






# Chapter 4 Part E: Fuel and exhaust systems - Digijet fuel injection

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## Degrees of difficulty

<b>Easy</b> , suitable for novice with little experience 	<b>Fairly easy</b> , suitable for beginner with some experience 	<b>Fairly difficult</b> , suitable for competent DIY mechanic 	<b>Difficult</b> , suitable for experienced DIY mechanic 	<b>Very difficult</b> , suitable for expert DIY or professional 
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4E

## Specifications

### Injection system

Type	Digijet
Application	1.3 litre (code NZ) engine
Control unit code colour:	
Up to July 1989	Copper-brown sticker
From July 1989	Blue sticker
System pressure (approx):	
Vacuum hose connected	2.5 bar
Vacuum hose disconnected	3.0 bar
Idle speed:	
Up to July 1989	750 to 850 rpm
July 1989	880 to 980 rpm
Speed limiter	6400 to 6500 rpm
CO content %:	
Up to July 1989	0.3 to 0.11
July 1989	0.3 to 1.5
Injectors:	
Resistance	15 to 20 ohms
Spray pattern	Conical

**1 General information and precautions**

**General information**

The Digijet fuel injection system is fitted to the 1.3 litre (code NZ) engine (see illustrations).

The system is regulated in accordance with instructions received from a control unit, located in the bulkhead plenum chamber on the left-hand side. This unit was modified in July of 1989 and can be identified by a blue sticker on the unit, earlier units having a copper-brown sticker.

The fuel pump and its location is identical to that described in Part F of this Chapter for the Digifant fuel injection system.

The fuel tank and its associated components are identical to those shown in Part A of this Chapter, the only difference being the feed line attachment to the gravity valve from the charcoal filter.

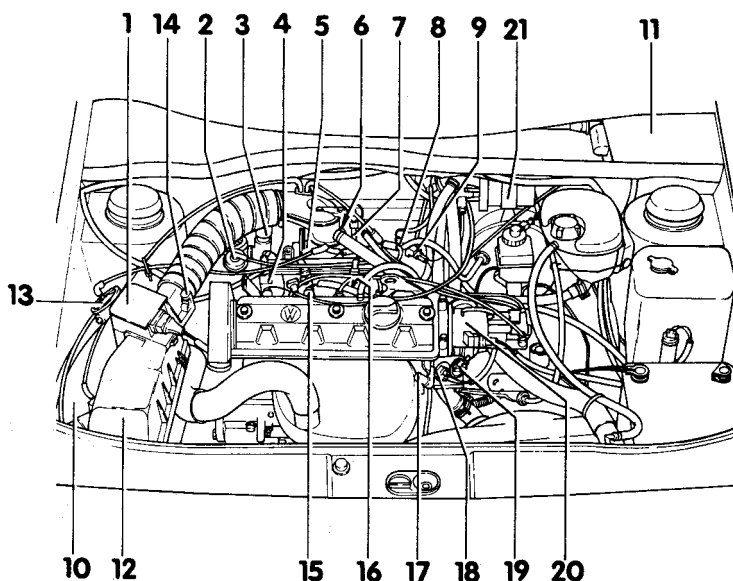
**Precautions**

Refer to Sections 1 and 2 in Part B of this Chapter.

