

Chapter 4 Part A:

Fuel and exhaust systems - carburettor models

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Degrees of difficulty

Easy , suitable for novice with little experience 	Fairly easy , suitable for beginner with some experience 	Fairly difficult , suitable for competent DIY mechanic 	Difficult , suitable for experienced DIY mechanic 	Very difficult , suitable for expert DIY or professional 
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Specifications

Air cleaner

Type	Automatic air temperature control
Element type	Renewable paper
Element application:	
1.05 litre	Champion W101
1.3 litre	Champion W102
1.6 litre	Champion U508
1.8 litre	Champion U508

Fuel pump

Type:	
1.05 and 1.3 litre	Mechanical, diaphragm, operated by plunger from camshaft
1.6 and 1.8 litre	Mechanical, diaphragm, operated by eccentric on intermediate shaft

Fuel filter

Type	Champion L104
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Carburettor - 1.05 litre

Pierburg/Solex 31 PIC-7

Type	Downdraught with manual or automatic choke
Venturi	23 mm
Main jet	X117.5
Air correction jet with emulsion tube	115 Z
Idling fuel jet	45
Idling air jet	135
Auxiliary fuel jet	32.5
Auxiliary air jet	130
Enrichment (primary/secondary)	70/70
Injection capacity (cc/stroke)	1.00 ± 0.15
Float needle valve	1.5
Float needle valve washer thickness	2.0 mm
Fast idle speed	2600 ± 100 rpm
Choke valve gap	1.8 ± 0.2 mm
Throttle valve gap smooth running detent	2.5 ± 0.3 mm
Idle speed	950 ± 50 rpm
CO content %	1.0 ± 0.5

4A•2 Fuel and exhaust systems - carburettor models

Carburettor - 1.05 litre (continued)

Pierburg/Solex 1B3

Venturi	23 mm
Main jet	105
Air correction jet	57.5
Idling fuel/air jet	50/130
Pump injection tube	32.5/150
Needle valve	1.5
Accelerator pump capacity (cc/stroke)	1.0 ± 0.15
Choke valve gap	1.8 ± 0.2 mm
Fast idle speed	2000 ± 100 rpm
Idle speed	800 ± 50 rpm
CO content %	2.0 ± 0.5

Weber 32 TLA

Venturi	22 mm
Main jet:	
Code 030 129 016	105
Code 030 129 016 D	102
Air correction jet:	
Code 030 129 016	80
Code 030 129 016 D	100
Emulsion tube	F96
Idling fuel jet	47
Idling air jet:	
Code 030 129 016	110
Code 030 129 016D	145
Auxiliary fuel jet (code 030 129 016D)	30
Auxiliary air jet (code 030 129 016D)	170
Pump injection tube	0.35/0.35
Needle valve	1.75
Needle valve washer thickness	0.75 mm
Accelerator pump capacity (cc/stroke)	1.05 ± 0.15
Choke valve gap (pull-down):	
Without vacuum	2.5 ± 0.2 mm
With 300 mbar vacuum	2.0 ± 0.2 mm
Choke valve gap (wide open kick):	
Code 030 129 016	2.0 ± 0.5 mm
Code 030 129 01 6D	2.5 ± 0.5 mm
Float level	28.0 ± 1.0 mm
Fast idle speed	2000 ± 100 rpm
Idle speed	800 ± 50 rpm
CO content %	2.0 ± 0.5

Carburettor - 1.3 litre

Pierburg/Solex 2E3

Type	Twin progressive choke, downdraught with automatic choke	
	Stage I	Stage II
Venturi	19	23
Main jet	X95	X110
Air correction jet with emulsion tube	120	130
Idling fuel/air jet	45/130	-
Full throttle enrichment	-	95
Pump injection tube diameter	0.35 mm	-
Choke cover code	276	
Injection capacity (cc/stroke)	1.0 ± 0.15	
Locking lever clearance	0.4 ± 0.15 mm	
Full throttle enrichment - height above atomiser	12.0 mm	
Choke valve gap	2.0 ± 0.1 mm	
Fast idle speed	2000 ± 100 rpm	
Idle speed	800 ± 50 rpm	
CO content %	2.0 ± 0.5	

Carburettor-1.6 litre
Pierburg/Solex 2E2 - engine code EZ

Type	Twin progressive choke, downdraught with automatic choke	
	Stage I	Stage II
Venturi diameter	22.0 mm	26.0 mm
Main jet	X110	X127
Air correction jet with emulsion tube	0.75/1.05 mm	1.05 mm
Idle fuel/air jet	42.5	-
Full throttle enrichment	-	0.7
Pump injection tube	0.5	-
Injection capacity (cc/stroke)	1.0 ± 0.15	
Choke valve gap with primary throttle open 45°	6.3 ± 0.3 mm	
Fast idle speed	3000 ± 200 rpm	
Idle speed	950 ± 50 rpm	
Increased idle speed:		
Automatic transmission	800 rpm	
Air conditioner	950 ± 50 rpm	
CO content %	1.0 ± 0.5	

Pierburg/Solex 2E2 - engine code RF

	Stage I	Stage II
Venturi	22.0 mm	26.0 mm
Main jet	102.5	127.5
Air correction jet with emulsion tube	80	105
Idle fuel/air jet	42.5	-
Fuel throttle enrichment	-	0.7
Accelerator pump injection tube	0.5	-
Choke valve gap:		
Manual gearbox	2.5 ± 0.15 mm	5.0 ± 0.15 mm
Automatic transmission	1.9 ± 0.15 mm	5.3 ± 0.15 mm
Accelerator pump capacity (cc/stroke)	1.0 ± 0.15	
Fast idle speed	3000 ± 200 rpm	
Idle speed	750 ± 50 rpm	
CO content %	1.0 to 1.5	

Carburettor - 1.8 litre
Pierburg/Solex 2E2

Type	Twin progressive choke, downdraught with automatic choke	
	Stage I	Stage II
Venturi diameter	22.0 mm	26.0 mm
Main jet	X105	X120
Air correction jet with emulsion tube	105 mm	100 mm
Idle fuel/air jet	42.5	-
Full throttle enrichment	-	0.9
Pump injection tube:		
Carburettor part number type 027 129 015	0.35	-
Carburettor part number type 027 129 015 Q	0.5	-
Injection capacity (cc/stroke)	1.1 ± 0.15	
Choke valve gap (measured at lower edge)	2.3 ± 0.15 mm	4.7 ± 0.15 mm
Fast idle speed	3000 ± 200 rpm	
Idle speed	950 ± 50 rpm	
Increased idle speed:		
Automatic transmission	800 rpm	
Air conditioner	950 ± 50 rpm	
CO content %	1.0 ± 0.5	

Torque wrench settings

	Nm	lbf ft
1.05 and 1.3 litre		
Carburettor	10	7
Intermediate flange	10	7
Inlet manifold	25	18
Inlet manifold preheater	10	7
Fuel tank strap bolts	25	18
Exhaust manifold	25	18
Exhaust manifold to downpipe	25	18
Exhaust pipe clamp bolts	25	18

Torque wrench settings (continued)

	Nm	lbf ft
1.6 and 1.8 litre		
Carburettor	7	5
Fuel pump	20	15
Inlet manifold	25	18
Inlet manifold preheater	10	7
Fuel tank strap bolts	25	18
Exhaust manifold	25	18
Exhaust pipe clip:		
8 mm	25	18
10 mm	40	30

1 General information and precautions

General information

The fuel system comprises a rear-mounted fuel tank, a mechanical diaphragm fuel pump and a downdraught carburettor.

The pump on 1.05 and 1.3 litre models is operated by means of a plunger activated by the camshaft, whilst on 1.6 and 1.8 litre models, it is operated directly by an eccentric on the intermediate shaft.

The air cleaner unit contains a renewable paper element and incorporates an automatic temperature control.

A conventional exhaust system is used on all models, being fitted in sections for ease of replacement.

Precautions

Fuel warning



Many of the procedures in this Chapter require the removal of fuel lines and connections which may result in some fuel spillage.

Before carrying out any operation on the fuel system refer to the precautions given in Safety first! at the beginning of this Manual and follow them implicitly. Petrol is a highly dangerous and volatile liquid and the precautions necessary when handling it cannot be overstressed.

Tamperproof adjustment screws

Certain adjustment points in the fuel system are protected by "tamperproof" caps, plugs or seals. The purpose of such tamperproofing is

to discourage, and to detect, adjustment by unqualified operators.

In some EEC countries (though not in the UK), it is an offence to drive a vehicle with missing or broken tamperproof seals. Before disturbing a seal, satisfy yourself that you will not be breaking any anti-pollution regulations by doing so. Fit a new seal when adjustment is complete, if this is required by law.

Do not break tamperproof seals on a vehicle which is still under warranty.

Unleaded petrol - usage

For full information on the use of unleaded petrol, consult your VW dealer who will be able to inform you if your vehicle is capable of running on unleaded fuel and, where possible, of the necessary adjustments required. The use of unleaded fuel in a vehicle not designed, or suitably adjusted, to run on unleaded fuel will lead to serious damage of the valve seats.

3 Note the location of all hoses and tubes then disconnect them. Withdraw the air cleaner body from the carburettor and remove the sealing ring (see illustrations).

4 Refit in the reverse order of removal, ensuring that all hose connections are securely made.

1.6 and 1.8 litre engines

5 Remove the element.

6 Unclip and detach the air hose at the side of the cleaner body (see illustration).

7 Undo the retaining nut at the top and lift the cleaner unit clear, disconnecting the remaining hoses.

8 Refit in the reverse order of removal. Fit a new sealing washer if the old one has perished or distorted.

4 Automatic air cleaner temperature control - testing



2 Air cleaner element - renewal



Refer to Chapter 1, Section 32

3 Air cleaner unit - removal and refitting



1.05 and 1.3 litre engines

1 Remove the element.

2 Unscrew the nut(s) securing the air cleaner body and remove the adapter or retaining ring (see illustration).

1 Unclip and remove the vacuum unit and inlet pipe but leave the vacuum pipe connected (see illustration).

2 Suspend a thermometer in the flow of air through the inlet duct then start the engine. Between -20°C and +20°C, the control flap in the unit should be a maximum of 2/3rds open to admit hot air from the exhaust manifold. Above 20°C, the control flap must close the hot air supply (see illustration).

3 The control flap movement can be checked by sucking on the vacuum inlet.

4 With the engine running and inlet air temperature above 20°C, disconnect the vacuum hose from the vacuum unit. The control flap should fully open within a maximum of 20 seconds.



3.2 Removing air cleaner body retaining ring - 1.3 litre



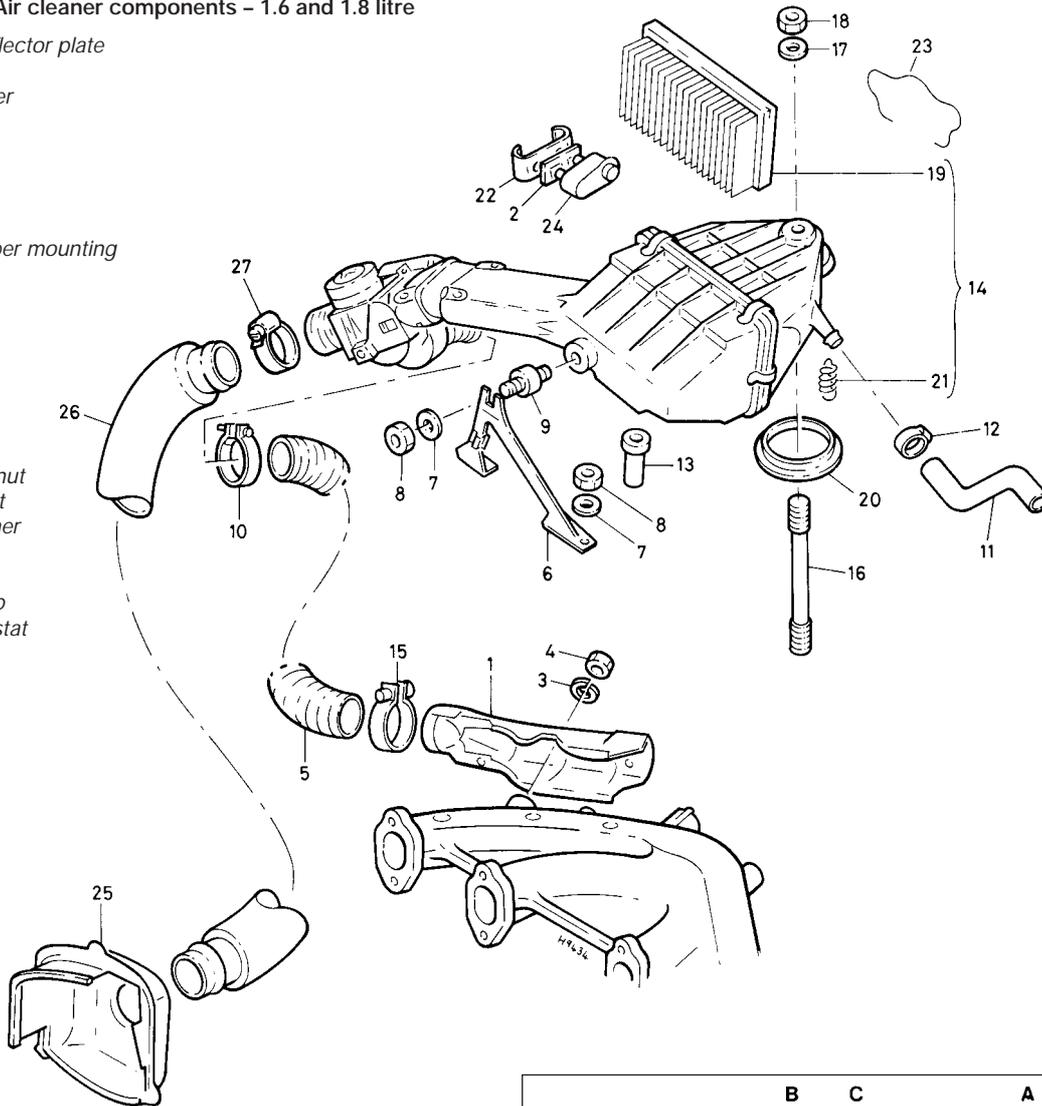
3.3a Disconnecting temperature sensor hose ...



