

To diagnose a problem is to find a possible cause. A good place to start is with the plugs. Remove the plugs and keep them in cylinder order. Now use the [chart as shown on the maintenance page.](#)

Plug colours		Condition
Left bank	Right bank	
Grey	Grey	Indicates a possible fault in ignition system, plug leads condition or routing, timing, centrifugal or vacuum advance.
White	White	Could be air leaking into inlet system. suspect Air Valve or one of the many vacuum connections. Less likely but possible, the electrics or the Air flow meter.
Black	Black	If air filter and hose connections are good it could be the fuel regulator, thermostat switch or coolant temp. sensor. Signalling engine is cold when it is already hot. Faulty air flow meter is also a possibility
Black Grey	Grey Black	Over fuelling on one bank. Most certainly an electrical fault. Poor connection or chafing of the wires. Or...problems with your ECU

The Rover V-8 EFI system is very sensible for leaking vacuum connections which can result in a bad idling and/or a rough running engine. Therefore carefully inspect all the vacuum pipes for leakage and check the conditions of the clamps!. On the SD1 most piping is at least 13 years old by now so the rubber can be hardened or become porous.

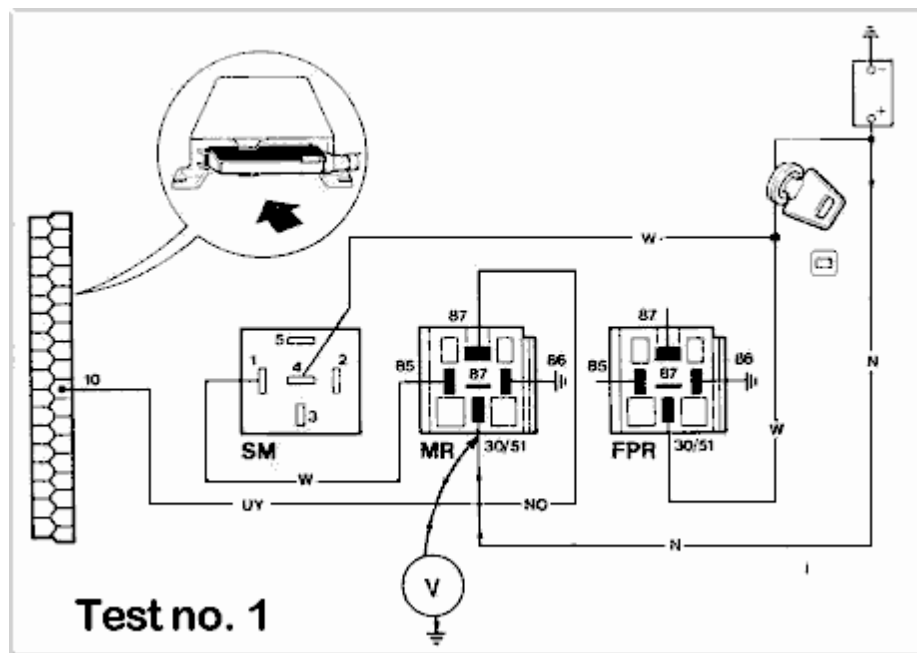
An indication for a vacuum leak can be noticed because the engine is running rough on idling and low rpm. The rough running then slowly disappears with increasing rpm. This can be explained because at idle and low rpm the throttle valve is almost closed. This gives a high vacuum in the plenum chamber and thus a high vacuum in the vacuum piping. So a lot of outside air is sucked in directly instead of going through the air flow meter, as a result the air/fuel mixture is too lean resulting in a poor running engine, and yes..those white noses on your plugs. With wider throttle openings the vacuum becomes less and thus less air is leaking in.

A simple test if you have a rough running engine at low rpm is to disconnect the filter and manually (with a screwdriver for instance) open the flap of the airflow meter a bit with the engine idling. This way you make the EFI system injecting more fuel. If the engine starts to run smooth there is almost certainly a leakage in your vacuum piping.

Excessive fuel consumption and black smoke can be caused by a perforated diaphragm from the fuel pressure regulator. To check this remove the vacuum pipe. If there is fuel coming out of the regulator's vacuum connection, the diaphragm is at fault and the regulator should be replaced.

If the problem wasn't in the hose connections or in the ignition then the following tests can help you locating the fault in your EFI system.

Test 1 Voltage supply



ECU connected

Ignition off

Voltmeter connected between pin 30/51 of the main relay and earth.

