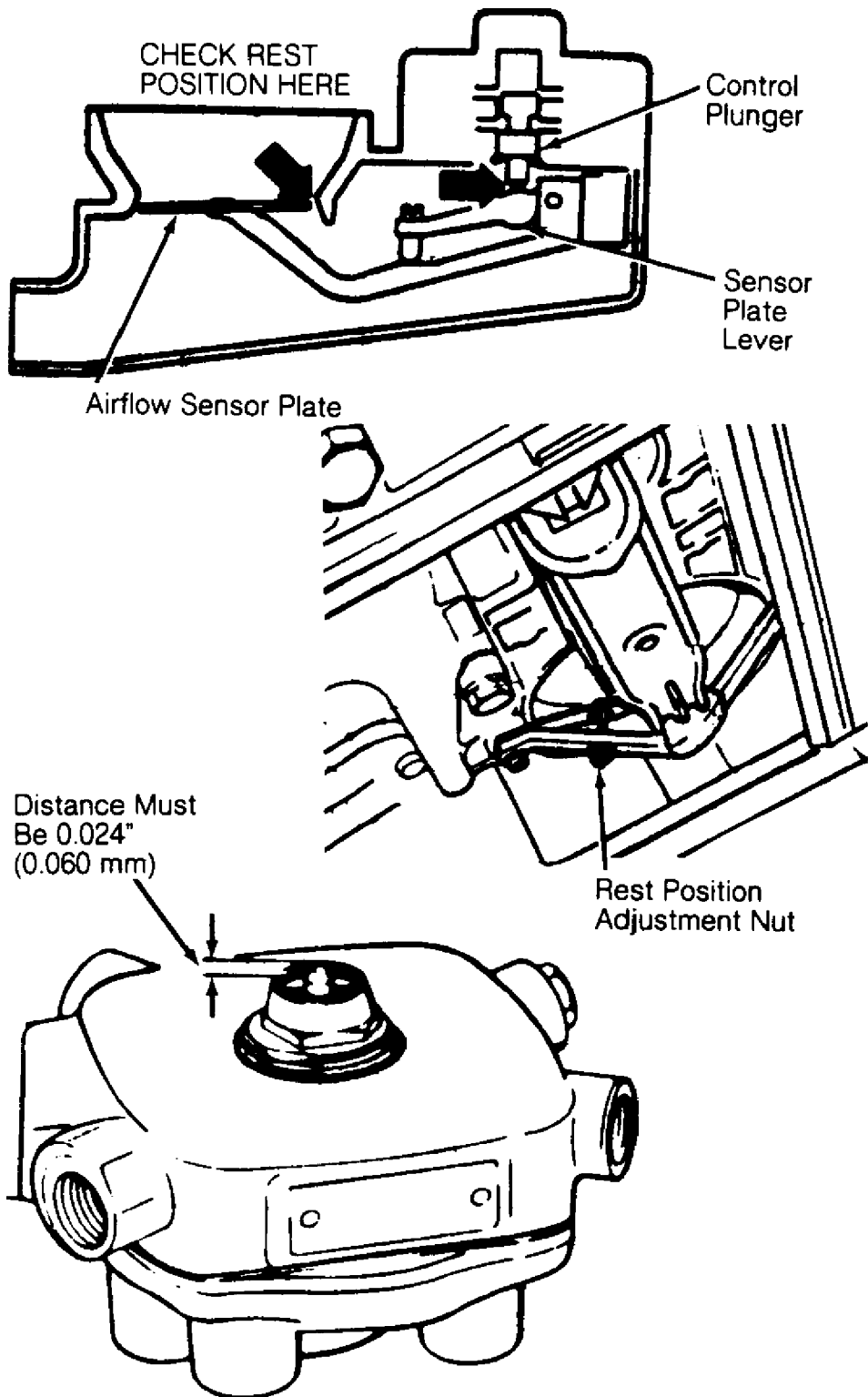
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Fig. 2: Adjusting Airflow Sensor (Passat GL)
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IDLE & FULL THROTTLE SWITCHES

IDLE & FULL THROTTLE SWITCH ADJUSTMENTS

NOTE: The Passat GL 2.0L engine uses two types of idle/full throttle switch assembly on throttle body. Some models use separate idle and full throttle switches. Other models use an idle switch, full throttle switch, and throttle valve potentiometer contained in one assembly below throttle body.