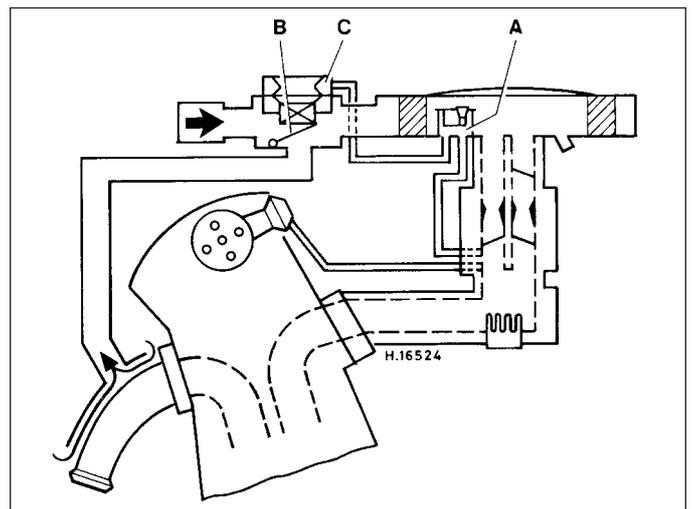
3.3b ... and crankcase emission hose - 1.3 litre

3.6 Air cleaner components - 1.6 and 1.8 litre

- 1 Warm air deflector plate
- 2 Gasket
- 3 Spring washer
- 4 Nut
- 5 Air hose
- 6 Bracket
- 7 Washer
- 8 Nut
- 9 Bonded rubber mounting
- 10 Clip
- 11 Air Hose
- 12 Clip
- 13 Spacer tube
- 14 Air cleaner
- 15 Clip
- 16 Stud
- 17 Washer
- 18 Self-locking nut
- 19 Filter element
- 20 Sealing washer
- 21 Spring
- 22 Lockplate
- 23 Retaining clip
- 24 Dual thermostat
- 25 Union
- 26 Air hose
- 27 Clip



4.1 Air cleaner vacuum unit



4.2 Air cleaner load and temperature control diagram - 1.05 and 1.3 litre

- A Temperature regulator
- B Intake pipe with thermostat
- C Vacuum unit



4.5 Upper view of air temperature sensor - 1.3 litre

- 5 If the control unit does not operate correctly then renew it, together with the temperature sensor (see illustration).
- 6 Refit the vacuum unit and inlet pipe.

5 Fuel pump - testing, removal and refitting



Testing

1 Pump location is dependent on engine type and is as follows:

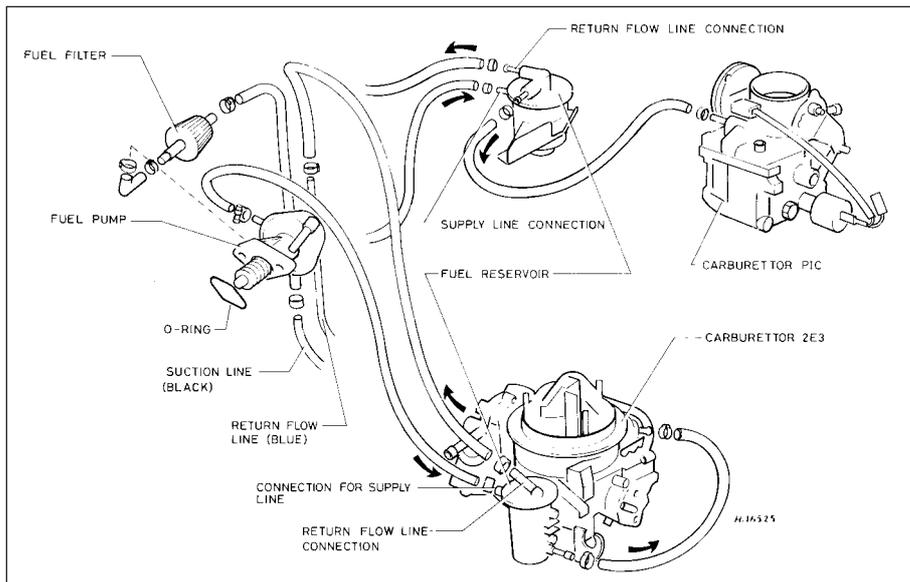
- a) 1.05 and 1.3 litre engines - The pump is located on the right-hand side of the engine, forward of the carburettor (see illustration). Mounted on the cylinder head, it is driven indirectly from the camshaft.
- b) 1.6 and 1.8 litre engines - The pump is located on the side of the cylinder block, next to the oil filter mounting bracket. It is driven direct from the intermediate shaft.

2 If the pump is suspected of malfunctioning, disconnect the supply pipe from the carburettor (air cleaner removed) and the LT lead from the coil positive terminal. Ensure that there is fuel in the tank. Turn the engine on the starter while holding a wad of rag near the fuel pipe. If the pump is operating correctly, well defined spurts of fuel should be ejected from the pipe.

3 If the pump is malfunctioning then it must be renewed, as it is not possible to service or repair it. However, prior to removal of the pump, check the in-line filter for blockage.



5.1 Fuel pump location - 1.3 litre



5.4a Fuel line attachments - 1.05 and 1.3 litre

Removal

4 To remove the fuel pump, first identify the hoses for position then disconnect them from the pump (see illustrations).

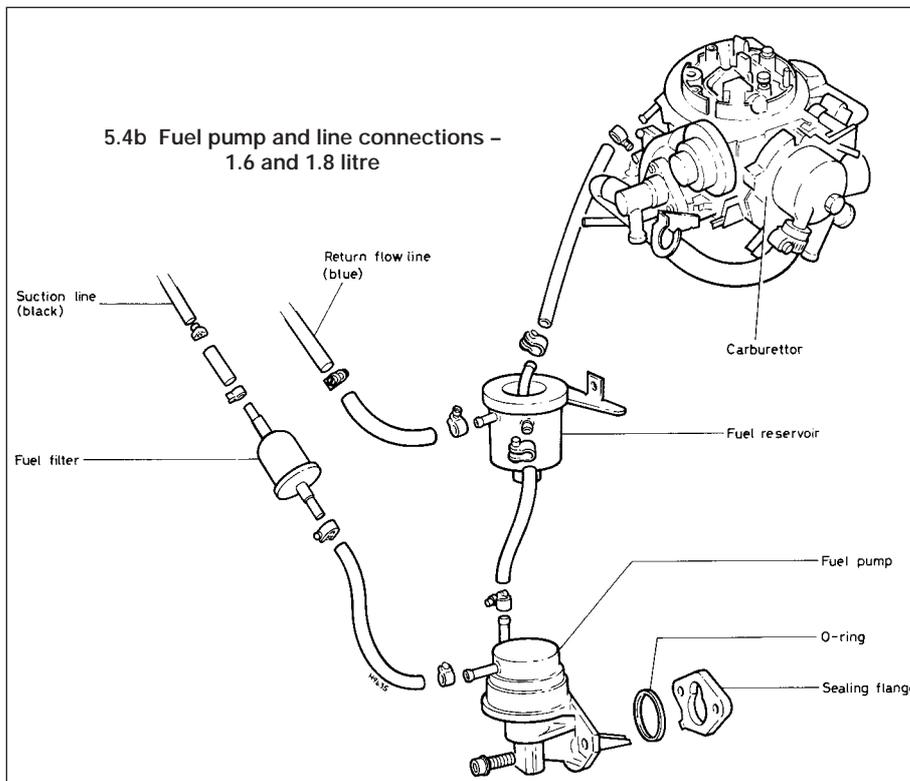
5 Using a suitable splined or Allen key, unscrew the pump retaining bolts and withdraw the unit from the cylinder head or cylinder block (as applicable). Remove the sealing ring and, if applicable, note the earth lead location.

6 Clean the mating faces of the pump and cylinder head or cylinder block/seal flange.

Refitting

7 Refitting is a reversal of the removal procedure. Renew the seal ring and, where crimped type hose clips were used, change them to screw type clips.

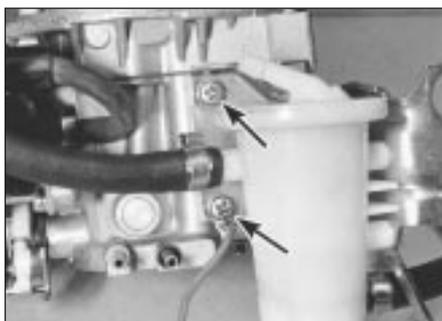
8 On completion, check all hose connections with the engine running and look for any sign of fuel leakage.



5.4b Fuel pump and line connections - 1.6 and 1.8 litre



6.1 Fuel reservoir location - 1.3 litre



6.3 Fuel reservoir retaining screws (arrowed)

Note earth lead connection to lower screw

6 Fuel reservoir - removal and refitting



1 The fuel reservoir is located between the fuel pump and the carburettor (see illustration). The reservoir has three hose connections which are marked as follows:

- a) From the pump - arrow marked
- b) To the carburettor - not marked
- c) To the fuel return line - marked R

2 To remove the reservoir, disconnect the three hoses and plug them to prevent leakage.

3 Remove the support bracket retaining screws and lift away the reservoir. Note the earth lead connection (see illustration).

4 Refit in the reverse order to removal and then check for any signs of leakage on completion.

7 Fuel tank - removal and refitting



Warning: The fuel tank must always be removed in a well ventilated area and never over a pit

Removal

- 1 Disconnect the battery negative lead.
- 2 Siphon or pump all the fuel from the tank (there is no drain plug).

3 Lift the floor covering from the luggage compartment then remove the circular sender unit cover (see illustration).

4 Disconnect the wiring plug from the top of the sender unit, also the fuel feed (to pump) and return (from fuel reservoir) hoses.

5 Jack up the rear of the vehicle and support it on axle stands (see "Jacking and vehicle support"). Chock the front wheels, remove the right-hand side rear wheel.

6 Disconnect the breather hose from the filler neck (see illustration).

7 Disconnect the expansion tank-to-filler neck hose and breather pipe.

8 Disconnect the filler neck funnel which is secured by a large C-clip.

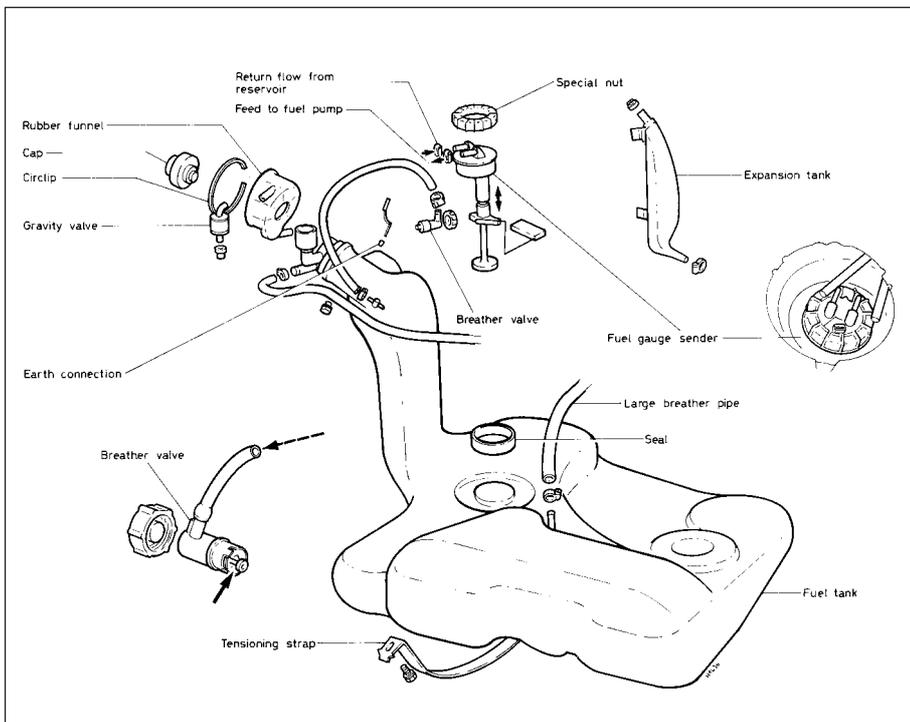
9 Support the fuel tank with a trolley jack and length of wood. Unscrew the retaining nuts and bolts, detach the straps (see illustration) and lower the tank to the ground. On GTi models, it will also be necessary to detach the side protector plate.

10 If the expansion reservoir is to be removed, undo the retaining bolt and lower it from the wheel arch.

11 If the tank is contaminated with sediment or water, remove the gauge sender unit and swirl the tank out with clean fuel. If the tank is damaged or leaks, it should be repaired professionally or renewed.

Refitting

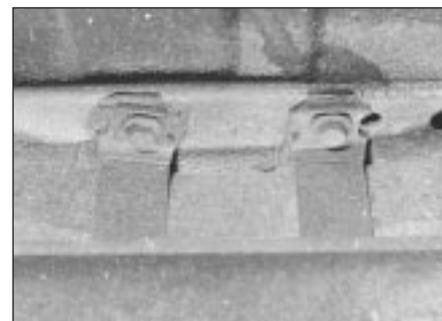
12 Refitting is a reversal of removal. Make sure that the rubber packing strips are fitted to the retaining straps. Refit the hoses free of any kinks.



7.3 Fuel tank and associated components



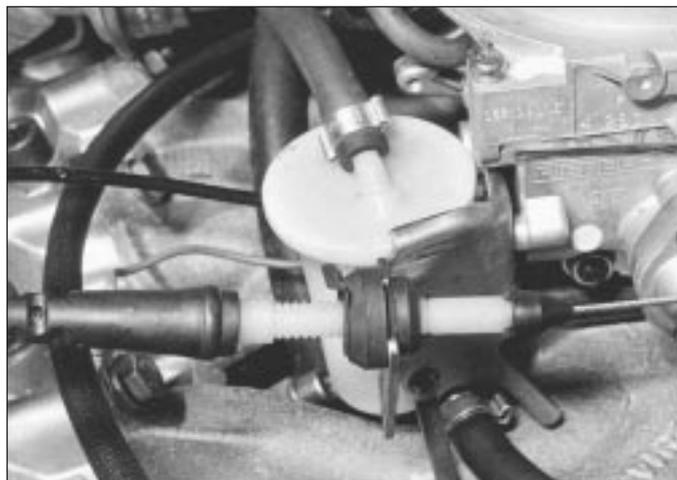
7.6 Fuel filler breather valve and hose



7.9 Fuel tank retaining strap-to-floor bolts



10.3 Accelerator cable to carburettor throttle control



10.4 Release cable grommet from support bracket

8 Fuel gauge sender unit - removal and refitting



Warning: The fuel gauge sender unit must always be removed in a well ventilated area.

Removal

- 1 Disconnect the battery negative lead.
- 2 Lift the luggage compartment floor covering and remove the circular sender unit cover.
- 3 Disconnect the wiring connector from the top of the unit then detach the fuel supply and return hoses.
- 4 Undo the retaining nut and lift out the unit, noting its orientation alignment marking. A suitable wrench may be necessary to loosen the securing nut.
- 5 Renew the sender unit seal.

