CARBURETOR AND THROTTLE LINKAGE ALL MODELS

CONTENTS

DESCRIPTION AND OPERATION

CARBURETOR

The two-barrel carburetor for all 1973 Opel1 1900, Manta and GT models is a down-draft carburetor with two barrels of 1.25 inch diameter each. It has an automatic choke and a secondary valve operated by a vacuum diaphragm, except when installed in an Opel GT. In the GT, the secondary throttle valve is operated by mechanical linkage from the primary throttle valve.

The two-barrel carburetor consists of three main parts - throttle body, float chamber and air horn. Each barrel is a separate system, but both barrels discharge into a common inlet in the intake manifold. The secondary barrel does not have a choke valve or an accelerator pump. See Figure 6E-2.

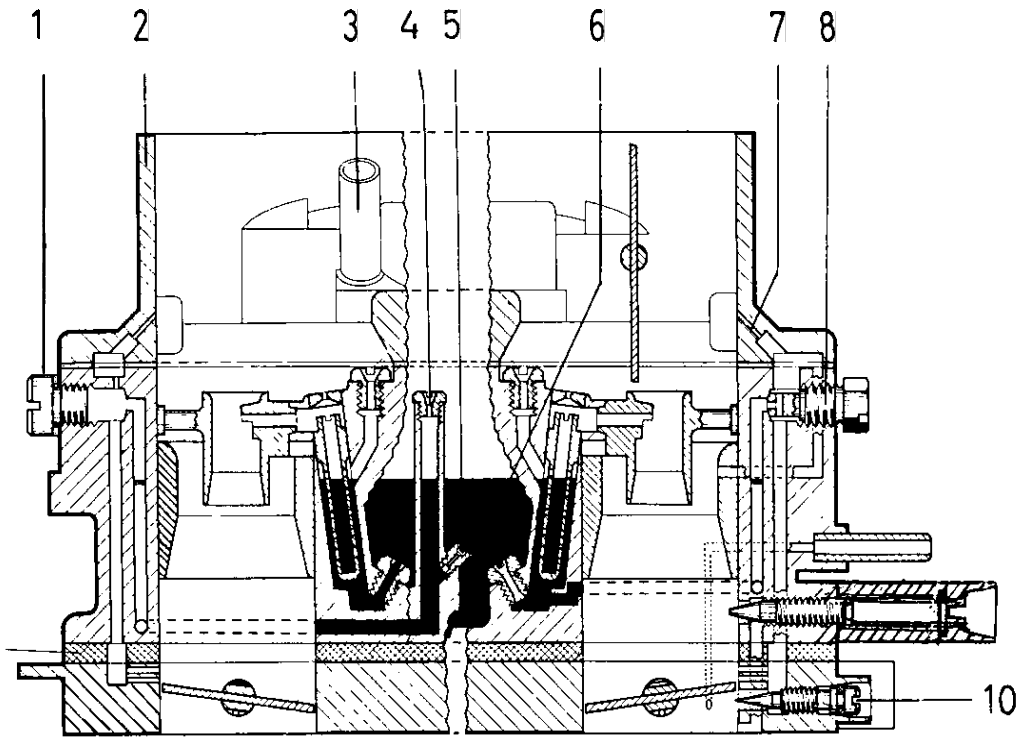
The throttle valve of the primary barrel is opened through the throttle linkage. When the primary throttle valve is almost open, at approximately half of the maximum engine RPM, the secondary throttle valve is opened by vacuum applied through a vacuum diaphragm case. See Figure 6E-3. The secondary throttle valve on the GT model is opened by mechanical linkage from the primary throttle shaft.

Choke System

The automatic choke is operated by a bi-metal spring. The tension of the spring - depending on temperature of the heater coil - decreases with rising temperature and the choke valve opens progressively until it is completely opened at engine operating temperature. The choke valve is off-set so that choke valve opening increases as air flow increases.

If the choke valve is closed, the throttle valve is opened slightly to provide a fast idle speed. This is done through a cam, abutment lever and throttle connecting link. With the throttle valve opened slightly, the vacuum during cranking can take effect up to the choke valve, thereby drawing ample fuel out of the main nozzle. See Figure 6E-4.

With rising temperature of the heater coil, the choke



Sectional View Of 19 US Carburetor (both barrels)

1 Plug (transition channels, secondary barrel)
2 Carburetor cover
3 Vent tube
4 Transition jet
5 Transition air jet
6 Float chamber
7 Idle air passage
8 Idle air jet
9 Idle air adjusting screw
10 Mixture adjusting screw

6E-1

Figure 6E-1 Sectional View of Primary and Secondary Barrels

valve gradually opens and the mixture becomes leaner. During this process, the abutment lever changes position on the fast idle cam, further closing the throttle valve until, the engine is at normal operating temperature, the choke valve is wide open and the throttle valve is in slow idle position.

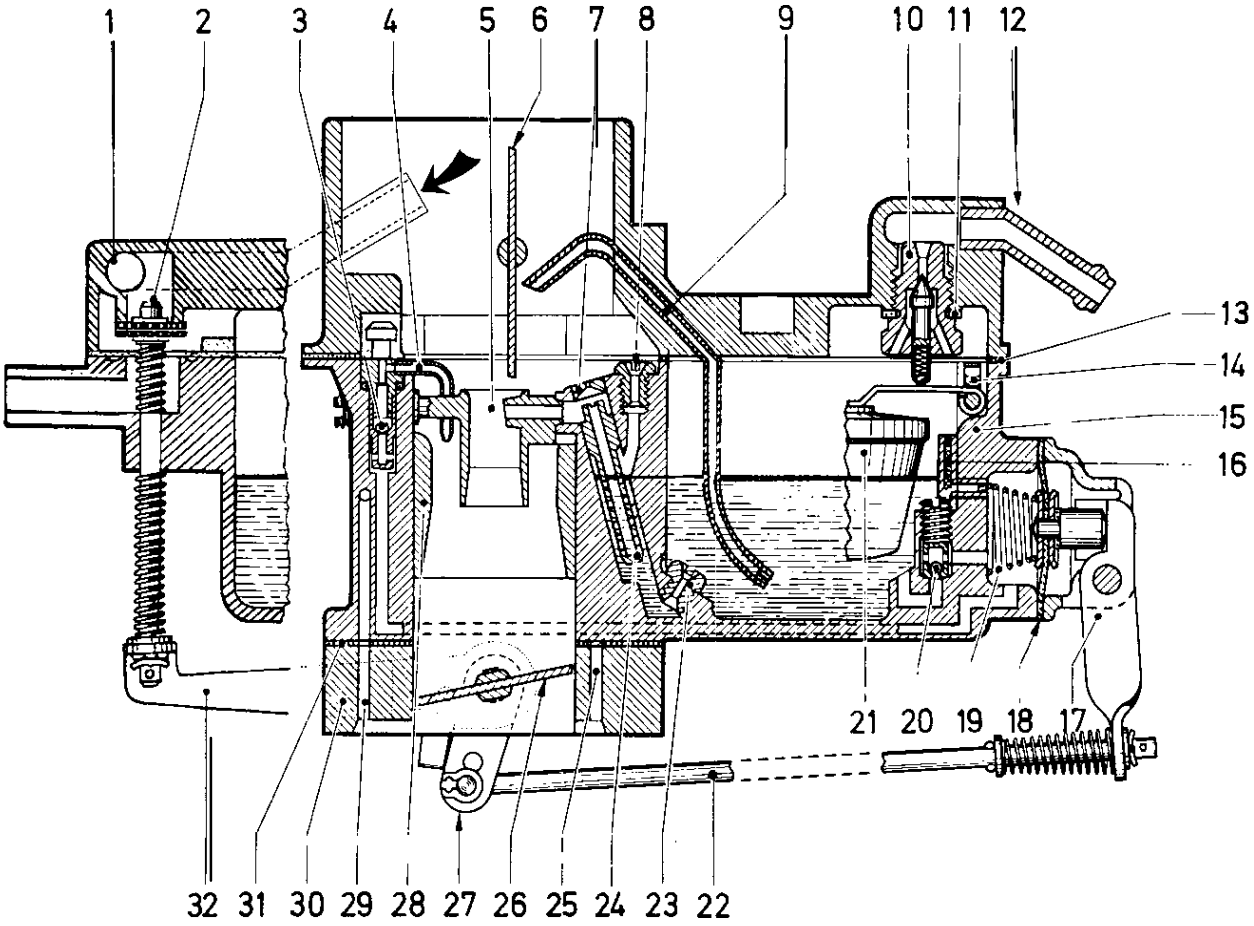
A choke diaphragm is connected to the intermediate lever of the choke valve spindle through a pull rod. The vacuum, which develops below the throttle valve, takes effect on the diaphragm through a vacuum passage. See Figure 6E-4. As soon as the engine starts, this vacuum pulls the choke valve slightly open; the amount of choke valve opening depends on the amount of vacuum, which depends on the engine load. Therefore, with a light engine load, the choke valve will open slightly; with a heavy engine load, the valve will close slightly to give a richer mixture as required for this engine load.

