Chapter 16
Solex 32/34 & 34/34 Z1 (CISAC)

Manufacturer	Peugeot	Peugeot	Peugeot
Model	405 1.9 & 4x4	405 1.9	405 1.9 Auto
Year	1988 to 1992	1990 to 1992	1990 to 1992
Idle speed (rpm)	750 ± 100	750 ± 100	750 ± 50
Fast idle speed (rpm)	2400	2200	2200
CO @ idle (% vol)	0.8 to 1.5	0.8 to 1.5	0.8 to 1.5

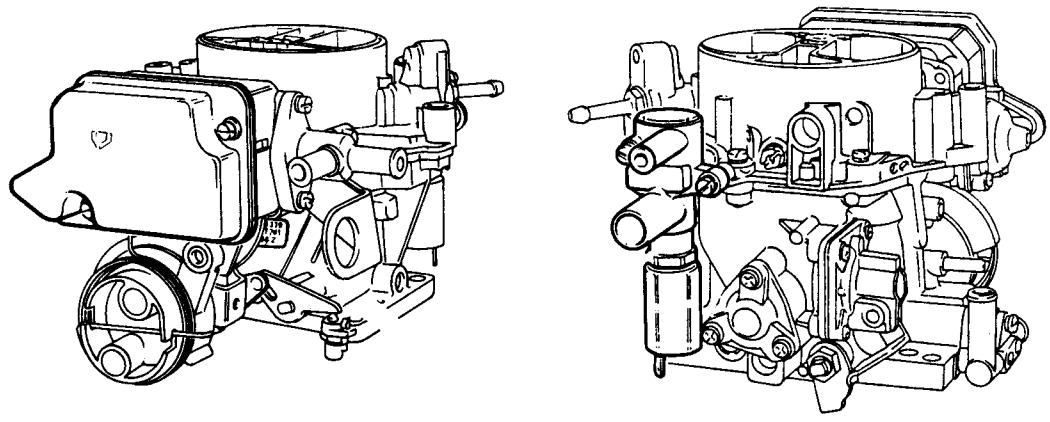


Fig. 16.1 Solex Z1 carburettor (Sec 1)

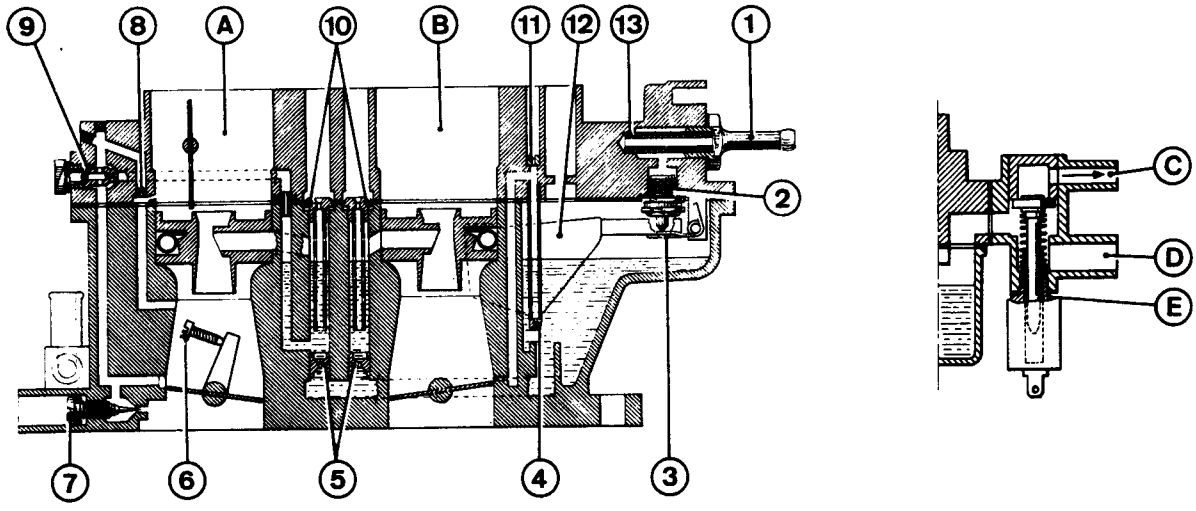


Fig. 16.2 Main and idle circuits (Sec 1)

1 *Fuel inlet connection*
2 *Float needle valve*
3 *Inner float tag*
4 *Progression fuel jet – secondary venturi*
5 *Main jets – primary and secondary venturi*
6 *Throttle stop screw*
7 *Idle mixture control screw*
8 *Idle air jet*
9 *Idle fuel jet*
10 *Combined air corrector jet with emulsion tube – primary and secondary venturis*
11 *Progression air jet – secondary venturi*
12 *Float*
13 *Fuel filter*
A *Primary venturi*
B *Secondary venturi*
C *Float chamber vent – air filter*
D *Float chamber vent – atmosphere*
E *Electrical vent valve*

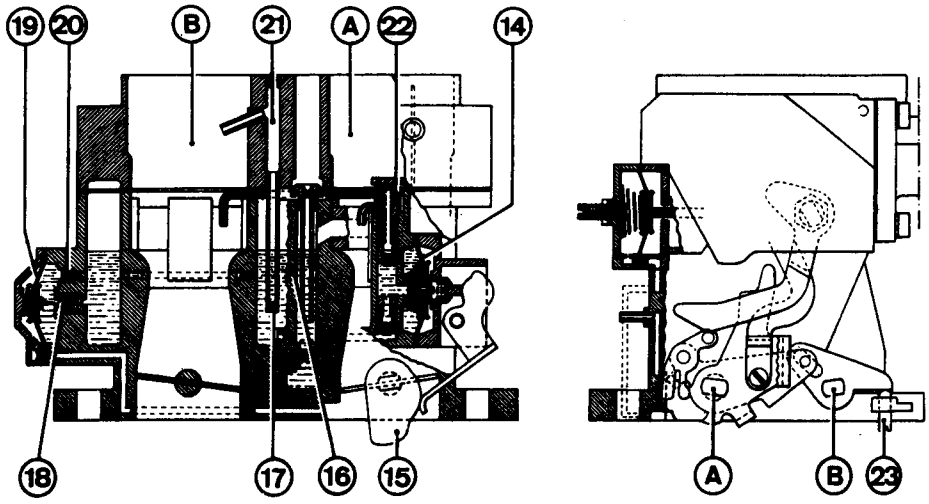


Fig. 16.3 Accelerator pump, part- and full-load enrichment circuits (Sec 1)

