



# I - SYSTEM/COMPONENT TESTS

## Article Text (p. 2)

1993 Volkswagen EuroVan

For Volkswagen Technical Site

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**NOTE:** The Electronic Control Module (ECM) must be reset if Blue engine coolant temperature sensor has been disconnected while the engine is running or if throttle body, throttle valve potentiometer, airflow sensor or ECM have been replaced. This procedure is not necessary on Digifant II systems.

### ENGINE SENSORS & SWITCHES

**NOTE:** For engine sensors and switches not covered in this article, see the D - ADJUSTMENTS article. For component locations, see Fig. 1.

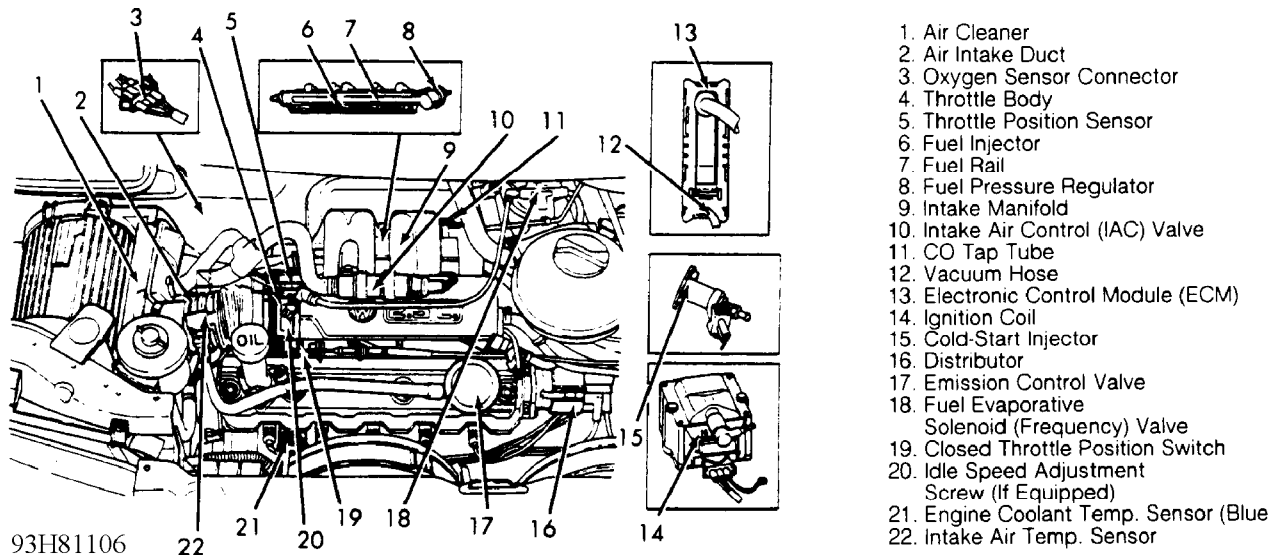


Fig. 1: Component Locations (EuroVan 2.5L)  
Courtesy of Volkswagen United States, Inc.

### INTAKE AIR TEMPERATURE SENSOR

EuroVan (2.5L)

1) Connect Scan Tester (VAG 1551) to Data Link Connectors (DLC) located in fold-down storage shelf in front of relay panel. Remove intake air temperature sensor from air intake duct.

2) With scan tester in READ MEASUREMENT BLOCK function, read intake air temperature sensor value as displayed in channel No. 3 of scan tester. Spray sensor with cooling spray and observe value on scan tester.

3) Scan tester value must drop. If temperature value does not change, repair intake air temperature sensor circuit or replace sensor as necessary. After repairs, erase Diagnostic Trouble Code (DTC) memory (if applicable) and select END DATA TRANSFER function.

### HALL EFFECT SENSOR

EuroVan (2.5L)

1) Disconnect Hall Effect sensor wiring harness connector at

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ignition distributor. Connect DVOM, using test leads from Adapter Kit (VW 1594), to outer terminals of connector.

2) Turn ignition on. DVOM reading must be 10 volts minimum.

If voltage is not okay, repair open Hall Effect sensor voltage supply circuit. If circuit is okay, replace ECM. If voltage is okay, reconnect Hall Effect sensor.

3) Turn ignition off. Disconnect cold-start injector and fuel injector wiring harness at fuel rail. Use LED Tester (US 1115) to backprobe center and Brown/White outer wire at Hall Effect sensor connector. Crank engine and observe LED tester. If LED tester does not flicker, replace Hall Effect sensor.