Refitting

- 6 Refit in the reverse order to removal, noting the following:
 - a) Check that the unit is correctly aligned with the markings in register
 - b) Replace the crimped supply and return line clips with screw type clips
 - c) Check that the wiring connection is secure.

9 Fuel filler gravity valve - removal, testing and refitting



- 1 The gravity valve is located in the fuel filler neck and is accessible from within the right-hand rear wheel arch.
- 2 To remove the valve, pull it upwards from the fuel filler neck and unclip it.
- 3 When the valve is held vertically, it must be open. When the valve is angled at 45° then it must shut. Renew the valve if found to be defective.
- 4 Refit in the reverse order of removal.

10 Accelerator and throttle cables - removal, refitting and adjustment



Manual gearbox

Removal

- 1 Disconnect the battery earth lead.
- 2 Remove the air cleaner unit.
- 3 Prise free and release the inner cable securing clip(s) at the carburettor throttle control, noting their location (see illustration).
- 4 Release the cable grommet from the support bracket (see illustration).
- 5 Working inside the vehicle, remove the lower fascia panel then unclip the inner cable from the accelerator pedal (see illustration).
- 6 Withdraw the complete accelerator cable into the engine compartment, together with the rubber grommets.

Refitting

- 7 Refitting of the accelerator cable is a reversal of removal. Make sure that the cable is free of kinks. Adjust it as follows before refitting the air cleaner.

Adjustment

- 8 Before adjusting the cable, check that it is correctly aligned over its full length.

- 9 Have an assistant fully depress the accelerator pedal.

10 Check that the clearance between the throttle lever at the carburettor and the fully open stop is a maximum of 1.0 mm. Note that the throttle lever must not be hard against the fully open stop (ie. there must be a small clearance).

11 There are different cable adjustment arrangements which are as follows:

- a) Where locknuts are provided at the engine end of the outer cable, loosen them then adjust the cable position and tighten the locknuts
- b) Where a ferrule and circlip are provided, extract the circlip, adjust the cable position then refit the circlip so that it is abutting the ferrule guide
- c) On some models, it is necessary to adjust the inner cable by loosening the clamp screw, repositioning the lever while holding the cable taut then tightening the screw

- 12 After adjustment refit the air cleaner.

Automatic transmission

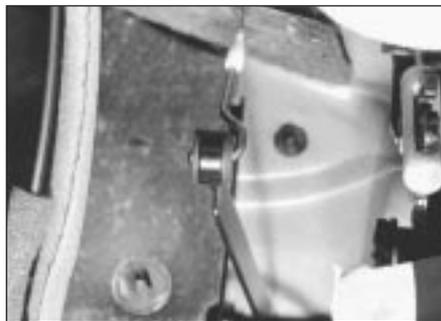
Removal

13 On automatic transmission models, the accelerator pedal activates the accelerator cable which is attached to the operating lever of the gearbox shift control. This simultaneously operates the throttle cable fitted between the shift mechanism and the carburettor (see illustration).

14 Before removing either cable, select P (Park).

15 To remove the accelerator pedal cable, first loosen the cable adjusting nut then detach the inner cable from the operating lever clevis and the outer cable from its location bracket. The cable can then be disconnected from the pedal and removed in the same manner as that for manual gearbox models.

16 To remove the throttle cable, loosen the adjuster and locknut at the carburettor support bracket, remove the inner cable



10.5 Accelerator cable-to-pedal attachment

retaining clip and then disconnect the cable from the carburettor.

17 At the transmission end, prise free the securing clip and detach the cable from the operating lever and the cable support bracket.

Refitting

18 Refitting of both cables is a reversal of the removal procedure.

Adjustment

19 This procedure is described in Chapter 7B.

11 Accelerator pedal - removal and refitting

Removal

- 1 Remove the lower fascia panel.
- 2 Disconnect the accelerator cable from the pedal
- 3 Prise out the clip and remove the pivot pin.
- 4 Remove the accelerator pedal. If necessary press out the pivot pin bushes.

Refitting

5 Refitting is a reversal of removal. Lubricate the bushes with a little grease and check cable adjustment.

12 Choke cable (1.05 litre engine) - removal, refitting and adjustment

Removal

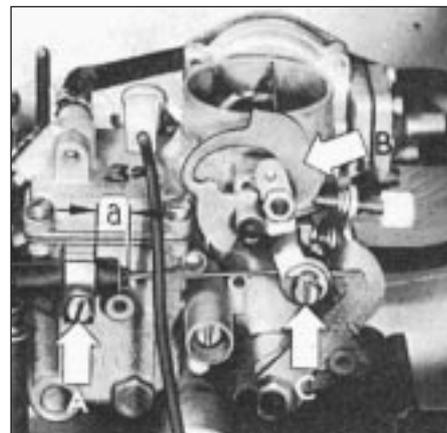
- 1 Disconnect the battery negative lead.
- 2 Remove the air cleaner.
- 3 Using a screwdriver, loosen the inner and outer cable clamps and disconnect the cable from the carburettor.
- 4 Working inside the vehicle, remove the lower fascia panel.
- 5 Pull out the clip and remove the choke knob.
- 6 Unscrew the ring and withdraw the cable from the fascia.
- 7 Disconnect the wiring and withdraw the complete cable from inside the vehicle.

Refitting

8 Refitting is a reversal of removal. Make sure that the cable is correctly aligned and that the grommets are firmly fitted in the bulkhead. Adjust it as follows before refitting the air cleaner.

Adjustment

9 Locate the outer cable in the clamp so that its end protrudes by approximately 12.0 mm. Tighten the clamp with the outer cable in this position (see illustration).



12.9 Choke cable adjustment setting - 1.05 litre

- A Outer cable projection
- B Cam and stop
- C Choke inner cable connection

10 Push the choke knob fully in then pull it out by 3.0 mm. Switch on the ignition and check that the warning lamp is not lit.

11 Insert the inner cable into the choke lever clamp and fully open the choke lever by hand. Tighten the inner cable clamp screw in this position.

12 Refit the air cleaner.

13 Carburettor - removal and refitting

Removal

- 1 Disconnect the battery earth lead.
- 2 Remove the air cleaner unit.
- 3 Disconnect the accelerator cable from the carburettor.
- 4 Disconnect the wiring from the following, as applicable:

- a) Fuel cut-off solenoid
- b) Bypass air cut-off valve
- c) Part throttle channel heater
- d) Automatic choke control unit
- e) Earth point

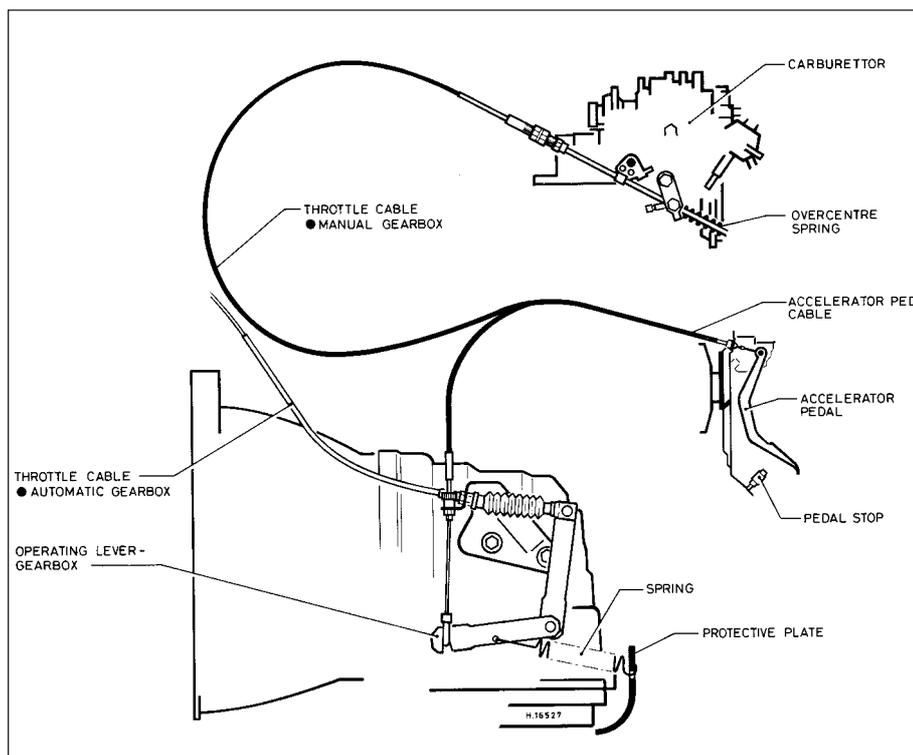
5 Drain off half the engine coolant then disconnect the coolant hoses from the automatic choke unit and the expansion element (where applicable) (see illustrations).

6 Disconnect the fuel supply and return hoses at the carburettor/fuel reservoir, as necessary, and plug or clamp the hoses to prevent fuel leakage. Note the connections in case of confusion when refitting.

7 Disconnect the vacuum hoses and note their connections.

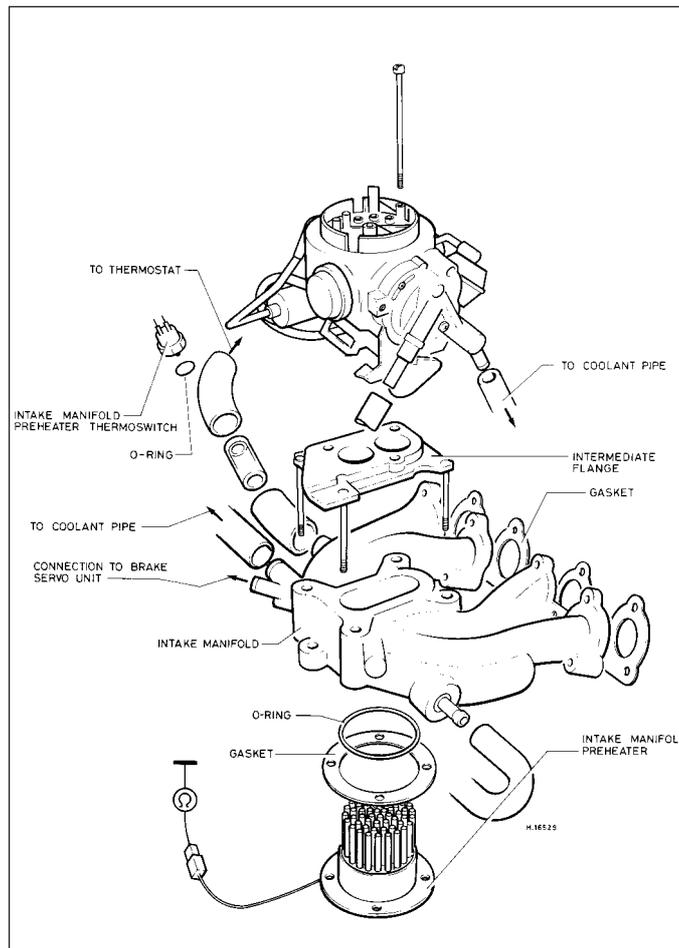
8 Unscrew the through-bolts or retaining nuts, as applicable, and carefully remove the carburettor from the inlet manifold (see illustration).

9 To remove the intermediate flange from the manifold, undo the four nuts on the manifold underside and lift the flange clear.

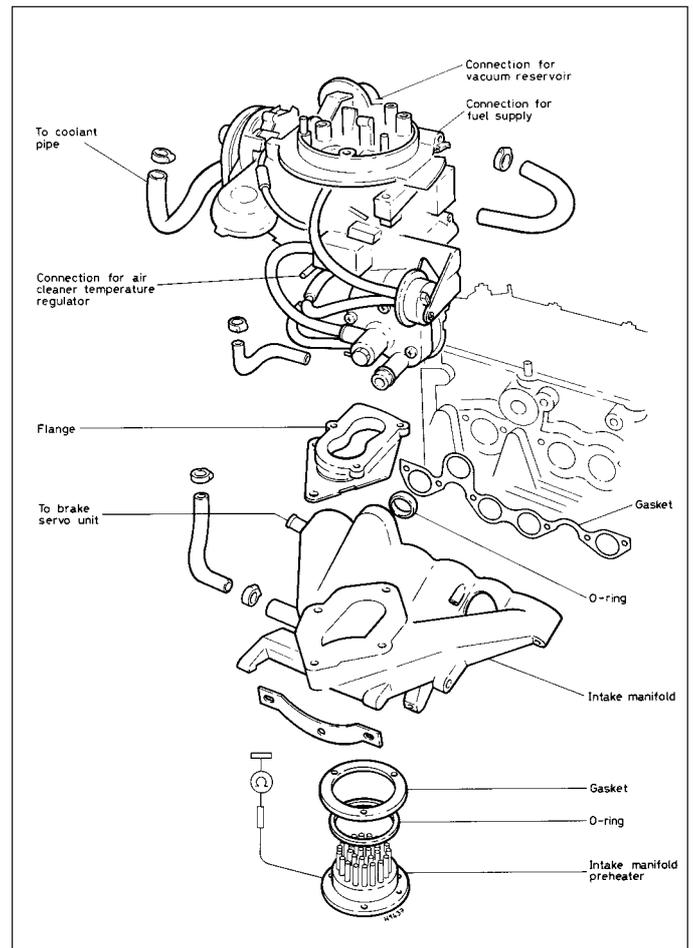


10.13 Accelerator/throttle cable connections - manual gearbox and automatic transmission variants with 2E2 carburettor

4A



13.5a Pierburg/Solex 2E3 carburettor, manifold and associated components



13.5b Pierburg/Solex 2E2 carburettor, manifold and associated components

Refitting

10 Refitting is a reversal of the removal procedure. Ensure that the inlet manifold, intermediate flange and carburettor mating faces are clean and use new gaskets.



13.8 Carburettor securing bolts (arrowed) - Pierburg/Solex 2E3

11 On completion, top-up the cooling system, restart the engine and check for fuel and coolant leaks.

12 Adjust the carburettor as necessary.

14 Carburettor - overhaul



1 A complete strip-down of a carburettor is unlikely to cure a fault which is not immediately obvious without introducing new problems. If persistent carburation problems are encountered, it is recommended that the advice of a VW dealer or carburettor specialist is sought. Most dealers will be able to provide carburettor re-jetting and servicing facilities and if necessary, it should be possible to purchase a reconditioned carburettor of the relevant type.