14 *Accelerator pump diaphragm*
15 *Accelerator pump cam*
16 *Fuel channel to main well – part-load enrichment*
17 *Fuel supply tube – full-load enrichment*
18 *Inlet ball valve – part-load enrichment*
19 *Diaphragm*
20 *Calibrated part-load enrichment jet*
21 *Full-load enrichment tube*
22 *Accelerator pump injectors*
23 *Throttle stop screw – secondary throttle plate*
A *Primary venturi*
B *Secondary venturi*

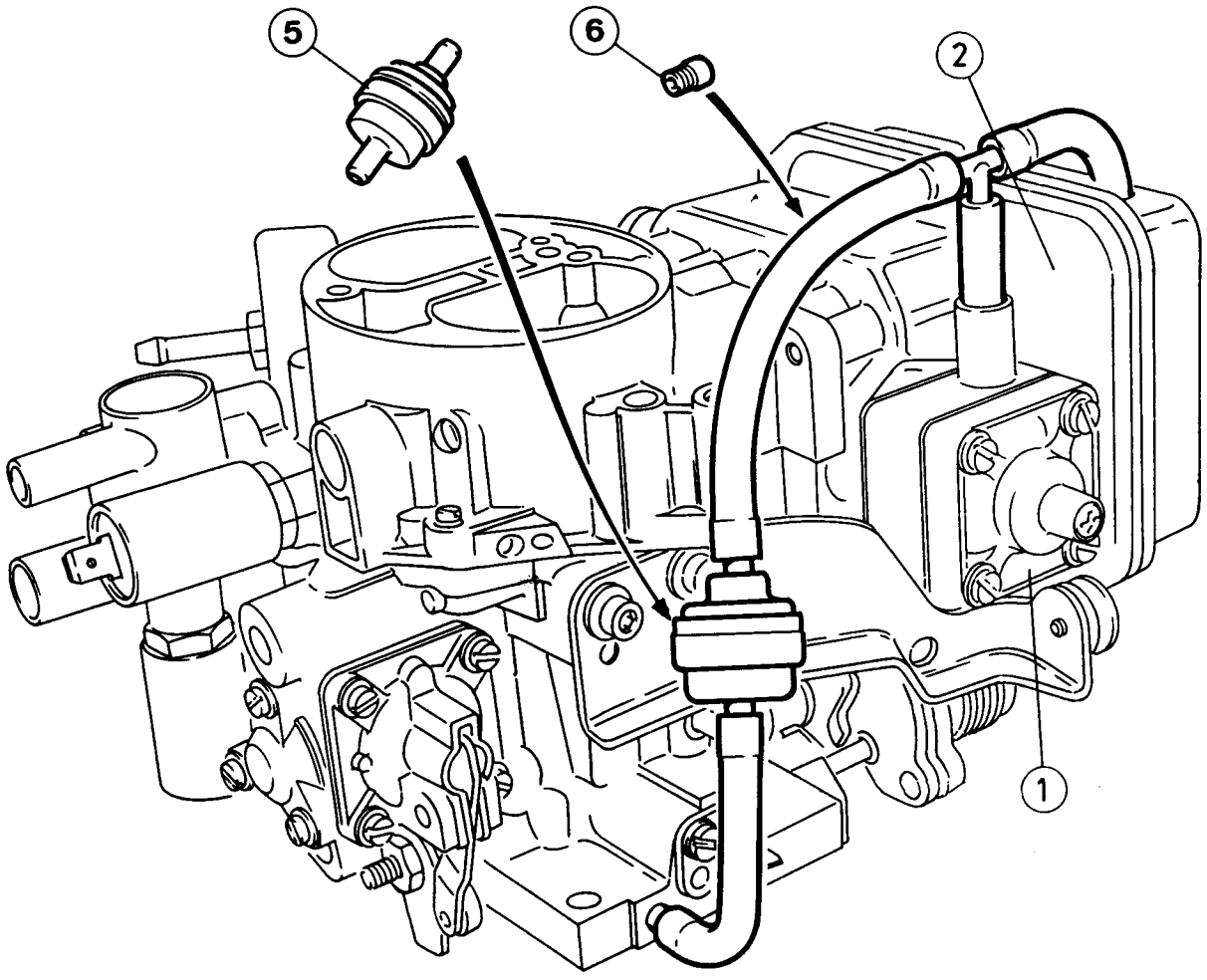


Fig. 16.4 Choke two-stage pull-down components (Sec 1)

1 Pull-down assembly 2 Reservoir (some variations) 5 Delay valve 6 Restrictor

level in the float chamber is controlled by a needle valve and plastic float assembly. An anti-vibration ball is incorporated into the needle valve design.

The float chamber utilises a dual-venting arrangement, operated by an electrical vent valve. Venting is to atmosphere with the engine shut down, but once the ignition is switched on, the valve closes off the atmospheric vent. This allows the float chamber to vent into the upper air intake, which is on the clean-air side of the air filter.

A calibrated fuel return system is provided on some variations, to ensure that relatively cool fuel is supplied to the carburettor.

Idle, slow running and progression

Fuel, sourced from the main well, passes into the idle channel through a metered idle jet. Here it is mixed with a small amount of air from a calibrated air bleed, and the resulting emulsion is drawn through a channel, to be discharged from the idle orifice under the primary throttle plate. A tapered mixture screw is used to vary the outlet, and this ensures fine control of the idle mixture.

A progression slot provides enrichment as it is uncovered by the opening throttle during initial acceleration.

The idle speed is set by an adjustable screw. The adjustable mixture screw is tamperproofed at production level, in accordance with emission regulations.

Idle cut-off valve (some variations)

An idle cut-off valve is used to prevent run-on when the engine is shut down. It utilises a 12-volt solenoid plunger to block the idle jet when the ignition is switched off.

Accelerator pump

The Solex Z1 accelerator pump is controlled by a diaphragm, and is mechanically operated by a lever and cam attached to the primary throttle linkage. During acceleration, fuel is pumped through a ball valve, located in the pump injector, where it is discharged into both primary and secondary venturis. The inlet ball valve is located in a channel from the float chamber; excess fuel/air mixture is returned to the float chamber through a separate fuel channel.

