

# Chapter 4 Part D: Fuel and exhaust systems - Mono Jetronic fuel injection

The following information is a revision of, or supplementary to, that contained in Part B of this Chapter

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4D

## 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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## Specifications

### Injection system

Type	Mono Jetronic, central injection system
Application	1.8 litre (code RP) engine
System pressure	0.8 to 1.2 bar
Idle speed	750 to 950 rpm (not adjustable)
CO content %	0.2 to 1.2
Holding pressure (system off for 5 minutes)	0.5 bar
Injector resistance	1.2 to 1.6 ohm

### Torque wrench settings

	Nm	lbf ft
Air inlet manifold	10	7
Injector holder	5	3.7
Throttle valve positioner	6	4.4
Inlet manifold-to-injector unit flange	13	9
Inlet manifold	25	18
Inlet manifold pre-heater	10	7

## 1 General information and precautions

### General information

The Mono-Jetronic central fuel injection system is fitted to the 1.8 litre (code RP) engine. It is a simplified method of fuel injection (see illustrations).

Fuel is injected into the inlet manifold by a single solenoid valve (fuel injector) mounted centrally in the top of the injector unit housing. The length of time for which the injector remains open determines the quantity of fuel reaching the cylinders for combustion. The electrical signals which determine the fuel

injector opening duration are calculated by the Electronic Control Unit (ECU) from information supplied by its network of sensors. Fuel pressure is regulated mechanically.

The signals fed to the ECU include the following:

- a) The engine coolant temperature
- b) The engine speed and crankshaft position - from the distributor
- c) The position of the throttle valve plate - from the throttle position sensor
- d) The oxygen content in the exhaust gases - via a sensor (Lambda probe) in the exhaust manifold

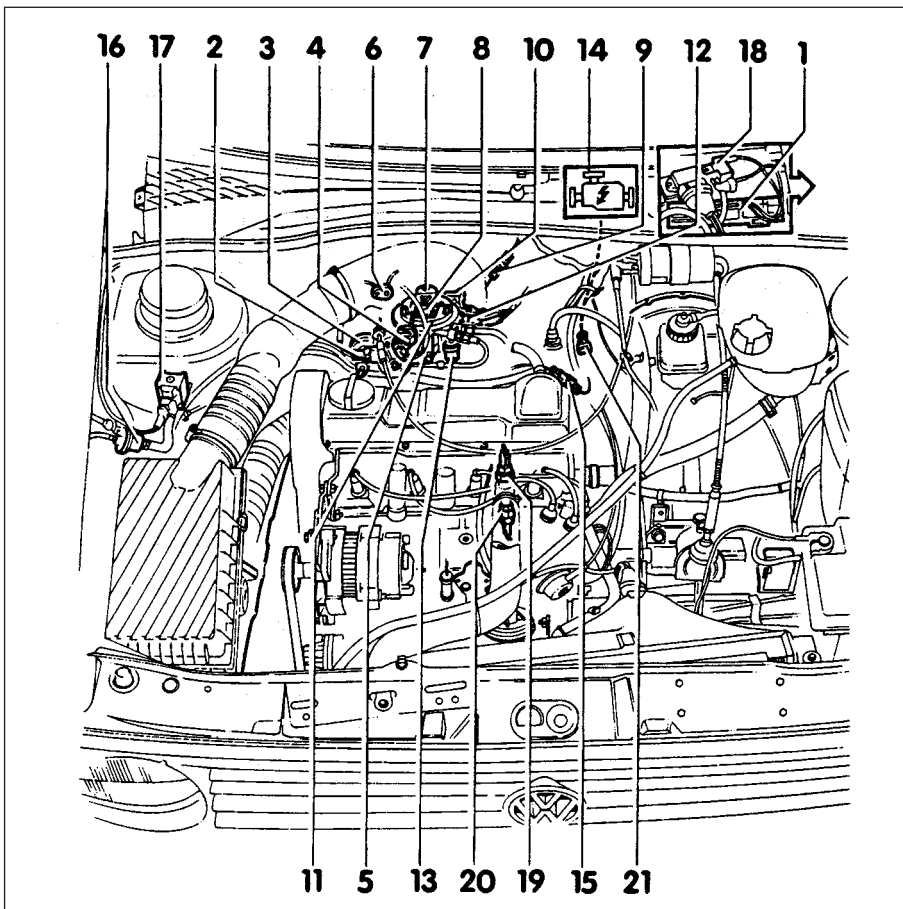
Using the information gathered from the various sensors, the ECU sends out signals to control the system actuators as required.

