EMISSION CONTROL SYSTEM

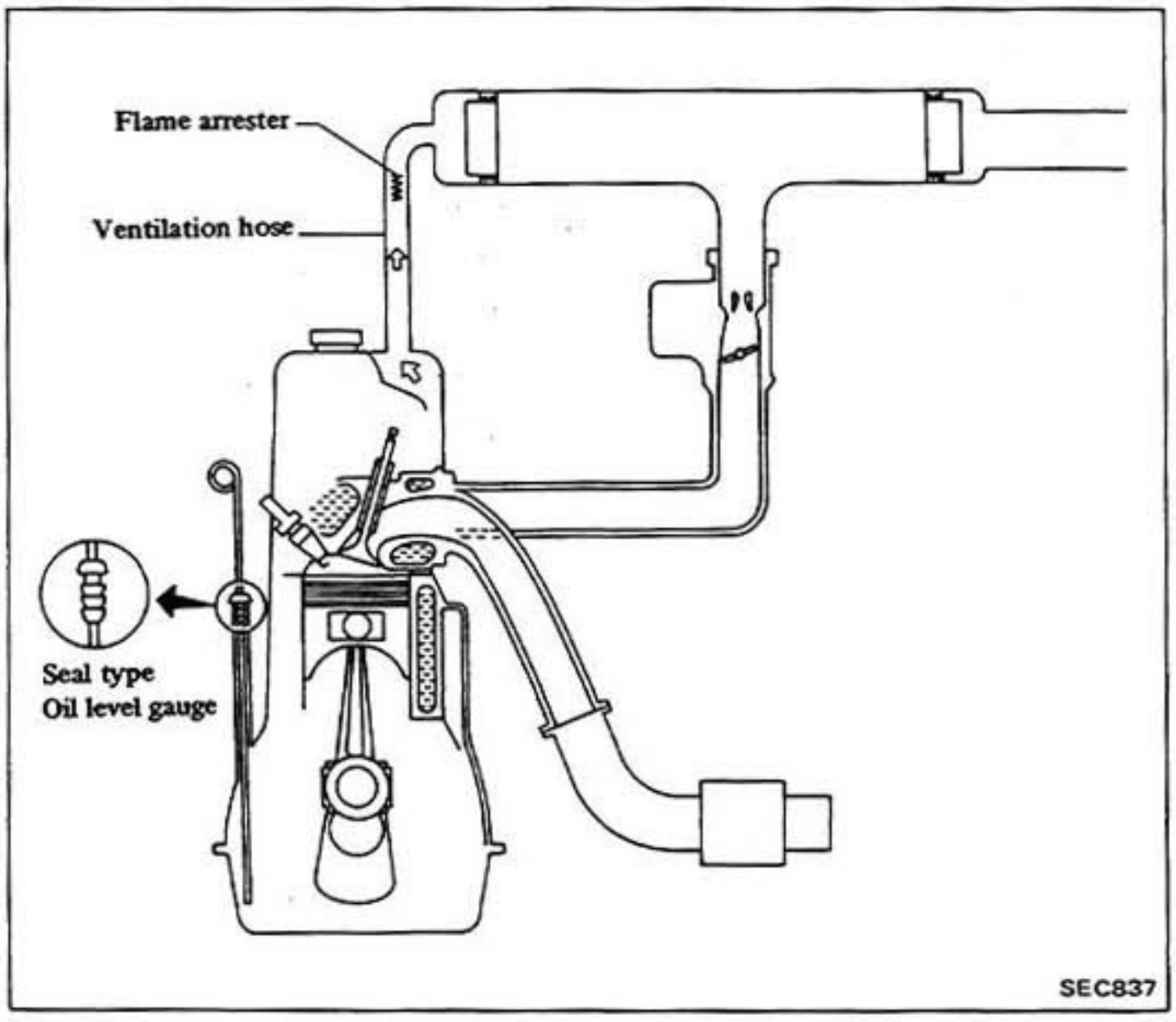
CONTENTS

EC

CRANKCASE EMISSION CONTROL SYSTEM (P40 engine)

DESCRIPTION

This system is designed to send blow-by gases back to the combustion chamber through the air cleaner for reburning, and prevents blow-by gases from being emitted into the atmosphere.



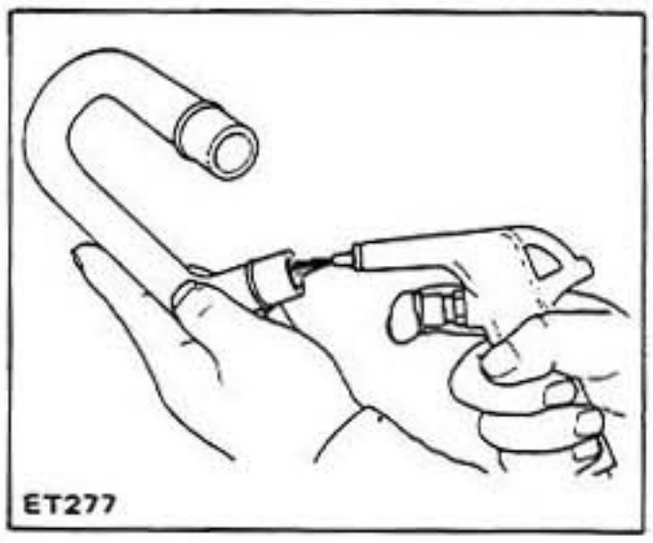
INSPECTION

VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air.

If any hose cannot be freed of obstructions, replace.

Ensure that flame arrester is securely inserted in hose between air cleaner and rocker cover.



CRANKCASE EMISSION CONTROL SYSTEM (L28 engine)

DESCRIPTION

This system returns blow-by gas to both the intake manifold and carburetor air cleaner.

The positive crankcase ventilation (P.C.V.) valve is provided to conduct crankcase blow-by gas to the intake manifold.