Main circuit

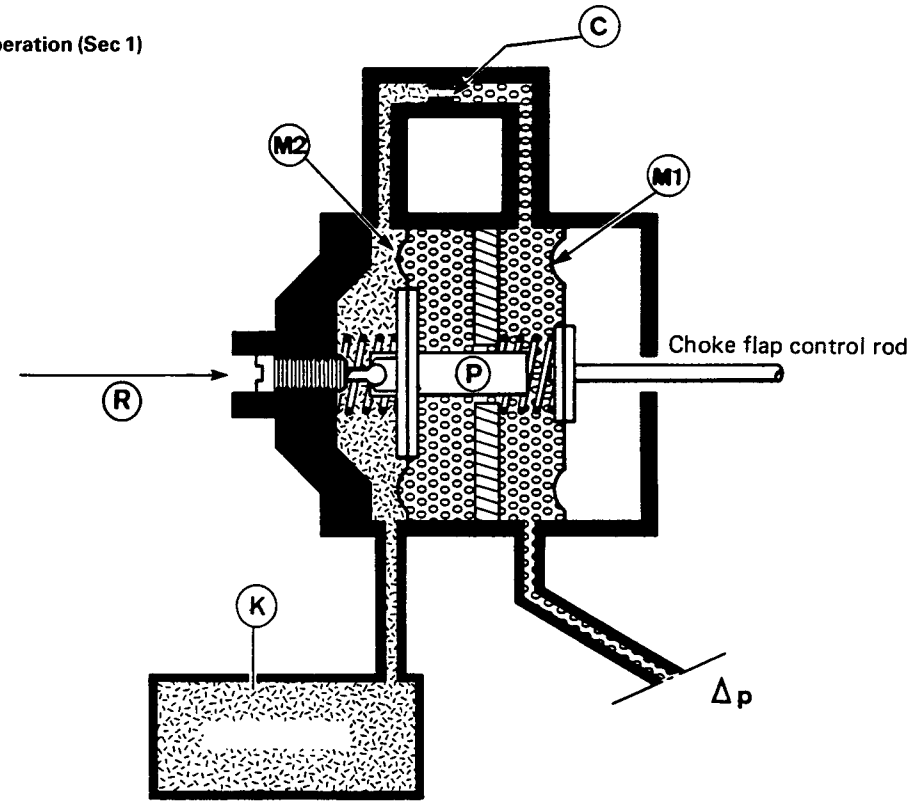
The amount of fuel discharged into the airstream is controlled by a calibrated main jet. Fuel is drawn through the main jet, into the base of a vertical well which dips down into the fuel in the float chamber; an emulsion tube is placed in the well. The fuel is mixed with air, drawn in through the air corrector and through the holes in the emulsion tube. The resulting emulsified mixture is discharged from the main orifice through an auxiliary venturi.

Part-load enrichment (power valve)

Fuel flows from the float chamber into the enrichment chamber, through a fuel channel and a brass inlet valve. An air passage is taken from under the throttle plate to the cover of the chamber. At idle, and during light-throttle operation, manifold vacuum draws the diaphragm back against spring pressure. The diaphragm pintle is withdrawn from the valve, and the spring-loaded ball seats to close off the inlet channel. Under acceleration and wide-open throttle operation, the vacuum in the manifold is depleted. The diaphragm returns under spring pressure, and

Fig. 16.5 Choke two-stage pull-down operation (Sec 1)

C Restrictor
K Reservoir
M1 Stage 1 diaphragm
M2 Stage 2 diaphragm
P Stop rod
p1 Inlet manifold vacuum
p2 Carburettor vacuum
R Adjustment screw
V Delay valve



the power diaphragm pintle pushes the ball to open the inlet valve. Fuel then flows through the valve into the enrichment chamber; from here, it passes through a calibrated jet into a fuel channel leading to the primary main well. The fuel level rises in the well, and the fuel mixture is enriched.

Secondary action

Once the primary throttle valve is about two-thirds open, the secondary throttle plate will begin to open. At full-throttle, the linkage is arranged so that both throttle plates will be fully open.

A progression circuit is used to prevent hesitation as the secondary throttle plate starts to open. An emulsified mixture is discharged into the secondary venturi, via a progression drilling, at the initial opening of the secondary throttle plate.

Once the secondary throttle plate has opened, the action of the secondary main circuit is similar to the primary circuit.

When the choke is operating, a tag on the lever locks the secondary throttle operating linkage, and secondary throttle operation on choke is thus avoided.

Full-load enrichment

At full-load and high engine speeds, the velocity of air creates a depression sufficient to raise fuel from the float chamber into a channel. The fuel then passes through a calibrated bushing, to the upper section of the air intake. Here it is mixed with a small amount of air from a calibrated air bleed, and the emulsified mixture is discharged into the airstream from the full-load enrichment nozzle.

Choke operation

The Z1 carburettor uses an automatic choke starting system. A thermostatic capsule is used to control a strangler choke flap arranged in the primary air intake. Heating of the capsule is by coolant from the engine cooling system.

Fast idle is achieved when a lever (with an adjustable screw) butts against the capsule and pushes upon the throttle valve mechanism. As the capsule is heated, and the lever is released, the idle speed will progressively return to normal.

Choke pull-down

Once the engine has fired, the choke flap must open slightly, to weaken the mixture and avoid flooding during idle and light-throttle operation. This is achieved by using manifold vacuum to actuate a pull-down diaphragm. A linkage attached to the diaphragm will then pull upon the choke flap.

Early versions of the Z1 utilised a single-stage pull-down unit, whereas later versions used a two-stage pull-down system. Carburettors with the two-stage pull-down system (and later versions of the single-stage pull-down unit) employ a vacuum reservoir attached to the choke mechanism. As vacuum empties the reservoir, a stronger depression is formed to pull upon the choke diaphragm, and this further aids pull-down operation.

The two-stage pull-down system functions as follows – refer to Fig. 16.5. When starting the engine from cold, the choke flap fills the carburettor upper air intake, and the pull-down diaphragms are held back by spring pressure. Once the engine has started, vacuum will pull diaphragm M1 against stop rod P to move the choke flap control rod and complete the pull-down first stage. As the engine continues to run, vacuum increases and passes through restriction C to empty reservoir K. In turn, diaphragm M2 is moved against the position of adjusting screw R. Diaphragm M1 will follow the movement of M2 to move the choke flap control rod and complete the pull-down second stage. Vehicles with automatic transmission may employ an additional vacuum signal. This relays vacuum from the carburettor base, via a delay valve and restrictor, to further aid the emptying of the reservoir K.

2 Identification

The Solex identification code is stamped on a metallic tag, attached to the cover by an upper body fixing screw. The tag quotes the Solex part number and the vehicle manufacturer part number, and identifies the carburettor type. Later carburettors may have this information stamped upon the carburettor body.

F13 379	*Solex part number*
CIT 391	*Vehicle manufacturer part number*
32-34 Z1	*Carburettor type*

Where the tag is missing, refer to Chapter 2, Section 1 for other ways of identifying the carburettor.