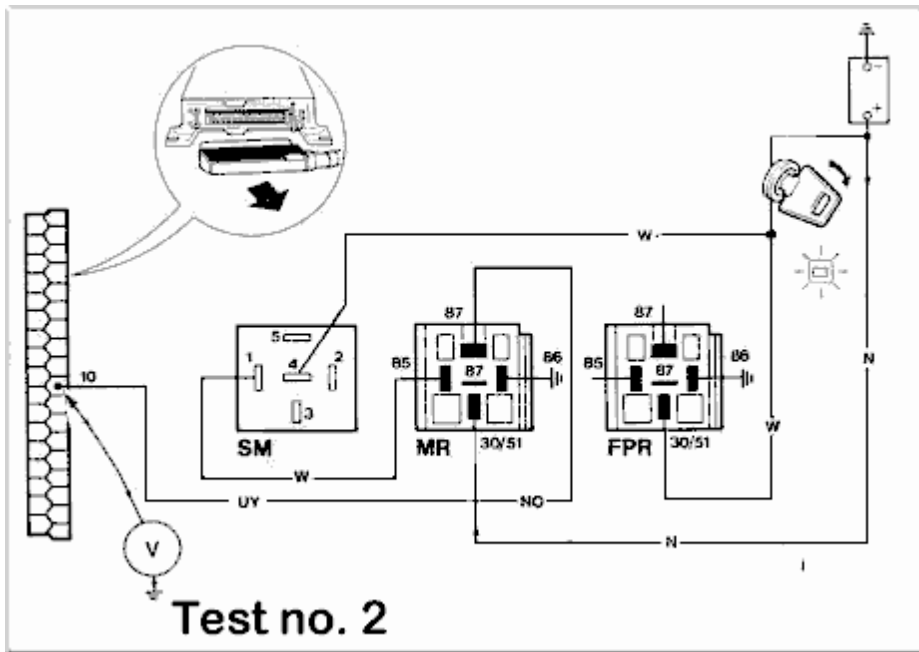
The reading should be 11 to 12.5 Volts

If below 11 Volts or 0 Volts check:

- State of the battery
- Earth connections
- Positive connections to main relay (Brown wire (N))

If OK continue with [Test 2](#)

Test 2 Voltage supply to ECU



ECU DISconnected

Ignition OFF

Voltmeter connected between terminal 10 of the multiplug (Not the ECU itself!) and earth.

The reading should be 0 Volts

If above 0 Volts renew the main relay

Turn ignition ON

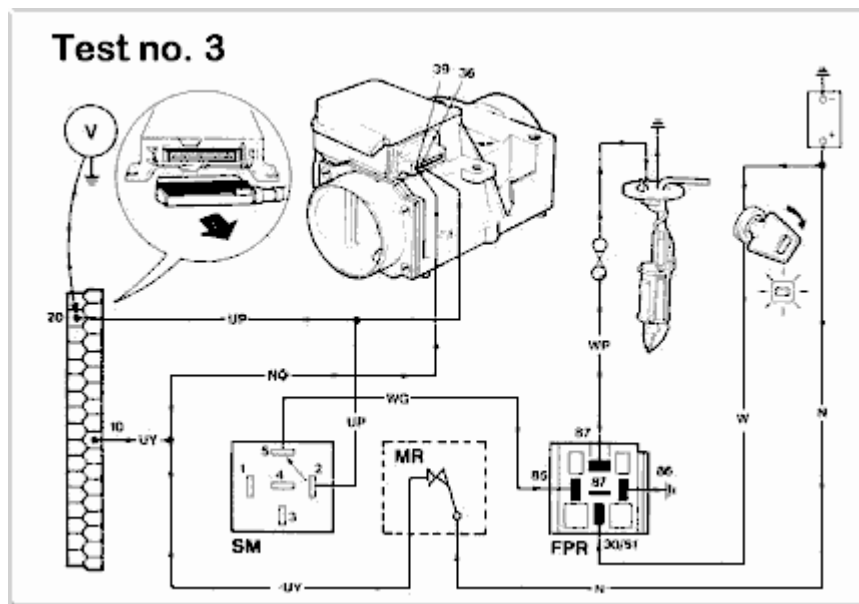
Main relay can be heard by a click and voltmeter should read 11 to 12.5 Volts If below 11 Volts or 0 Volts check:

- All the white wire connections (W) to the relays and steering module
- Earth connections at terminal 86 and both relays
- Good connection of brown&orange wire (NO) at main relay terminal 87
- Good connection of blue&yellow wire (UY) at main relay terminal 87 and ECU pin 10.

If still below 11 Volts substitute the steering module and the main relay.

If OK continue with Test 3

Test 3 Voltage supply to Fuel pump



ECU DISconnected

Ignition ON

Voltmeter connected between terminal 20 of the multiplug (Not the ECU itself) and earth.

Air flow meter flap closed the meter should read zero Volts

Manually open the flap of the meter.

Listen for the fuel pump and relay operation.

Voltmeter should read 11 to 12,5 Volts

If below 11 Volts check:

- All wiring connections as shown in this diagram.