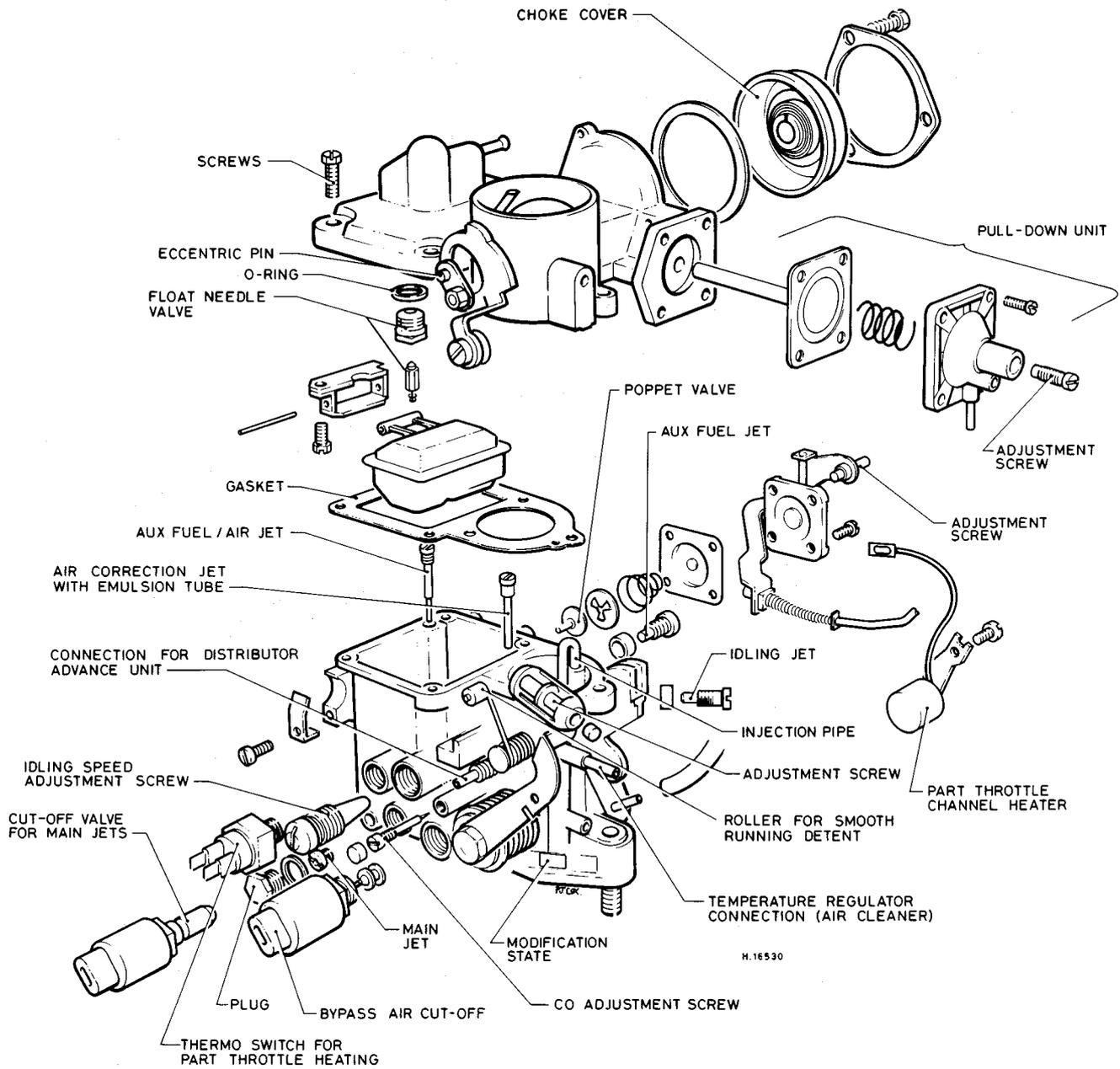
2 If it is decided to go ahead and service a

carburettor, check the cost and availability of spare parts before commencement. Obtain a carburettor repair kit, which will contain the necessary gaskets, diaphragms and other renewable items.

3 When working on carburettors, scrupulous cleanliness must be observed and care must be taken not to introduce any foreign matter into components. Carburettors are delicate instruments and care should be taken not to disturb any components unnecessarily.

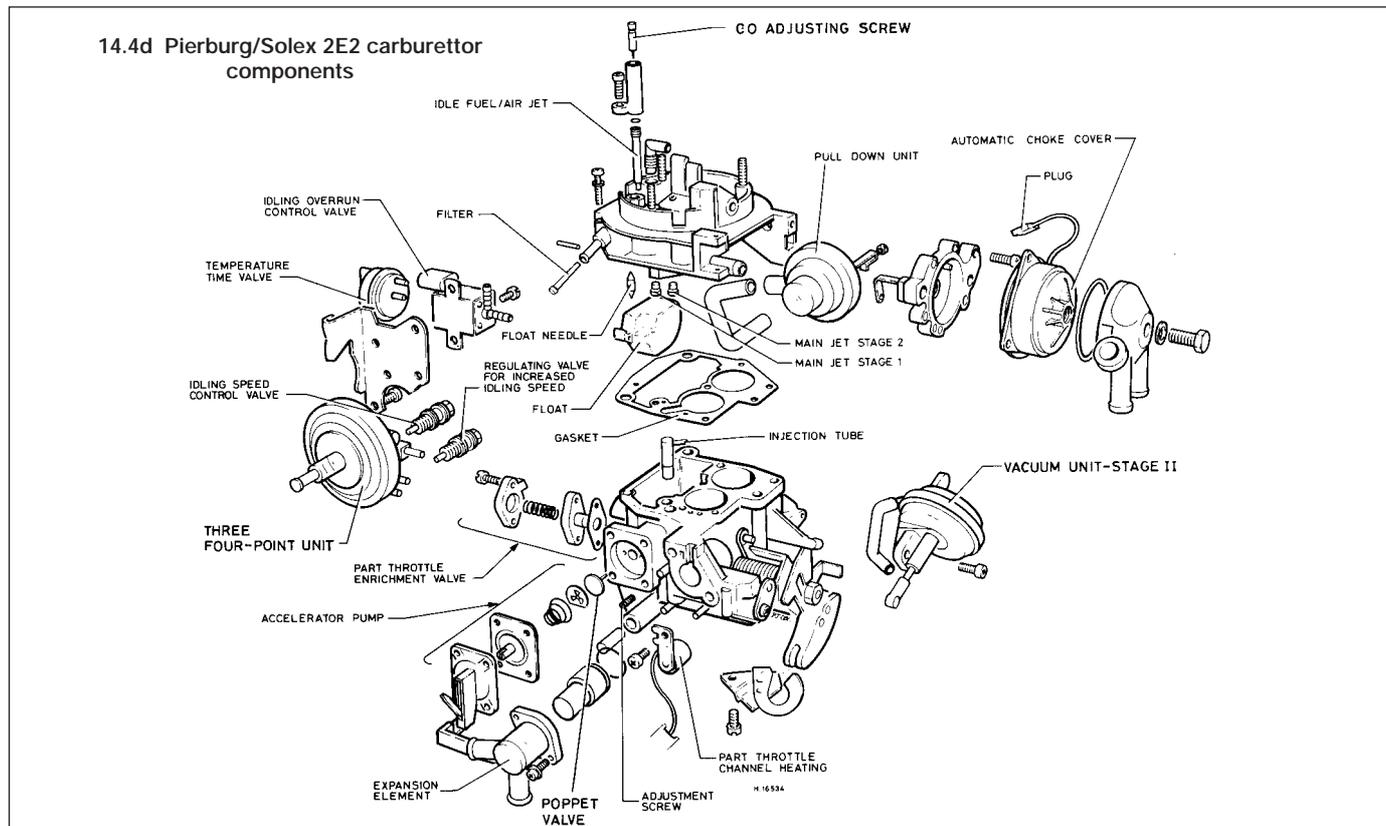
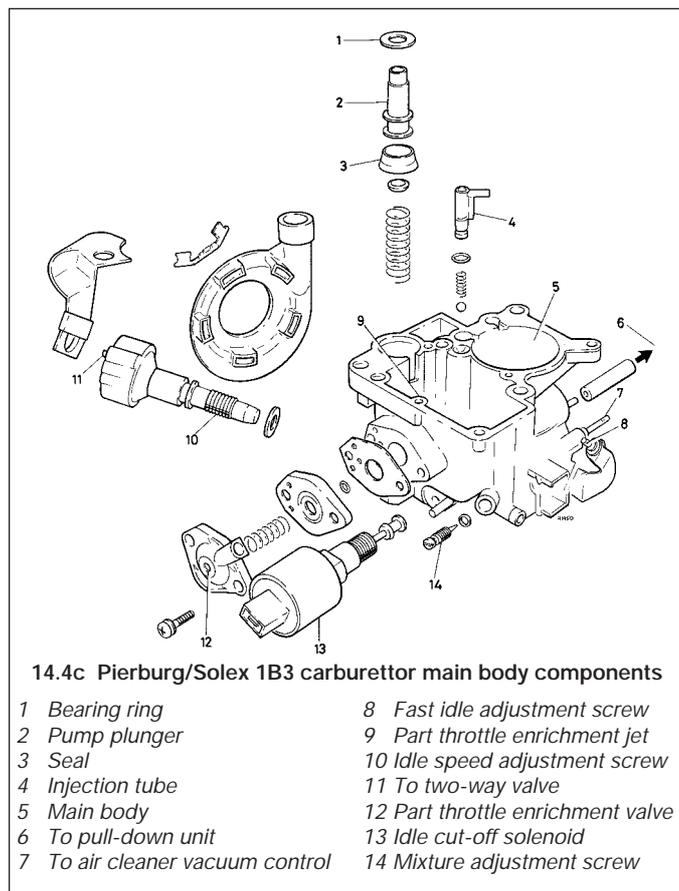
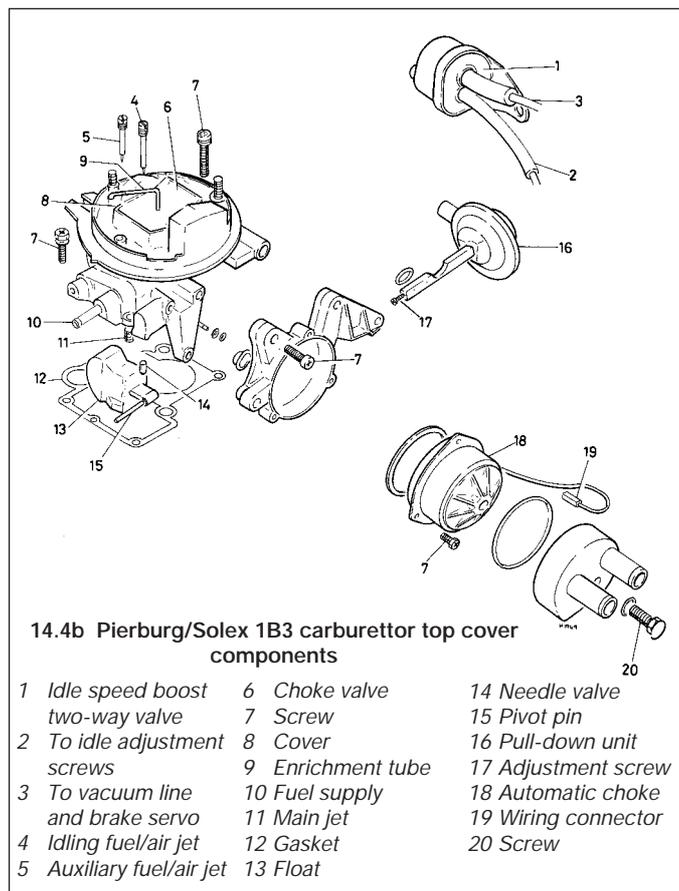
4 Referring to the relevant exploded view of the carburettor (see illustrations), remove each component part whilst making a note of its fitted position. Make alignment marks on linkages, etc.

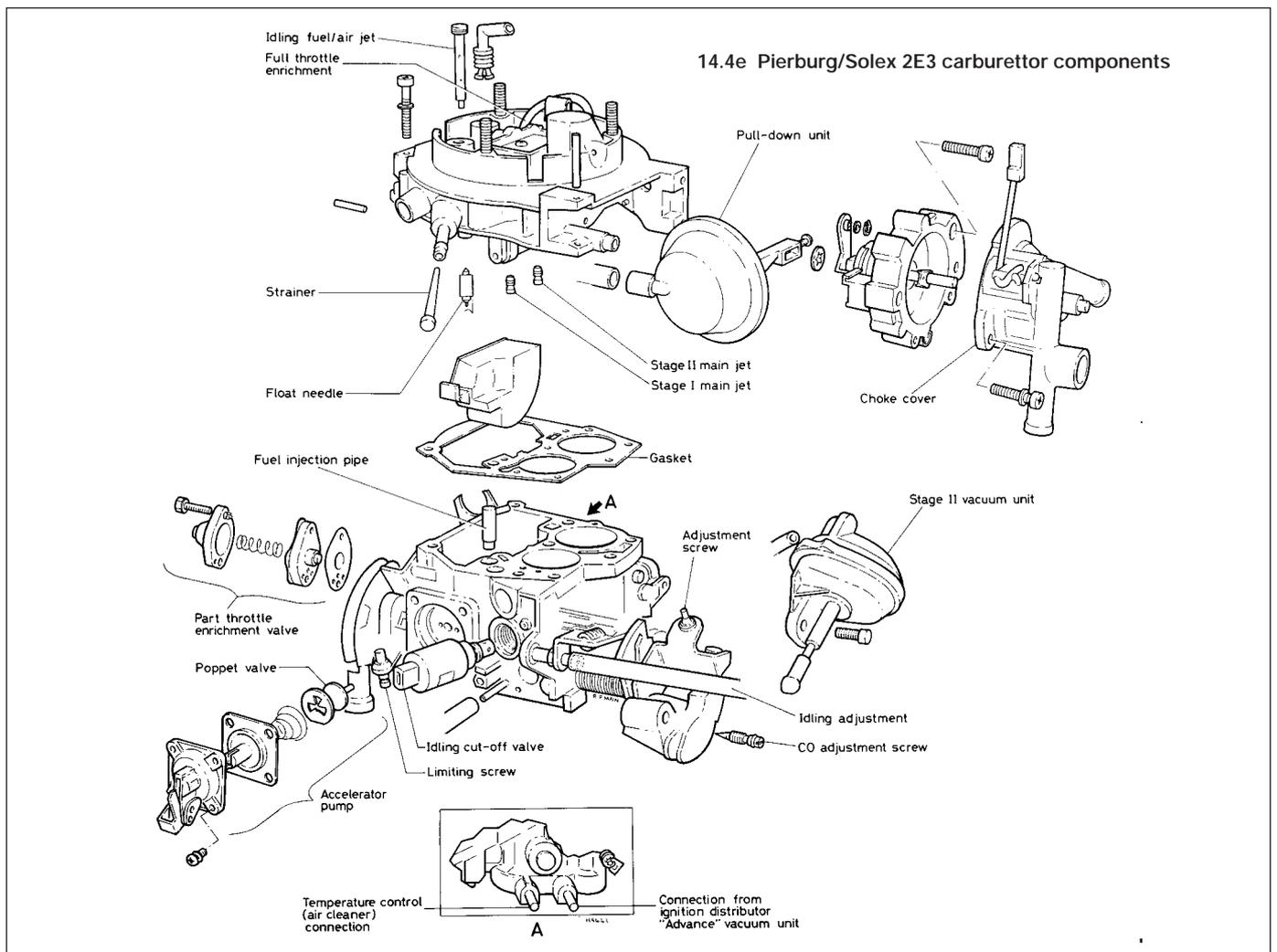
5 Reassemble the carburettor in the reverse order to dismantling, using new gaskets, O-rings etc. Be careful not to kink any diaphragms.