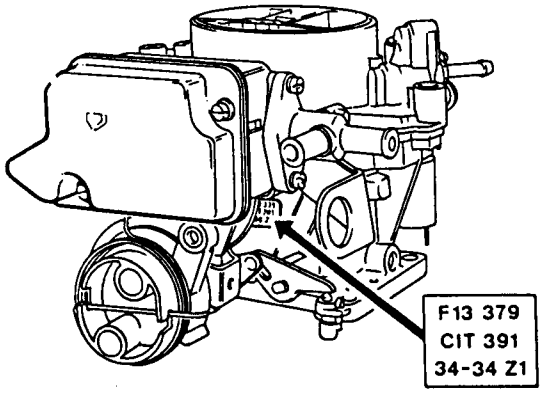


Fig. 16.6 Identification markings (Sec 2)

3 General servicing

Read this Chapter in conjunction with Chapter 2, which describes some of the operations in more detail. It is assumed that the carburettor is removed for this service. However, many of the operations can be tackled with the carburettor in place. Where this is undertaken, first remove the carburettor upper body, and soak the fuel out of the float chamber using a clean tissue or soft cloth.

Dismantling and checking

1 Remove the carburettor from the engine (refer to Chapter 2, Section 2 for general advice on removing a carburettor).
2 Check the carburettor visually for damage and wear (refer to Chapter 2, Section 3).
3 Remove the idle cut-off valve assembly (where fitted), and clean it with carburettor cleaner. Test the plunger operation by connecting the valve to the battery or other voltage supply (or use the valve supply wire in the engine compartment). Touch the valve body to earth with the ignition 'on'. Repeat this several times, and ensure that the plunger tip advances and retracts cleanly. Renew the valve if the action is faulty, if cleaning does not improve its operation.
4 Detach the throttle spring, then remove the two screws and take off the throttle drum.
5 Remove the pin and spring assembly that holds the fast idle lever to the throttle lever. Note the arrangement of the throttle and fast idle levers for ease of reassembly later.
6 Remove the five screws, and detach the carburettor upper body. Remove and inspect the O-ring.
7 Inspect the float chamber for corrosion and calcium build-up.
8 Tap out the float pin, and remove the float, needle valve and float chamber gasket.
9 Use a straight edge to check for distorted flanges on all facing surfaces.
10 Check that the anti-vibration ball is free in the valve end.
11 Check the needle valve tip for wear and ridges.
12 The float should be checked for damage and ingress of petrol.
13 Renew the float pin if it shows signs of wear.
14 Unscrew the fuel inlet tube, and inspect the fuel filter. Clean the filter housing of debris and dirt, and renew the filter if necessary.
15 Remove the mixture screw, and inspect the tip for damage or ridges.
16 The accelerator pump injector is a push fit in the body. Carefully prise it from its location, and test it by shaking it. No noise from the outlet ball would indicate that the valve is seized.
17 Remove the four screws, and detach the accelerator pump cover, diaphragm and spring. Check the diaphragm for fatigue and damage.
18 Remove the idle jet from the upper body.
19 Unscrew the primary and secondary combined air corrector and emulsion tubes.
20 Use a long thin screwdriver to unscrew the main jets - they are located at the bottom of the emulsion tube wells. Invert the carburettor over a cupped hand to catch the jets as they fall out of the wells. **Note:** *The primary main jet is located on the power valve side of the carburettor, and the secondary main jet is located on the choke side of the carburettor.*
21 Note the sizes and locations of all the jets, for correct installation during reassembly.
22 Check the jet calibration against the specifications. It is possible that the jets may have been transposed (or the wrong size fitted) during the last overhaul.
23 Check that the channels from the float chamber into the emulsion tube wells are clear.
24 Remove the three screws, and detach the power valve housing cover, spring and diaphragm from the body. Check the diaphragm for fatigue and damage.
25 The brass outlet (power) valve is cast into the body, and is not removable. The ball in the outlet valve should seal the outlet. Depress and release the ball with a small screwdriver, and it should move smoothly in and out.
26 Unscrew and remove the small power jet from inside the power valve housing. Check that the channel into the emulsion tube well is clear.
27 Do not disturb the adjustment of the secondary throttle angle, unless absolutely necessary.
28 Remove the fixing screw and remove either the electrical throttle body heater or the heating flange.
29 Remove the four screws, and detach the choke pull-down cover, spring and diaphragm from the housing. Check the diaphragm for fatigue.
30 Remove the two screws, and detach the choke mechanism reservoir (or plain cover if fitted). Inspect the O-ring for damage.
31 Clean the jets, carburettor body assemblies, float chamber and internal channels. An air line may be used to clear the internal channels once the carburettor is fully dismantled. **Warning:** *If high-pressure air is directed into the channels and passages with the diaphragms still in place, diaphragm damage may result.* Spraying carburettor cleaner into all the channels and passages in the carburettor body will often clear them of gum and dirt.

Reassembly

During reassembly, a complete set of new gaskets should be fitted. Also renew the needle valve, the float pin, and all diaphragms. Inspect and renew (where necessary) the mixture screw, main jet, air corrector/emulsion tubes, idle jet, and the accelerator pump injector. Renew worn linkages, screws, springs, and other parts where necessary.

Ensure that all the jets are firmly locked into their original positions (but do not over-tighten). A loose jet can cause a rich (or even lean) running condition. Clean all mating surfaces and flanges of old gasket material, and reassemble with a new gasket. Ensure that housings are positioned with their air and fuel routes correctly aligned.

1 Refit the choke diaphragm and spindle assembly to the choke housing. Refit the spring and cover, and secure with the four screws.
2 Check that the secondary throttle plate is fully closed. The adjustment screw should not normally be used to alter the throttle plate position. Where a throttle setting gauge is available, use it to set the throttle angle; the correct angle is 9°. In the absence of a setting gauge, the screw can be adjusted so that the throttle plate is open just enough to prevent its seizure in the throttle body.
3 Refit the coolant heating flange (where used), and secure with the screw.
4 Refit the electrical throttle body heater (where used). Take care (if the throttle body heater is of the type shown in Fig. 16.8) that the component parts are fitted as shown. An incorrectly-assembled heating resistance may result in a short circuit to earth. Later versions of the Z1 utilise a unitary-construction heater.
5 Refit the power jet into its original position.
6 Refit the power diaphragm, spring and cover assembly, and secure with the three screws.
7 Refit the main jets and emulsion tube/air correctors into their original positions (do not transpose the jets).
8 Refit the idle jet into the upper body, and lock it firmly into position.
9 Refit the accelerator pump spring, diaphragm and cover assembly, and secure with the four screws.
10 Carefully refit the accelerator pump injector, after renewing the small seal on the injector body.
11 Refit the idle mixture screw, after renewing the small seal. Turn the screw in gently, until it just seats. From this position, unscrew it two full turns - this will provide a basic setting, to allow the engine to be started.