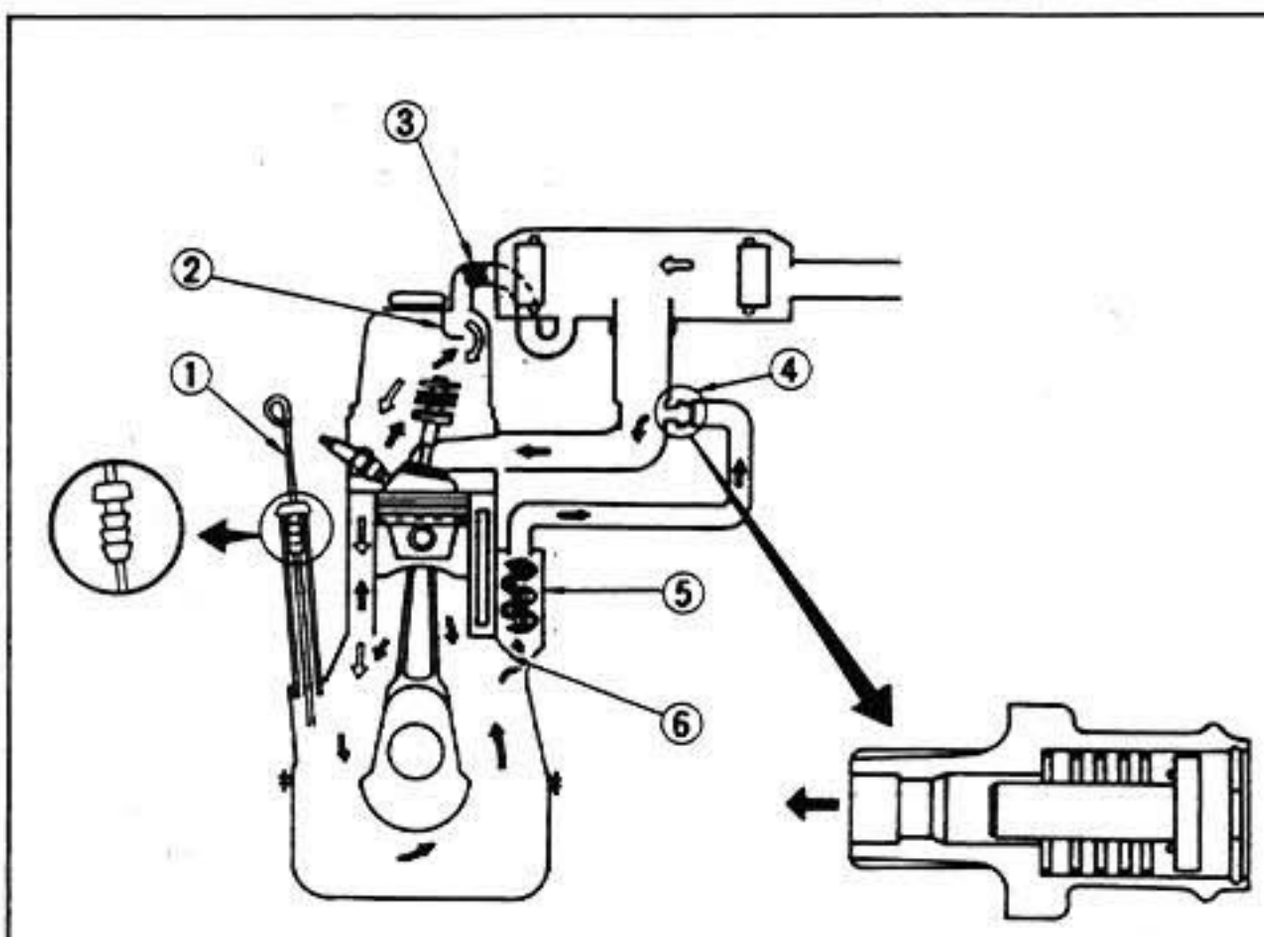
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the P.C.V. valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the clean side of the carburetor air cleaner, through the tube connecting the carburetor air cleaner to the rocker cover, into the crankcase.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve, and its flow goes through the tube connection in the reverse direction.

On vehicles with an excessively high blow-by, some of the flow will go through the tube connection to the carburetor air cleaner under all conditions.



⇨ Fresh air

➡ Blow-by gas

1 Seal type oil level gauge
2 Baffle plate
3 Flame arrester
4 P.C.V. valve
5 Steel net
6 Baffle plate

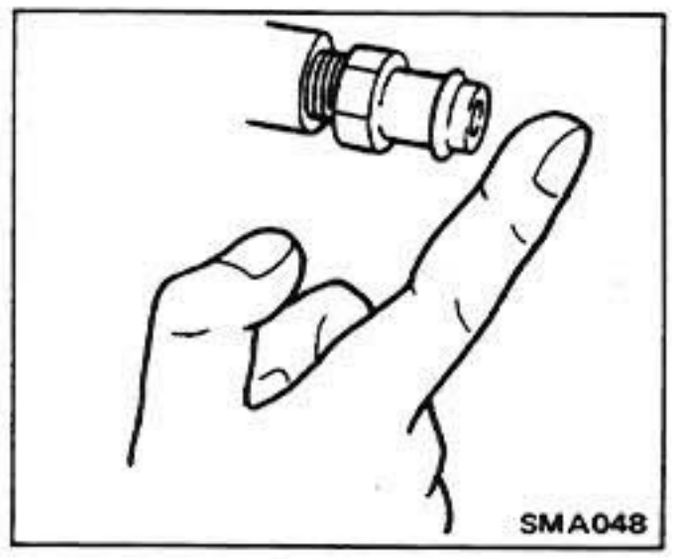
EC282A

INSPECTION

P.C.V. VALVE

Check P.C.V. valve in accordance with the following method:

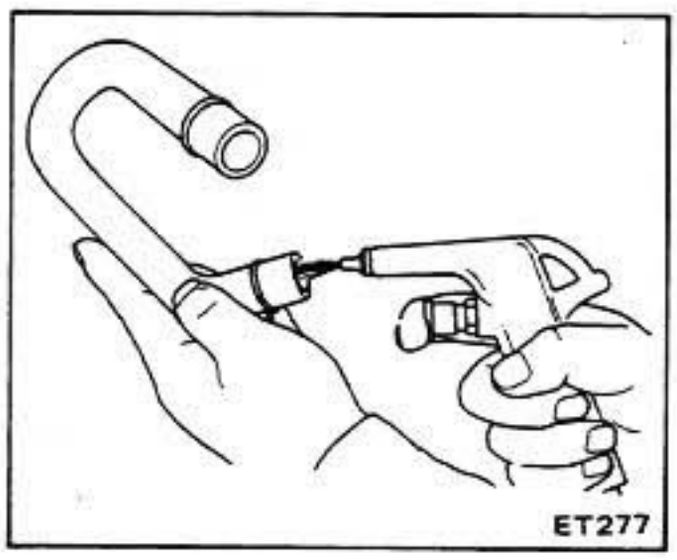
With engine running at idle, remove ventilation hose from P.C.V. valve; if valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet. Replace P.C.V. valve in accordance with the Maintenance Schedule.



Ⓣ: P.C.V. valve
15 - 20 N·m
(1.5 - 2.0 kg-m, 11 - 14 ft-lb)

VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



EXHAUST EMISSION CONTROL SYSTEM (L28 engine)

BOOST CONTROLLED DECELERATION DEVICE (B.C.D.D.)

DESCRIPTION

The B.C.D.D. serves to reduce HC emissions during coasting.

The high manifold vacuum during coasting prevents the complete combustion of the mixture gas due to the reduced amount of mixture gas available.

As a result, an excess amount of HC is emitted into the atmosphere.

When manifold vacuum exceeds the set value, this B.C.D.D. operates to supply additional mixture gas of optimum mixture ratio.

Complete combustion of fuel is assisted by this additional mixture, and HC emissions are thereby reduced.