The ECU also has a diagnostic function which can be used in conjunction with special VW test equipment for fault diagnosis. With the exception of basic checks to ensure that all relevant wiring and hoses are in good condition and securely connected, fault diagnosis should be entrusted to a VW dealer.

Basic testing can be carried out on the system components covered in the following text. More detailed testing can be carried out by using specialised equipment but this must be entrusted to a VW dealer.

### Precautions

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



1.0a Mono-Jetronic system component location

- |  |   |
|--|---|
| 1 Electronic Control unit (ECU)                          | 11 Injector                                       |
| 2 Connector (throttle valve positioner and idle switch)  | 12 Throttle valve potentiometer                   |
| 3 Throttle damper  | 13 Water separator (throttle valve potentiometer) |
| 4 Connector (injector and air intake temperature sender) | 14 Self diagnosis fault warning lamp              |
| 5 Throttle valve positioner and idle switch              | 15 Lambda probe connector                         |
| 6 Intake air pre-heater temperature regulator            | 16 Activated charcoal filter solenoid valve       |
| 7 Injector and air temperature sender                    | 17 Activated charcoal filter solenoid valve       |
| 8 Fuel pressure regulator                                | 18 Injector series resistor                       |
| 9 Inlet manifold pre-heater                              | 19 Thermoswitch for manifold pre-heater           |
| 10 Injection timing vacuum control valve                 | 20 Coolant temperature sender                     |
|  | 21 Self diagnosis plug                            |

## 2 Air cleaner element - renewal

Refer to Chapter 1, Section 32

## 3 Air inlet duct and manifold - removal and refitting

1 Undo the retaining clips and release the duct from the manifold and air cleaner.

2 To remove the manifold from the top of the injector unit housing, detach the hoses from the temperature sensor unit on the manifold whilst noting their fitted positions.

3 Undo the retaining bolt and lift the manifold, together with its gasket, from the top face of the injector unit.

4 Refit in the reverse order of removal.

## 4 Air inlet pre-heater - testing

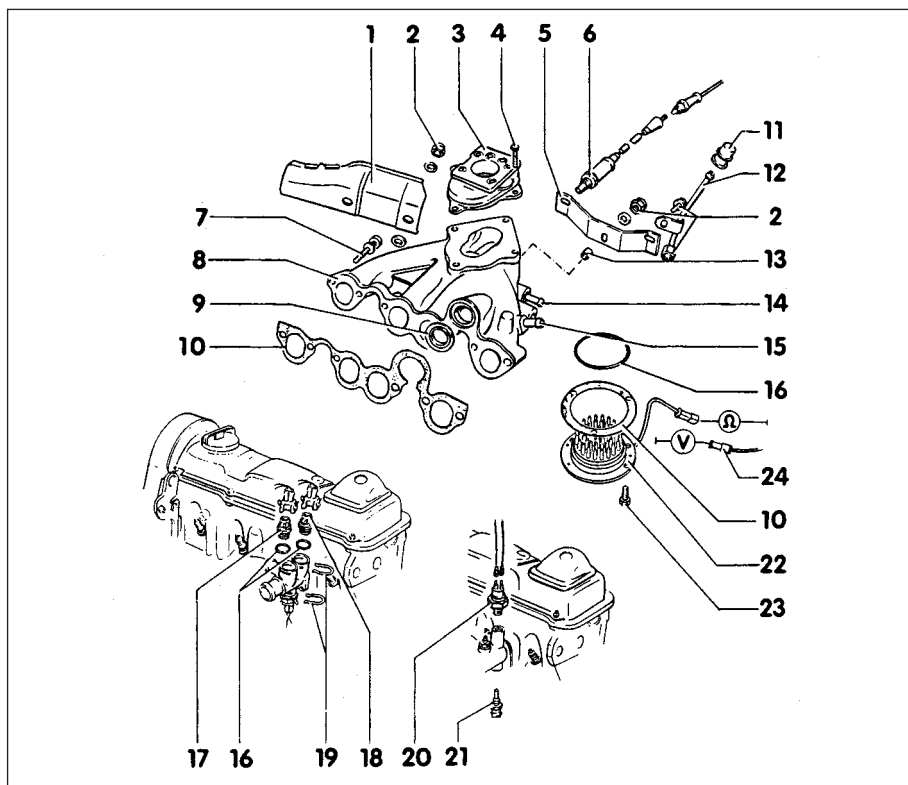
1 With the engine cold, detach and remove the upper section of the air cleaner followed by the filter element.

2 Check the air flap valve in the base of the lower section of the air cleaner for freedom of movement. Ensure that when closed, it shuts off the warm air passage.