Fig. 16.7 Exploded view of Solex Z1 carburettor (Sec 3)

1 *Upper body*
2 *Fuel inlet filter*
3 *Float pin*
4 *Float*
5 *Needle valve*
6 *Idle jet (primary)*
7 *Float chamber vent valve*
10 *Idle mixture control screw*
11 *Accelerator pump diaphragm*
13 *Pump injector*
15 *O-ring*
16 *Emulsion tube and air corrector – primary venturi*
17 *Emulsion tube and air corrector – secondary venturi*
18 *Main jet – primary venturi*
19 *Main jet – secondary venturi*
21 *Tamperproof cap*
22 *Float chamber gasket*
23 *Main body*
24 *Throttle body heater flange – coolant water type*
27 *Choke housing*
28 *Thermostatic capsule*
29 *Choke coolant housing*
30 *Choke pull-down diaphragm*

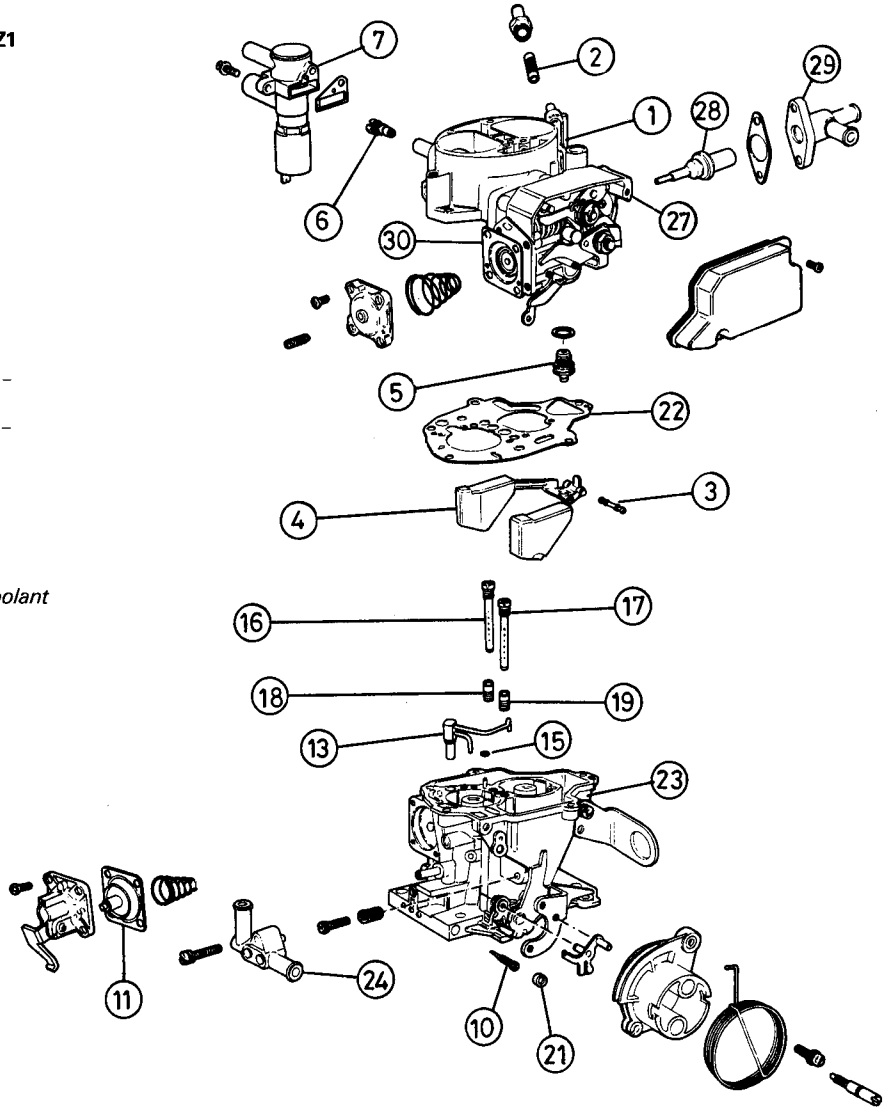
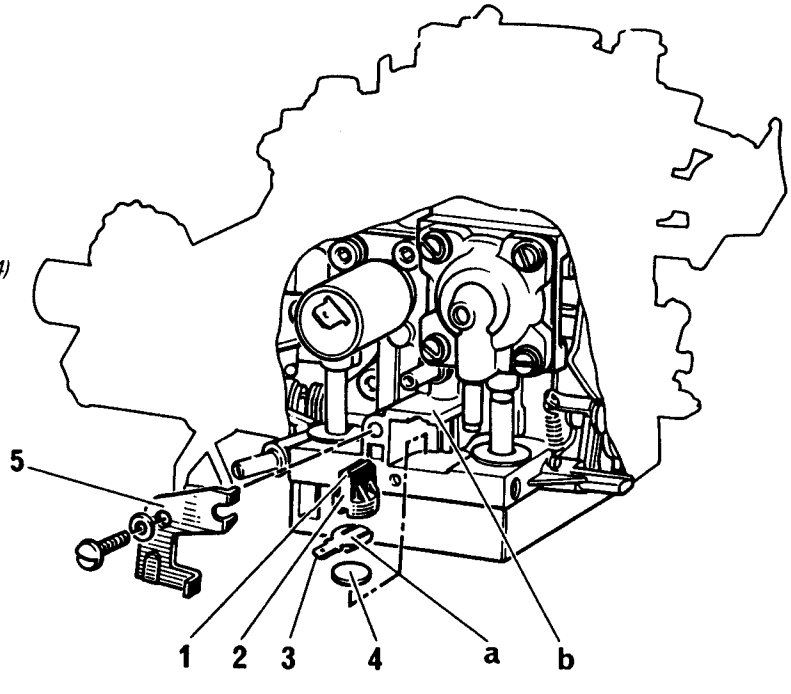


Fig. 16.8 Installation of throttle body heater (Sec 3)

1 *Positioning pin*
2 *Spacer*
3 *Connecting terminal*
4 *Resistance*
5 *Securing lug*
a *The tab 'a' must be on the same side as the resistance (4)*
b *Carburettor*