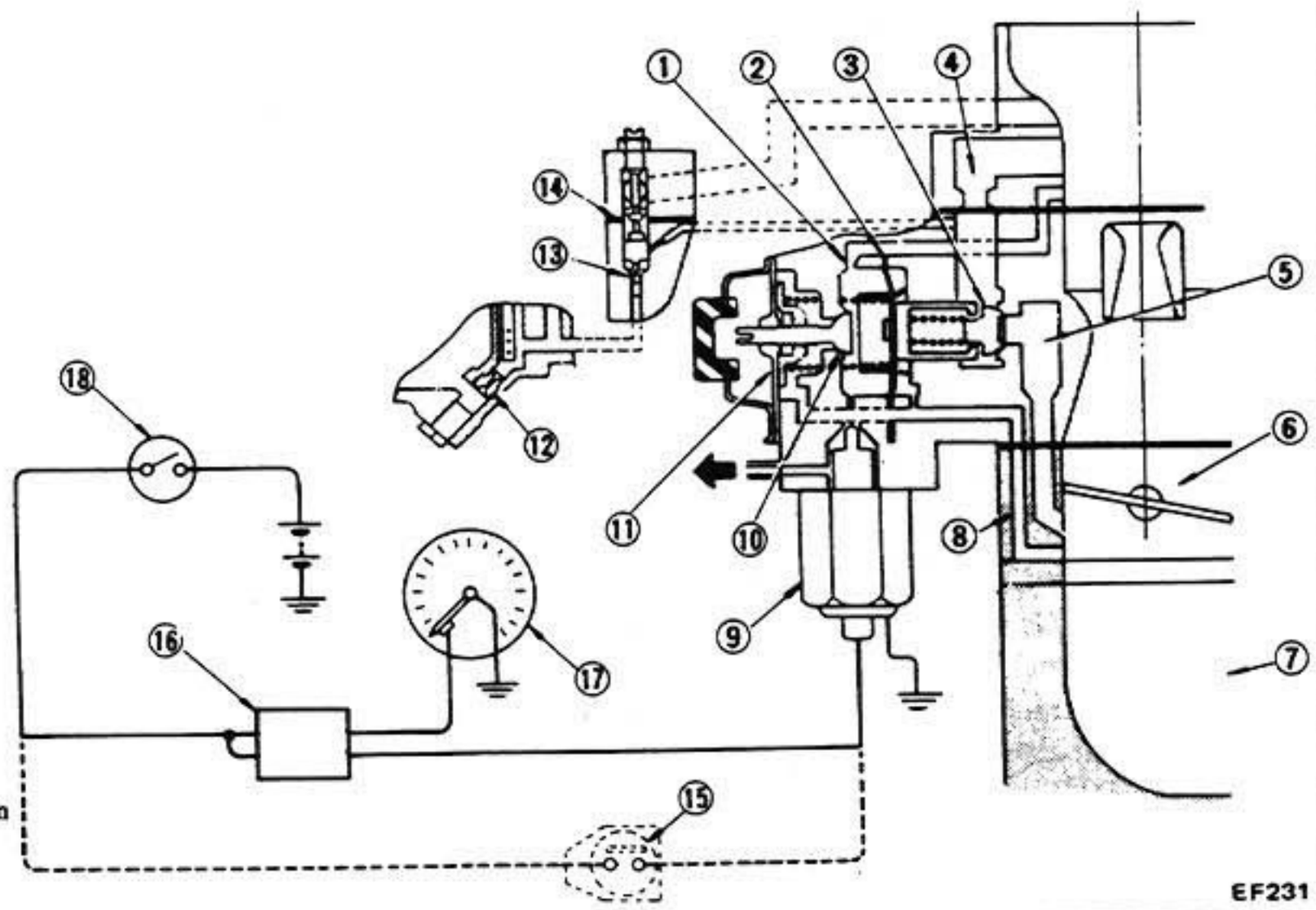
A B.C.D.D. cut solenoid serves to inactivate B.C.D.D. at idling.

A speed switch monitors the vehicle speed of below 10 km/h (5 MPH) for manual transmission models. It actuates the cut solenoid to inactivate the B.C.D.D.

On automatic transmission models, an inhibitor switch monitors the "N" or "P" position, and inactive the B.C.D.D.

1 Air jet
2 Diaphragm II
3 Mixture control valve
4 Coasting air bleed II
5 Mixture air passage
6 Secondary barrel
7 Intake manifold
8 Boost passage
9 B.C.D.D. cut solenoid
10 Vacuum control valve
11 Diaphragm I
12 Secondary main jet
13 Coasting jet
14 Coasting air bleed I
15 Inhibitor switch "N", "P": ON (for automatic transmission)
16 Amplifier
17 Speed detecting switch below 10 km/h (5 MPH): ON (for manual transmission)
18 Ignition switch

Note: Broken line applies only to Automatic Transmission



INSPECTION AND ADJUSTMENT

Generally, it is unnecessary to inspect and adjust B.C.D.D., however, if it should become necessary to do so, proceed as follows:

Prepare the following tools.

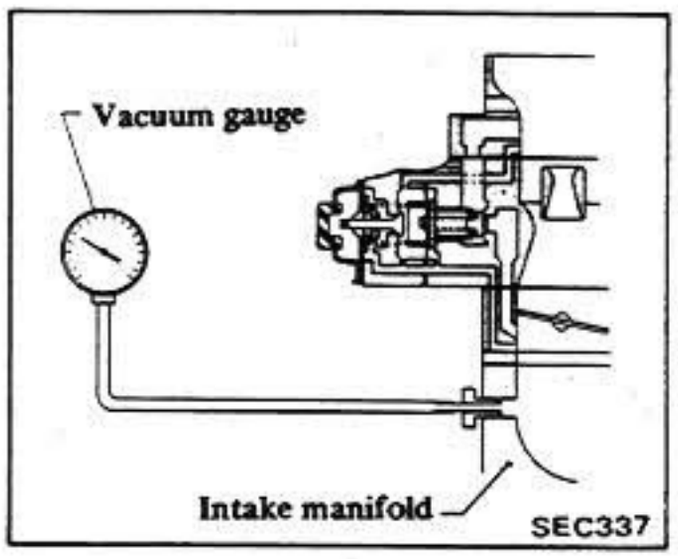
(1) Tachometer to measure the engine speed, and a screwdriver.
(2) A vacuum gauge and rubber hose.

A quick-response type boost gauge such as Bourdon's type is recommended: a mercury-type manometer should not be used.

1. Disconnect lead wire of B.C.D.D. cut solenoid.

Be sure to reconnect harness of solenoid after inspection or adjustment is completed.

2. Connect vacuum gauge to intake manifold.



A service plug is installed on intake manifold. Remove this plug and install an attachment which is equipped with a vacuum gauge.

3. Fully loosen dash pot adjusting screw. (A/T model only)

After adjustment has been made, readjust dash pot touch point.