### COOLANT TEMPERATURE SENSOR

EuroVan (2.5L)

1) Ensure engine is cold. Connect Scan Tester (VAG 1551) to Data Link Connectors (DLC) located in fold-down storage shelf in front of relay panel. With scan tester in READ MEASUREMENT BLOCK function, read coolant temperature value in channel No. 1 of scan tester.

2) Temperature value must increase uniformly without interruption. If coolant temperature value does not change, test circuit using J - PIN VOLTAGE CHARTS article. If necessary, replace engine coolant temperature sensor. After repairs, erase DTC memory (if applicable) and select END DATA TRANSFER function.

### MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

EuroVan (2.5)

1) Connect Scan Tester (VAG 1551) to Data Link Connectors (DLC) located in fold-down storage shelf in front of relay panel. With scan tester in READ MEASUREMENT BLOCK function, ensure coolant temperature is more than 185°F (85°C) as displayed in channel No. 1 of scan tester.

2) With scan tester still in READ MEASUREMENT BLOCK function, read MAP sensor value in channel No. 4 of scan tester. Value must be 20-40 percent and fluctuating.

3) If a constant value of roughly 90 percent is displayed, check for leaks in vacuum hose to ECM or replace ECM as necessary. After repairs, erase DTC memory (if applicable) and select END DATA TRANSFER function.

### FUEL SYSTEM

#### ACCELERATION/FULL THROTTLE ENRICHMENT & DECELERATION FUEL CUT-OFF

EuroVan (2.5L)

1) Connect Scan Tester (VAG 1551) to Data Link Connectors (DLC) located in fold-down storage shelf in front of relay panel. With scan tester in READ MEASUREMENT BLOCK function, ensure coolant temperature is more than 185°F (85°C) as displayed in channel No. 1 of scan tester.

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2) Allow engine to run 2 minutes at idle. Read and record closed throttle position value in channel No. 4 of scan tester. Check full throttle load enrichment by gradually pressing down accelerator to 3000 RPM and then releasing it.

3) Display value must increase, drop down to 0 milliseconds, then return to value recorded at closed throttle. If specified values are not obtained, check idle speed. Also check THROTTLE POSITION (TP) SENSOR ADJUSTMENT in ON-VEHICLE ADJUSTMENTS article.

### COLD-START INJECTOR

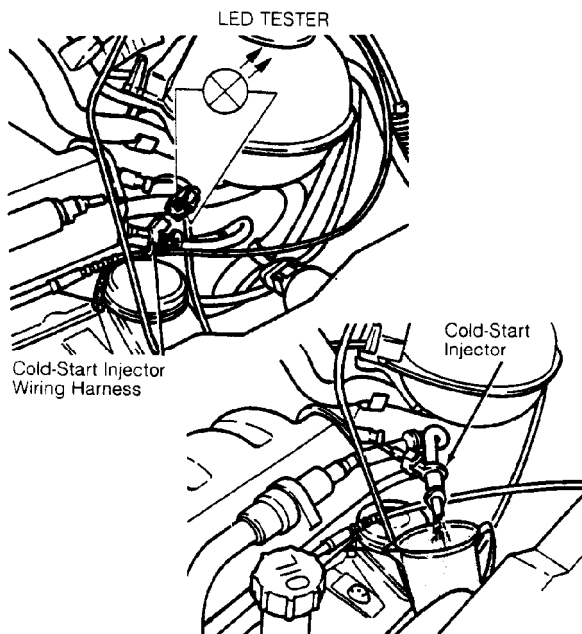
EuroVan (2.5L)

1) Disconnect main fuel injector wiring harness from fuel rail. Disconnect cold-start injector. See Fig. 2. Connect LED Tester (US 1115) to wiring harness connector using test leads from Adapter Kit (VW 1594).

2) Disconnect Blue Engine Coolant Temperature (ECT) sensor. Crank engine and observe LED tester. LED tester must light up for 1-4 seconds. If LED tester does not light up, check cold-start injector voltage supply circuit using J - PIN VOLTAGE CHARTS article or replace ECM as necessary.

3) If LED tester lights up (voltage supply circuit okay), remove cold-start injector and reconnect cold-start injector to wiring harness. Place cold-start injector in container and crank engine.

4) Cold-start injector must spray uniformly for 1-4 seconds. Wipe off cold-start injector nozzle and observe tip. No drips or dampness may occur within one minute. Replace cold-start injector if it does not operate as specified.