Before starting a cold engine slowly, depress the accelerator pedal three times before engaging the starter.

Idle and Part Throttle System

At engine idle and during low speed (part throttle) operation, fuel is drawn from the emulsion tube bore, controlled by the idle jet and mixed with air entering through idle air bleeds (Figure 6E-1) and ports in the throttle body. This mixture is drawn downward to the three ports near the throttle valve. When the throttle valve is closed, the mixture is drawn from the lowest port and mixed with air by-passing the throttle valve to form the idle mixture.

Turning the idle mixture screw (Figure 6E-1) inward results in a leaner mixture, and turning it out results



Sectional View Of Carburetor

1 Carburetor cover
2 Vent valve
3 Ball valve (pressure valve)
4 Injection tube
5 Primary venturi
6 Choke valve
7 Vent jet
8 Air correction jet
9 Enrichment
10 Float needle valve
11 Float needle valve seal ring
12 Fuel line connecting tube
13 Carburetor cover gasket
14 Leaf spring
15 Float chamber
16 Pressure reduction valve
17 Pump lever
18 Diaphragm
19 D iophragm spring
20 Ball valve (suction valve)
21 Float
22 Pump connecting rod
23 Metering jet
24 Emulsion tube
25 Bore without function
26 Throttle valve
27 Intermediate lever
28 Main venturl
29 Vacuum passage for automatic choke
30 Throttle valve body
31 Gasket
32 Vent valve lever

Figure 6E-2 Sectional View of Carburetor

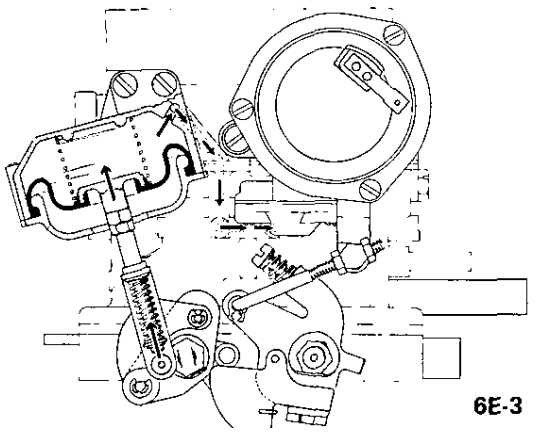


Figure 6E-3 Secondary Vacuum Diaphragm

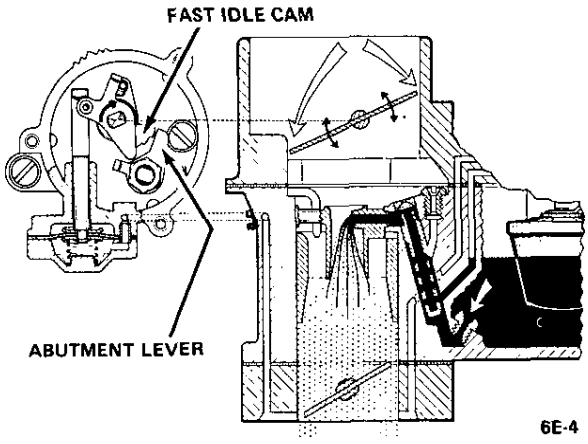


Figure 6E-4 Automatic Choke System

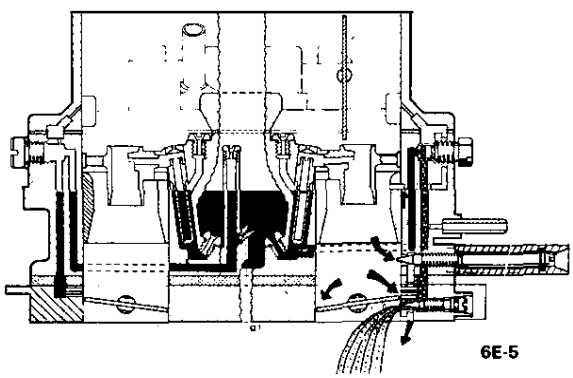


Figure 6E-5 Idle System

in a richer mixture. When the throttle valve is opened, fuel is also drawn from the upper ports, providing a good transfer from the idle system to the main metering jet system. See Figure 6E-5.

Main Metering Jet System

During high-speed operation, fuel is drawn from the float chamber through the main metering jet (Figure 6E-2) into the emulsion tube bore. The emulsion tube, which is provided with transverse bores, is inserted in the emulsion tube bore. Vacuum in the primary venturi (Figure 6E-2) draws fuel from the main nozzle. As the vacuum increases, the tendency is to draw too much fuel from the main nozzle, making the mixture too rich. To compensate for this tendency, the fuel level drops in the emulsion tube bore and more emulsion tube transverse bores are exposed. Air from the high speed air jet (Figure 6E-2) enters the emulsion tube through these transverse bores and mixes with the fuel. The more the fuel level drops, the more the transfer bores are exposed. This causes the air-fuel ratio to remain constant over the whole engine speed range. See Figure 6E-6.

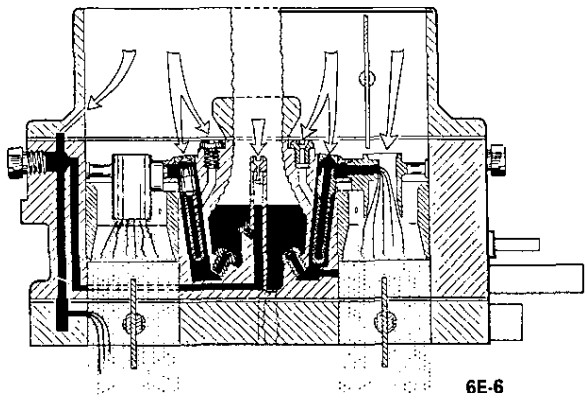


Figure 6E-6 High Speed System

The secondary valve diaphragm is operated by vacuum taken from the mixing chamber of the primary barrel on the Opel 1900 and Manta only. With the primary throttle valve almost open and with engine speed at approximately half of the maximum engine RPM, vacuum increases to such an extent that the secondary throttle valve starts opening from vacuum applied in the vacuum diaphragm case acting through a connecting rod and throttle valve lever. See Figure 6E-3.

Primary to Secondary Transfer System

In order to have a smooth engagement of the second-

ary barrel, it is provided with a transfer system. When the secondary throttle valve starts to open, two ports (which are normally just above the closed valve) are uncovered, causing fuel to feed into the secondary bore just before the secondary nozzle starts feeding. This provides for an additional enrichment of the air-fuel mixture at the beginning of full throttle operation. See Figure 6E-7.