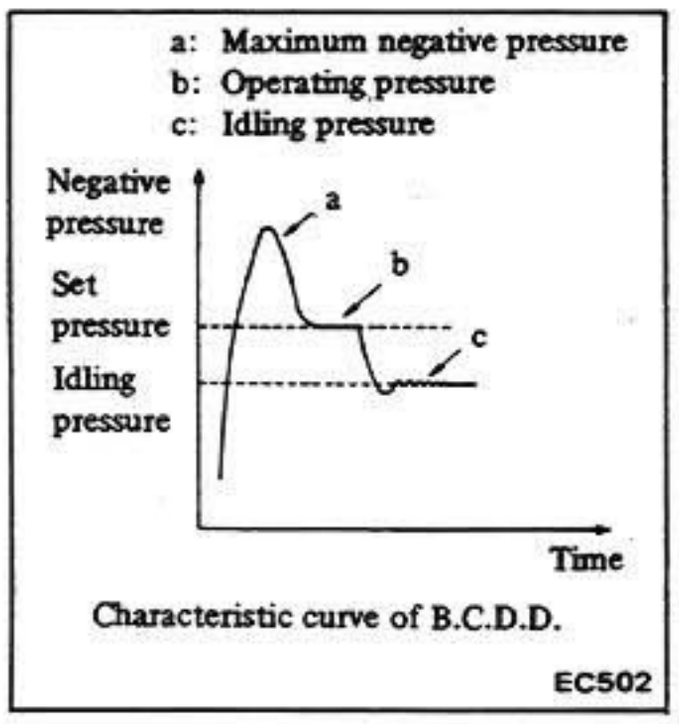
4. Warm up engine until it is heated to operating temperature.

Then adjust engine at normal idle setting. (Refer to MA section.)

5. Run engine under no load. Increase engine speed to 3,000 to 3,500 rpm, then quickly close throttle valve.

This operation simulates the engine coasting condition.

6. At that time, the manifold vacuum pressure will charge as follows:



a. It will suddenly rise up to about –80.0 kPa (–800 mbar, –600 mmHg, –23.62 inHg).
b. It will decrease gradually to –74.6 kPa (–746 mbar, –560 mmHg, –22.05 inHg) and stay there for a while. This is so called operating pressure.
c. In most cases, it will drop to idling pressure.

The operating pressure should be within the specified range: namely set pressure.

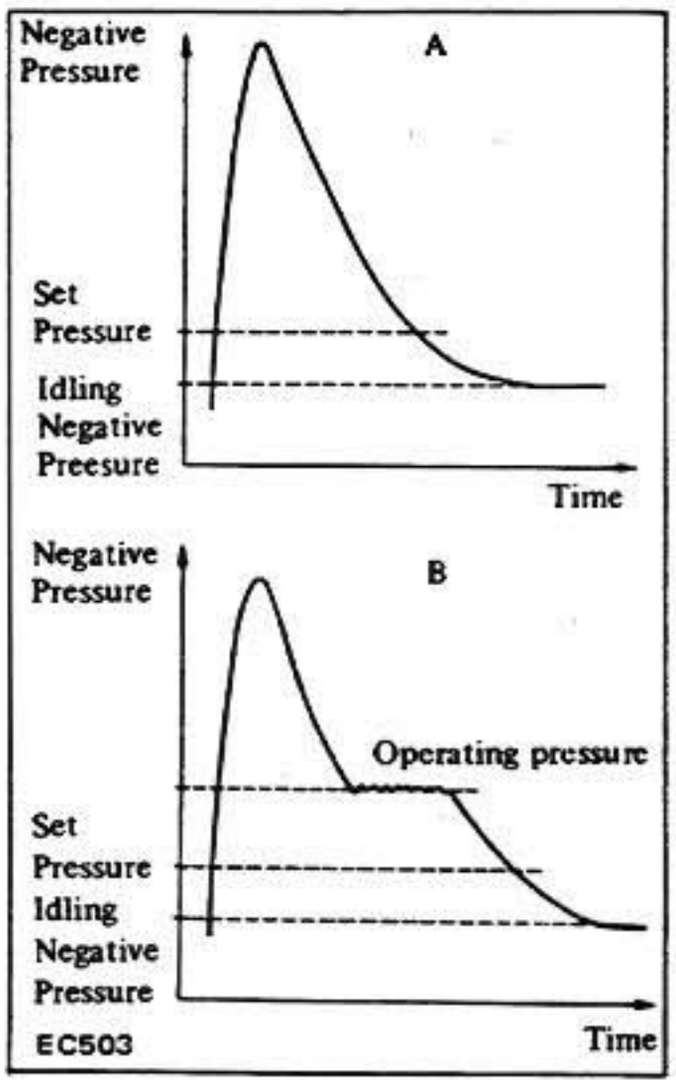
B.C.D.D. set pressure
–74.6±2.7 kPa
(–746±27 mbar,
–560±20 mmHg,
–22.05±0.79 inHg)

There are two types of manifold vacuum operation as shown in following figures when B.C.D.D. operating pressure is not correct. In such a case, adjust it as follows.

≪ High operating pressure ≫

When operating pressure is too high,

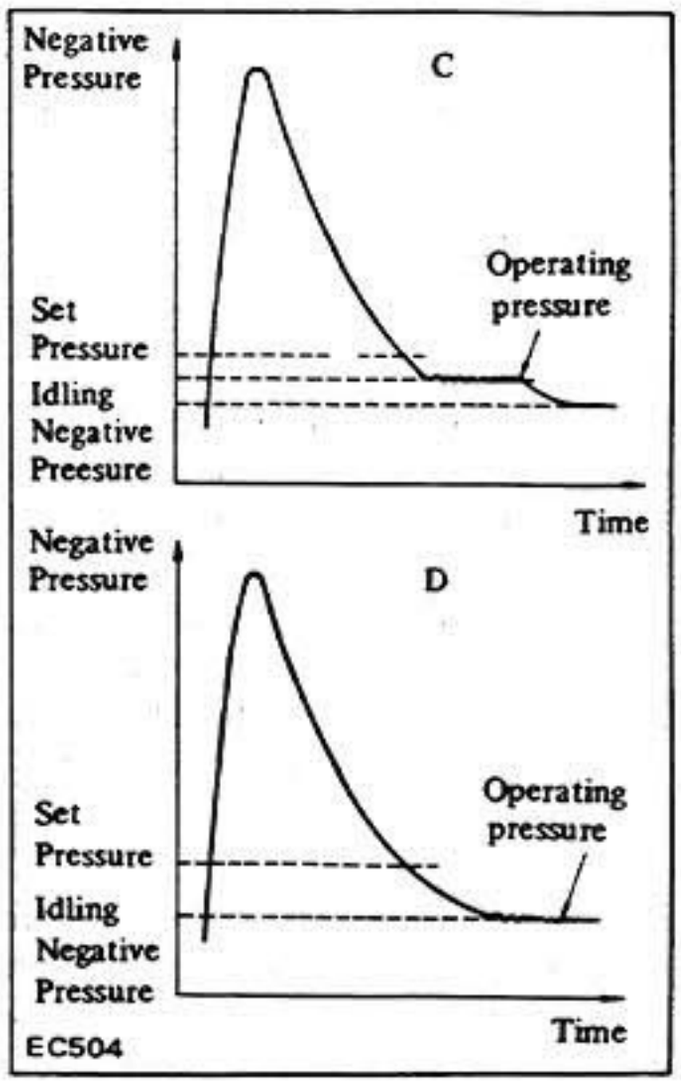
A. B.C.D.D. remains inoperative and negative pressure decreases with no sustained plateaus while it is falling.
B. B.C.D.D. operates, but the operating pressure is higher than the specified level (such as set pressure).