3 Whilst running the engine at idle speed, check that the flap closes off the cold air passage.

4 To check that the temperature regulator is operating correctly, disconnect the two hoses from it (see illustration), connect them together and then note if the warm air passage remains closed off. If this is the case, the vacuum unit is defective. Where the flap valve closes off the cold air passage, the temperature regulator is at fault and in need of replacement.

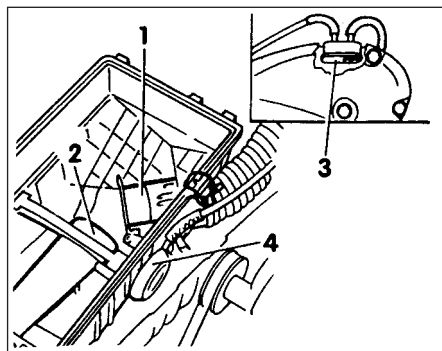
5 The position of the flap valve when the engine is running is dependent on the temperature of the regulator. When the temperature is below 35°C, the temperature regulator should be open and the cold air



1.0b Mono-Jetronic system inlet manifold and associated components

- |                      |   |  |
|----------------------|---|--|
| 1 Warm air deflector | 10 Gasket   | 18 Coolant temperature sender (blue)                       |
| 2 Nut                | 11 Cap  | 19 Retainer spring   |
| 3 Flange             | 12 CO measuring pipe                                      | 20 Thermostat (red) for manifold pre-heater - up to 7/1988 |
| 4 Bolt               | 13 Spacer   | 21 Coolant sender unit                                     |
| 5 Bracket            | 14 Coolant hose connection                                | 22 Inlet manifold pre-heater                               |
| 6 Lambda probe       | 15 Vacuum connection                                      | 23 Screw   |
| 7 Bolt               | 16 O-ring   | 24 Connector   |
| 8 Inlet manifold     | 17 Thermostat (red) for manifold pre-heater - from 8/1988 |  |
| 9 O-ring             |   |  |

passage closed off. At temperatures above 45°C, the regulator should be closed and the warm air passage sealed off.

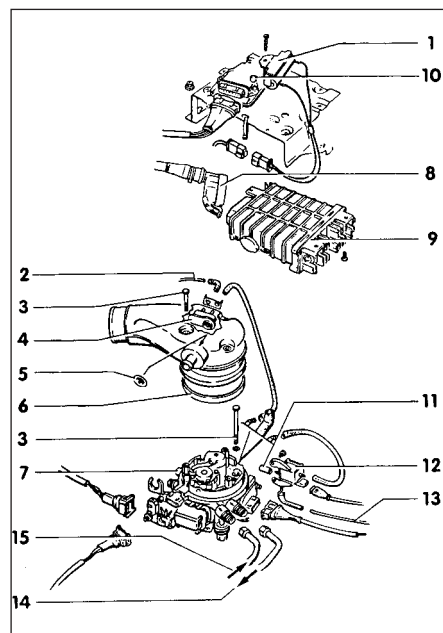


4.4 Air intake components in air cleaner housing

- 1 Warm air nozzle
- 2 Cold air nozzle
- 3 Temperature regulator
- 4 Vacuum unit

### 5 Idle speed and mixture (CO content) - testing

- 1 The prerequisites for this test are that the ignition timing must be correct and the engine must be at its normal operating temperature. During the test, all electrical circuits including the engine cooling fan and, where applicable, the air conditioning, must be switched off.
- 2 The ignition must be switched off before the test meter is attached to check engine speed. An exhaust gas analyser must be used to check the CO content from the exhaust.
- 3 The idle speed and mixture are not adjustable on this system and if they are not as specified, all that can be done is to inspect the various fuel system and associated vacuum electrical connections to ensure that they are in good condition and securely connected. If found to be in good condition, it will be necessary to have the system checked out by a VW dealer using specialised testing equipment to identify and rectify the fault.



6.1 Injector, ECU and associated components

- |                         |                                 |
|-------------------------|---------------------------------|
| 1 Series resistor       | 9 Electronic Control Unit (ECU) |
| 2 Vacuum hose           | 10 Spacer                       |
| 3 Fixing screw          | 11 Flap vent                    |
| 4 Temperature regulator | 12 Idle switch control valve    |
| 5 Poppet valve          | 13 Vacuum pipe                  |
| 6 O-ring                | 14 Fuel return pipe             |
| 7 Injector unit         | 15 Fuel feed pipe               |
| 8 Connector             |                                 |