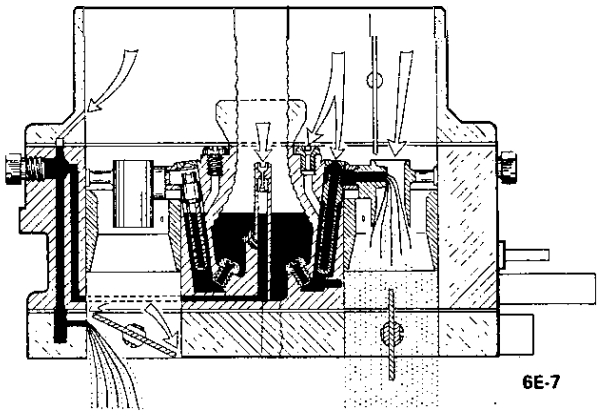


Figure 6E-7 Primary to Secondary Transfer System

Full Throttle Enrichment System

If the secondary throttle valve is fully opened, the vacuum in the throttle valve area is reduced so that the transfer ports (mentioned above) stop feeding. However, the vacuum increases greatly in the secondary venturi area. An enrichment tube which protrudes into the primary venturi area, feeds fuel continuously during full throttle operation. See Figure 6E-2.

Acceleration System

Whenever the throttle is closing, the suction stroke of the diaphragm pump causes fuel to flow from the float chamber through the inlet ball valve into the pump chamber. When the throttle valve is opened the diaphragm is moved inward by the pump connecting rod and the pump lever. Fuel is injected into the primary bore through the injector tube. The amount of fuel is determined by the pump stroke.

The inlet ball valve in the pump chamber prevents fuel from flowing back into the float chamber during the pressure stroke of the pump. The outlet ball valve prevents air from being drawn into the injector tube during the suction stroke of the pump. See Figure 6E-8.

Float Bowl Ventilation

While driving, the float bowl is ventilated from inside the carburetor. That is, the float bowl is connected through the vent valve with the area under the air cleaner.

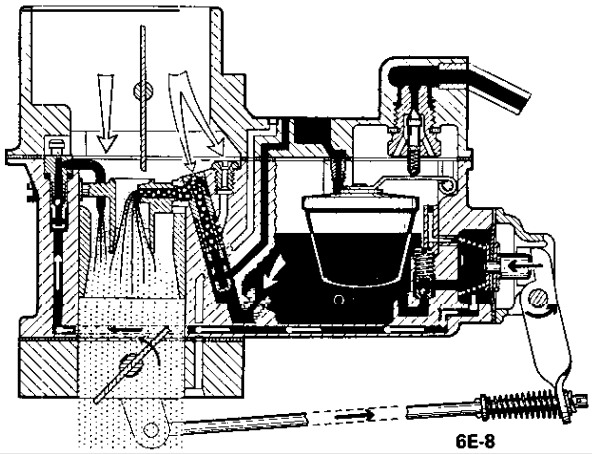


Figure 6E-8 Acceleration System

When the engine is idling or off, the ventilation from inside is cut off and ventilation from the charcoal canister is cut in. The upper spring now seats the valve on the upper seat. See Figure 6E-9.

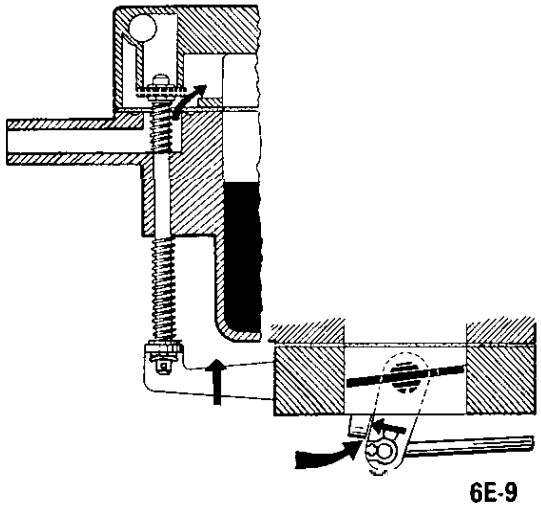


Figure 6E-9 Float Bowl Ventilation

The advantage of an inside vent while driving is that air cleaner restriction does not enrichen the air fuel mixture. The purpose of the charcoal canister vent while idling or after shutting-off a hot engine, is to prevent excess fuel vapors from entering the intake manifold and outside air. Excess fuel vapors may cause an idling engine to stall, or may make it difficult to restart a hot engine.

DIAGNOSIS

CARBURETOR

Condition I

Hesitation or Stall Upon Light Acceleration

Correction

1. Check spark plugs and plug gap. Plug gap should be .030 in.

2. Check dwell and timing.

3. Adjust carburetor.

4. Accelerator pump should discharge fuel between throttle plate and venturi wall with engine off. If aim is not correct, use needlenose pliers to slightly bend nozzle so proper aim is achieved. See Figure 6E- 10.

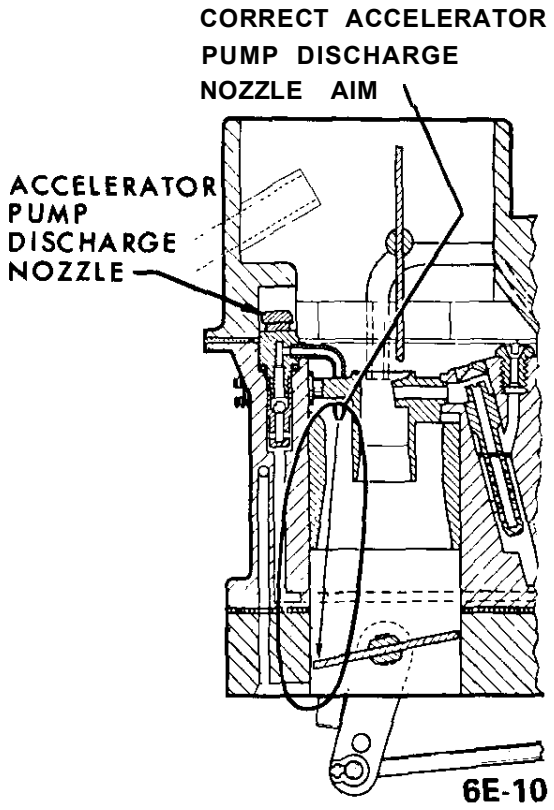


Figure 6E-10 Pump Shot Aim

Road test car. If hesitation still exists, check for the follo wing:

1. Plugged accelerator pump discharge nozzle.

2. Dirt in accelerator pump circuit.

3. Defective inlet check ball.

4. Defective accelerator pump pressure relief valve.

5. Defective accelerator pump diaphragm.

6. Maladjusted accelerator pump linkage.

Condition II

Hard Start After Hot Soak

Correction

Perform Steps 1-4 in Condition I.

Condition III

Hard Start When Engine Is Cold

Correction

1. Align groove on choke cover with pointer on choke housing. See Figure 6E-17.

2. Set fast idle.

3. Replace distributor points if pitted.

4. Check spark plugs and gap at .030.

5. Set dwell and timing.

If above procedure does not correct problem, replace with new automatic choke assembly.

Condition IV

Rough, Erratic, or No Idle

Correction

1. Check spark plugs and gap at .030.

2. Check dwell angle and ignition timing.

3. Clean idle jet and passages with air hose. See Figure 6E-5.

4. Check manifold to head bolt torque. Should be 33 lb.ft.

5. Check automatic choke linkage alignment.

6. Adjust carburetor.

MAINTENANCE AND ADJUSTMENTS

IDLE SPEED ADJUSTMENT

Note: *Idle speeds of 600 to 800 R.P.M. are normal for engines with less than 3,000 miles.*

Prior to making any adjustment to the carburetor, the following items must be checked for proper operation and/or setting:

1. Valve Adjustment (Hydraulic lifters can be improperly adjusted.)

2. Dwell Angle.

3. Ignition Timing.

4. Spark Plug Gap.

5. Exhaust Gas Recirculation Valve (See "Checking" under EXHAUST GAS RECIRCULATION SYSTEM.)

After it has been ascertained that the above items are properly adjusted and operating correctly and idle R.P.M. is still not within specifications, proceed as follows:

1. With air cleaner installed, run engine until normal operating temperature is reached.

2. Remove plastic caps from the idle mixture screw and air speed screw. See Figure 6E-11.

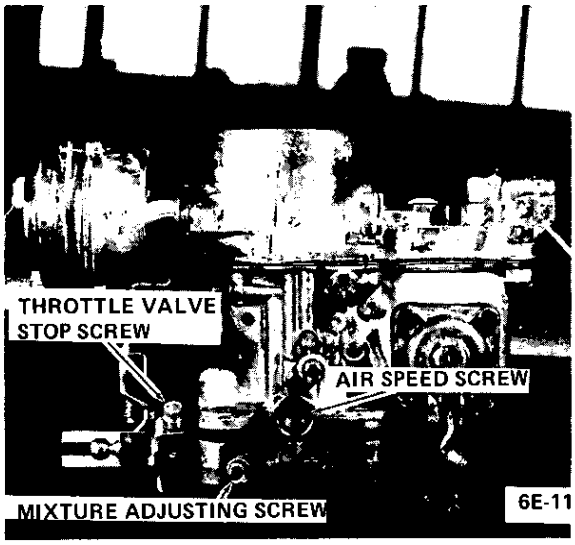


Figure 6E-11 Carburetor Adjusting Screws

3. To raise R.P.M., turn air speed screw counterclockwise. To lower R.P.M., turn air speed screw clockwise, thereby reducing the amount of air going through the system.