≪ Low operating pressure ≫

When operating pressure is too low,

C. Engine rpm will not fall to idling speed. (Even in this case, it is normal if the result of road test described below is correct.)
D. Engine falls to idling speed, but the operating pressure is lower than the specified level (such as set pressure).

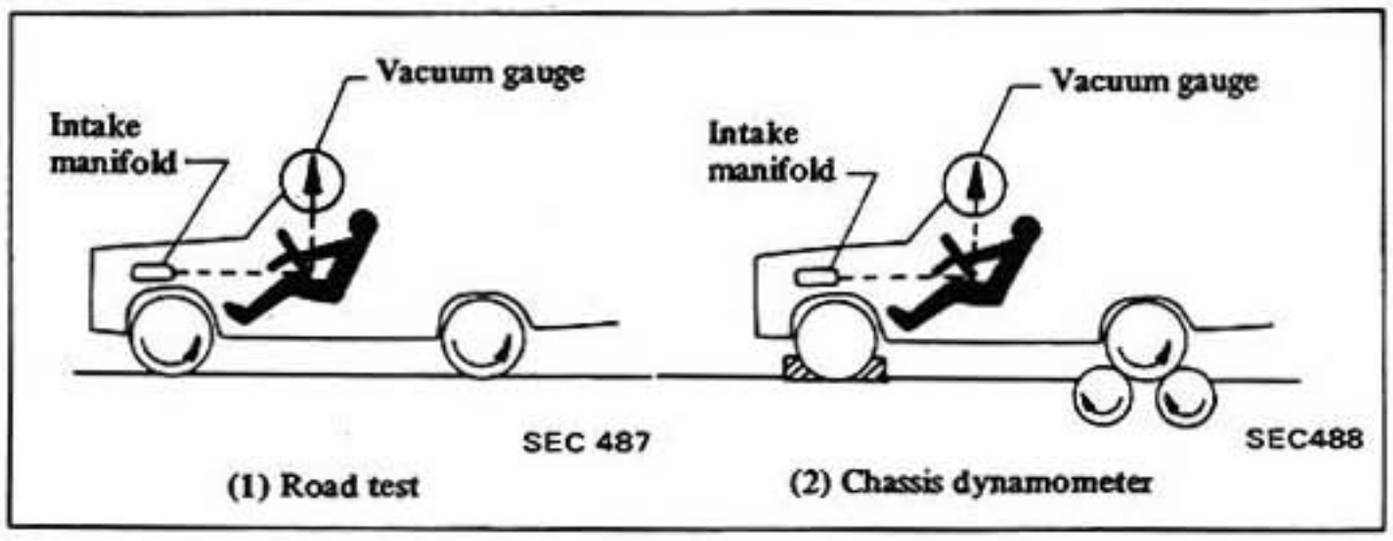


If engine speed cannot be decreased to idling when checking B.C.D.D. operating pressure, proceed as follows.

When the engine speed does not fall to idling speed, it is necessary to reduce the negative idling pressure of the manifold to lower than the set pressure of the B.C.D.D. (The engine speed will not drop to idling speed when the negative idling pressure is higher than the set pressure of the B.C.D.D.)

In this case, the engine must be labored by (1) road test (2) chassis dynamometer, accelerating the vehicle to 60 to 80 km/h (37 to 50 MPH) in top gear (manual transmission) or in "D" position (automatic transmission), and then releasing the accelerator pedal and letting the vehicle decelerate. After doing this, check whether the B.C.D.D. set pressure is at the predetermined value or not.

7. Connect leat wire of B.C.D.D. cut solenoid, and make sure engine falls to idling speed.



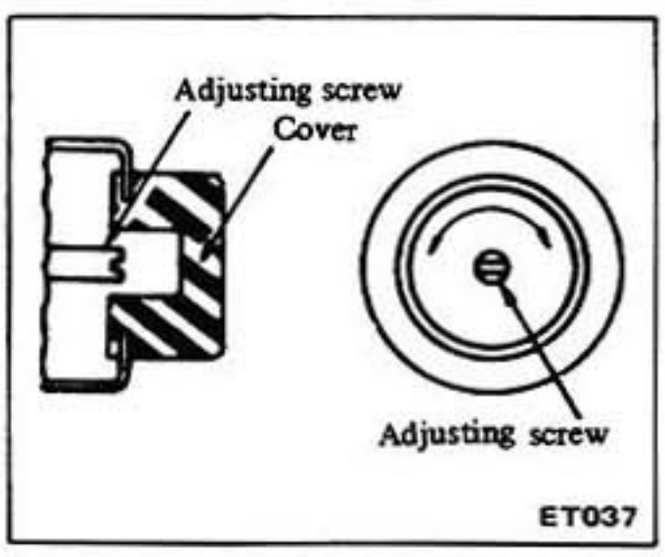
(1) Road test (2) Chassis dynamometer

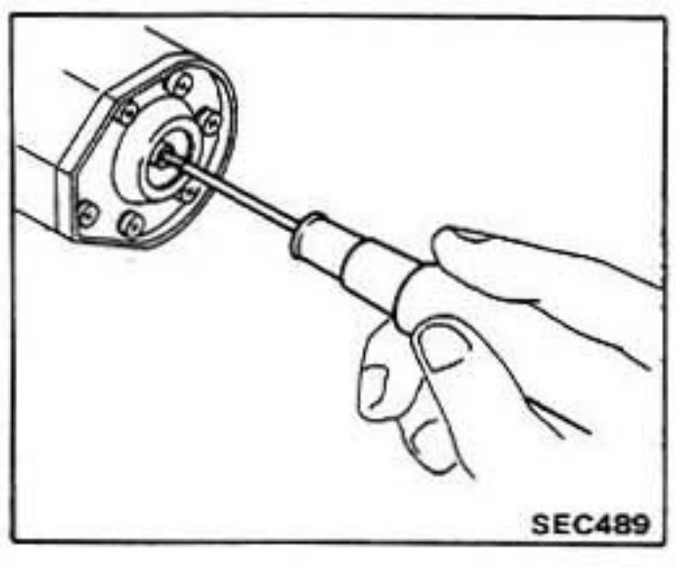
Adjustment

1. Remove rubber cap at bottom of B.C.D.D.
2. Turn adjusting screw slightly. Then, race engine and confirm that operating pressure is at the specified value.

If it is higher than the set level, turn adjusting screw clockwise until correct adjustment is made; if it is lower than that, turn screw counter-clockwise.