**2 Air cleaner element - renewal**

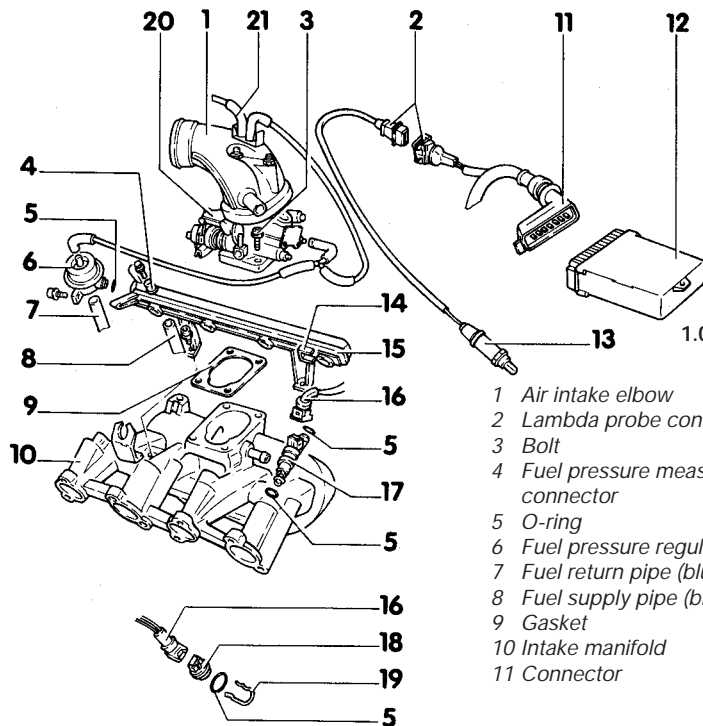


Refer to Chapter 1, Section 32



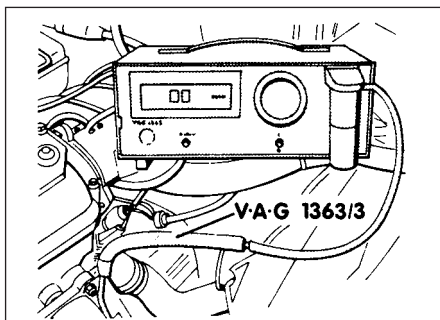
1.0a Digijet fuel injection system component location

- |   |   |
|---|---|
| 1 Airflow meter                           | 13 Cut-off valve  |
| 2 Fuel pressure regulator                 | 14 Mixture (CO) adjustment screw                            |
| 3 Heater element                          | 15 Spark plug   |
| 4 Injector                                | 16 Auxiliary air valve                                      |
| 5 Throttle valve housing                  | 17 CO measuring pipe  |
| 6 Idle speed adjustment screw             | 18 Temperature sender (blue) for Digijet system             |
| 7 Throttle valve switch                   | 19 Temperature sender (black) for coolant temperature gauge |
| 8 Auxiliary air valve connector           | 20 Distributor (with Hall sender)                           |
| 9 Lambda probe connector                  | 21 Ignition coil  |
| 10 Intake air preheating vacuum unit      |   |
| 11 Digijet control unit/TCI-H switch unit |   |
| 12 Air cleaner                            |   |

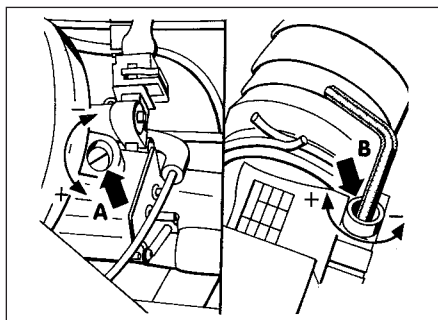


1.0b Digijet fuel injection system components

- |                                     |  |
|-------------------------------------|--|
| 1 Air intake elbow                  | 12 Control unit                              |
| 2 Lambda probe connector            | 13 Lambda probe                              |
| 3 Bolt                              | 14 Clip                                      |
| 4 Fuel pressure measuring connector | 15 Injector manifold                         |
| 5 O-ring                            | 16 Connector                                 |
| 6 Fuel pressure regulator           | 17 Injector                                  |
| 7 Fuel return pipe (blue)           | 18 Temperature sender (blue)                 |
| 8 Fuel supply pipe (black)          | 19 Clip                                      |
| 9 Gasket                            | 20 Throttle valve housing                    |
| 10 Intake manifold                  | 21 To air cleaner lower port regulating flap |
| 11 Connector                        |  |



3.4 CO analyser and connecting pipe



3.7 Idle speed (A) and mixture adjustment (B) screws

### 5 Inlet air pre-heater - testing



- 1 The inlet air pre-heater is fitted to engines manufactured from September 1989.
- 2 A hot air blower such as a hair dryer can be used to test the pre-heater. First release the retaining clips, lift the lid from the air cleaner unit and remove the element - see illustration, Section 32, Chapter 1.
- 3 With the engine cold and with the air temperature around the pre-heater between 5 to 15° C, the warm air flap valve must be seen to be open. On heating up the air temperature in the area of the air inlet valve to over 20° C, the valve should be seen to close.