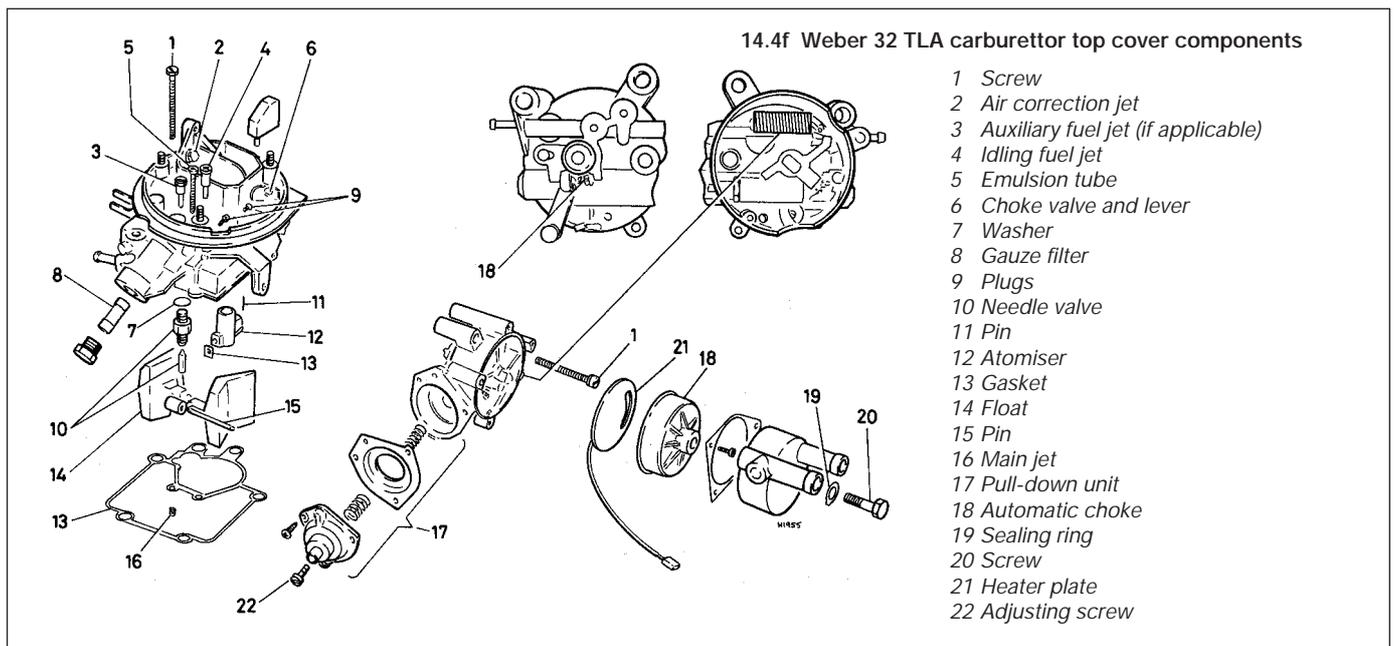
4A

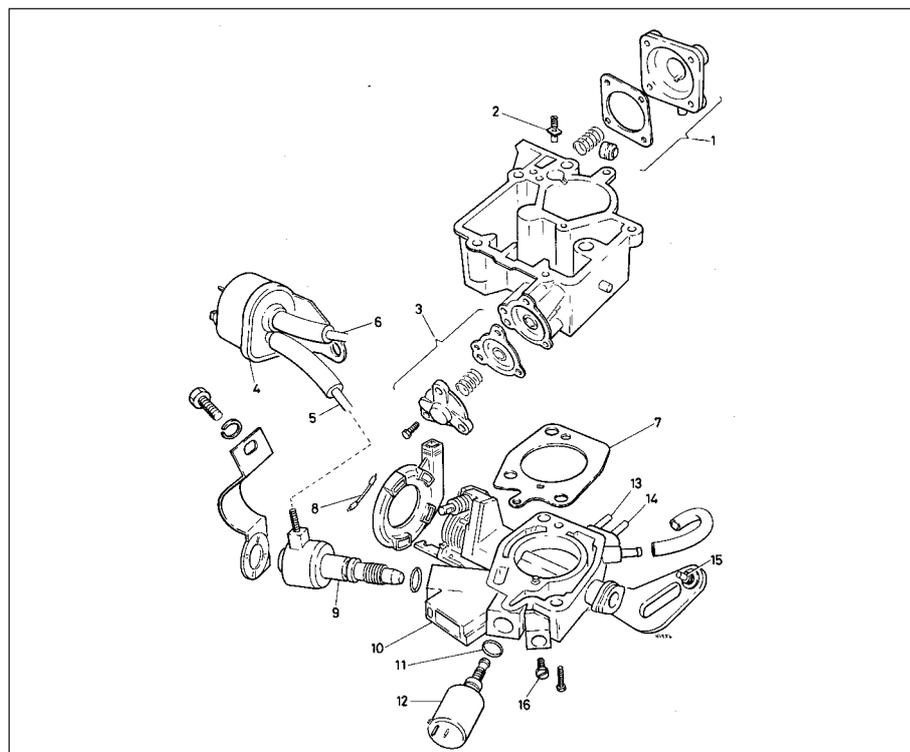
14.4a Pierburg/Solex PIC carburettor components





4A





14.4g Weber 32 TLA carburettor main body components

- 1 Accelerator pump
- 2 Injection pipe
- 3 Part throttle enrichment valve
- 4 Idle speed boost two-way valve
- 5 To idle adjusting screw
- 6 To vacuum line and brake servo
- 7 Gasket
- 8 Clip
- 9 Idle speed adjustment screw
- 10 Throttle housing
- 11 Sealing ring
- 12 Idle cut-off solenoid
- 13 To air cleaner
- 14 To distributor
- 15 Fast idle adjustment screw
- 16 Mixture adjustment screw

15 Carburettor (1.05 litre engine) - adjustments



Note: Accurate adjustment of the carburettor is only possible if adjustment of the ignition timing, dwell angle and spark plug gaps is correct. Incorrect valve clearances can also effect carburettor adjustment

Pierburg/Solex 31 PIC7

Bypass air cut-off valve

1 To check the bypass air cut-off valve when removed, depress the pin approximately 3 to 4 mm then energise it with battery voltage. A click should be heard and the pin should move out.

Cut-off valve

2 To check the cut-off valve for the main jets (where fitted), apply battery voltage. It must

be heard to click when the voltage is applied.

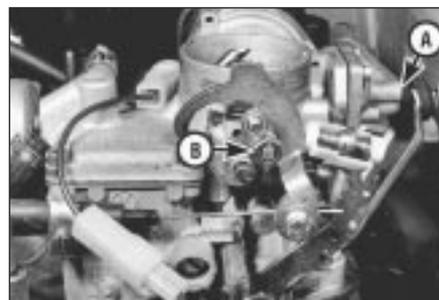
Choke valve gap

3 To adjust the choke valve gap, operate the choke lever fully then return it to the smooth running detent and hold it there. With the choke spindle lever against the cam, check that the clearance between the choke valve and barrel is as shown in *Specifications*. Use a twist drill to make the check and if necessary, adjust the clearance by turning the adjusting screw as required (see illustrations).

4 Although the choke valve gap smooth running detent position is preset during manufacture its setting can be checked and if necessary adjusted. Pull the choke out fully, then push it onto the smooth running detent. Press the choke lever against the cam and check the choke valve gap with a twist drill, as in the previous paragraph. If the gap is not as specified, adjust by turning the eccentric pin on the choke spindle lever.



15.3a Checking choke valve gap with twist drill



15.3b Adjusting screw location for choke valve gap (A) and choke valve gap smooth running detent eccentric pin (B)

Accelerator pump injection capacity

5 The accelerator pump injection capacity may be checked with the carburettor fitted or removed. However, the air cleaner must be removed and the float chamber must be full.

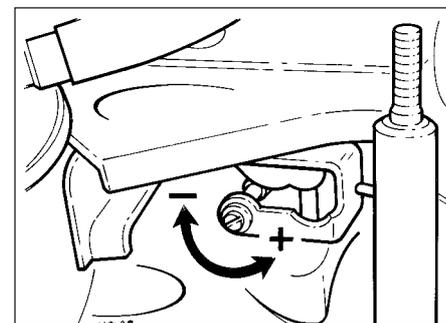
6 Open the choke valve and retain it in the open position with a piece of wire, then push a length of close fitting plastic tube over the injection pipe. Operate the throttle until fuel emerges then place the tube in a measuring glass. Operate the throttle fully five times allowing at least three seconds per stroke. Divide the final quantity by five to determine the amount per stroke and compare with the amount specified. If necessary, reposition the adjusting screw on the accelerator pump lever (see illustration). Note that fuel must be injected into the throttle valve gap. If necessary, bend the injection pipe.

Slow running and fast idle

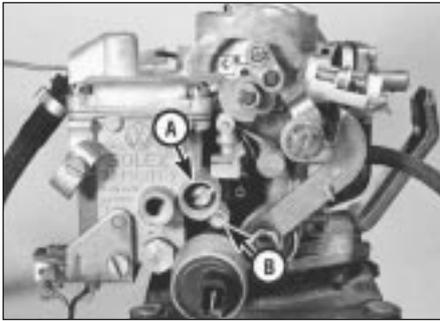
7 Run the engine to normal operating temperature then stop it. Connect a tachometer and, if available, an exhaust gas analyser.

8 Check that all electrical accessories are switched off and note that slow running adjustments should not be made while the radiator cooling fan is running.

9 Disconnect the crankcase ventilation hose from the air cleaner body and plug the air cleaner outlet.



15.6 Accelerator pump adjuster screw



15.10 Idle speed (A) and mixture (B) adjusting screw locations

10 Start the engine and let it idle. Check that the engine speed and CO content are as specified. If not, turn the two screws located above the cut-off solenoid alternately as necessary (see illustration).

11 If an exhaust gas analyser is not immediately available, an approximate mixture setting can be made by turning the mixture screw to give the highest engine speed.

12 Reconnect the crankcase ventilation hose. If this results in an increase in the CO content, the engine oil is diluted with fuel and should be renewed. Alternatively, if an oil change is not due, a long fast drive will reduce the amount of fuel in the oil.

13 Stop the engine and remove the tachometer and exhaust gas analyser.

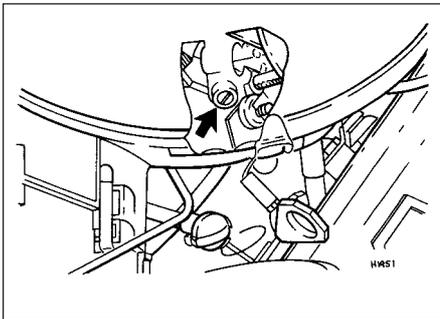
14 To adjust the fast idle speed, first check that the engine is still at normal operating temperature. Remove the air cleaner.

15 With the engine stopped, pull the choke control knob fully out then push it in to the smooth running detent.

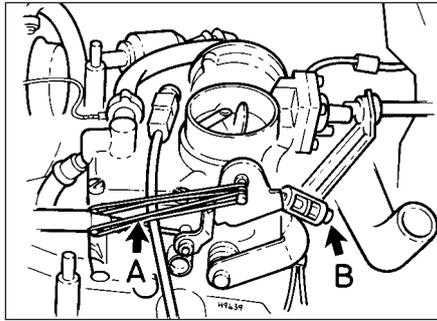
16 Retain the choke valve in its open position using an elastic band.

17 Connect a tachometer then start the engine and check that the fast idle speed is as specified. If not, turn the adjustment screw on the side of the choke lever cam. Note that this screw may also have a tamperproof cap (see illustration).

18 Stop the engine, disconnect the tachometer and elastic band, then refit the air cleaner. Push the choke control knob fully in.



15.22 Idle speed adjustment screw location



15.17 Fast idle speed setting

A Choke valve held open with rubber band
B Adjustment screw

Pierburg/Solex 1B3

19 All adjustments are as described for the Pierburg 2E3 carburettor fitted to the 1.3 litre engine, with the following additions.

Enrichment tube

20 With the choke valve closed, the bottom of the enrichment tube should be 1.0 mm from the valve (see illustration).

Idle speed and mixture

21 Before making any adjustment, ensure that the automatic choke is fully open, otherwise the throttle valve linkage may still be on the fast idle cam.

Idle speed boost valve

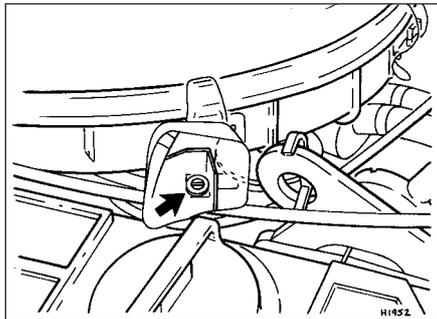
22 The idle speed adjustment screw (see illustration) incorporates a vacuum-operated valve which opens if the idle speed drops below 700 rpm, thereby causing an increase in the idle speed. The valve is itself controlled by a two-way valve and further control unit. The control unit monitors the engine speed and activates the two-way valve which applies vacuum to the idle valve.

23 To test the system, run the engine at idle speed, then slowly reduce the engine speed by manually closing the choke valve. At 700 rpm there should be vacuum at the hose in the idle valve.

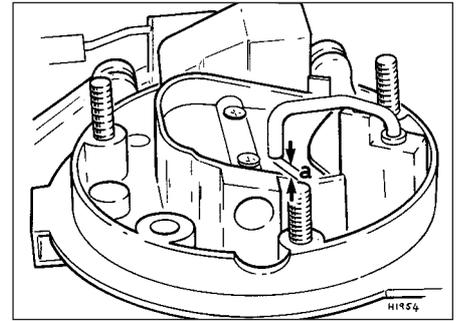
Fast idle speed

24 With the engine at normal operating temperature and switched off, connect a tachometer and remove the air cleaner.

25 Fully open the throttle valve, then turn the



15.26 Mixture (CO content) adjustment screw location



15.20 Enrichment tube adjustment
 $a = 1.0 \pm 0.3 \text{ mm}$

fast idle cam and release the throttle valve so that the adjustment screw is positioned on the second highest part of the cam.