If still below 11 Volts

Substitute the steering module

If the voltmeter reads correctly but the relay or pump don't operate

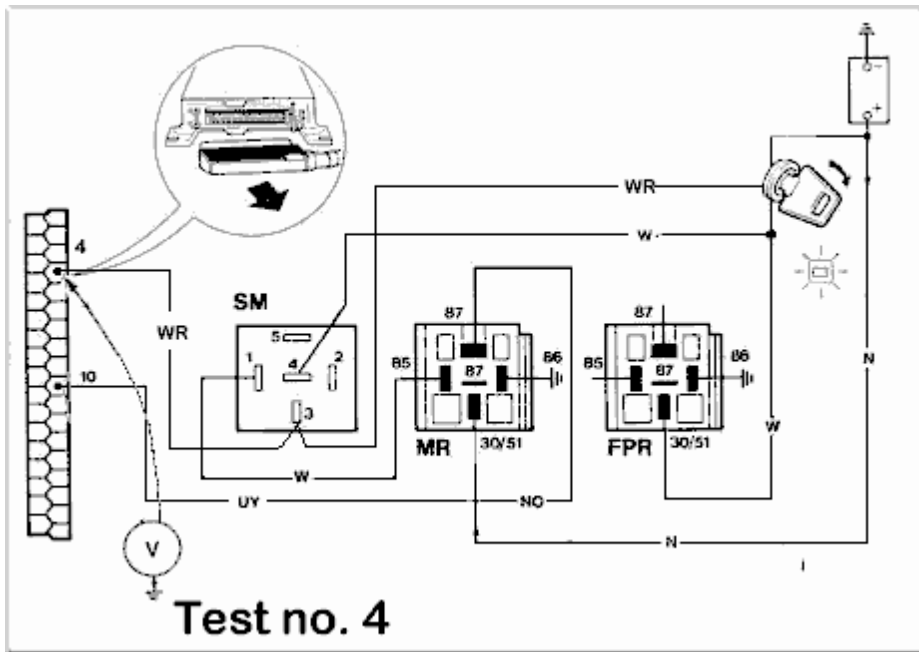
Substitute steering module and then pump relay.

If pump still isn't operating

Suspect a faulty fuel pump.

If OK continue with Test 4

Test 4 cranking Voltage



ECU DISconnected

Voltmeter connected between ECU terminal 4 and earth.

Ignition ON and cranking

The reading should be 8 to 12 Volts

If no reading but the starter motor operates check:

- White&red (WR) wiring
- connections to ECU pin 4 via the steering module and the wiring loom multiplug.

If below 8 Volts check:

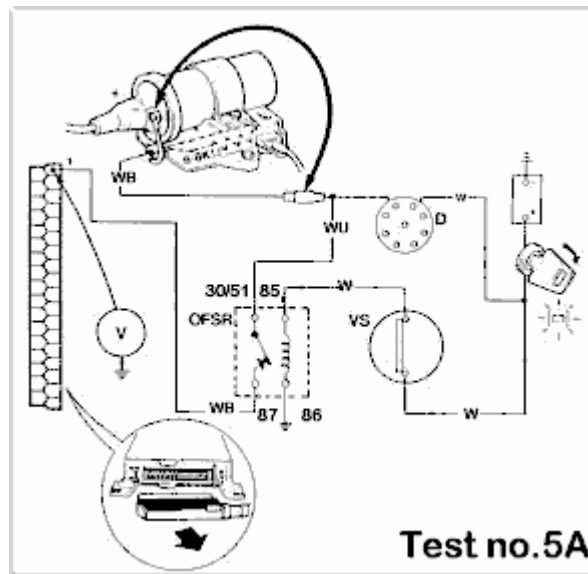
- Battery and starter motor

If no readings and the starter motor does not operate,check:

- Black & orange (BO) wiring, connections and starter circuit

If OK continue with [Test 5A \(with separate ignition amplifier\)](#)
or continue with [Test 5B \(with integral ignition amplifier\)](#)

Test 5A Voltage speed signal circuit fuel shut off relay and vacuum switch



ECU DISconnected

Connect a jump lead between the negative coil terminal and the white/blue (WB) connector adjacent to the coil.

Voltmeter connected between ECU multiplug terminal 1 and earth.

Ignition ON

Listen for operation of fuel shut-off relay

If relay does not operate check:

- White wiring (W) and connections
- earth connection 86 from relay
- the vacuum switch and the connection hose, substitute if necessary

CRANK the engine

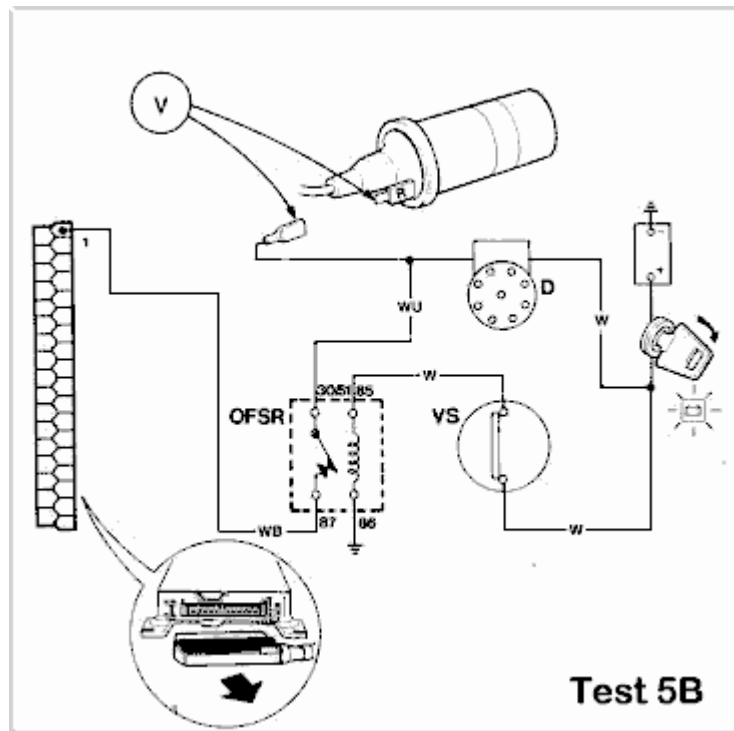
Voltage should fluctuate between 6 and 9 Volts