4. Adjust idle mixture screw until highest R.P.M. is obtained. Alternately adjust idle mixture screw and air speed screw until R.P.M. is obtained that is 50 R.P.M. higher than the desired final setting. This is to be accomplished with the idle mixture screw at best idle.

5. Turn idle mixture screw clockwise (lean) until a decrease of 50 R.P.M. is obtained. The idle R.P.M. will now be within specifications and proper emission control maintained.

6. Install red plastic caps over the air speed screw and idle mixture screw.

Basic Idle Adjustment

A basic idle adjustment is to be made only if engine idle R.P.M. correction does not result in correct idle R.P.M. setting and engine has more than 3,000 miles of operation. If necessary, proceed as follows:

1. Remove plastic cap from the throttle valve stop screw. See Figure 6E-11.

2. Place the Manometer (J-23951) in a vertical position. Turn the 2 vents on top open to equalize pressure and balance gauge to read zero. With engine idling, unplug the vacuum advance hose from the carburetor and connect the manometer hose in its place. See Figure 6E- 12.

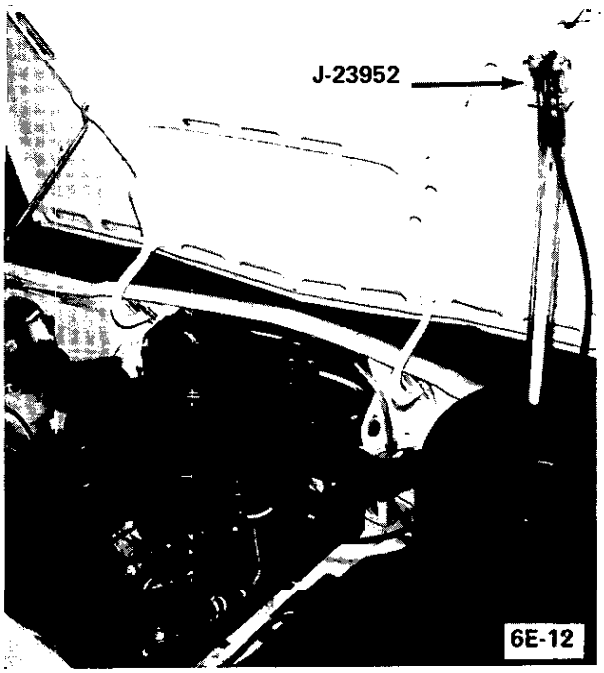


Figure 6E-12 Throttle Plate Calibrator J-23951 Installed

3. If the manometer does not read 1 to 8 inches of

water, adjust the throttle stop screw to read 6 inches of water (3 inches down and 3 inches up).

4. Disconnect manometer and reconnect the vacuum advance hose.

5. Adjust idle air speed screw and mixture screw to obtain maximum idle at 850 to 900 R.P.M. (automatic transmission) or 900 to 950 R.P.M. (manual transmission).

6. Make final adjustment by turning idle mixture screw in to reduce idle speed 50 R.P.M.

7. Install red plastic caps over the air speed screw and idle mixture screw. Replace plastic cap over the throttle valve stop screw and secure in place with Loctite.

Fast Idle Speed Adjustment

1. Remove air cleaner cover.

2. With engine off, open the throttle halfway and close the choke valve, release the throttle, then release the choke.

3. Start engine without moving the throttle. Adjust to 3200 to 3300 R.P.M. using 2 nuts on fast idle rod. See Figures 6E-13 and 6E-14.

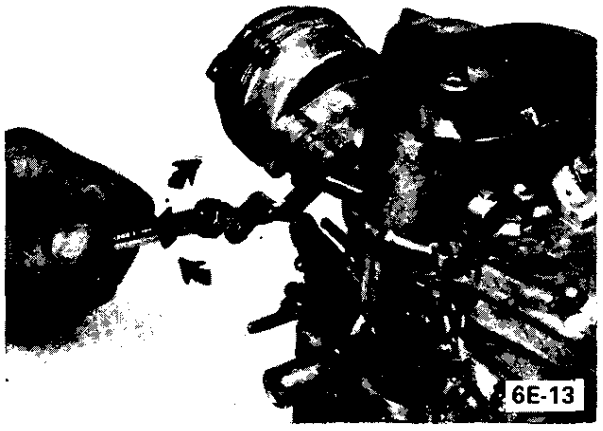


Figure 6E-13 Decreasing Fast Idle Speed

CARBURETOR LINKAGE ADJUSTMENT

GT Series

1. Remove air cleaner.

2. Have helper depress accelerator pedal to floor and check to see if wide open throttle is reached at carburetor.

3. If adjustment is necessary, proceed as follows:

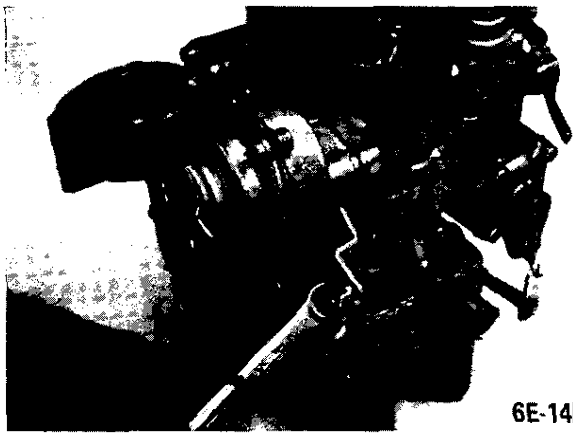


Figure 6E-14 Increasing Fast Idle Speed

(a) Unhook accelerator pedal return spring.

(b) Remove lock spring at upper end of vertical control rod and detach rod.

(c) Lengthen or shorten control rod so that wide open throttle is obtained at the carburetor when accelerator pedal is 1/4" - 1/2" from floor mat.

(d) Reinstall rod, lock spring and pedal return spring.

Opel 1900 and Manta Series

The carburetor bowden control wire is properly adjusted if, with correctly-adjusted engine idle speed, engine at operating temperature and accelerator pedal at an angle of 25 degrees to the vertical plane, the ball (A) of the carburetor bowden control wire rests against the accelerator pedal lever. See Figure 6E-15.

1. Position accelerator pedal at an angle of 25 degrees to the vertical plane. To do this, loosen lock nut of adjusting bolt (c) and unscrew adjusting bolt a few turns.

Squeeze a 1 3/8" wood block (D) between accelerator pedal and dash panel. See Figure 6E-15.

Screw in adjusting bolt until the accelerator pedal lever releases the wood block (D). Tighten lock nut.

2. Adjust bowden control wire at adjuster. See Figure 6E-16. Prior to doing this, adjust engine idle speed with engine at operating temperature.

Set carburetor bowden control wire adjuster at the bracket so that the ball (A) of the control wire rests against part (B) of the accelerator pedal lever and the wire core between bracket and segmental disc is not sagging.