12 Clean or renew the fuel filter, and refit the fuel inlet tube with a new sealing washer.
13 Locate a new float chamber gasket in position on the upper body.
14 Fit the new needle valve assembly, using a new sealing washer. Ensure that it is firmly locked into position (but do not over-tighten). Refit the float, and secure with the float pin.
15 Adjust the float level with reference to Section 4.
16 Renew the upper body O-ring, then refit the upper body to the main body, and secure with the five screws. Reconnect the fast idle lever to the throttle lever, and secure with the pin and spring. Attach the throttle drum, and secure with the two screws. Refit the throttle spring to the drum, and check that the tension is sufficient to actuate the throttle successfully.
17 Refit the idle cut-off valve (where used).
18 Ensure that the choke flap and linkage move smoothly and progressively, and inspect the operating mechanism for stickiness and wear.
19 Renew the choke mechanism O-ring, then refit the reservoir (or plain cover) to the choke mechanism, and secure with the two screws.
20 Adjust the choke fast idle and pull-down with reference to Section 4.
21 Refit the carburettor to the engine (refer to Chapter 2, Section 2 for general advice on installing a carburettor).
22 Always adjust the carburettor idle speed and mixture after any work has been carried out on the carburettor – preferably with the aid of a CO meter. Refer to Section 4 for details.

4 Service adjustments

Adjustment pre-conditions

Refer to Chapter 2, Section 4 for general advice on the pre-conditions for correct adjustment of this carburettor.

Idle speed and mixture (CO)

1 Run the engine at 3000 rpm for 30 seconds to clear the manifold of fuel vapours, then allow the engine to idle.
2 Use the idle speed screw to set the specified idle speed (refer to the specifications at the start of this Chapter).
3 Check the CO level; if incorrect, remove the tamperproof plug and adjust the idle mixture screw to obtain the correct level. Turning the screw clockwise (inwards) will reduce the CO level, and turning the screw anti-clockwise (outwards) will increase the CO level. *Refer to Chapter 2, Section 4 for a method of setting the idle mixture without the aid of a CO meter.*
4 Repeat paragraphs 2 and 3 until *both* adjustments are correct.
5 Clear the manifold every 30 seconds during the setting operation by running the engine at 3000 rpm for 30 seconds.
6 Increase the speed to 2000 rpm, and note the CO reading. The 'cruise' reading should be less than half the idle CO reading.
7 Fit a new tamperproof plug to the mixture control screw on completion.

Float level

8 Invert the upper body, so that the float faces upwards and the needle valve is depressed.
9 Measure the distance between the upper body (with its gasket) and the upper face of the plastic float (refer to the specifications for the correct float level).
10 Adjust as necessary by bending the inner float tag (1) in Fig. 16.10.
11 The upper faces of the float should not differ in height by more than 1 mm. Adjust by bending the float arms if necessary.

Automatic choke

12 Allow the temperature of the thermostatic capsule to stabilise for a minimum of 30 minutes at an ambient temperature of 20°C; all Z1 choke adjustments should be undertaken at this temperature. **Note:** *At the time of writing, adjustment specifications were not available for all the Z1 carburettors covered by this Chapter.*

Single-stage pull-down unit

13 Remove the two screws, and detach the choke mechanism reservoir (or plain cover if fitted).

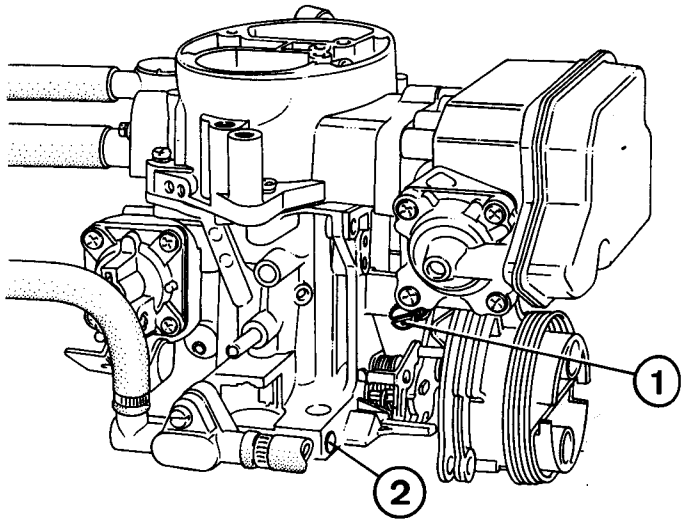


Fig. 16.9 Idle adjustment screws (Sec 4)

1 Idle speed adjustment screw
2 Idle mixture control screw

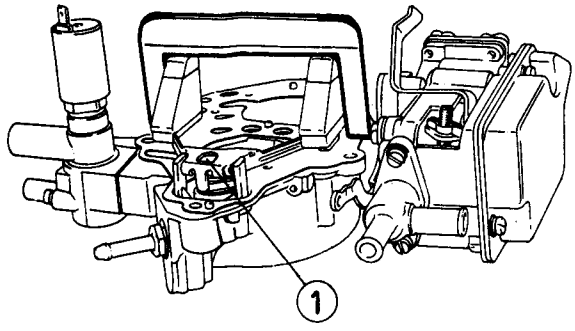


Fig. 16.10 Float level adjustment (Sec 4)

1 Inner float tag

14 Refer to Fig. 16.11, and measure dimension (a); the correct measurement at 20°C is 27.6 mm.
15 If adjustment is necessary, insert a screwdriver into aperture (d) shown in Fig. 16.12. Adjust by turning screw (5) in Fig. 16.13 in the appropriate direction.
16 To carry out the following fast idle adjustment, the carburettor must be removed from the engine. Refer to Chapter 2, Section 4 for a method of setting the fast idle speed without removing the carburettor.
17 Use the shank of a twist drill to measure the gap (b) in Fig. 16.14 between the wall of the throttle bore and the throttle plate. The correct clearance at 20°C is 0.45 mm.
18 Adjust as necessary by turning the fast idle adjustment screw (4) in Fig. 16.11 in the appropriate direction.
19 Use thin-nose pliers to push the diaphragm operating rod up to its stop. At the same time, use the shank of a twist drill to measure the pull-down gap between the upper section of the choke flap and the air intake. Refer to the specifications for the required drill size. Where data is not available, adjust to 6.0 mm at 20°C.
20 Remove the plug in the diaphragm cover (loosen the locknut, where applicable) and adjust as necessary by turning the adjustment screw in the appropriate direction. Tighten the locknut and renew the plug when adjustment is complete.
21 Open the throttle so that the primary throttle plate is fully open. At the same time, use the shank of a twist drill to measure the gap between