### 6 Idle switch control valve - testing

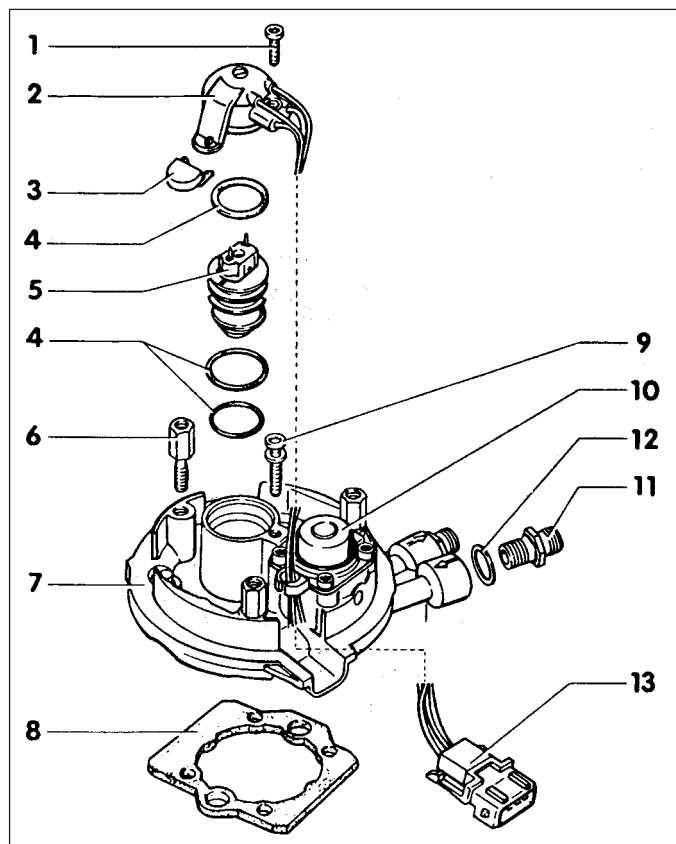
This device is attached to the throttle position sensor (see illustration) and its function is to control the ignition timing vacuum advance. If defective, it can cause problems with the idle speed and/or the overrun cut-off.

A simple test can be made by switching on the ignition, then opening and closing the throttle valve. Listen to hear if the control valve clicks twice. If this is proved to be in order, start the engine, allow it to idle and then momentarily detach the wiring connector from the control valve and reconnect it. The idle speed should momentarily increase and then drop back to normal. If not, the control valve is faulty and should be renewed.

### 7 Fuel injector - testing, removal and refitting

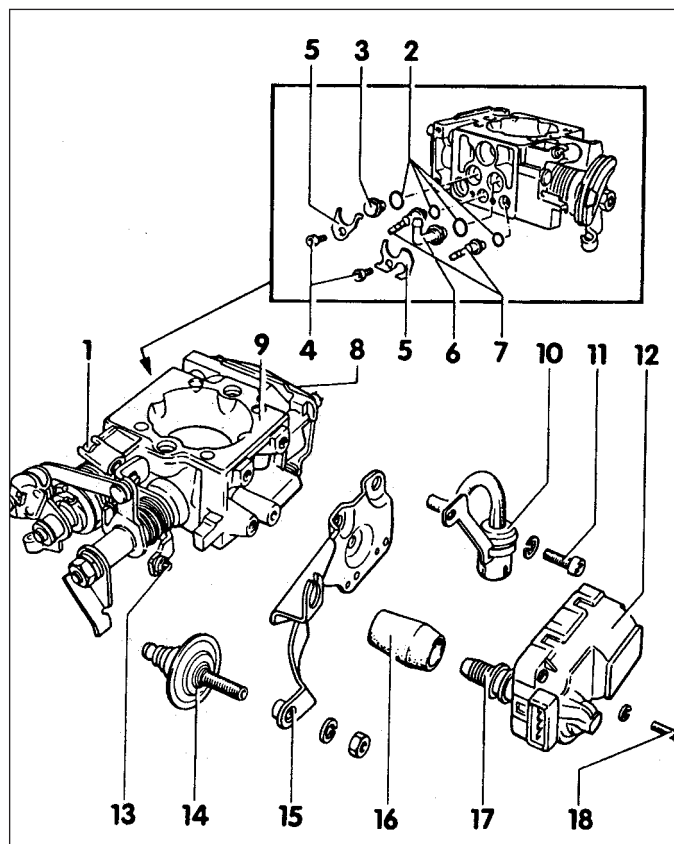
#### Testing

- 1 Run the engine up to its normal operating temperature, then detach and remove the air inlet duct from the top of the injector unit.