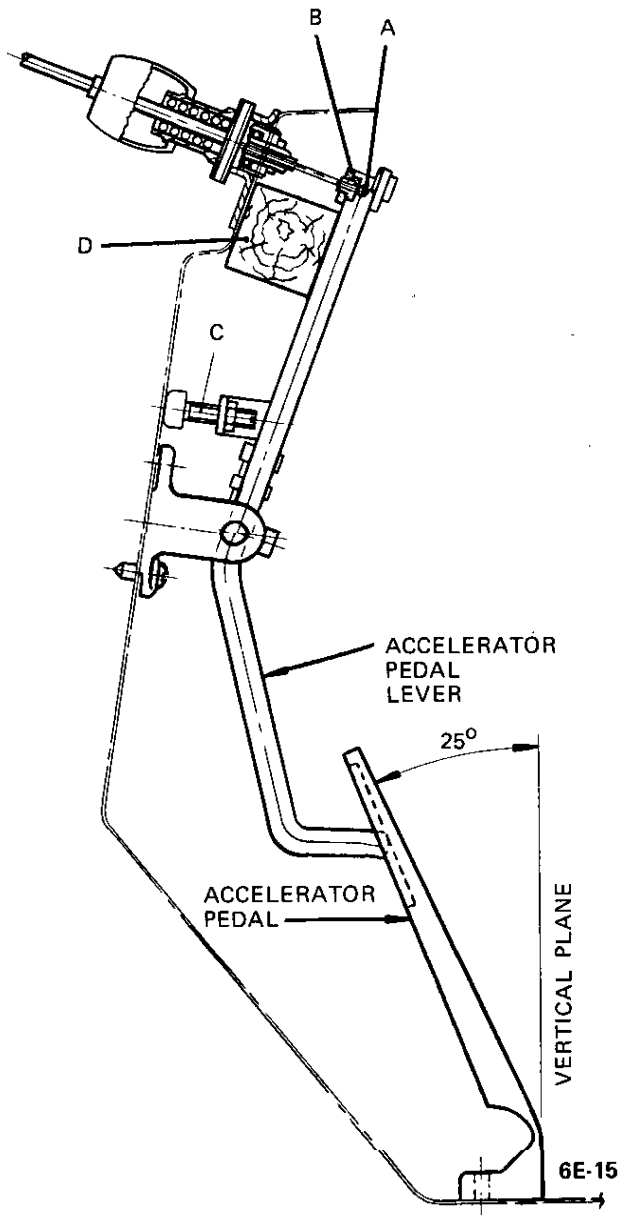


Figure 6E-15 Adjusting Accelerator Cable

Depress accelerator pedal until pedal lever touches floor mat. The carburetor throttle valve must now be completely opened.

MAJOR REPAIR

REMOVE AND INSTALL CARBURETOR

1. Remove air cleaner.

2. Remove fuel and vacuum hoses from carburetor fittings.

3. Remove choke wire.

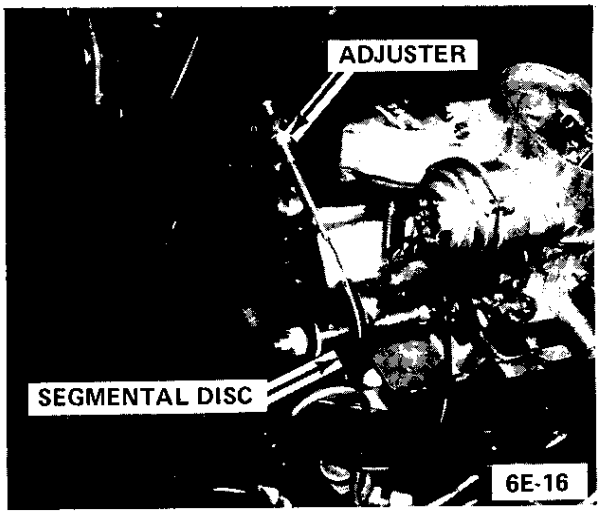


Figure 6E-16 Bowden Control Wire Adjuster and Segmental Disc

4. Disconnect throttle linkage by removing lock pin and unsnapping ball socket from ball on end of throttle shaft.

5. Remove carburetor by removing four nuts and lockwashers.

Install in reverse order, noting the following:

1. Prior to carburetor installation, place a new gasket on intake manifold.

2. Make certain that all nuts and screws on the carburetor are securely tightened.

3. Make sure that choke housing is set on index and that choke valve is nearly closed at room temperature. See Figure 6E-17. Make sure choke valve is free in all positions.

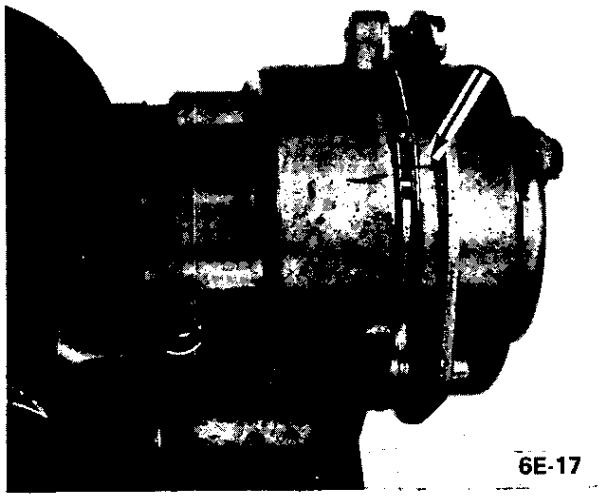


Figure 6E-17 Choke Housing Set on Index

4. Adjust engine idle speed and mixture

CAUTION: : ***Make sure choke valve opens fully before starting idle adjustment.***

THROTTLE LINKAGE REMOVAL

Removal

Opel 1900 and Manta Series

1. Remove control wire from bracket and unhook it from segmental disc. See Figure 6E-16.

2. In passenger compartment, unhook wire with ball **and** plastic bushing from accelerator pedal lever. See arrow in Figure 6E-18.

Figure 6E-18 Unhook Wire in Passenger Compartment

3. In engine compartment, pull bowden control wire out of bracket on dash panel.

If bowden control wire is kinked or damaged in any way, it must be replaced.

Installation

1. Feed ball and plastic bushing from engine compartment through opening in dash panel and hook in accelerator pedal lever. See Figure 6E-19.