If higher than 9 Volts or lower than 6 than check:

- electronic ignition system

If OK continue with [Test 6](#)

Test 5B Voltage speed signal circuit fuel shut off relay and vacuum switch



ECU DISconnected

Disconnect the connector from the resistor at the negative coil terminal and connect a Voltmeter between the resistor and the connector. (see diagram)

Ignition ON

Listen for operation of fuel shut-off relay

If relay does not operate check:

- White wiring (W) and connections
- earth connection 86 from relay
- the vacuum switch and the connection hose, substitute if necessary

CRANK the engine

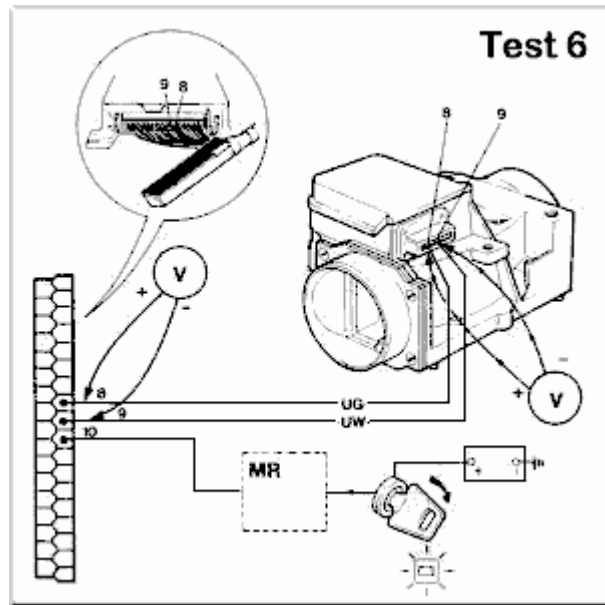
Voltage should fluctuate between 6 and 9 Volts

If higher than 9 Volts or lower than 6 than check:

- electronic ignition system

If OK remove voltmeter and reconnect the connector, continue with [Test 6](#)

Test 6 Voltage of airflow resistor



ECU connected

Disconnect the multiplug, remove the multiplug cover and reconnect the multiplug.

Ignition ON

Voltmeter connected between pins 8 and 9 with the multiplug connected to the ECU

Air flow meter flap closed. The voltmeter should read 1.55 +/- 0.1 Volts

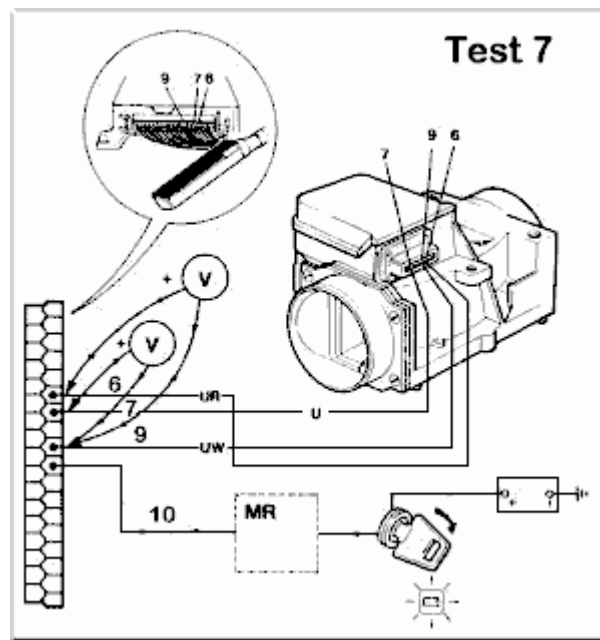
If reading is incorrect

- peel back the rubber covering at the flow meter and connect voltmeter to terminals 8 and 9
- Measure readings again

If reading is still incorrect the air flow meter is faulty. Open the top of the flow meter and check the potentiometer. It could be that corrosion damaged the tracks of the potentiometer or the pick-up points are corroded.

If OK leave the ECU connections exposed and continue with Test 7

Test 7 Voltage of airflow potentiometer



ECU connected

Disconnect the multiplug, remove the multiplug cover and reconnect the multiplug.

Ignition ON

Voltmeter connected between pins 6 and 9 with the multiplug connected to the ECU

Voltmeter should read 4.3 +/- 0.2 Volt.

If Voltmeter reads 0 check:

- All wiring and connections seen in the diagram above

Voltmeter connected between pins 6 and 7

Voltmeter should read 3.7 +/- 0.1 Volt

If voltmeter reads lower check:

- The wiring for high resistance (corrosion)

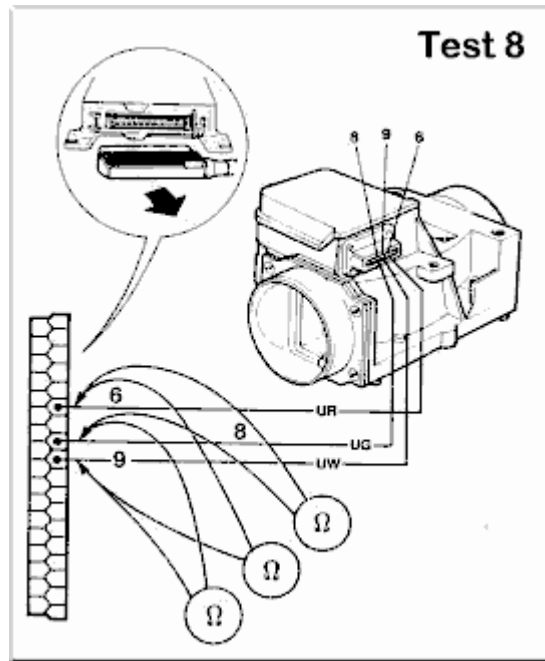
With the voltmeter connected between pins 6 and 7 slowly open the air flap.