- **a. Turning adjusting screw one quarter rotation will cause a change in operation pressure of about 2.7 kPa (27 mbar, 20 mmHg, 0.79 inHg).**
- **b. Do not fit tip of screwdriver tightly into screw slot.**





3. Race the engine and check for adjustment.

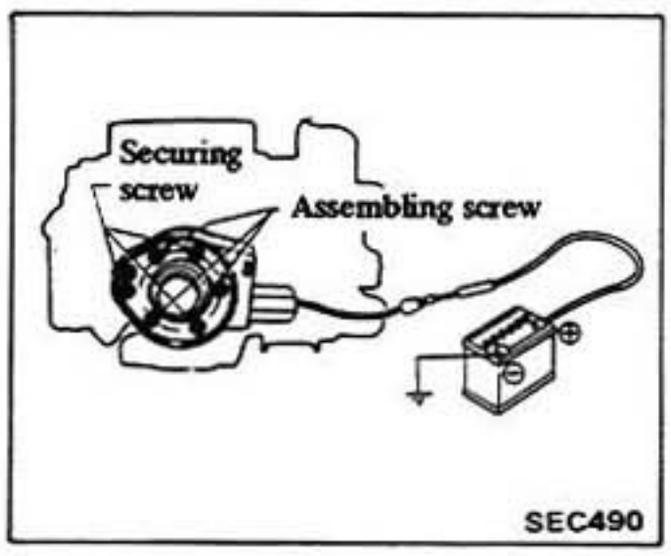
INSPECTION

Cut solenoid

Check function of cut solenoid as follows:

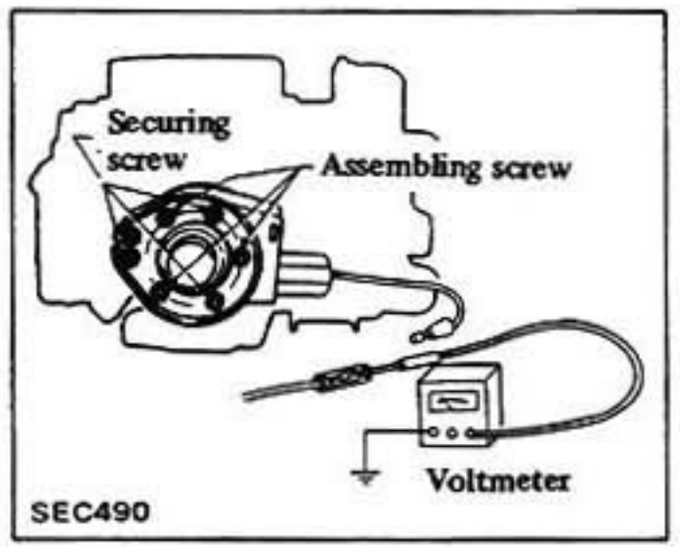
Apply 12 volts to B.C.D.D. cut solenoid lead wire and check for movement of needle valve in solenoid. When needle valve does not move, replace solenoid.

If solenoid is in good condition, check control circuit.



Control circuit

1. Confirm that each wire connector of control circuit is fitted tightly. Also check fuse.
2. Turn on ignition switch and check voltage between harness side connector for solenoid and body ground with test lamp or voltmeter.



- **a. Never use ammeter or amplifier may be damaged.**
- **b. On automatic transmission models, shift in "N" position while check is being made.**

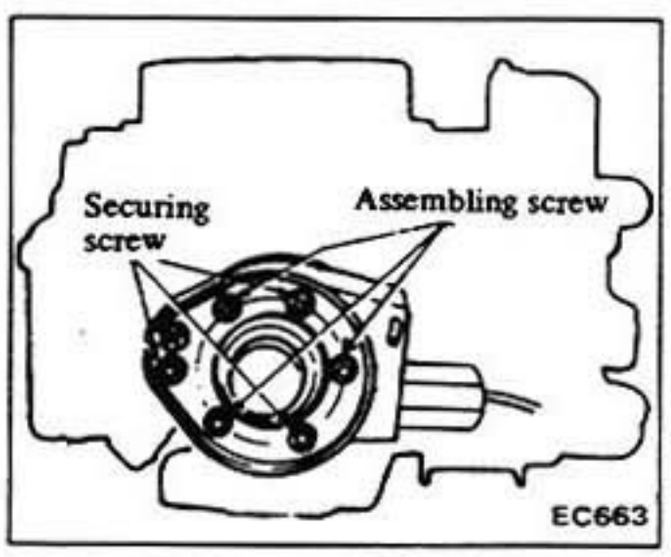
3. When a voltage of approx. 12 volts is indicated, control circuit is in good condition.

If not, the amplfier (M/T model) or inhibitor switch (A/T model) may be damaged.

REPLACEMENT

B.C.D.D. assembly

1. Remove three B.C.D.D. retaining screws, B.C.D.D. assembly can then be taken out from carburetor.



There are seven screws at the bottom of B.C.D.D. Three of them are B.C.D.D. securing screws and others are B.C.D.D. assembly screws.

2. Remove B.C.D.D. cut solenoid from B.C.D.D. assembly. B.C.D.D. can then be taken out easily.
3. New B.C.D.D. assembly can be installed in the reverse sequence of removal.

After securing three securing screws, rescrew other three B.C.D.D. assembly screws in order to avoid warping B.C.D.D. body.

Ⓣ : B.C.D.D. securing screws assembly screws
2 - 4 N·m
(0.2 - 0.4 kg-m, 1.4 - 2.9 ft-lb)

Cut solenoid

1. Disconnect lead wire at connector.
2. Remove cut solenoid by unscrewing it.
3. Install new solenoid in the reverse seuqence of removal.

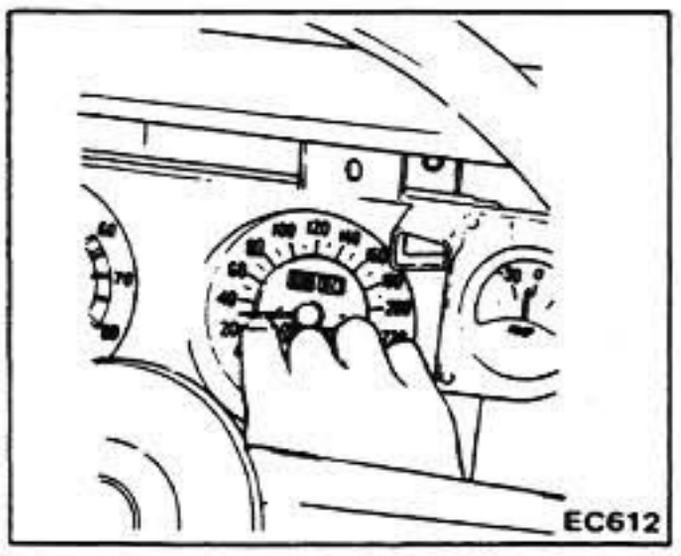
Amplifier, speed switch (M/T only)

The speed switch is part of the speedometer. The amplifier is installed on the back of the speedometer. After replacing amplifier, check its function.

1. Remove combination meter. Refer to Section EL.
2. Disconnect lead wires from amplifier. Remove setscrew, and remove amplifier.
3. Install new amplifier on combination meter.
4. Install combination meter into dash panel, then remove meter cover by unscrewing setscrews.

Connect all wires for combination meter at this point.

5. Turn ignition switch ON, and move speedometer pointer to ensure that cut solenoid moves.



6. Then, install combination meter with amplifier in the reverse sequence of removal.

Inhibitor switch (A/T only)

The inhibitor switch is located on the automatic transmission.