26 Without touching the accelerator pedal, start the engine and check that the fast idle speed is as specified. If not, turn the adjustment screw on the linkage as necessary. If a tamperproof cap is fitted, renew it after making the adjustment (see illustration).

Choke valve gap

27 With the engine cold, fully open the throttle valve, then turn the fast idle cam and release the throttle valve so that the adjustment screw is positioned on the highest part of the cam.

28 Press the choke operating rod as far as possible towards the pull-down unit.

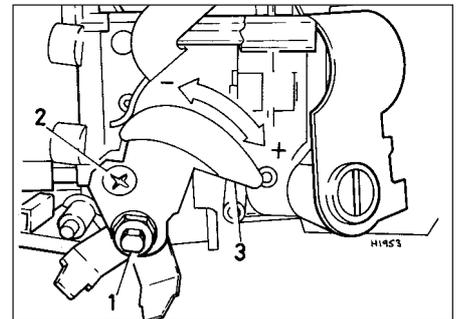
29 Using the shank of a twist drill, check that the distance from the choke valve to the carburettor wall is as specified. If not, adjust the screw behind the automatic choke.

Accelerator pump capacity

30 Hold the carburettor over a funnel and measuring glass.

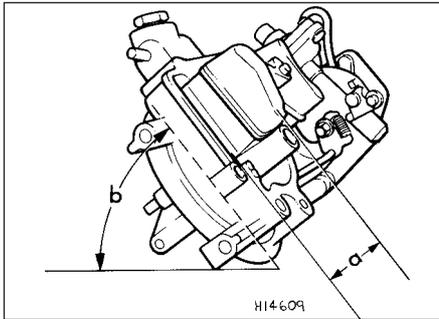
31 Turn the fast idle cam so that the adjusting screw is off the cam. Hold the cam in this position during the following procedure.

32 Fully open the throttle ten times, allowing at least three seconds per stroke. Divide the total quantity by ten and check that the resultant injection capacity is as specified. If not, loosen the camplate locking screw, turn the camplate as required and tighten the screw (see illustration).



15.32 Accelerator pump adjustment

1 Nut 2 Camplate locking screw
3 Camplate



15.36 Float level checking diagram
 $a = 28 \pm 1.0 \text{ mm}$ $b = 45^\circ \text{ angle}$

33 If difficulty is experienced in making the adjustment, check the pump seal and make sure that the return check valve and injection tube are clear.

Idle cut-off solenoid

34 When the ignition is switched on, the solenoid should be heard to click, indicating that the idle circuit has been opened.

35 If the solenoid is removed for testing, the plunger must first be depressed by 3.0 to 4.0 mm before switching on the unit.

Weber 32 TLA

Float level

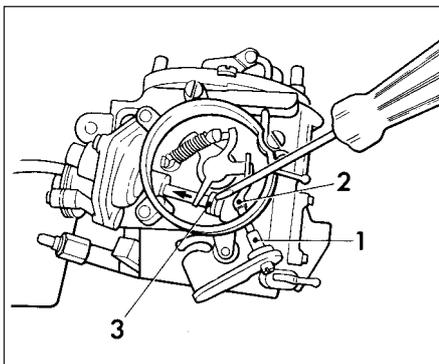
36 With the upper part of the carburettor inverted and held at an angle of approximately 45° , the measurement "a" (see illustration) should be as shown. The ball of the float needle should not be pressed in against the spring when making the measurement,

Idle speed and mixture

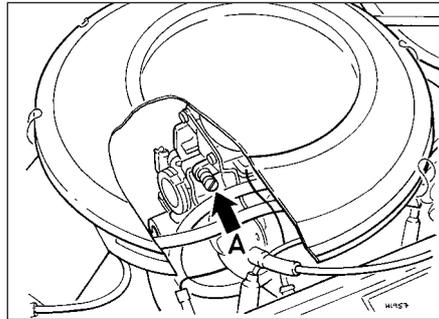
37 The procedure for checking and adjusting the idle speed and CO content are basically the same as given for the Pierburg 31 PIC-7 carburettor. Refer to the accompanying illustrations for the location of adjustment screws and to the *Specifications* for settings. (see illustrations).

Idle speed boost valve

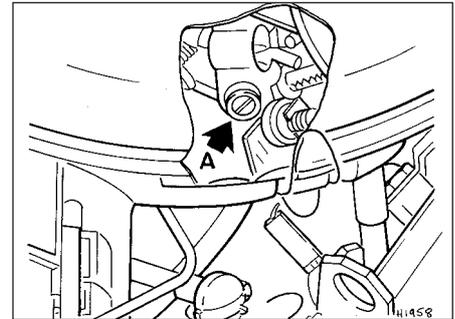
38 The idle speed boost valve is identical to the unit on the Pierburg 1B3 carburettor.



15.40 Choke valve gap adjustment
 1 Fast idle adjustment screw
 2 Cam 3 Pull rod



15.37a Idle speed adjusting screw (A) - pre June 1985



15.37b Idle speed adjusting screw (A) - from July 1985

Choke valve gap (pull-down)

39 Remove the choke cover.

40 Place the fast idle speed adjusting screw on the highest step of the cam (see illustration). The manufacturer's original instruction was to press the pull rod in the direction of the arrow shown, then to check that the choke valve gap is $2.5 \pm 0.2 \text{ mm}$. As from April 1987 however, this instruction is revised and it is now necessary to use a vacuum pump to apply 300 mbar vacuum on the pull-down unit. The choke valve gap in this case must be $2.0 \pm 0.2 \text{ mm}$.

41 Adjustment is made on the screw at the end of the pull-down device. Ensure that the spring "2" (see illustration) is not compressed when making the check.

Idle cut-off valve

42 To check the cut-off valve, apply battery voltage. The valve must be heard to click when voltage is applied.

Fast idle speed

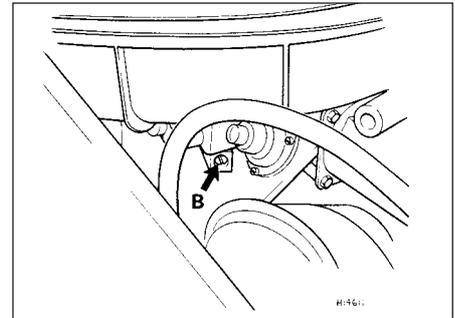
43 Before carrying out this check, ensure that the ignition timing and manual idling adjustments are correct. The engine should be at normal operating temperature.

44 Remove the air cleaner.

45 Plug the temperature regulator connection.

46 Connect the tachometer.

47 Remove the choke cover and set the fast



15.37c Mixture (CO content) adjusting screw (B)

idle speed adjusting screw on the second highest step on the cam (see illustration).

48 Tension the operating lever with a rubber band so that the choke valve is fully open.

49 Without touching the accelerator pedal, start the engine, which should run at the fast idle speed specified.

50 Adjust the screw as necessary.

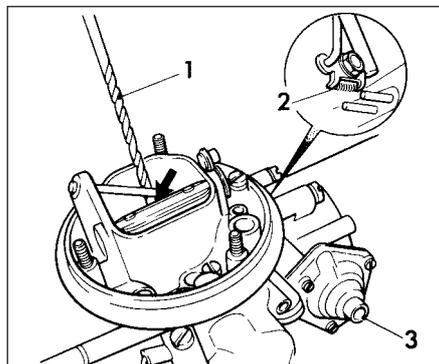
Choke valve gap (wide open kick)

51 Remove the air cleaner.

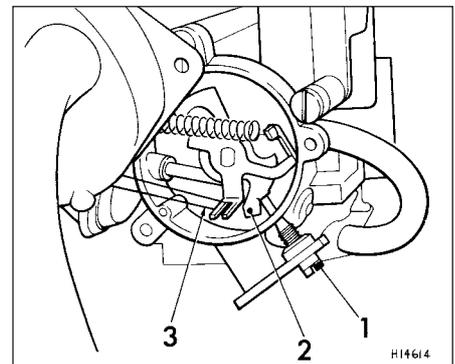
52 Fully open the throttle and hold it in this position.

53 Press the lever (1) upwards (see illustration).

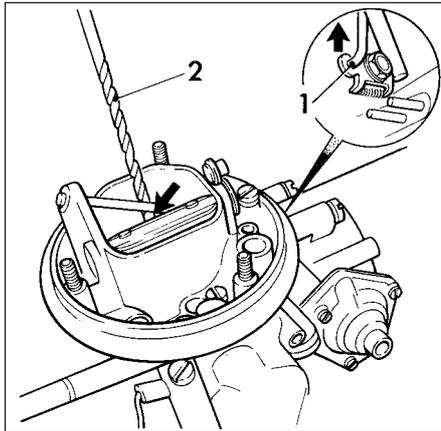
54 Check the gap with a twist drill. The gap should be as specified. If necessary, adjust by bending the lever (see illustration).



15.41 Checking choke valve gap (pull-down)
 1 Twist drill 2 Spring 3 Adjusting screw



15.47 Adjusting fast idle speed
 1 Fast idle adjusting screw
 2 Cam 3 Rubber band



15.53 Checking choke valve gap (wide open kick)

- 1 Pressure applied upwards
- 2 Twist drill

Accelerator pump capacity

55 This can be checked by following the procedure given for the Pierburg 2E3 carburettor, with the following differences.

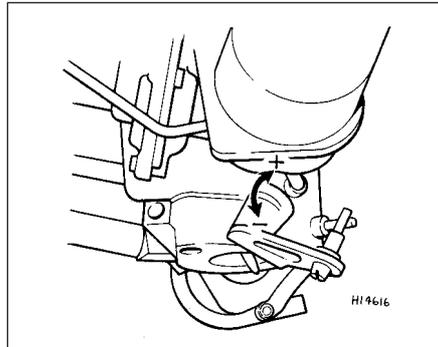
56 Open the throttle valve quickly when operating the pump (ie. one second per stroke, with pauses of three seconds between strokes).

57 The amount of fuel injected can be altered, but only very slightly, as follows: (see illustration).

58 Take the accelerator cable cam off the throttle valve lever.

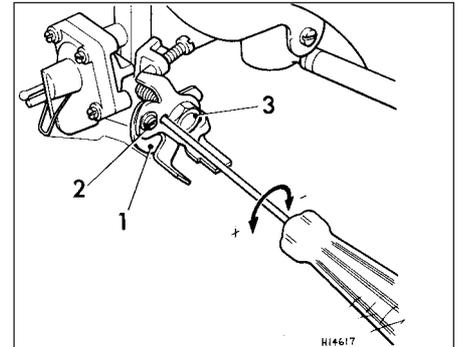
59 Secure the accelerator pump cam with an M4 screw.

60 Loosen the locknut on the camplate securing screw. Loosen the screw and turn the camplate with a screwdriver clockwise to decrease injected fuel and anti-clockwise to increase injected fuel. Tighten the screw and locknut and recheck the injection capacity.



15.54 Adjusting choke valve gap (wide open kick)

Bend lever as required



15.57 Accelerator pump adjustment

- 1 Cam
- 2 Camplate
- 3 Camplate locking nut

16 Carburettor (1.3 litre engine) - adjustments

Note: Accurate adjustment of the carburettor is only possible if adjustment of the ignition timing, dwell angle and spark plug gaps is correct. Incorrect valve clearances can also effect carburettor adjustment

Pierburg/Solex 2E3

Cut-off valve

1 To check the cut-off valve, apply battery voltage. It must be heard to click when the voltage is applied.

Choke valve gap

2 To check the choke valve gap the choke cover must be removed. Move the throttle valve and the fast idle cam so that the adjustment screw is against the highest cam stop. Now push the choke valve operating rod fully towards the adjustment screw (and pull-down unit), then check the choke valve-to-barrel clearance using a twist drill as a gauge. If necessary turn the adjuster screw as required to provide the specified choke valve gap (see illustrations).

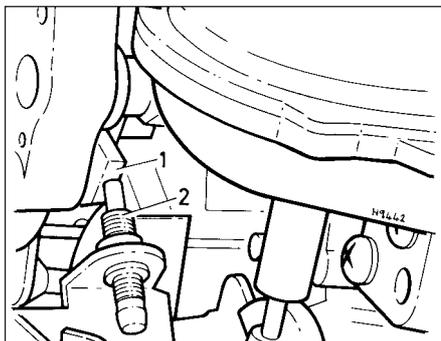
Accelerator pump injection capacity

3 The accelerator pump injection capacity can be checked in the same manner as that described for the Pierburg 2E3 carburettor but allow 1 second per stroke and 3 seconds between strokes (see illustration).

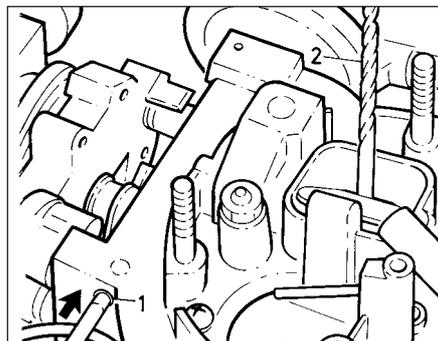
Choke

4 The automatic choke cover and choke housing alignment marks should correspond. To check the choke, connect up a test lamp between a battery positive terminal and the choke lead. The test lamp should illuminate. If not, then the choke unit is defective and must be renewed.

5 The choke pulldown unit can be checked when removed but as this requires the use of a vacuum pump and gauge, it is a check best entrusted to your VW dealer. The pulldown unit can also be tested when the carburettor is in position in the vehicle. The air cleaner unit must be removed. Run the engine at idle speed then close the choke valve by hand and check that a resistance is felt over the final 3.0 mm of travel. If no resistance is felt, there may be a leak in the vacuum connections, or the pulldown unit diaphragm is broken, in which case the unit must be renewed.