The Voltage should gradually decrease to 1.6 +/- 0.1 Volts

If the results are not within the specifications the potentiometer is at fault. Take the cover of the air flow meter and check the potentiometer for corrosion, etc.

If OK refit the ECU multiplug cover and continue with [Test 8](#)

Test 8 Resistance of airflow potentiometer



ECU multiplug DISconnected

Ignition OFF

Air flow meter flap closed.

Ohmmeter connected between pins 6/8, 6/9 and 8/9

Pins	Ohms
6 and 8	360 +/- 10 Ohms
6 and 9	560 +/- 10 Ohms
6 and 9	200 +/- 10 Ohms

If Ohmmeter readings are incorrect:

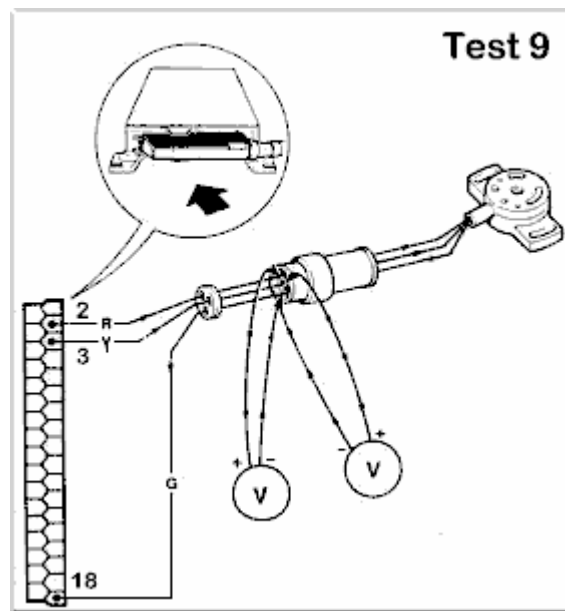
- Peel back rubber boot covering at airflow meter and repeat the test at the air flow plug and then at the air flow meter socket

If the readings are still incorrect:

- the potentiometer is at fault. Take the cover of the air flow meter and check the potentiometer for corrosion, etc.

If OK refit the ECU multiplug cover and continue with [Test 9](#)

Test 9 Voltage of throttle potentiometer



ECU multiplug connected

Ignition ON

Voltmeter connected between yellow and green wire at the multiplug

Voltmeter should read 4.3 +/- 0.2 Volts (ECU control voltage)

If zero or lower reading check:

- Wiring and connections

Measure between the yellow and red wire.

Voltmeter should read between 0.325 +/- 0.025 Volts

If incorrect, reset the potentiometer:

- Slacken the potentiometer body screws and rotate the body until the meter reads 0.325 +/- 0.025 Volts, tighten the screws

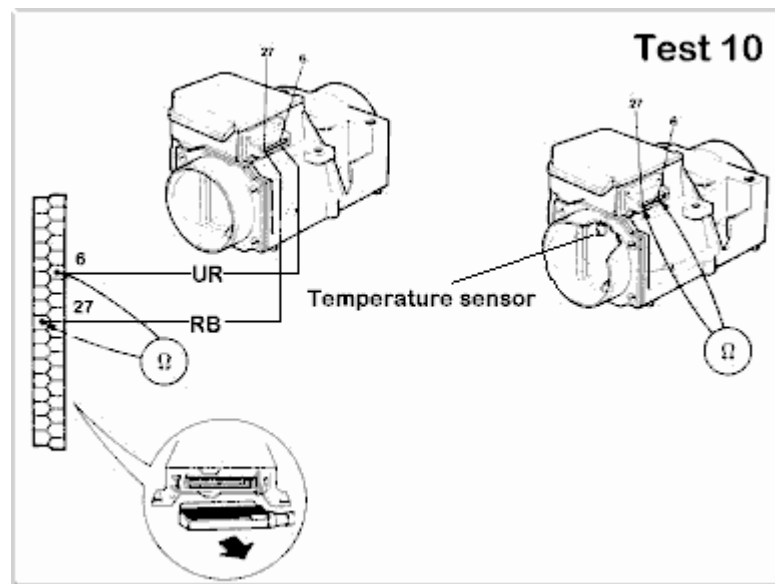
Slowly open the throttle the injectors should be heard to operate and the Voltmeter should register a smooth increase up to 4.5 Volts maximum.

If the voltages can't be obtained or if the voltage is erratic when the voltage is opened.

- Renew the throttle potentiometer. Often the potentiometer is worn at the lowest (idling) part of its path. This causes unregular idling with revs going up and down.