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Fig. 2: Testing Cold-Start Injector (EuroVan)

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### FUEL INJECTORS & CIRCUIT

EuroVan (2.5L)

1) Ensure Hall Effect sensor and its circuit is okay.

Disconnect fuel injector wiring harness. Using test leads from Adapter Kit (VW 1594), connect LED Tester (US 1115) to fuel injector wiring harness connector terminals No. 1 and 6. See Fig. 3.

NOTE: Connect LED tester to terminals No. 1 and 2 on models with 2-pin connector.

2) Crank engine and observe LED tester. LED tester must light up. Repeat injector circuit test using terminals No. 2 and 6, No. 3 and 6, No. 4 and 6, and terminals No. 5 and 6 (skip this test on 2-pin connector).

3) If LED lights up continuously, repair ground wire between battery and transmission or replace ECM as necessary. If LED flickers but DOES NOT light up, test fuel injector voltage supply circuit(s) using J - PIN VOLTAGE CHARTS article or replace ECM as necessary.

4) On models with 2-pin connector, connect Digital Volt-Ohmmeter (DVOM) between fuel injector wiring harness connector terminals No. 1 and 2. Injector resistance should be 3.0-4.0 ohms. If resistance is incorrect, remove fuel rail and test individual injectors (12.0-18.0 ohms).

5) On models with 6-pin connector, check individual fuel injector resistance between terminals No. 1 and 6, No. 2 and 6, No. 3 and 6, No. 4 and 6, and terminals No. 5 and 6. See Fig. 3. Individual injector resistance must be 12.0-18.0 ohms.

6) On all models, disconnect cold-start injector and Engine Coolant Temperature (ECT) sensor. Adjust Digital Potentiometer (VAG 1630) to 15000 ohms and connect potentiometer to ECT sensor using test leads from Adapter Kit (VW 1594).

7) Remove fuel rail, leaving fuel lines and injectors attached. Use test leads and fuel rail hose extensions if necessary. Place injectors in Fuel Analyzer (VAG 1602). Crank engine and observe injectors.

8) Injectors must spray uniformly while pulsating. Turn ignition off and disconnect fuel rail wiring harness. Turn ignition on for 5 seconds and check fuel injectors for leaks. No more than 2 drops are permissible per minute. When reinstalling fuel rail, ensure "O" rings are not damaged.

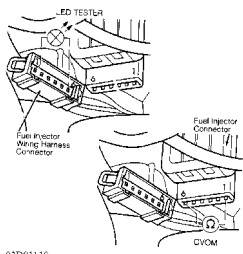


Fig. 3: Testing Fuel Injectors & Circuit (EuroVan)  
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## OXYGEN (O2) SENSOR CONTROL

EuroVan (2.5L)

1) Ensure engine idle speed is okay. Ensure there are no exhaust system leaks between catalytic converter and cylinder head. Connect Scan Tester (VAG 1551) to Data Link Connectors (DLC) located in fold-down storage shelf in front of relay panel. Refer to the appropriate G - TESTS W/CODES article in this section.

2) With scan tester in READ MEASUREMENT BLOCK function, ensure coolant temperature is more than 185°F (85°C) as displayed in channel No. 1 of scan tester. Allow engine to run for 2 minutes at idle.

3) Connect CO tester using Adapter (VAG 1363/3) on CO tap tube. DO NOT remove oxygen (O2) sensor. Measure CO level (0.3-1.2%), then read oxygen (O2) sensor factor (signal) in channel No. 3 of scan tester. Display value must fluctuate between 0.0-0.75 volts.

4) If value in channel No. 3 does not fluctuate, disconnect vacuum hose from fuel pressure regulator. Value must increase then drop back to original value. If value does not change, check voltage supply to oxygen (O2) sensor heater, repair oxygen (O2) sensor circuit or replace oxygen (O2) sensor as necessary. After repairs, erase DTC memory (if applicable) and select END DATA TRANSFER function.

## IDLE CONTROL SYSTEM

### IDLE AIR CONTROL (IAC) VALVE

EuroVan (2.5L)

1) Check Idle Air Control (IAC) valve using OUTPUT DIAGNOSTIC TEST MODE. See the G - TESTS W/CODES article. Turn ignition on. IAC valve must vibrate or hum. If IAC valve does not vibrate or hum, turn ignition off and disconnect IAC valve.

2) Connect Digital Volt-Ohmmeter (DVOM) to IAC valve using test leads from Adapter Kit (VW 1594). IAC valve resistance should be 2-10 ohms. If resistance is incorrect, replace IAC valve.