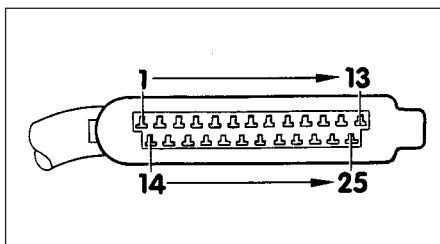
### 3 Idle speed and mixture - adjustment



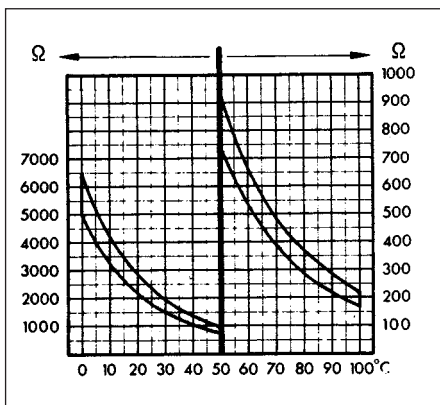
1 The idle speed can only be accurately checked using a suitable tachometer and an exhaust CO analyser. VW recommend that the inlet air temperature sender in the airflow meter must ideally be set to 1.8 K ohms to provide a neutral air inlet temperature. As this requires the use of specialised VW equipment, an approximate check/setting will therefore have to suffice.

2 When checking or making any adjustments to the idle speed, it is important to adhere to the following:

- a) The engine must be at its normal operating temperature
- b) All electrical components must be switched off, including the cooling fan



4.1a Control unit plug showing terminal connectors



4.1b Intake air temperature sender resistance graph

c) The ignition timing adjustment must be correct

- 3 Pull free the crankcase ventilation hose from the pressure regulating valve and plug it.
- 4 With the ignition switched off, connect a tachometer in accordance with the manufacturer's instructions, then connect the CO analyser to the measuring pipe (see illustration). An adapter will probably be needed to ensure a good seal between the analyser hose and measuring pipe.

5 Disconnect the Lambda probe wiring plug from its in-line connector.

6 Start the engine and check that the idle speed and CO content are as specified. If the idle speed is too high, check that the throttle valve is fully closing before making any adjustments to the idle speed.

7 If adjustment to the idle speed and/or the mixture (CO content) is required, turn the appropriate adjuster screw as necessary (see illustration).

8 If the CO content is to be adjusted, the mixture screw's tamperproof cap will have to be carefully prised free and a suitable Allen key used to make the adjustment. On models produced from July 1989 on, the idle speed should initially be between 900 to 1000 rpm and the CO content between 1.0 and 1.4%. When the Lambda probe is reconnected, the idle speed and the CO content should settle down to the specified setting. Fit a new tamperproof cap over the mixture screw on completion.

9 With the idle speed/CO content correct, disconnect the analyser and reconnect the Lambda probe wiring plug.

### 6 Fuel injectors - testing



Refer to Section 13 in Part B of this Chapter and proceed as described. Note however that the dribble test in paragraph 5 differs. Switch on the ignition for a period of 5 seconds and check that no more than 2 drips per minute leak from any of the injectors.

### 7 Throttle valve switch - testing



1 A multi-meter (set to the resistance scale) will be required to make this test.

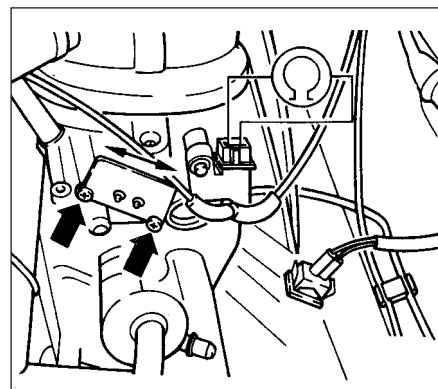
2 Pull free the wiring connector from the throttle valve switch, connect up the meter probes between the switch contacts and check that the reading is zero ohms (see illustration). Operate the throttle to fully open it (a high 'infinite' resistance reading will be shown on the meter), then slowly close the throttle to the point where 0.3 mm clearance exists between the throttle lever and the stop screw. Check that zero ohms is shown on the meter.