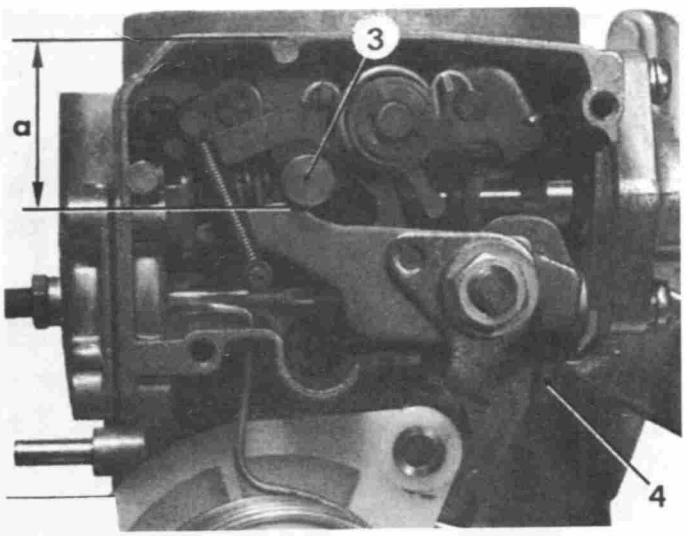


Fig. 16.11 Choke thermostatic capsule dimension 'a' (Sec 4)

a Refer to text
3 Roller
4 Adjustment screw for fast idle clearance 'b' (Fig. 16.14)

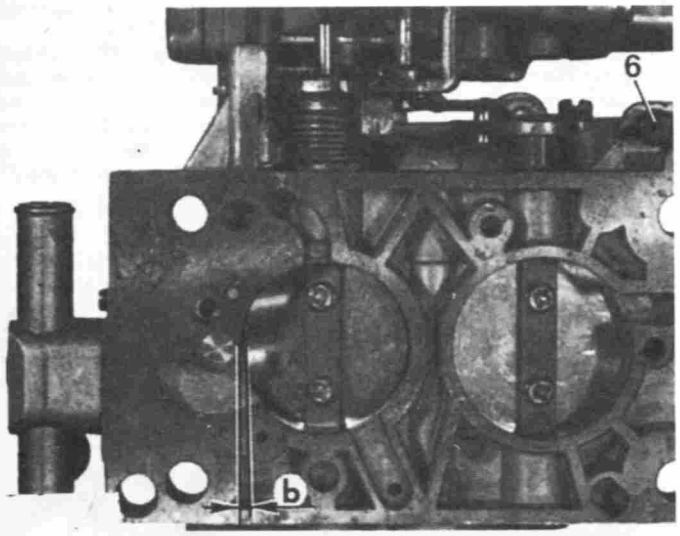


Fig. 16.14 Fast idle clearance (Sec 4)

b Measure the fast idle clearance with a twist drill – adjust with screw '4' (Fig. 16.11)
6 Secondary throttle stop screw – do not adjust; for information only

the upper section of the choke flap and the air intake. The correct clearance at 20°C is 8 mm.

22 Adjust as necessary by bending the fork lugs (4) in Fig. 16.17 in the appropriate direction. Opening the fork lugs will increase the clearance, and closing the fork lugs will decrease the clearance.

23 Renew the O-ring, then refit the reservoir (or plain cover) to the choke mechanism, and secure with the two screws.

24 **Note:** *It is also possible to check and adjust the choke with the engine running, using a special tool – Citroen part number OUT 10 4066-T; Peugeot part number 0143 ZZ.*

Two-stage pull-down unit

25 Carry out paragraphs 13 to 17 above.

26 Use thin-nose pliers to push the diaphragm operating rod until a

Fig. 16.12 Adjustment aperture for dimension 'a' (Sec 4)

d Insert screwdriver here and adjust screw '5' (Fig. 16.13)



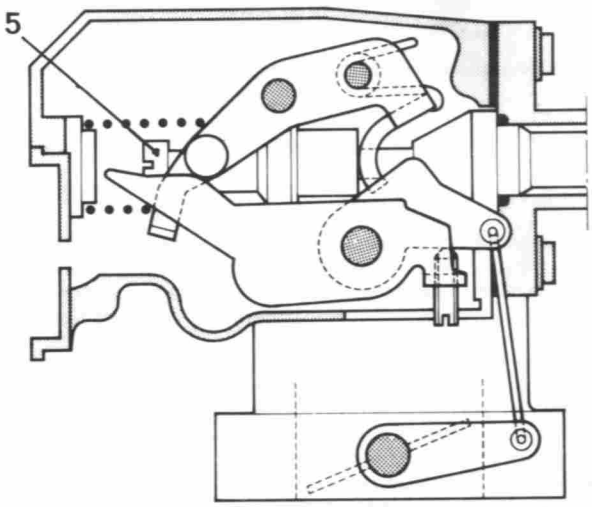


Fig. 16.13 Adjustment screw for dimension 'a' (Sec 4)

5 Adjust dimension 'a' by turning the screw in the appropriate direction

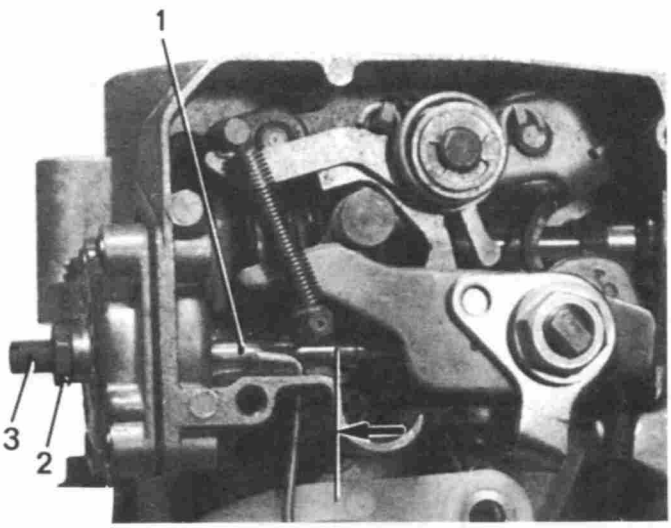


Fig. 16.15 Measurement of choke pull-down clearance (Sec 4)