2. Lightly pull wire core so that the plastic bushing slips into bore of accelerator pedal lever.

3. Hook bowden control wire in segmental disc and attach control wire to bracket.

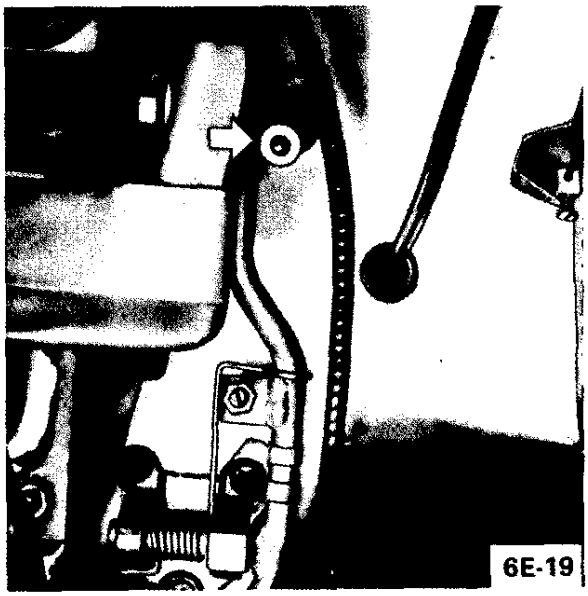


Figure 6E-19 Installing Ball and Plastic Bushing

4. Adjust control wire.

OVERHAUL CARBURETOR

Disassembly

1. Remove outer nut from end of throttle lever to choke link. See Figure 6E-20.

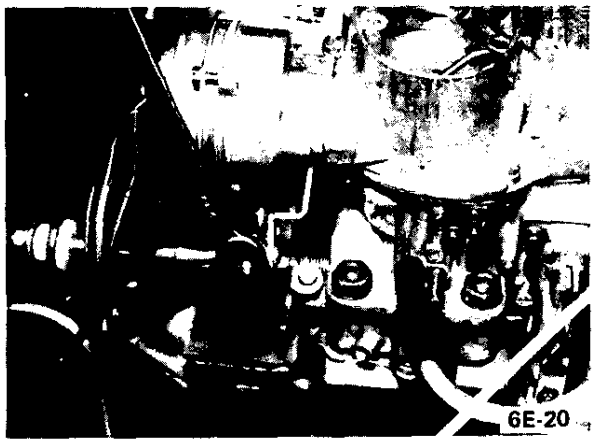


Figure 6E-20 Removing Choke Link

2. Pry off vacuum case connecting lever. See Figure 6E-21.

3. Unscrew carburetor cover.

4. Screw float needle valve out of carburetor cover and take off copper seal ring.

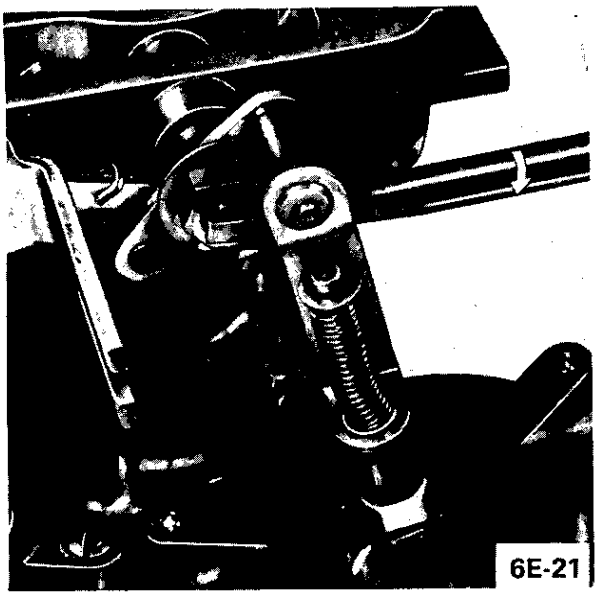


Figure 6E-21 Removing Vacuum Case Lever

5. Unscrew vacuum diaphragm cover from choke housing. See Figure 6E-22.

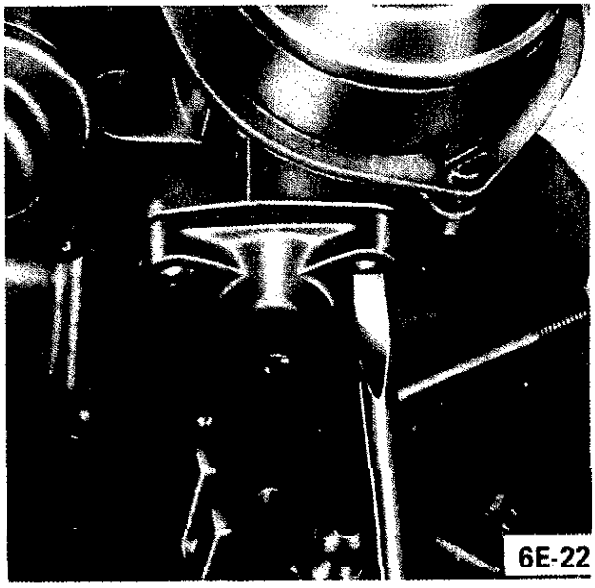


Figure 6E-22 Removing Vacuum Diaphragm Cover

6. Unscrew retaining ring from automatic choke body and take off cover.

7. Unscrew vacuum diaphragm case from carburetor cover. Remove reduction jet. See Figure 6E-23.

8. Take float together with spindle and leaf spring from float chamber.

9. Pull accelerator pump discharge nozzle assembly out of carburetor housing. Nozzle is press fitted. See Figure 6E-24.

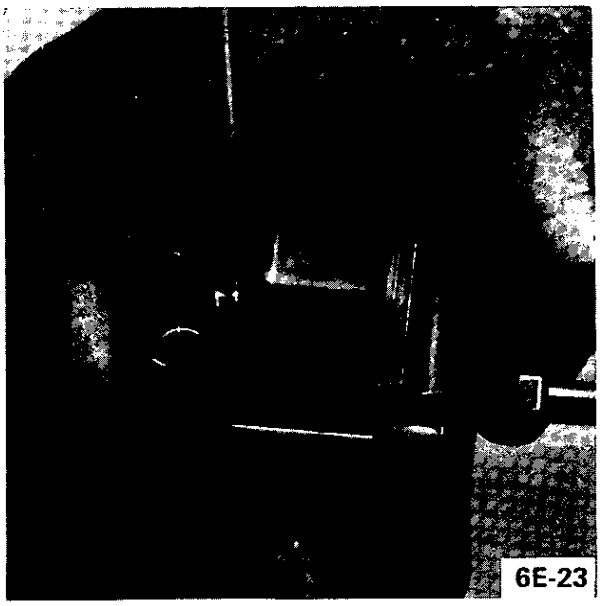


Figure 6E-23 Removing Vacuum Case Reduction Jet

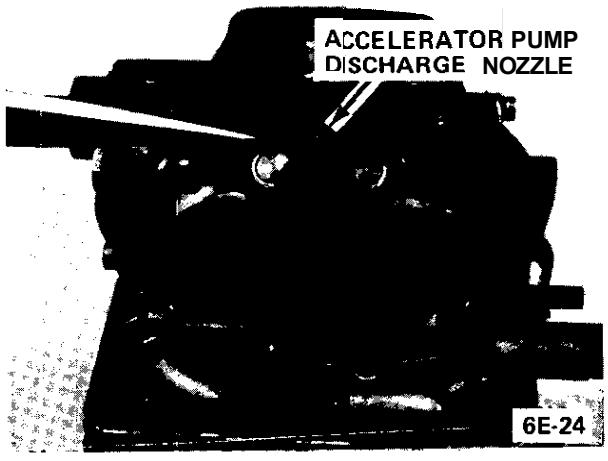


Figure 6E-24 Removing Accelerator Pump Discharge Nozzle

10. Remove primary idle jets and secondary idle plug. Remove primary and secondary high-speed air jets.

11. Remove primary and secondary main metering jets.

12. Remove cotter pin from pump connecting rod. Remove accelerator pump.

13. Remove idle mixture adjusting screw from throttle valve body. Remove idle air adjusting screw from

float chamber. Clean all parts and blow out with compressed air. Replace gaskets and seal rings.

14. Check actuating parts in automatic choke body, including diaphragm, for wear. Check pull rod for free operation. See Figure 6E-25.