### 4 Airflow meter - testing

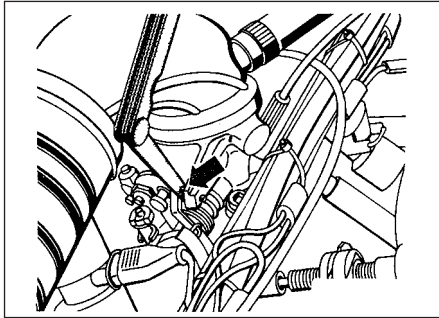


The efficiency of the airflow meter in the inlet manifold is checked by measuring the resistance value between contacts 1 and 4 of the control unit plug (see illustrations).

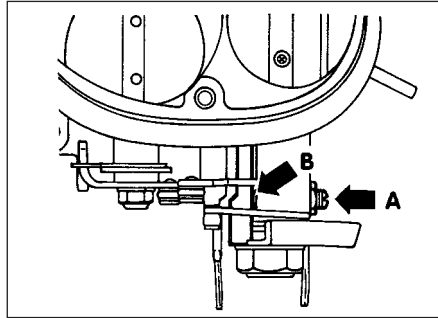
The potentiometer is measured in the same manner by connecting the probes to terminals 2 and 3 and simultaneously operating the airflow sensor plate. The resistance reading must be seen to fluctuate.



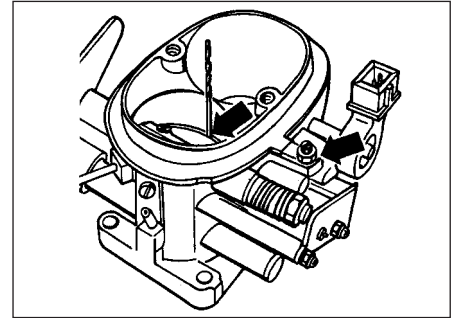
7.2 Throttle valve switch test meter connections and securing screws



7.3 Feeler blade location for throttle valve switch check



7.5 Throttle valve basic setting showing limiting screw (A) and stop (B)



8.2 Measuring pre-throttle valve clearance using 0.5 mm twist drill

*Adjustment screw and locknut also indicated*

## 8 Pre-throttle valve clearance - adjustment



The pre-throttle valve clearance is set during production and under normal circumstances should not require checking and adjustment.

If the clearance is to be checked, first remove the air cleaner unit. Using a suitable 0.5 mm diameter twist drill, check the clearance at the point indicated (see illustration). If adjustment is required, loosen off the locknut and turn the adjuster screw in the required direction to set the clearance, then retighten the locknut.

## 9 System components - removal and refitting



By reference to the illustrations accompanying this Chapter, removal and refitting of the various components of the system are self explanatory. However, the following special points should be noted:

- Observe the precautions described in Sections 1 and 2, Part B of this Chapter, whenever any parts of the system are to be removed and refitted.
- To ensure correct reassembly, ensure that the routings and connections of the system wiring, fuel and vacuum components are noted prior to disconnection (see illustrations).
- If the injector manifold is to be removed, it is first necessary to detach and remove the air inlet elbow complete with the throttle valve housing.
- Any component O-rings and gaskets must be renewed.
- The accelerator cable removal, refitting and adjustment procedures are as described in Part A of this Chapter.
- The fuel tank and its associated components are removed in a similar manner to that described in Part A of this Chapter, the only difference being the

3 Insert a feeler blade of 0.3 mm thickness between the lever and the stop screw to ensure the correct clearance (see illustration). If adjustment is required, loosen off the throttle valve switch screws then move the switch in the required direction to the point where the zero ohms reading is shown. Retighten the screws. Fully open the throttle valve and check that it is switched 'on' as described above. Reconnect the wiring connector to the switch on completion of the check.