If OK continue with [Test 10](#)

Test 10 Resistance of temperature sensor



WARNING! only connect the ohmmeter for a short period. the ohmmeter will heat up the winding and give an incorrect reading as time goes

ECU multiplug DISconnected

Ignition OFF

Ohmmeter connected between pins 6 and 27

Temperature	Ohms
-10 C +/- 0.5 C	8.26 to 10.56 Ohms
+20 C +/- 0.5 C	2.28 to 2.72 Ohms
+50 C +/- 0.5 C	0.76 to 0.91 Ohms

If Ohmmeter readings are incorrect:

- Try to find another temperature sensor with the right spec's and place it into the air filter housing with the wires reconnected or replace the air flow meter

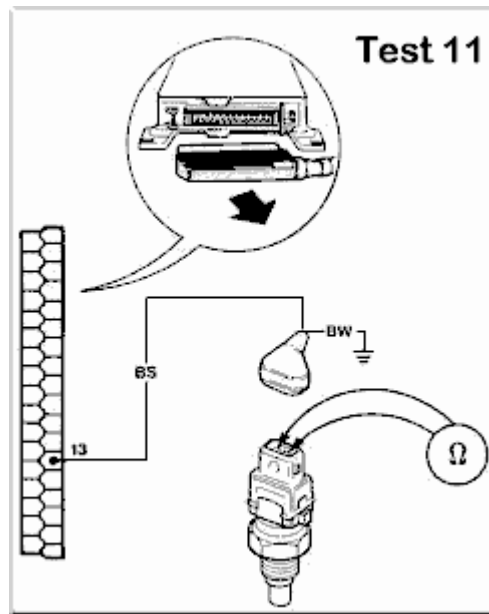
If the readings are correct. Repeat the resistance check at the ECU harness pins 6 and 27 to check continuity

If the readings are incorrect, check:

- Red & Brown wiring (RB) and connections
- Blue & Red wiring (UR) and connections

If OK refit the ECU multiplug cover and continue with [Test 11](#)

Test 11 Resistance of coolant temperature sensor



A faulty coolant temperature sensor can cause black plugs and excessive fuel consumption. The ECU thinks the engine is cold if the connection is faulty.

WARNING! only connect the ohmmeter for a short period. the ohmmeter will heat up the winding and give an incorrect reading as time goes

ECU multiplug DISconnected
Ignition OFF
Measure coolant temperature with a thermometer
Disconnect the sensors socket
connect ohmmeter between the terminals

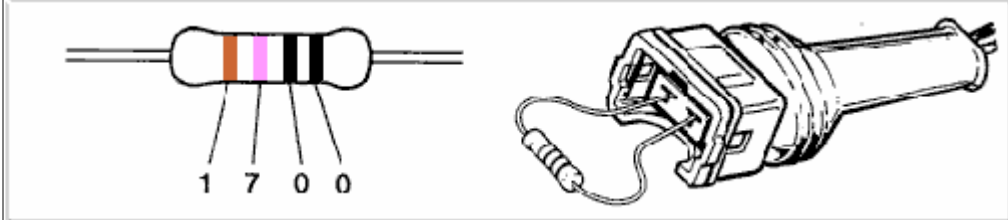
The readings should be:

Temperature	Ohms
-10 C	9100 to 9300 Ohms
0 C	5700 to 5900 Ohms
20 C	2400 to 2600 Ohms
40 C	1100 to 1300 Ohms
60 C	500 to 700 Ohms
80 C	300 to 400 Ohms
100 C	150 to 200 Ohms

If Ohmmeter readings are incorrect:

- Remove the sensor and check it again in melting ice and water (0 C) and boiling water (100 C)

If the readings are still incorrect. Replace the temperature sensor and recheck. A temporary solution for the problem is to connect a resistor of 175 Ohms across the sensors connection when the engine is hot. Remove the resistor when the engine is cold.



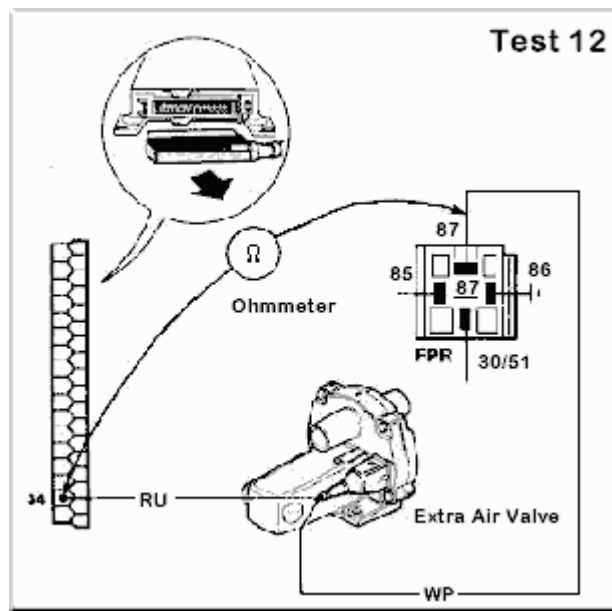
If the readings are correct reconnect the temperature sensor and check the resistance at the ECU pin 13 and the earth.

If the readings are incorrect check:

- Black & Slate (BS) wiring and connections
- Black & white (BW) wiring and connections
- Earthing

If OK continue with [Test 12](#)

Test 12 Resistance of the Extra Air Valve



ECU disconnected

Ignition off

Ohmmeter connected between pin 87 of the fuel pump relay and pin 34 on the ECU multiplug connection.