Passat GL (2.0L)

1) Disconnect idle/full throttle switch wiring harness at throttle body. Connect Test Harness (VAG 1501) to idle/full throttle switch connector. See Fig. 3. Place Digital Volt-Ohmmeter (DVOM) in ohmmeter mode.

2) Using jumper wires from Adapter Kit (VW 1594), connect DVOM between adapter terminals No. 1 and 2. Resistance should be zero ohms. Open throttle slightly. Ensure idle switch turns off and resistance increases to an infinite reading.

3) Check idle switch "on" point by opening throttle and then slowly closing it. Idle switch "on" point must occur between 0.006-0.020" (0.15-0.50 mm) before idle stop (measured between throttle valve lever and stop screw). If necessary, loosen adjustment screws and reposition switch.

NOTE: If 2nd stage throttle shaft is attached with a nut, use protractor without the magnetic adapter. And, if necessary, remove throttle shaft nut.

4) To check full throttle switch on throttle body WITHOUT throttle valve potentiometer, attach Protractor (3084) pointer to throttle body. See Fig. 3. Using Magnetic Adapter (3084/1), attach protractor onto 2nd stage throttle shaft. Zero protractor scale on pointer.

5) Fully open throttle by hand. Close throttle 30 degrees, then slowly open throttle until DVOM indicates continuity (zero ohms). Full throttle switch "on" point must occur 8-12 degrees before full throttle stop. If necessary, loosen adjustment screws and reposition switch.

NOTE: When idle switch is adjusted, the full throttle switch is also adjusted on throttle body WITH throttle valve potentiometer. To adjust throttle valve potentiometer input and output voltages, see THROTTLE VALVE POTENTIOMETER.

6) Mechanical adjustment of throttle valve potentiometer is made by removing throttle body from engine. Remove and heat shield from throttle body. Loosen adjustment screws and rotate potentiometer clockwise.

7) Now lightly rotate potentiometer fully counterclockwise up to stop, to keep throttle valve from opening. Tighten adjustment screws with potentiometer in this position.

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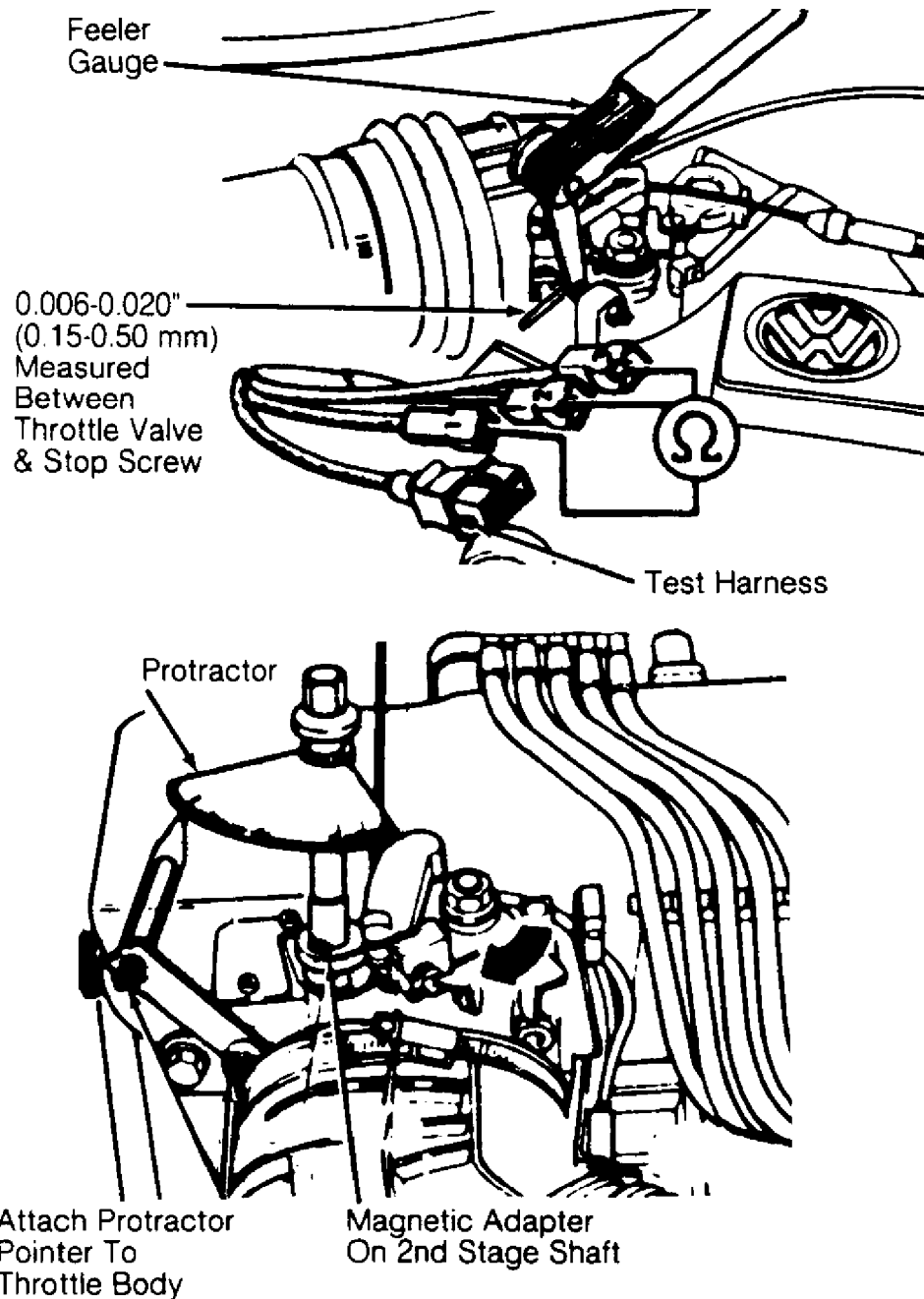
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Fig. 3: Adjusting Idle & Full Throttle Switch (Passat 2.0L)
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THROTTLE VALVE POTENTIOMETER