15. Remove choke assembly by removing choke valve and 2 choke housing - to - carburetor screws.

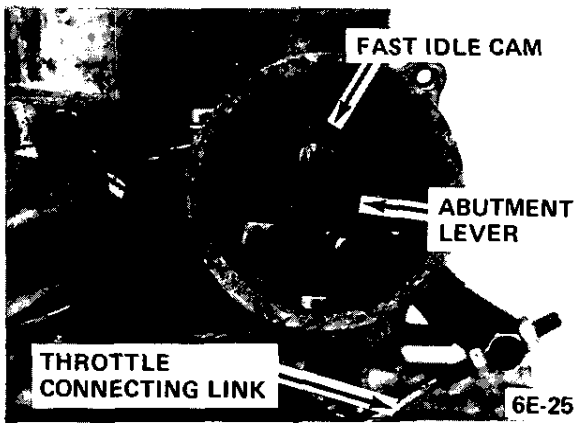


Figure 6E-25 Checking Automatic Choke Parts

16. Check vacuum case assembly. If bushing is worn, replace vacuum case assembly. See Figure 6E-27.

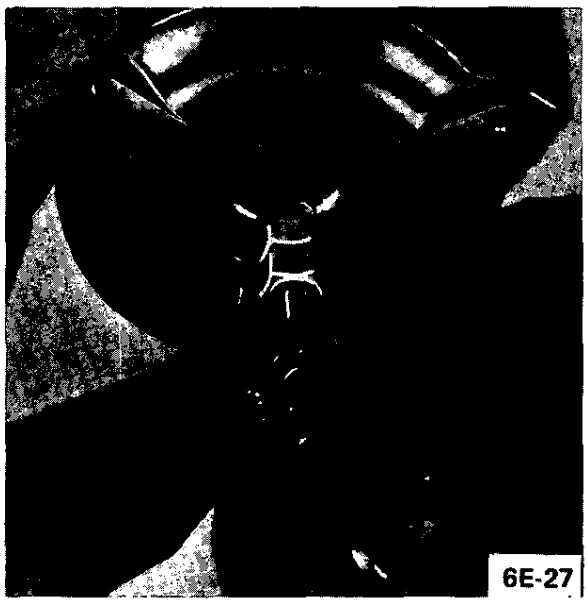


Figure 6E-27 Checking Vacuum Case Brass Bushings

17. Install secondary vacuum diaphragm case assembly. See Figure 6E-28.

18. Install gasket and shield between automatic choke cover and automatic choke body.

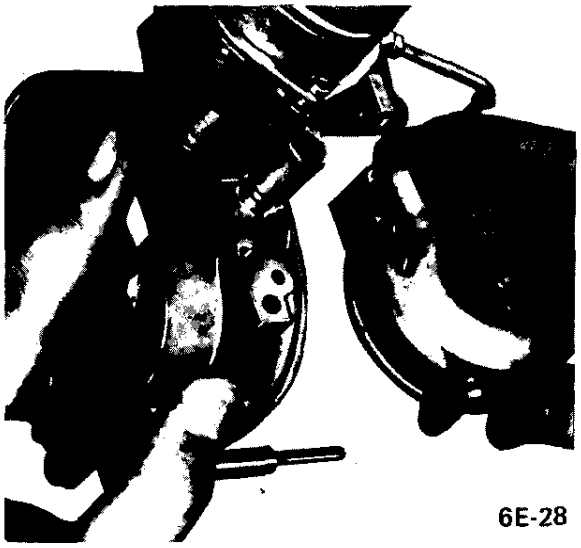


Figure 6E-28 Installing Vacuum Case Assembly

19. Install automatic choke cover so that the catch of the bi-metal spring is positioned onto bent end of the intermediate lever. See Figure 6E-29.

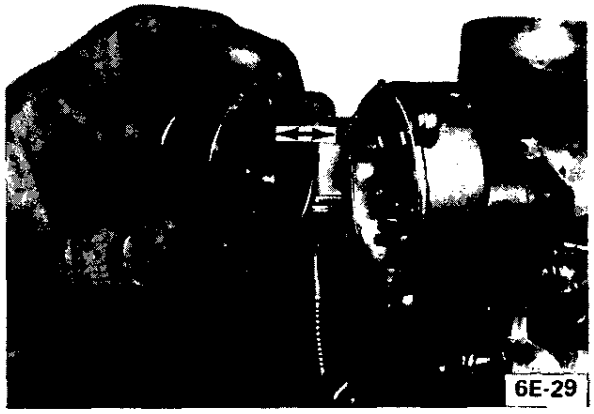


Figure 6E-29 Installing Automatic Choke Cover

20. Align and tighten automatic choke cover. Choke valve should be nearly closed at room temperature.

21. Check vent valve for free operation. Valve rod must not be bent.

22. Screw in jets according to calibration table. Never interchange parts of the primary and secondary barrel. See Figure 6E-37.

23. Install the throttle body to the bowl, using new throttle body gasket. Adjust secondary throttle valve gap by loosening lock nut on the secondary throttle

valve stop screw. Loosen the stop screw until the valve is completely closed. Turn the screw in 1/4 turn from **closed** position, hold, and tighten lock nut. This is done to insure that the throttle blade will not stick closed. See Figure 6E-30.

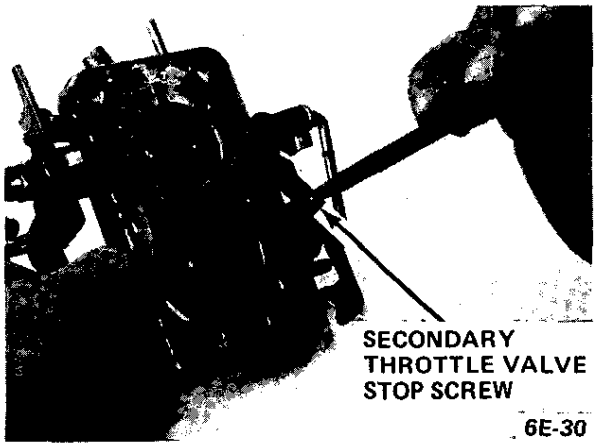


Figure 6E-30 Adjusting Secondary Throttle Valve Gap

24. Install accelerator pump connecting rod in lower hole of primary throttle shaft lever and cotter pin in outboard hole at accelerator pump actuating lever end. Paying attention to proper arrangement of cotter pin and washers. See Figure 6E-2.

25. With throttle plate completely closed, there should be no clearance between the pump lever and the pump plunger rod.

26. If a clearance is present, loosen 4 accelerator

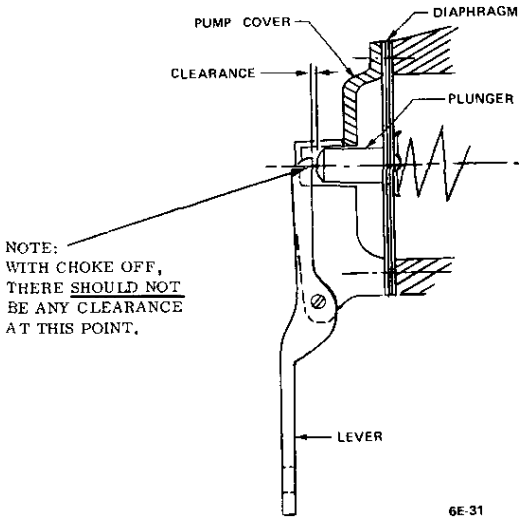


Figure 6E-31 Accelerator Pump Cover

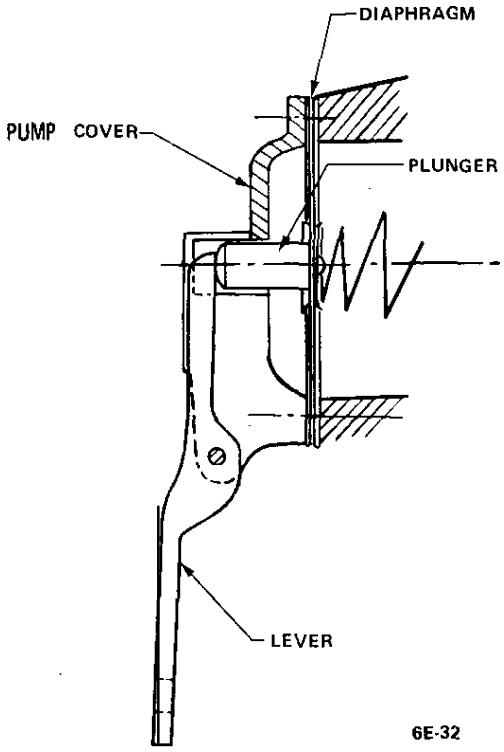


Figure 6E-32 Accelerator Pump Cover

pump cover retaining screws and allow the diaphragm spring to push plunger against lever so that a zero clearance exists. Then retighten the screws. See Figures 6E-3 1 and 6E-32.

27. Insert accelerator pump discharge nozzle so that the bent tube end points into suction channel of the primary barrel.

28. Fill the bowl with fuel.

29. With fuel in bowl, slowly open the throttle and observe the accelerator pump pressure relief valve exhaust ports and where it seats into the bowl. See Figure 6E-33. Fuel should not be bleeding back into the bowl from the exhaust ports or where the relief valve seats, but a steady stream of fuel should discharge from the discharge nozzle.

30. With fuel in bowl, rapidly open the throttle and observe the exhaust ports of the pressure relief valve. See Figure 6E-33. Fuel should exhaust from the accelerator pump pressure relief valve exhaust ports.

3 1. If the pressure relief valve malfunctions, remove it and replace with a new one.

32. No float adjustment is possible, so check position of float arm by comparing with a new float of the same carburetor type. If float arm is bent, replace float.