The Ohmmeter should read between 30 and 40 Ohms.

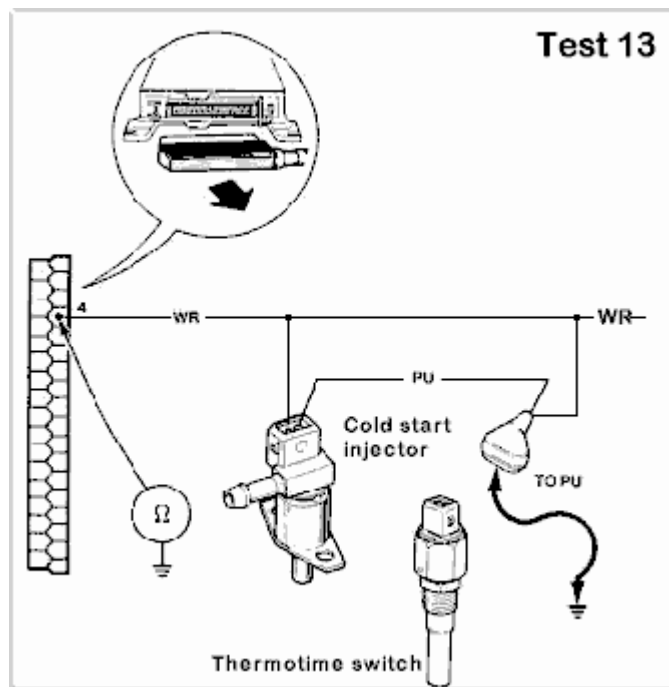
If readings are outside these limits. Renew the extra air valve.

If Ohmmeter shows infinity check:

- White & purple (WP) wiring and connections
- Red & Blue wiring (RU) and connections

If OK continue with [Test 13](#)

Test 13 Resistance of the Cold start injector



ECU multiplug disconnected

Ignition OFF

Disconnect the thermotime switch and temporarily connect the purple and blue wire (PU) to the earth.

Measure the resistance between the ECU multiplug pin 4 and the earth.

The resistance should be 0 to 5 Ohms.

If the reading is incorrect check:

- The temporary earth for good connections
- White & Red (WR) wire and connections
- Purple & Blue (PU) wire and connections

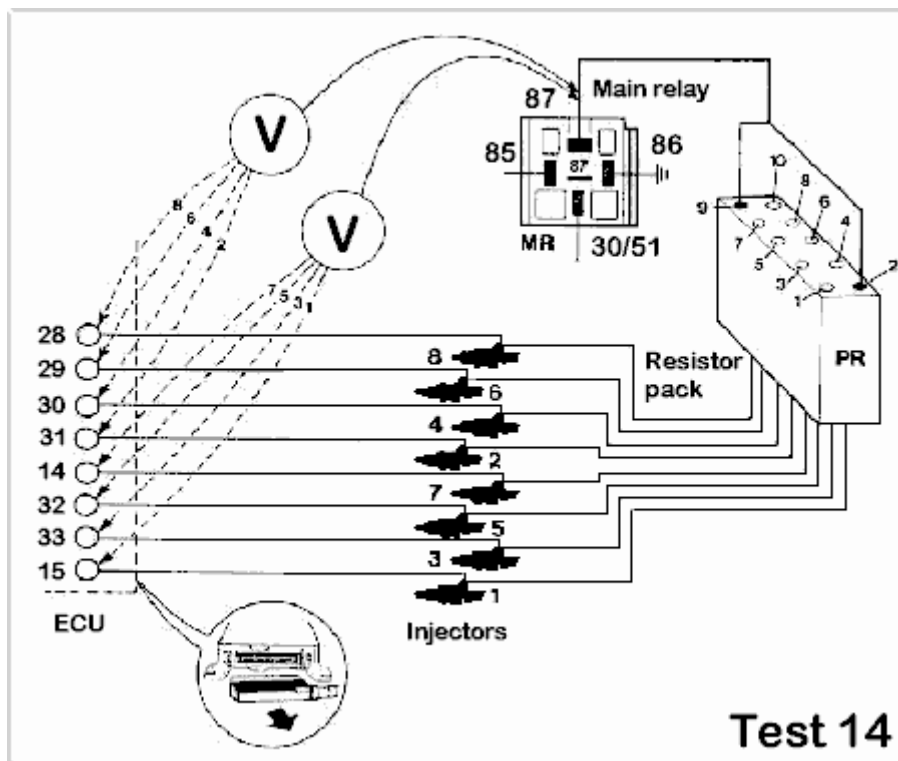
If the reading is still incorrect, disconnect the cold start injector and check its resistance.

The resistance of the injector should be 0 to 5 Ohms.

If incorrect renew the cold start injector

If OK continue with Test 14

Test 14 Voltage drop injector circuit



ECU multiplug disconnected
Ignition ON

Warning! The Voltmeter must be connected for a short time only because fuel will be injected during the test!