Passat GL (2.0L)

1) Connect Test Harness (VAG 1501) between throttle (airflow sensor) potentiometer and potentiometer wiring harness connector.

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Check input voltage between terminals No. 1 and 3 with ignition on. See Fig. 4. Voltage should be 4.35-5.35 volts. Turn off ignition.

2) Connect a voltmeter between terminals No. 2 and 3. Start engine and allow it to idle for 2 minutes. Output voltage should be within specifications, see THROTTLE VALVE POTENTIOMETER table.

3) If voltage is not as specified, carefully melt sealer from potentiometer adjusting screw and adjust output voltage. If adjustment is not possible, replace airflow sensor assembly.

THROTTLE VALVE POTENTIOMETER

AA

Input Voltage	Output Voltage
---------------	----------------

4.35.....	0.43-0.75
4.50.....	0.45-0.77
4.60.....	0.47-0.79
4.70.....	0.48-0.80
4.80.....	0.49-0.81
4.90.....	0.50-0.83
5.00.....	0.51-0.85
5.10.....	0.52-0.87
5.20.....	0.53-0.89
5.30.....	0.54-0.90
5.40.....	0.55-0.91

AA

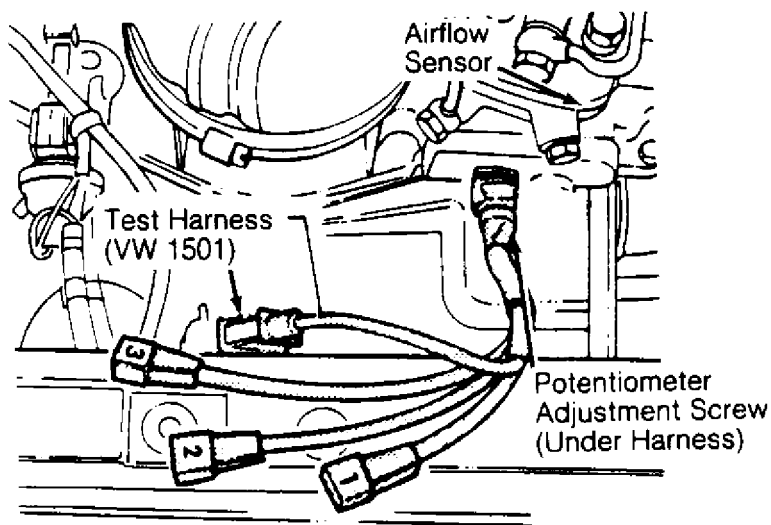


Fig. 4: Adjusting Throttle Valve Potentiometer (Passat GL)
Courtesy of Volkswagen United States, Inc.

END OF ARTICLE