NOTE: IAC valve control current amperage may vary between 400-1000 milliamps depending on engine load (A/C on, power steering at full lock, incorrect ignition timing).

3) If IAC valve is working properly, ensure engine coolant temperature is at least 176°F (80°C). Ensure idle speed is correctly set and no air leaks exist in air intake system.

4) With IAC valve disconnected, install Test Harness (VAG 1315A/2) between IAC valve and wiring harness connector. See Fig. 4. Using test leads from adapter kit, connect DVOM to test harness.

5) Start engine and allow it to idle. With engine at 775-825 RPM, IAC valve control current must be 500-600 milliamps. With throttle closed, disconnect Blue Engine Coolant Temperature (ECT) sensor.

6) With ECT sensor disconnected, IAC valve control current must remain at 500-600 milliamps. If IAC valve control current is not

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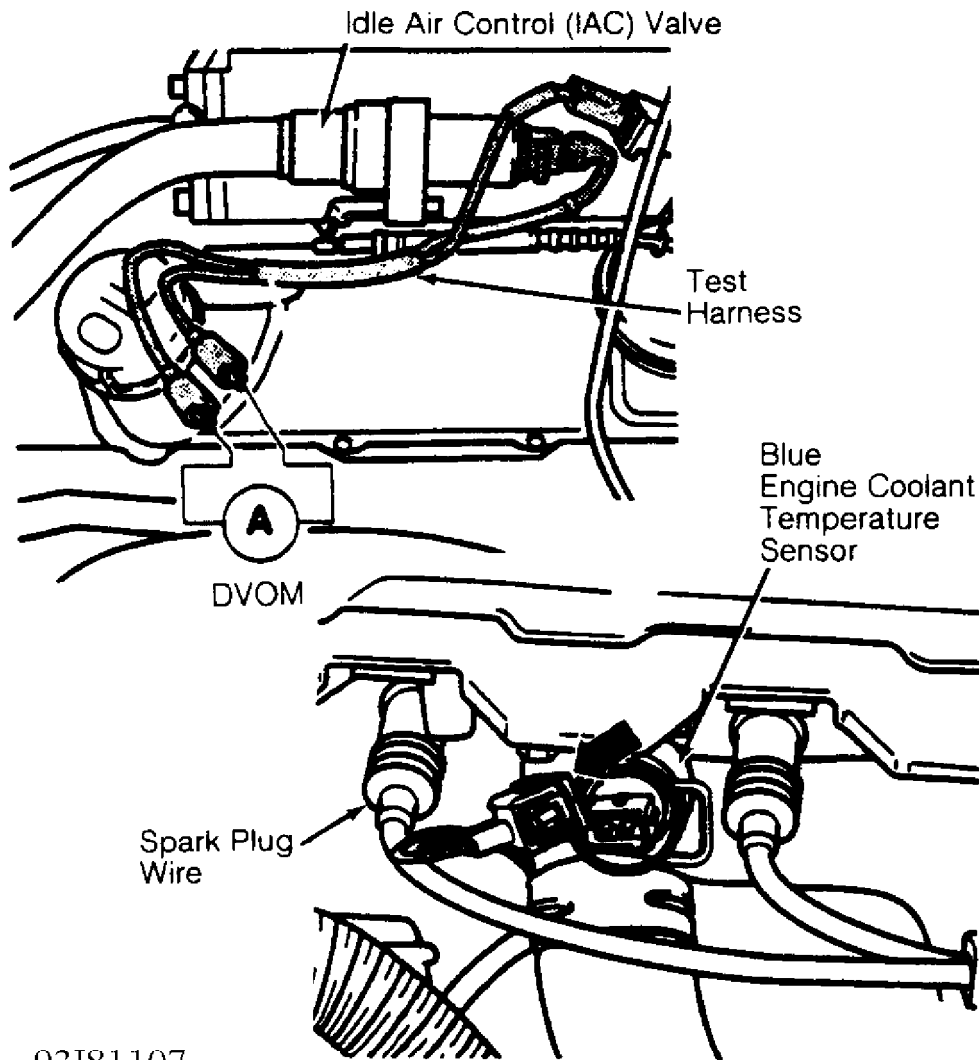
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as specified, repair circuit or replace ECM as necessary.

NOTE: If engine stalls, reconnect ECT before re-starting engine. This will prevent ECM from entering "limp home" mode, making IAC control current measurements inaccurate.