7.5 Injector unit and upper body components

- |                       |                       |
|-----------------------|-----------------------|
| 1 Screw               | 8 Gasket              |
| 2 Injector holder     | 9 Screw               |
| 3 Protector cap       | 10 Pressure regulator |
| 4 O-ring              | 11 Fuel pipe adapter  |
| 5 Injector            | 12 Seal ring          |
| 6 Stud                | 13 Connector          |
| 7 Injector upper body |                       |



8.3 Injector unit lower body and associated components

- |                                |  |
|--------------------------------|--|
| 1 Throttle valve stop screw    | 11 Screw                               |
| 2 O-ring                       | 12 Throttle valve positioner           |
| 3 Plug                         | 13 Throttle damper adjuster screw      |
| 4 Screw                        | 14 Throttle damper                     |
| 5 Retainer                     | 15 Bracket                             |
| 6 Connector                    | 16 Protector grommet (for idle switch) |
| 7 Connector                    | 17 Idle switch                         |
| 8 Throttle valve potentiometer | 18 Screw                               |
| 9 Injector lower body          |  |
| 10 Water separator             |  |

2 With the engine running at idle speed, look into the top of the injector unit and check the fuel spray pattern which should be visible on the throttle valve.

3 Increase the engine speed to 3000 rpm then snap shut the throttle and check that the fuel spray from the injector is momentarily interrupted. Turn the ignition off and then check that no more than two drops of fuel per minute leak from the injector. This indicates that the overrun cut-off is functioning in a satisfactory manner.

### Removal

4 Remove the inlet duct and manifold.  
5 Undo the retaining screw and lift clear the injector holder and O-ring seal from the top of the injector. Note its orientation, then grip and pull the injector from its location in the housing. Remove the O-ring seals (see illustration).

### Refitting

6 Refit in the reverse order of removal. The O-ring seals must be renewed and lightly lubricated prior to fitting.

### 8 Injector unit housing - removal and refitting



### Removal

1 Remove the air inlet duct and manifold.  
2 Detach the fuel feed and return lines from their connections on the side of the injector unit. Allow for fuel spillage as they are detached and plug the hoses to prevent further leakage and the ingress of dirt.  
3 Disconnect the wiring plugs from their connections on the injector unit (see illustration).

4 Disconnect the accelerator cable from the throttle lever at the injector unit.

5 Undo the retaining screws and withdraw the injector unit housing from the inlet manifold. Remove the gasket and if damaged or in doubtful condition, renew it when refitting the injector unit.

### Refitting

6 Refit in the reverse order of removal. Ensure that the mating faces of the housing and fuel lines are clean before reconnecting.

### 9 Throttle damper - adjustment



When the throttle valve is in the closed position, the throttle damper plunger should be pressed into the damper a minimum

distance of 4.0 mm by the operating lever (see illustration).

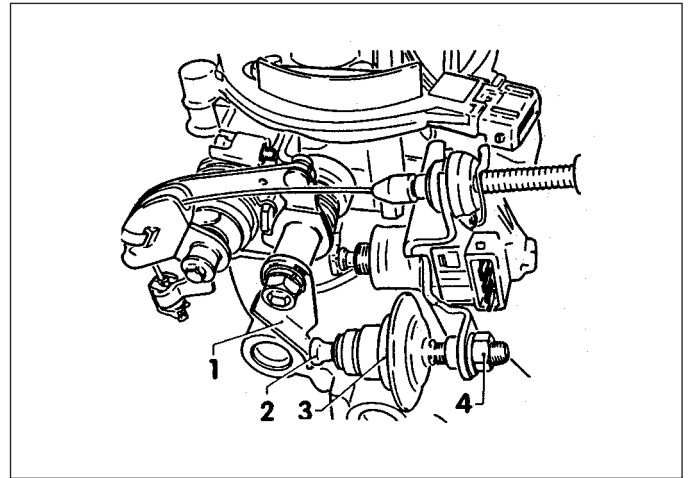
If adjustment is required, loosen off the adjuster locknut then rotate the damper screw to the point where the lever is just in contact with the plunger. Now turn the damper four and a half turns towards the lever, then retighten the locknut.

### 10 Fuel pump - testing, removal and refitting



From mid 1989, certain models fitted with the Mono Jetronic system were fitted with a single fuel pump in the fuel tank rather than the previous arrangement of one in the tank and a secondary pump outside the tank. The pump can be tested in the same manner as that for the "in-tank" dual pump referred to in Part F of this Chapter, Section 12.

The fuel pump can be removed in a similar manner to that described for the fuel gauge sender unit in Part A of this Chapter, Section 8.



9.1 Throttle damper assembly

- |                  |           |
|------------------|-----------|
| 1 Throttle lever | 3 Damper  |
| 2 Plunger        | 4 Locknut |