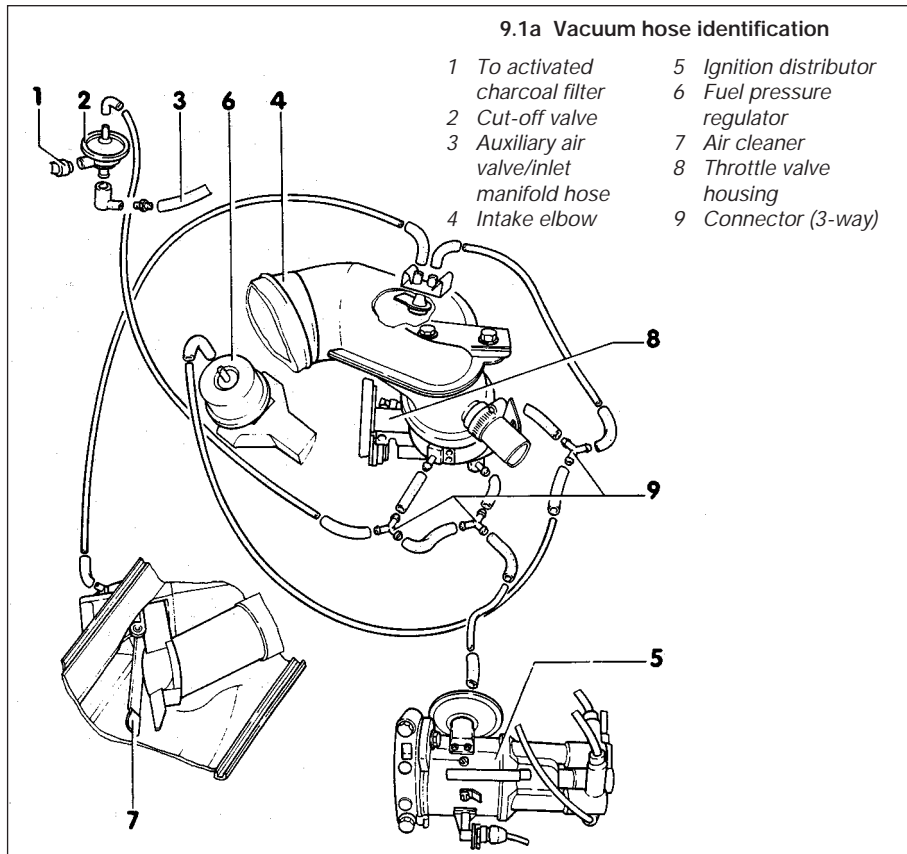
4 It should be noted that the throttle valve basic setting is made during production and in normal circumstances, it should not require further adjustment.

5 If minor adjustment to the valve setting is

necessary, it can be made by loosening off the limiting screw to provide a minimal clearance between the screw and the stop, then tightening the screw until it just comes into contact with the stop (see illustration). This setting is critical and to judge when the contact point is made, a piece of thin paper should be positioned between the lever and stop screw. Move the paper and simultaneously tighten the screw to the point where the paper is just clamped by the screw. From this point, tighten the screw a further half turn.

6 If adjustment has been made, the idle speed and mixture should be checked, as should the throttle valve switch.

### 9.1a Vacuum hose identification



feed line attachment to the gravity valve from the charcoal filter.

g) The fuel pump and its location is identical to that described in Part F of this Chapter.

## 10 Evaporative fuel control system



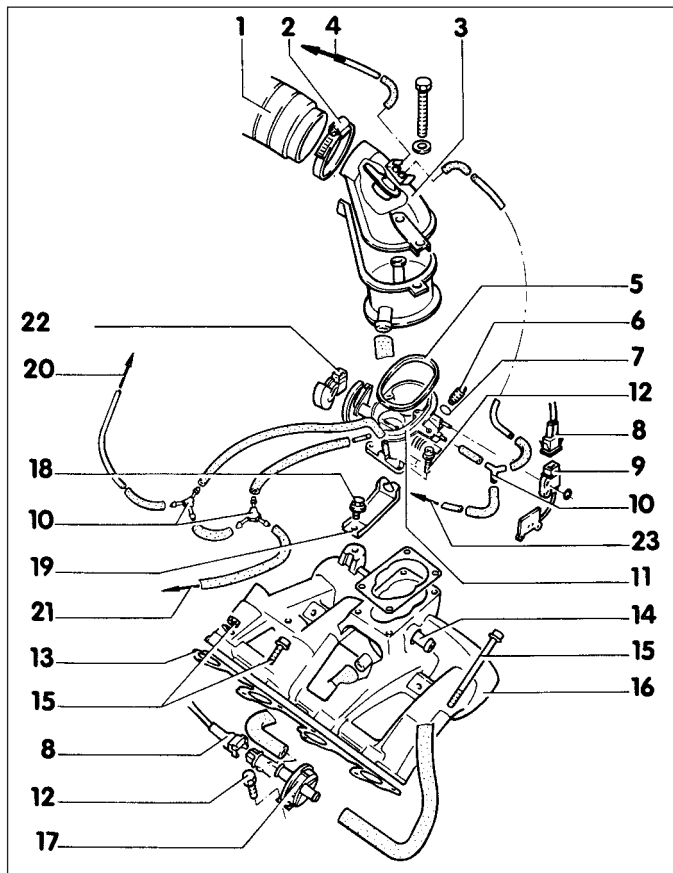
1 The function of this system is to aid evaporative fuel control by collecting and