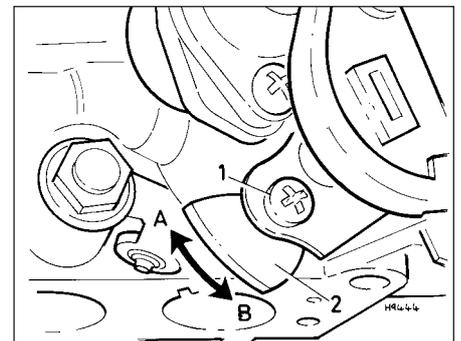


16.2a Fast idle cam (1) and choke valve gap adjusting screw (2)



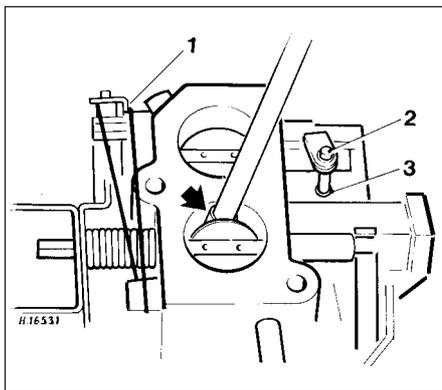
16.2b Checking choke valve gap

- 1 Choke valve operating rod (push in direction of arrow)
- 2 Twist drill



16.3 Accelerator pump adjustment

- 1 Fast idle cam
- 2 Fast idle cam clamp screw
- A Increase capacity
- B Decrease capacity



16.7a Throttle valve basic setting showing rod to hold valve open (arrowed), lock lever (1) limiting screw (2) and stop (3)

Throttle valve

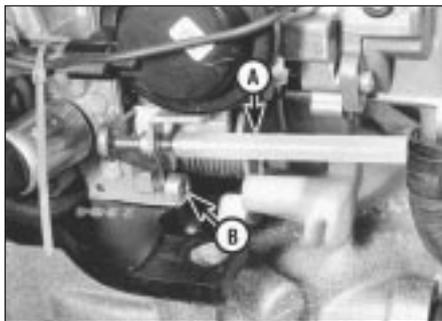
6 The basic Stage II throttle valve adjustment is made during manufacture and should not require further adjustment. If, for any reason, the limiting screw has been removed or its setting altered, readjust it as follows.

7 Open the throttle valve and hold it in position by inserting a wooden rod or similar implement between the valve and venturi (see illustration). Using a rubber band, pretension the Stage II throttle valve locking lever then unscrew the limiting screw to provide a clearance between the stop and the limiting screw. Now turn the limiting screw in so that it is just in contact with the stop. The limiting screw stop point can be assessed by inserting a thin piece of paper between the stop and screw. When the paper starts to get pinched between the two, the stop point is reached and from this point, tighten the limiting screw a further quarter turn then secure it with locking compound. Close both throttle valves then measure the locking lever clearances (see illustration). If the clearances are not as specified, then bend the levers as necessary.

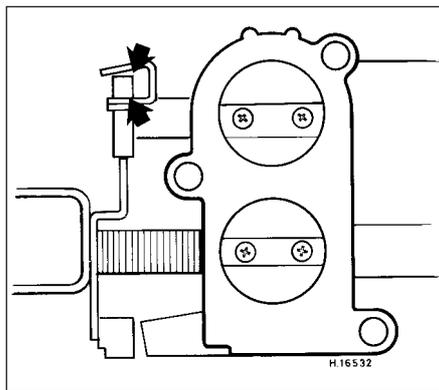
Slow running and fast idle

8 To check and adjust the slow running setting, refer to Section 15, paragraphs 7 to 13 inclusive (see illustration).

9 To check and adjust the fast idle adjustment, first check that the engine is still at normal operating temperature. The air



16.8 Idle speed adjustment screw and guide sleeve (A) mixture screw (B)



16.7b Locking lever clearance with throttle valves closed

Clearance to equal 0.25 to 0.55 mm (each side)

cleaner must be removed and the other provisional conditions must apply as for the slow running adjustment. Plug the air cleaner temperature control hose.

10 Restart the engine and open the throttle to give an engine speed of approx. 2500 rpm. Press down the fast idle cam to its stop then move the throttle valve back so that the adjuster screw is on the second highest stop on the fast idle cam. In this position, the fast idle speed should be as specified. If the setting is incorrect, turn the adjustment screw in the required direction until it is correct (see illustration). Note that the screw may have a tamperproof cap fitted.

11 On completion, unplug the temperature control connector and refit the air cleaner.

17 Carburettor (1.6 & 1.8 litre engines) - adjustments



Note: Accurate adjustment of the carburettor is only possible if adjustment of the ignition timing, dwell angle and spark plug gaps is correct. Incorrect valve clearances can also effect carburettor adjustment

Pierburg/Solex 2E2

1 The adjustment procedures for the 2E2 carburettor closely follow those described for



16.10 Fast idle speed adjustment screw (2)

the 2E3 carburettor. The following checks and adjustments are additional to, or differ from, those given.

Part throttle channel heater unit

2 To check this unit, connect a test lamp between the unit wiring plug and battery positive terminal. Earth the unit. If the test bulb fails to light, the unit is defective and must be renewed.

Choke valve gap (wide open kick)

3 Remove the automatic choke cover and fit a rubber band to the operating pin, so that the choke valve is held in the closed position.

4 Hold the primary throttle valve open 45°. To do this, temporarily insert a 10 mm nut between the fast idling adjustment screw and the vacuum unit plunger.

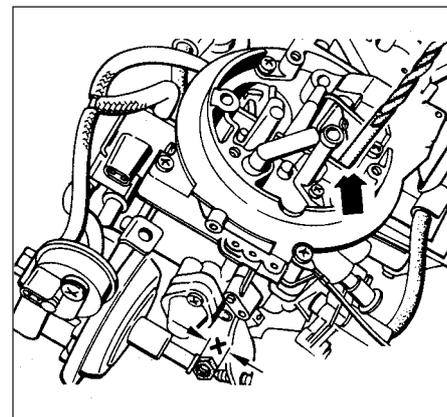
5 Using a twist drill, check that the gap between the choke valve and carburettor wall is 6.3 ± 0.3 mm. If not, bend the choke operating lever as required (see illustration).

6 After making an adjustment, check and adjust the choke pull-down unit as follows.

Choke pull down unit

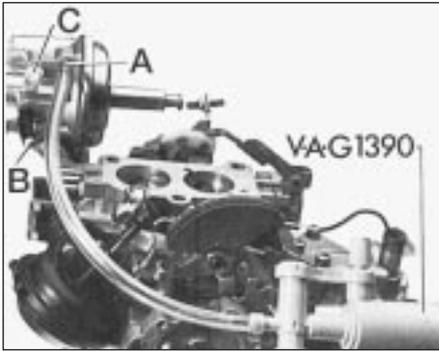
7 This unit can be checked in the same manner as that for the choke pull down unit on the 2E3 carburettor but note that the resistance felt must be over the final 5.0 mm of travel.

8 Note also that from February 1987, the choke pull-down unit is both temperature and time-controlled by a thermostime valve. When the valve is open (starting a cold engine) the vacuum to the pull-down unit is reduced, and the choke valve will open by a small amount. After between one and six seconds (depending on ambient temperature), the valve heats up (to approximately 20 to 30°C) and closes. This allows more vacuum to reach the pull-down unit and the choke valve will open by a larger amount. The choke is of course fully released by the heat of the engine coolant and the electric heater acting on the automatic choke bi-metallic spring.



17.5 Checking choke valve gap

Using drill of correct diameter as a gauge (arrowed)
Note dimension x (10.0 mm)



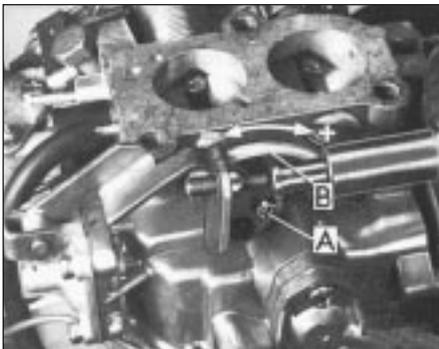
17.10 Accelerator pump check preparation

- A Vacuum pump connection
- B Plug vacuum connection (3-point unit)
- C Plug vacuum connection (4-point unit)

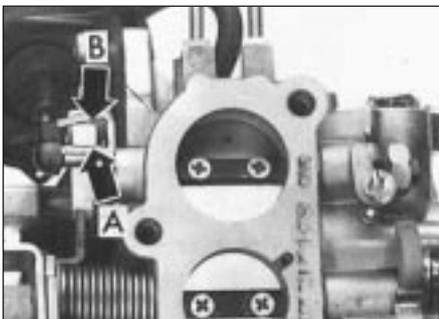
Accelerator pump

9 To make this check, the carburettor must be removed and you will need a vacuum pump and an M8 x 20 mm bolt.

10 Detach the vacuum hoses from the three/four point unit then connect up the vacuum pump to the three/four point unit at "A" (see illustration). Plug connection B (and C on four point unit). Apply vacuum with the pump to hold the diaphragm pushrod in the overrun/cut-off position and to give a clearance between the fast idle speed and diaphragm pushrod.



17.13 Loosen screw (A) and turn cam plate (B) in direction required to adjust accelerator pump injection capacity



17.15 Lock lever clearance with throttle valves closed

11 Pivot the warm-up lever up to the point where the throttle valve control pin has clearance and insert the M8 x 20 mm bolt to hold the warm-up lever in this position (see illustration).

12 Hold the carburettor over a funnel and measuring glass then slowly open the throttle valve lever fully five times allowing at least 3 seconds per stroke. Divide the total quantity by five and check the resultant injection capacity against that specified.

13 If adjustment is necessary, loosen screw A and rotate the cam plate B in the required direction to increase or decrease the injection capacity (see illustration). On completion, retighten the screw and seal in position with locking compound.

14 The accelerator pump injection capacity can also be checked with the carburettor in the vehicle but as specialised equipment is required, this is a task best entrusted to your VW dealer.

Throttle valve

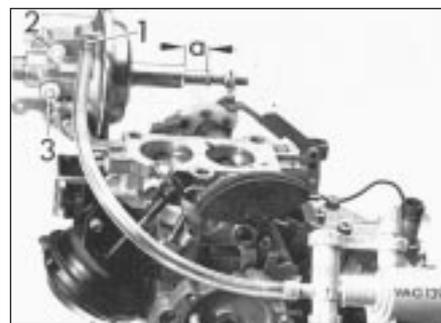
15 For the basic Stage II valve adjustment, proceed as described in Section 16, paragraphs 6 and 7 whilst referring to the accompanying illustration (see illustration).

Three/four point unit - vacuum pump method

16 Detach the vacuum hoses from the unit and attach a vacuum pump to connection "1" (see illustration). Apply vacuum to pull the diaphragm pushrod to the idle point and then measure the amount of rod protrusion, which must be as specified.

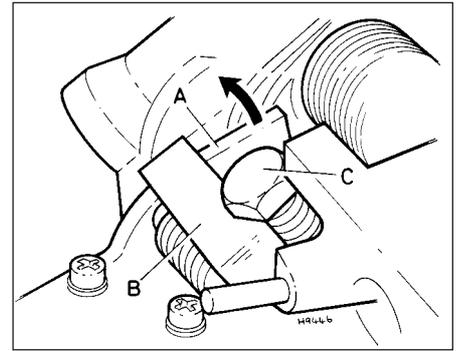
17 To check the overrun cut-off point, plug off the vacuum connection 3, then apply increased vacuum with the vacuum pump. This should cause the diaphragm pushrod to move to the overrun/cut-off point. Measure the rod protrusion (a) which should now be 1.0 mm. The pushrod should hold at this position for one minute.

18 If rod protrusion is incorrect, or will not hold for the specified period, then the diaphragm or three/four point unit are probably leaking and in need of renewal.



17.16 Three or four point unit check preparation

- Pushrod to idle point a = 8.5 mm
- 1 Vacuum connection
- 2 and 3 Plug these connections



17.11 Accelerator pump adjustment check showing warm-up lever (A) lever (B) and bolt (C)

Three/four point unit - engine vacuum method

19 Run the engine to normal operating temperature then switch it off. Remove the air cleaner and close the vacuum line from the carburettor to the temperature regulator.

20 With the engine stopped, check the diaphragm pushrod (A) (see illustration) is fully extended to approximately 14.5 mm.

21 Start the engine and let it idle. The diaphragm pushrod must now be extended approximately 8.5 mm (three-point unit), or 9.5 mm (four-point unit), and must just contact the fast idle adjustment screw.

22 On models with air conditioning, switch on the air conditioner with the blower on maximum speed. The diaphragm pushrod dimension should be approximately 12.0 mm.

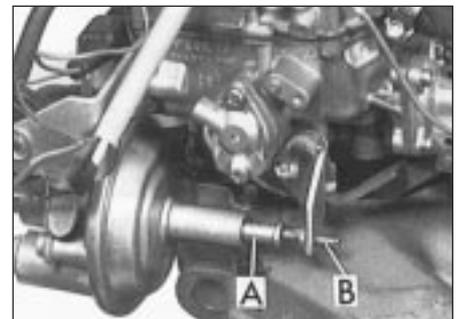
23 To check the overrun cut-off point, run the engine at idle speed.

24 On the four-point unit, disconnect and plug the pink-coloured hose at the control valve.

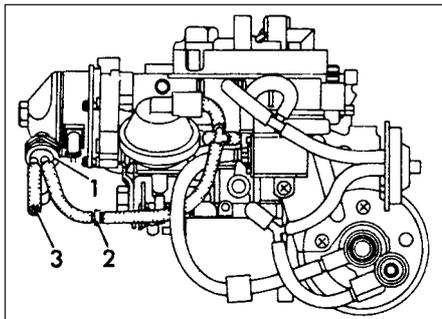
25 Using a screwdriver, hold the primary throttle valve fully closed to prevent it moving to the overrun cut-off point.

26 Disconnect the plug from the idling/overrun control valve, then check that the diaphragm pushrod dimension is approximately 1.5 mm.

27 To check the unit for leaks, first, on the three-point unit only, pinch the hose between the unit and Y-piece.



17.20 Three/four point unit with pushrod (A) and cold idling adjusting screw (B) in idling position



17.30 Stage II vacuum unit control

- 1 Thermo-pneumatic valve
- 2 Restrictor
- 3 Straight connection hose

28 Stop the engine by disconnecting the coil terminal 15, and check that the diaphragm rod remains in the overrun/cut-off position for a minimum of five seconds.

29 Reconnect the coil wiring, control valve plug and hose where applicable. Refit the air cleaner.

Stage II vacuum control unit

30 This device is fitted to 1.6 litre manual gearbox models and 1.8 automatic gearbox models from August 1984 on. Its function is to delay the Stage II opening slightly whilst the coolant temperature is below 18°C. It achieves this by venting the vacuum hose via the thermo-pneumatic valve and the resistor (see illustration).

31 Check that the straight hose at connection 3 on the thermo-pneumatic valve is not blocked and check the valve itself by blowing through it. It should be open at 18°C and close when the temperature rises above 28°C.