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Fig. 4: Testing Idle Air Control Valve (EuroVan)  
Courtesy of Volkswagen United States, Inc.

## IGNITION SYSTEM

### IGNITION COIL

EuroVan 2.5L (Primary & Secondary Windings)

1) Connect Digital Volt-Ohmmeter (DVOM) between coil terminals No. 1 and 15. See Fig. 5. Primary coil resistance should be 0.5-0.7 ohms.

2) Connect DVOM between coil tower and terminal No. 15. Secondary coil resistance should be 3000-4000 ohms. If resistance

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values are incorrect, remove ignition coil. Remove ignition coil power output stage from coil and repeat test.

EuroVan 2.5L (Ignition Coil Power Output Stage)

1) Ensure Hall Effect sensor and ignition coil are okay.

Disconnect 3-pin connector from ignition coil. Connect DVOM to ignition coil wiring harness terminals No. 1 and 3. See Fig. 5.

2) Turn ignition on. Battery (system) voltage should be indicated on DVOM. If battery voltage is not indicated, repair supply voltage circuit as necessary. If battery voltage is indicated, supply voltage circuit is okay.

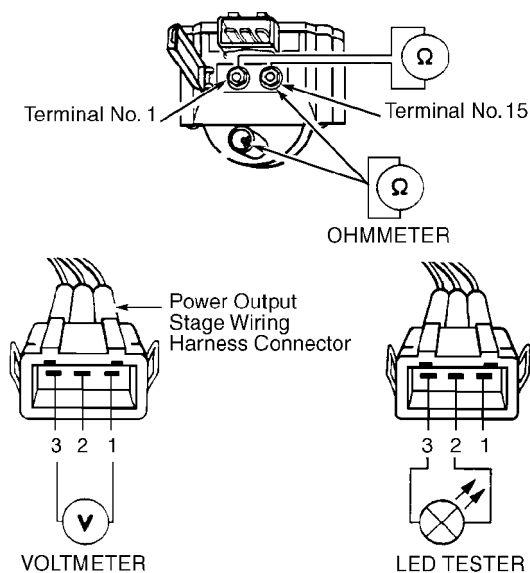
3) Turn ignition off. Disconnect cold-start injector (EuroVan only) and fuel injector wiring harness at fuel rail. Connect LED Tester (US 1115) to ignition coil wiring harness terminals No. 2 and 3 using test leads from Adapter Kit (VW 1594).

4) Crank engine and check for ignition signal from Electronic Control Module (ECM). If LED tester does not flicker, repair ignition signal circuit or replace ECM as necessary. If LED tester flickers, ignition signal circuit is okay.

5) Turn ignition off. Reconnect ignition wire and 3-pin connector to ignition coil. Connect LED tester between coil terminals No. 1 and 15. Turn ignition on. LED tester must light up for 1-2 seconds.

6) Crank engine and ensure LED tester flickers. If LED tester flickers, power output stage is okay. If LED tester does not flicker, replace power output stage.

NOTE: A DVOM may also be used in step 5). With ignition on, voltage should be 2 volts minimum and then drop to zero volts after 1-2 seconds.



93FR1111  
Fig. 5: Testing Ignition Coil & Power Output Stage  
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#### EMISSION SYSTEMS & SUB-SYSTEMS

NOTE: Other than EuroVan fuel evaporation system, additional emission systems and sub-system component testing information not available from manufacturer.

#### FUEL EVAPORATION

EuroVan (2.5L)

- 1) Ensure engine coolant temperature is at least 176°F (80°C). Ensure oxygen (O<sub>2</sub>) sensor and fuel/ignition system is operating properly.
- 2) Disconnect hose from fuel evaporative canister frequency solenoid valve (on left side of engine compartment firewall). Start engine and allow it to idle. Valve must not operate and no vacuum should be felt at valve connection.
- 3) Increase engine speed. Valve must open and close and vacuum must be felt at connection. If fuel evaporative canister frequency solenoid valve does not operate, perform OUTPUT DIAGNOSTIC TEST mode. See the G - TESTS W/CODES article.
- 4) If necessary, turn ignition off. Disconnect fuel evaporative canister frequency solenoid valve wiring harness connector. Using test leads from adapter kit, connect LED tester between wiring harness connector terminals. Start engine and increase engine speed. LED tester must briefly flicker.
- 5) If LED tester flickers, replace fuel evaporative canister frequency solenoid valve. If LED tester does not flicker, check wiring harness for an open circuit. If wiring harness is okay, replace Electronic Control Module (ECM).

**END OF ARTICLE**