recirculating the fuel vapours in the fuel tank to prevent them from escaping to the atmosphere (see illustration).

2 When the engine is stopped or idling, fuel vapour is collected by the charcoal canister where it is stored until the engine is started and run above idle speed. The vapour is then transferred from the canister, through a cut-off valve, into the air filter and inlet manifold to be burnt off during the normal combustion process.

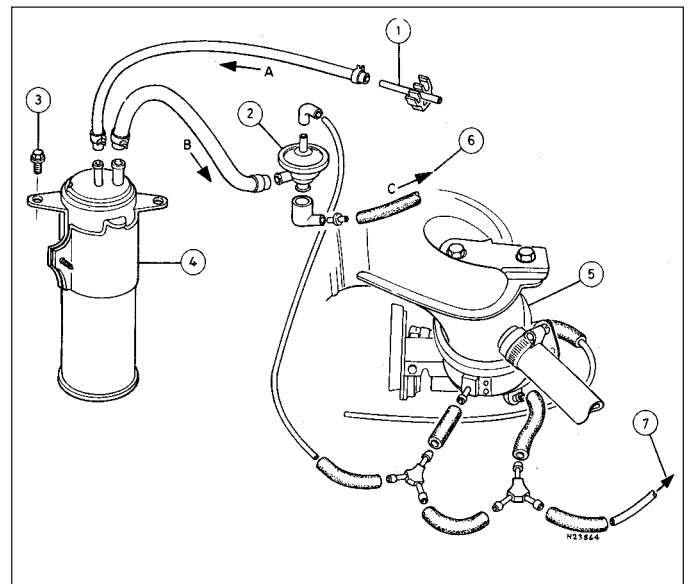
3 The charcoal canister is secured to the

base of the air cleaner unit and access to it for inspection or renewal is possible after first removing the air cleaner.



9.1b Air intake manifold and associated components

- |                              |  |
|------------------------------|--|
| 1 Intake hose                | 14 Brake servo vacuum connection         |
| 2 Clip                       | 15 Bolt                                  |
| 3 Elbow                      | 16 Intake manifold                       |
| 4 Hose to regulating flap    | 17 Auxiliary air valve                   |
| 5 Gasket                     | 18 Bolt                                  |
| 6 Idle speed adjusting screw | 19 Bracket                               |
| 7 O-ring                     | 20 Vacuum hose (to ignition distributor) |
| 8 Connector                  | 21 Vacuum hose (to non-return valve)     |
| 9 Throttle valve switch      | 22 Fast idle cam                         |
| 10 Angled connector          | 23 Fuel pressure regulator hose          |
| 11 Throttle valve housing    |  |
| 12 Screw                     |  |
| 13 Gasket                    |  |



10.1 Activated charcoal filter system components

- |  |   |
|--|---|
| A Fuel tank vapour route when engine is idling or stopped      | 3 Fixing screw                              |
| B/C Fuel tank vapour route when engine is run above idle speed | 4 Activated charcoal canister               |
| 1 Pipe (to fuel tank gravity valve in filler line)             | 5 Throttle valve housing                    |
| 2 Cut-off valve  | 6 Hose (auxiliary air valve/inlet manifold) |
|  | 7 Hose (to ignition distributor)            |