1 Push the diaphragm operating rod in the direction of the arrow
2 Locknut (where used)
3 Pull-down adjustment screw

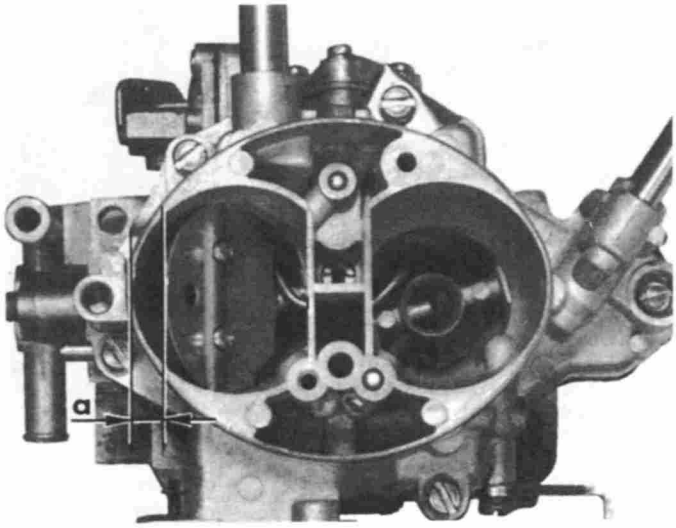


Fig. 16.16 Measurement of choke pull-down or dechoke clearance (Sec 4)

a Clearance – use drill of correct diameter

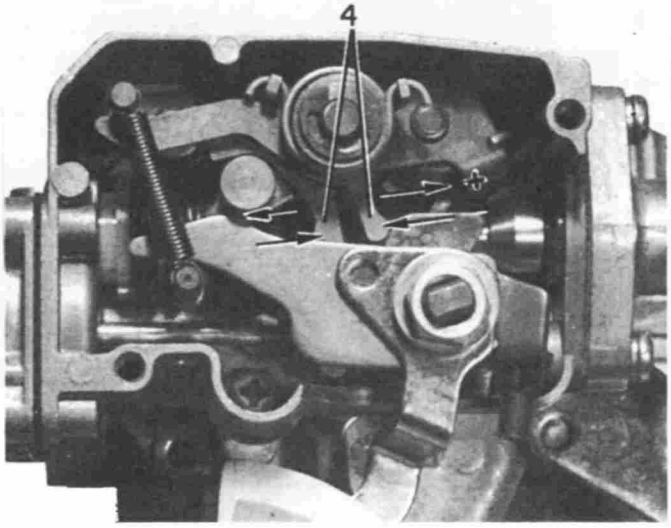


Fig. 16.17 Measurement of dechoke clearance (Sec 4)

4 Bend the adjustment fork lugs in the appropriate direction

resistance is felt. At the same time, use the shank of a twist drill to measure the pull-down gap between the upper section of the choke flap and the air intake. **Note:** *Stage one is not adjustable, and no data was available at the time of writing – make a note of the stage one gap, and compare with that for stage two.*

27 Use the thin-nose pliers to push the diaphragm operating rod fully up to its stop. At the same time, use the shank of a twist drill to measure the pull-down gap between the upper section of the choke flap and the air intake. Refer to the specifications for the required drill size.

28 Remove the plug in the diaphragm cover and adjust stage two, as necessary, by turning the adjustment screw in the appropriate direction. Renew the plug after adjustment is completed.

5 Component testing

Throttle body heater

1 With the ignition 'on', connect a voltmeter between the heater terminal and earth. If battery voltage is not obtained, check the wiring between the heater and ignition switch.

2 Disconnect the electrical connector to the heater, and connect a test lamp between the positive battery terminal and the connector terminal leading to the heater. If the lamp does not light, renew the heater. Take care (if the throttle body heater is of the type shown in Fig. 16.8) that the component parts are fitted as shown. An incorrectly-assembled heating resistance may result in a short circuit to earth. Later versions of the Z1 utilise a unitary-construction heater.

Float chamber vent valve

3 With the ignition 'on', connect a voltmeter between the valve terminal and earth. If battery voltage is not obtained, check the wiring between the valve and ignition switch.

4 Test the plunger operation by connecting the valve to a voltage

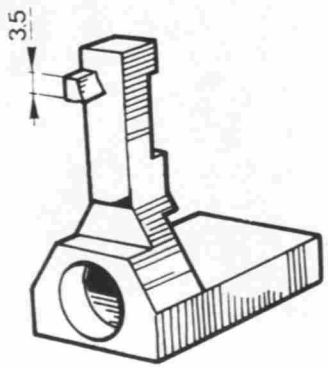


Fig. 16.18 Citroen/Peugeot special tool for engine-running choke adjustments (Sec 4)

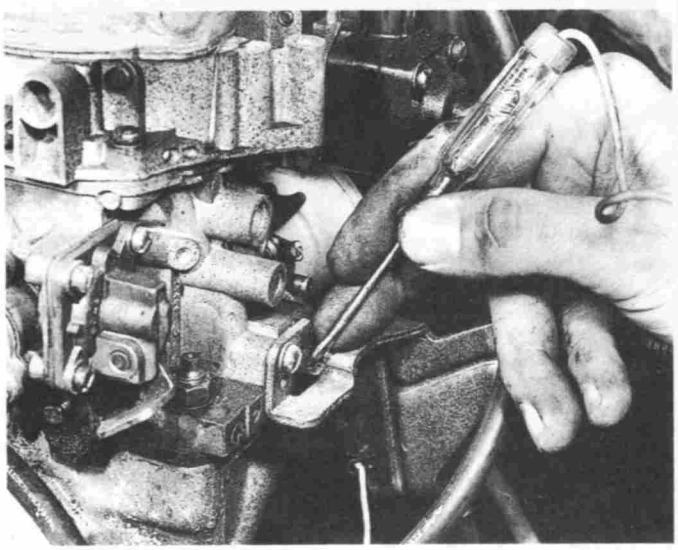


Fig. 16.19 Using a test lamp to test the throttle body heater (Sec 5)

supply; using a torch, peer into the valve through the lower connection spigot.
5 Dismantle and clean the valve if it does not actuate. Renew the valve if it is faulty, if cleaning does not improve its operation.

6 Fault diagnosis

Refer to Chapter 2, Sections 5 and 6 for diagnosis of general carburettor faults. The following faults are specific to the Solex Z1 carburettor.

Poor choke operation/poor cold starting

Failure of choke thermostatic capsule.
Poor O-ring seal between the choke reservoir and the body (where fitted).
Defective pull-down vacuum hose (where fitted).
Defective choke pull-down.
Also refer to *'Cold starting and warm-up problems'* in Chapter 2.