EVAPORATIVE EMISSION CONTROL SYSTEM (For Australia)

DESCRIPTION

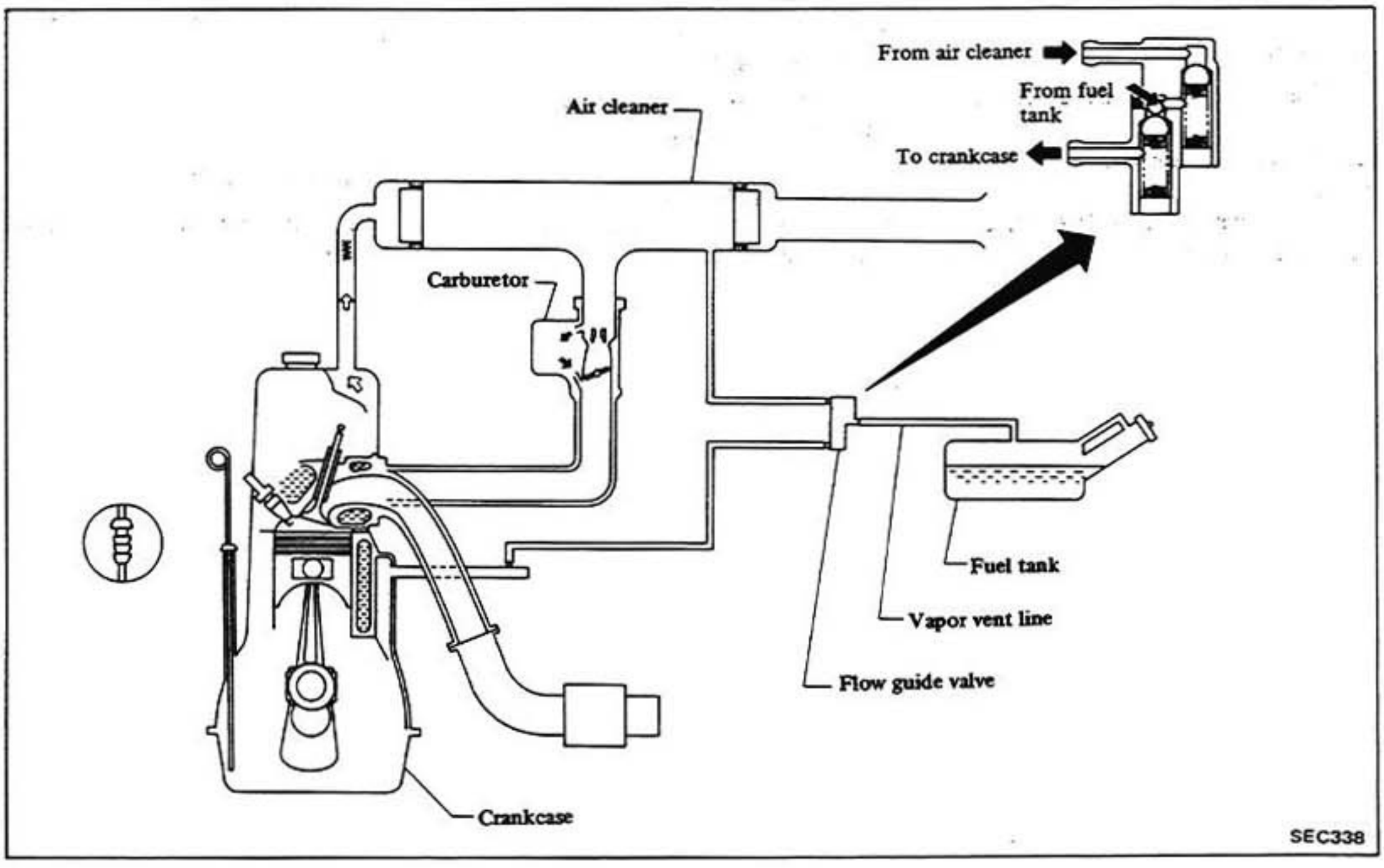
This system is adopted to prevent fuel vapor from evaporating into the atmosphere. The fuel vapor from the sealed fuel tank is led into the crankcase of engine.

This system consists of four basic elements indicated below:

1. Fuel tank with positive sealing filler cap.
2. Vapor vent line.
3. Flow guide valve.

The flow guide valve prevents blow-by gas from flowing into the fuel tank and guides fresh air into it, preventing gasoline vapor from escaping into the carburetor air cleaner.

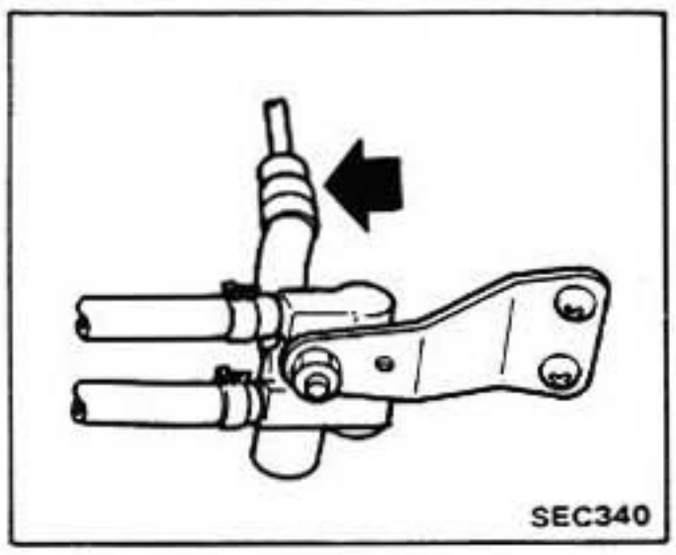
While the engine is stopped, the evaporative gas opens the flow guide valve and is led to the crankcase. Once the engine starts, the gas evaporating in the crankcase, is sucked into the manifold for combustion. When the pressure of the sealed type fuel tank, fuel liquid separator and vapor vent line becomes negative by decreasing the fuel, the flow guide valve opens to send fresh air from the carburetor air cleaner to the fuel tank.



INSPECTION

Fuel tank, fuel liquid separator and vapor vent line

1. Check all hoses and fuel tank filler cap.
2. Disconnect the vapor vent line connecting flow guide valve to fuel tank.



3. Connect a 3-way connector, a manometer and a clamp (or an equivalent 3-way change cock) to end of vent line.
4. Supply fresh air into vapor vent line through cock little by little until pressure becomes about 3.923 kPa (39.23 mbar, 400 mmH_2O, 15.75 inH_2O) (Water height). Then, leave clamp and cock closed for 2.5 minutes.