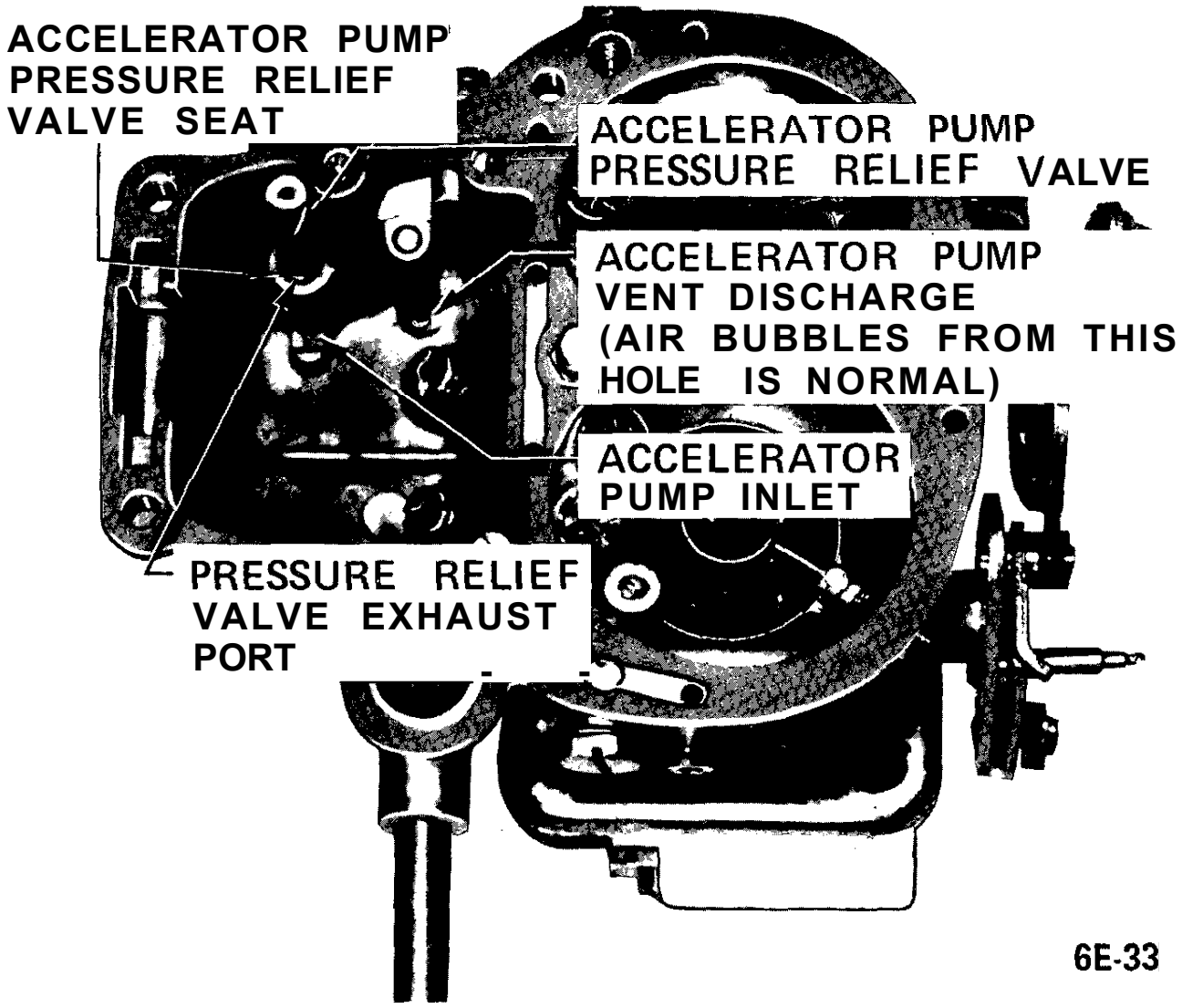


Figure 6E-33 Carburetor Fuel Bowl

33. Install float and pivot rod making sure rod is seated in casting.

34. Install leaf spring so that spring ends rest on float spindle. See Figure 6E-34.

3.5. Screw in float needle valve together with copper seal ring (.08 in. thick).

36. Install new air horn gasket so that the holes in the gasket coincide with the screw holes in carburetor housing. See Figure 6E-35.

37. On vent valve, pay attention to cotter pin position and arrangement of washers.

38. Basic adjustment of idle mixture adjusting screw is 5 turns open.

Figure 6E-34 Leaf Spring Installed

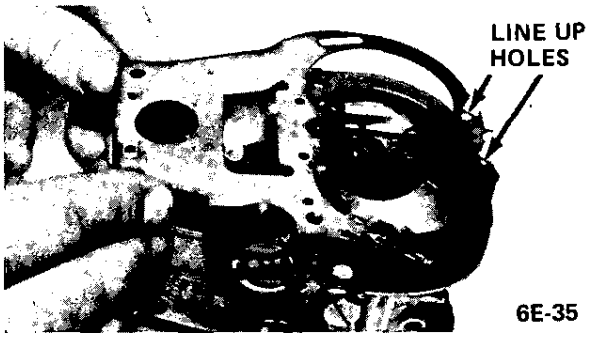


Figure 6E-35 Installing Cover Gasket

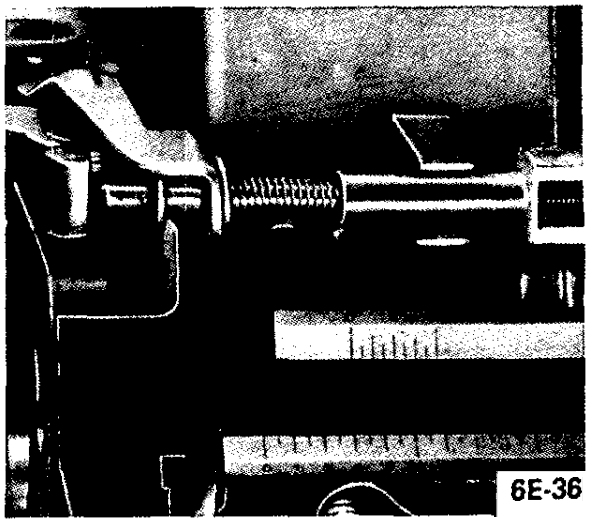


Figure 6E-36 Checking Vent Valve Adjustment

39. Check compression of vent valve lower spring. It should be compressed 1/4 inch with throttle valve completely closed. See Figure 6E-36.

40. Correct by bending valve lever.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Compression Ratio	7.6 to 1
Fuel Required	Low Lead
Fuel Tank Capacity (Gallons)	
Opel 1900 and Manta..	11.9
GT..	13.2
Fuel Gauge Type	Electrical
Fuel Pump Type	Mechanical
Fuel Pump Drive	Eccentric on Camshaft
Fuel Pump Pressure at 1950 RPM	3.1 to 3.7 psi
Fuel Filter	In-Line Filter
Carburetor Make and Type	1-Solex 2 BBL Automatic Choke
Air Cleaner Element Type	Fiber Mesh ▪ Paper

1973 OPEL CARBURETION SPECIFICATIONS

	Manta & 1900 Manual Transmission	Manta & 1900 Automatic Transmission	G. T. Manual Transmission	G. T. Automatic Transmission
Carburetor Tag No.	3441825	3441596	3441826	3441827
Primary Main Metering Jet	X122.5	X122.5	X120	X120
Secondary Main Metering Jet	X155	X155	X137.5	X137.5
Primary Air Correction Jet	120	120	110	110
Secondary Air Correction Jet	80	80	120	120
Idle Jet	47.5	47.5	45	45
Accelerator Pump Discharge Nozzle	50	50	50	50
Fast Idle Setting	3200-3300 R.P.M.	3200-3300 R.P.M.	3200-3300 R.P.M.	3200-3300 R.P.M.
Primary Venturi	.94 (24)	.94 (24)	.94 (24)	.94 (24)
Secondary Venturi	1.10 (28)	1.10 (28)	1.10 (28)	1.10 (28)

6E-37

Figure 6E-37 Carburetor Specifications