Idle/overrun control valve

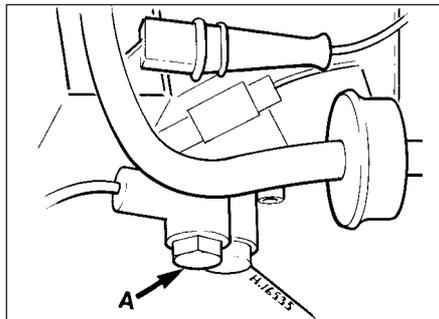
32 Entrust this operation to your VW dealer as specialised testing equipment is necessary.

Temperature time valve

33 Entrust this operation to your VW dealer as specialised testing equipment is necessary.

Slow running and fast idle

34 To check and adjust the slow running setting, proceed as described in Section 15,



17.34a Idling speed control valve (A)

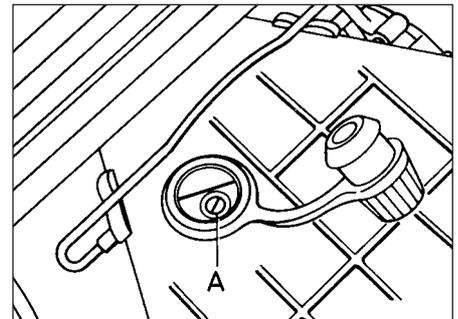
paragraphs 7 to 13 inclusive whilst noting the following differences:

- a) Before making any adjustments, ensure that the three/four point unit pushrod is in the idling position with the cold idling adjusting screw touching the pushrod
- b) If adjustment is necessary, turn the idling speed control valve and CO adjustment screw (see illustrations), as necessary.
- c) Access to the CO adjustment screw is gained by prising out the tamperproof plug. If the CO content is difficult to adjust, remove the adjustment screw and clean its point, then refit and adjust it

35 On automatic transmission models, the increased idling speed can be checked and adjusted as follows. In addition to those preliminary requirements necessary when checking the idle speed slow running setting, the hand brake must be fully applied and chocks placed against the wheels.

36 When the engine is started, turn on the fresh air blower (fully), switch on the headlights (high beam) and the heated rear window. Get an assistant to sit in the vehicle and depress the foot brake then select D. Check that the four point unit diaphragm rod is in the increased idling position, the fast idle adjuster screw rests against the diaphragm rod and the engine increased idle speed is not under that specified. Adjust if necessary by altering the regulator valve setting (see illustration).

37 On models fitted with air conditioning, the procedure for checking the increased idling speed is similar to that for automatic



17.34b Mixture (CO) adjustment screw (A)

transmission models except that it is also necessary to switch on the air conditioner and have the control set at maximum cooling at the highest blower speed. The increased idle speed must be as specified and if adjustment is required, alter the regulator valve setting accordingly.

38 With the slow/increased running idle speed adjustment complete, the fast idle speed can be checked and, if necessary, adjusted. Check that the engine is still at its normal operating temperature.

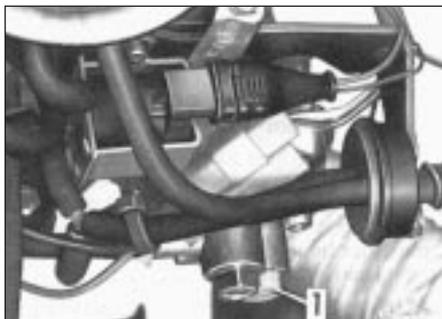
39 Detach the Y-piece from the vacuum hose and plug the hose (see illustration). Connect a tachometer to the engine. Start and run the engine and check that the fast idle speed is as specified. If not, turn the adjustment screw on the linkage as necessary (see illustration). On completion of adjustment, apply sealant to the screw threads to lock it in position, unplug and reconnect the Y-piece to the vacuum hose and check that the slow running (idle) speed is as specified.

18 Inlet manifold preheating - testing



Heater element

1 The inlet manifold is preheated by coolant from the cooling system and by a heater element located in the bottom of the inlet manifold.



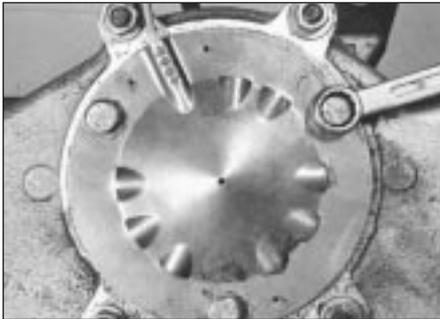
17.36 Engine speed regulator valve (1)



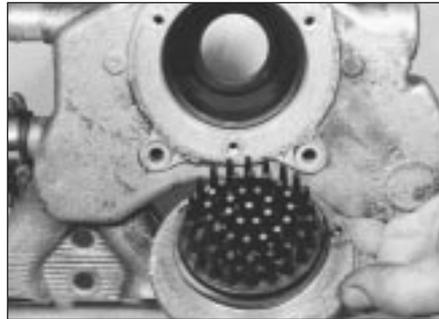
17.39a Disconnect and plug vacuum hose (1) to check/adjust engine fast idle speed adjustment



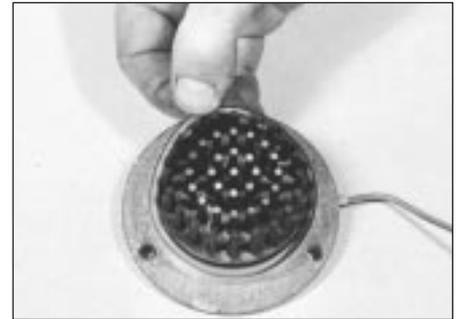
17.39b Fast idle adjustment screw (A)



18.3a Unscrew the bolts . . .



18.3b . . . and remove heater element from inlet manifold



18.3c Removing sealing ring from heater element

2 To check the heater element, the engine should be cold. Disconnect the wire from the element at its in-line connector, then attach an ohmmeter between the wire connector from the element and earth. This should record 0.25 to 0.50 ohm.

3 To remove the element, disconnect the wire then unscrew the bolts and withdraw the unit. Remove the sealing ring and gasket (see illustrations). When refitting, always renew the sealing ring and gasket.

Thermo-switch

4 On 1.05 and 1.3 litre engines, the heater element is controlled by a thermo-switch located in the coolant supply hose to the inlet manifold. On 1.6 and 1.8 litre engines, the thermo-switch is located in the top of the coolant hose connecting piece mounted on the side of the cylinder head.

5 Before removing the thermo-switch, drain off some engine coolant to reduce spillage when the switch is removed.

6 To test the thermo-switch, first detach the lead connector. Unscrew and remove the switch from the housing and plug the hole to stop any leakage of coolant.

7 With an ohmmeter connected to the terminals, gradually heat the base of the switch unit in hot water. Below the following temperatures there should be zero resistance (ie. internal contacts closed):

1.05 litre engine - 65°C

1.3, 1.6 and 1.8 litre engines - 55°C

8 Above the following temperatures there should be a maximum resistance (ie. internal contacts open):

1.05 litre engine - 75°C

1.3, 1.6 and 1.8 litre engines - 65°C

9 If defective, the switch must be renewed.

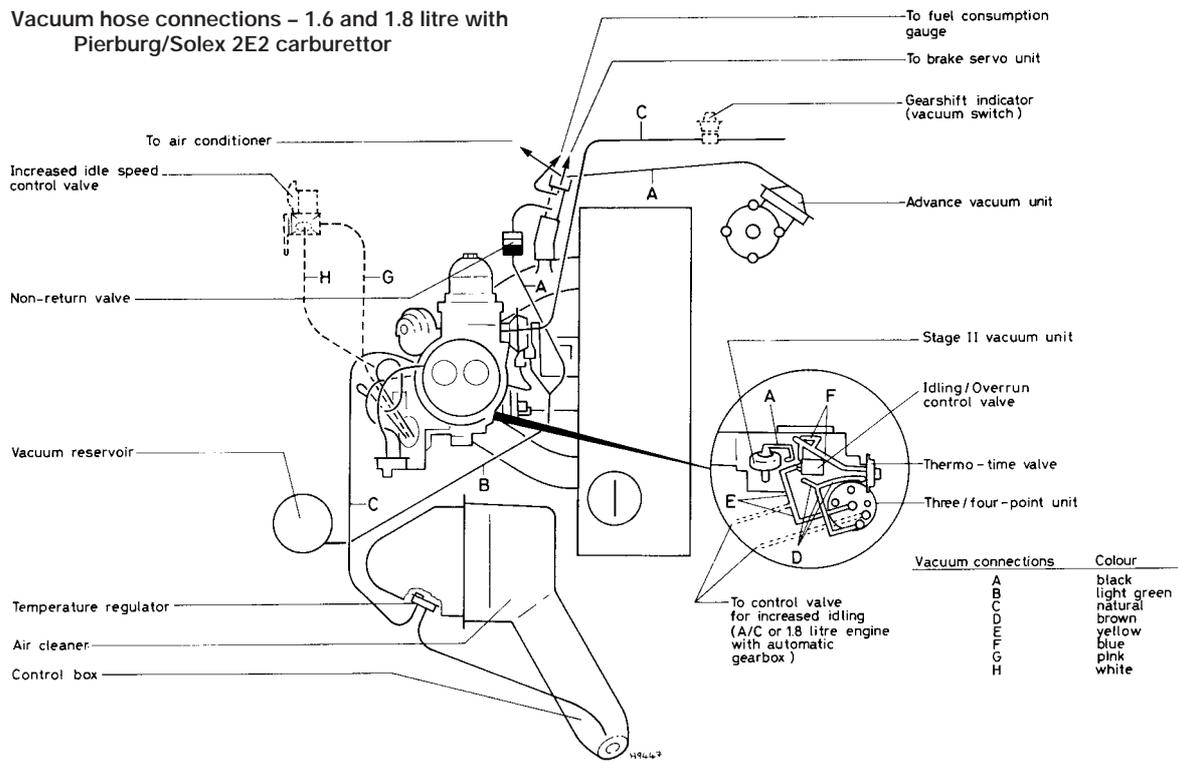
19 Inlet and exhaust manifolds - removal and refitting



Inlet manifold

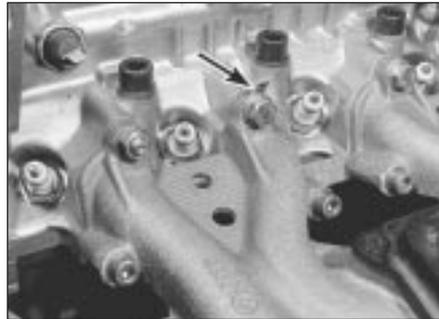
- 1 Remove the carburettor.
- 2 Disconnect the inlet manifold preheater wire at the in-line connector.
- 3 Drain the cooling system and disconnect the coolant hoses from the manifold.
- 4 Disconnect the manifold vacuum hoses as necessary (see illustration).
- 5 Where applicable, disconnect the stay rod between the base of the manifold and the crankcase (see illustration).
- 6 Undo the manifold retaining nuts and bolts (see illustration) whilst noting their respective

19.4 Vacuum hose connections - 1.6 and 1.8 litre with Pierburg/Solex 2E2 carburettor





19.5 Inlet manifold support stay - 1.3 litre



19.6 Inlet manifold-to-cylinder head securing nuts and bolts

Note position of earth lead spade connector (arrowed) - 1.3 litre



19.9 Warm air deflector plate - 1.3 litre

locations, then carefully withdraw the manifold from the cylinder head.

7 Remove the gasket and clean the mating faces of the manifold and cylinder head.

8 Refitting is a reversal of the removal procedure. Use a new manifold gasket and tighten the securing nuts and bolts to the specified torque setting.

Exhaust manifold

9 Undo the retaining nut(s) and withdraw the warm air deflector plate from the exhaust manifold (see illustration).

10 On 1.05 and 1.3 litre engines, unbolt and detach the exhaust downpipe from the manifold joint (see illustration).

11 On 1.6 and 1.8 litre engines, refer to Section 20, paragraph 2.

12 Unscrew and remove the remaining manifold retaining bolts/nuts, then carefully withdraw the manifold from the cylinder head. Remove the gasket.

13 Clean the mating faces of the manifold and cylinder head. Also the exhaust downpipe flange connections.

14 Refit in the reverse order of removal. Use a new gasket and tighten the securing nuts/bolts evenly to the specified torque wrench setting.

15 When reconnecting the downpipe to the manifold, smear a little exhaust jointing paste onto the flange prior to connection. This will ensure a good seal at the joint.

20 Exhaust system - inspection, removal and refitting



Inspection

1 Refer to Chapter 1, Section 19

Removal

2 On 1.6 and 1.8 litre engines, it should be noted that if the exhaust system is to be separated at the manifold/downpipe connection, then VW tool No. 3049A will be necessary to release and subsequently refit the joint retaining clips (see illustration). Without this tool, it is virtually impossible to separate and reassemble the joint without distorting the retaining clips. In view of this, removal and refitting of the system will necessitate detachment of the manifold and front pipe section, or manifold and system complete, and then taking the assembly to your VW dealer to separate/reassemble the front joint. If the complete system is in need of replacement, it is probably best entrusted to your VW dealer.

3 On 1.05 and 1.3 litre engines, when removing any part of the exhaust system it is usually easier to undo the manifold-to-front pipe joint and remove the complete system from the vehicle, then separate the various

pieces of the system, or cut out the defective part with a hacksaw.

4 Before doing any dismantling work on the exhaust system, wait until the system is cool and then saturate all bolts and joints with a proprietary anti-corrosion fluid (see illustrations). It may be found easier to cut through heavily corroded bolts with a hacksaw, rather than try to unscrew them.

Refitting

5 Refit the system a section at a time starting at the front. If the manifold has been removed its gasket must be renewed. New nuts and bolts should be used throughout the system.

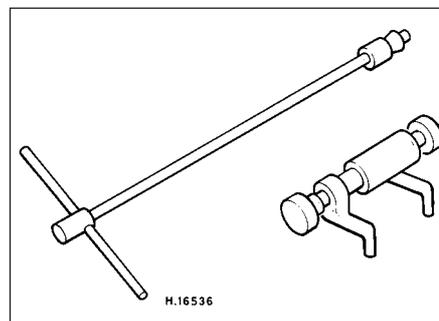
6 Before assembly, smear all joints with a proprietary exhaust sealing compound. This makes it easier to align the pieces and also ensures that the joints will be gas tight. Leave all bolts loose.

7 Run the engine until the exhaust system is at normal temperature and then, with the engine running at idling speed, tighten all the mounting bolts and clips, starting at the manifold and working towards the rear silencer. Take care to avoid touching any part of the system with bare hands because of the danger of painful burns.

8 With all bolts and clips tightened, it is important to ensure that there is no strain on any part of the system.



19.10 Exhaust downpipe-to-manifold flange connection - 1.3 litre



20.2 VW tool 3049A used to release and fit exhaust downpipes to manifold clips - 1.6 and 1.8 litre