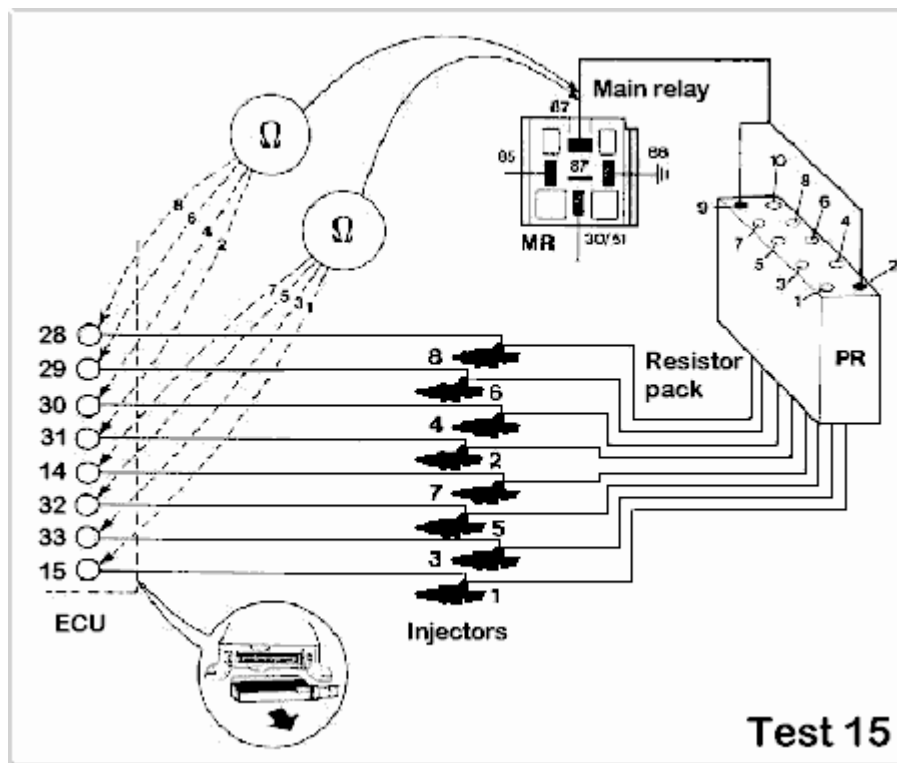
Connect the voltmeter between a good earth and each injector ECU multiplug terminal in turn.

Check the voltage reading for each injector

Compare the injector voltages. These should not vary by more than 0,5 Volt

If the variation is more than 0,5 volt continue with [Test 15](#)

Test 15 Resistance of injector circuit



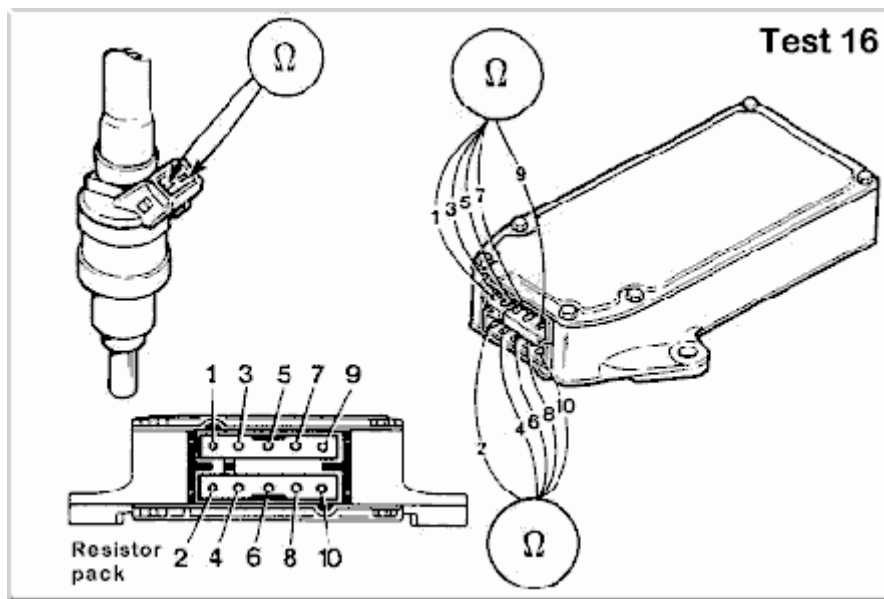
ECU multiplug disconnected
Ignition OFF

Connect the ohmmeter between terminal 87 or 87A of the main relay and each injector ECU multiplug terminal in turn

A reading of 7-10 Ohms indicates	No fault
Infinity indicates	A broken connection or component
A high resistance reading indicates	A poor connection, faulty wiring or faulty injector or resistor

If a faulty injector or resistor is suspected continue with test 16

Test 16 Resistance of injector circuit (2)



Disconnect the harness multiplug from the resistor pack
Connect an ohmmeter between terminal 9 and terminals 1,3,5 & 7 on the harness multiplug to check the values for injectors 1,3,5 & 7.

Do the same between terminal 2 and the terminals 4,6,8 & 10 for those injectors.

The values should read 6 Ohms +/- 1 Ohm.

If any value is incorrect replace the resistor pack

If all is OK

Disconnect the wiring from each resistor and check its resistance value by connecting the ohmmeter between its both terminals

The resistance value for each resistor must be 2.4 Ohms at 20°C +/- 0.5 Ohm

Renew any injector outside this resistor range

END OF THE TESTS !!

With these last tests you should have located the problem in your injection system. If the engine still isn't running or running uneven the problem probably won't be the fuel injection but the ignition or something mechanical.