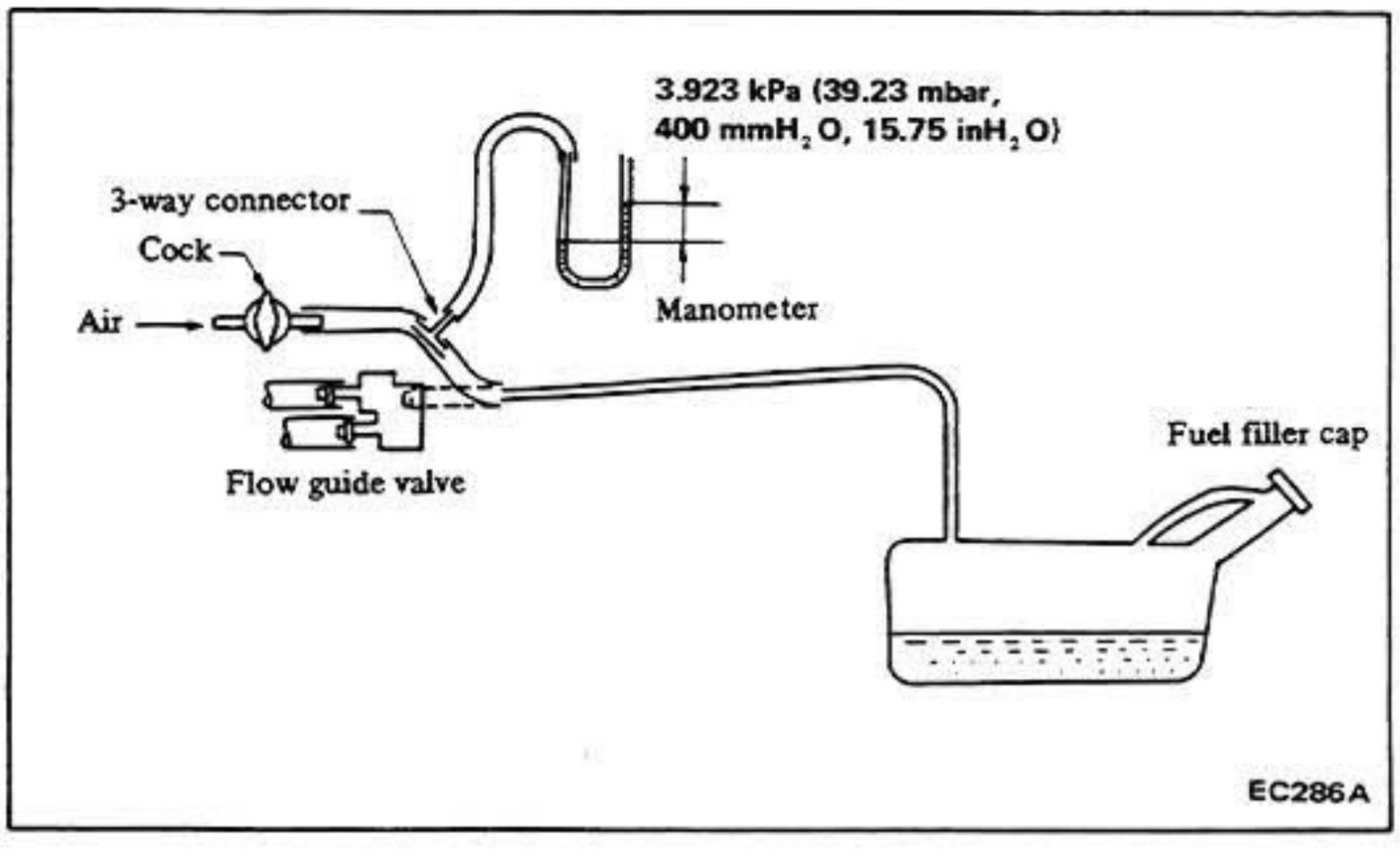
5. After 2.5 minutes, measure height of liquid in manometer.

Variation in height should remain with 0.245 kPa (2.45 mbar, 25 mmH_2O, 0.98 inH_2O) (Water height).

If height should drop to zero in a short time, some piping may be damaged.

6. If height does not drop to zero in short time when filler cap is removed, hose is stuffy.

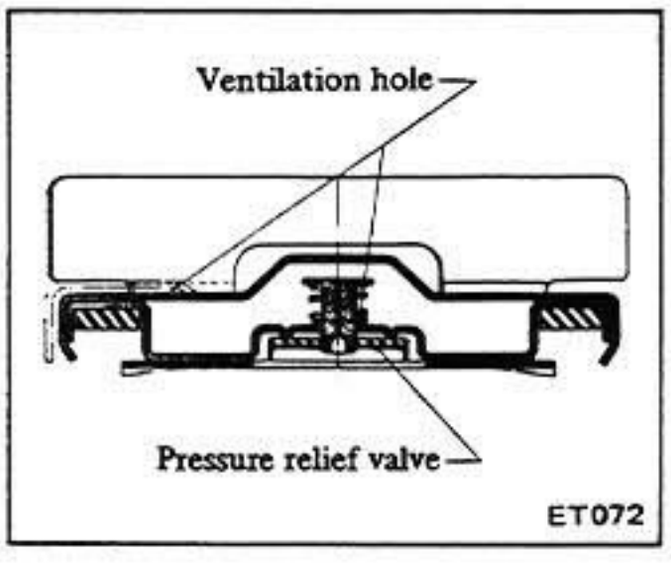
In case vent line is obstructed, breathing in fuel tank is not thoroughly made, thus causing insufficient delivery of fuel to engine or vapor lock. It must therefore be repaired or replaced.



Fuel tank vacuum relief valve operation

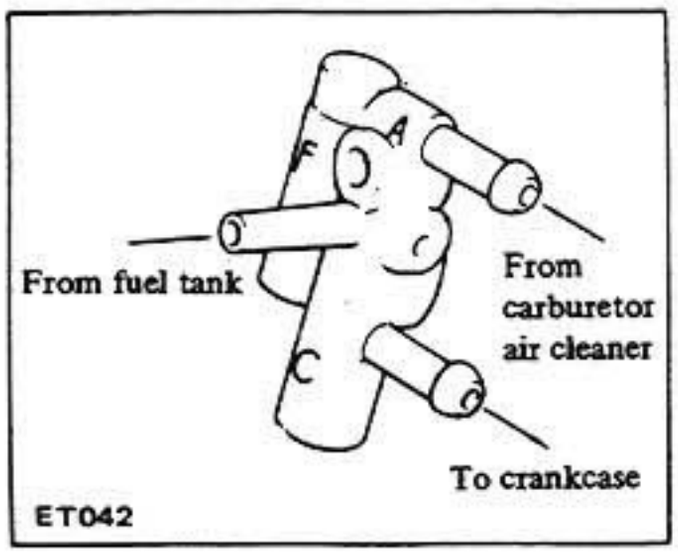
Remove fuel filler cap and see it functions properly.

1. Wipe clean valve housing and have it in your mouth.
2. Inhale air. A light resistance accompanied by valve indicates that valve is in good mechanical condition. Note also that, by further inhaling air, resistance should be disappeared with valve clicks.
3. If valve is clogged, or if no resistance is felt, replace cap as an assembled unit.



Flow guide valve

This valve is mounted in the engine compartment. Marks A, F and C are engraved in the body of the valve to indicate the connection of the vapor vent line.



1. Disconnect all hoses connected to the flow guide valve.
2. While lower pressure air is pressed into the flow guide valve from the ends of vent line of fuel tank side (F), the air should go through the valve and flow to crankcase side (C). If the air does not flow, the valve should be replaced. But when the air is blown from crankcase side (C), it should never flow to the other two vent lines.
3. While the air is pressed into the flow guide valve from the carburetor air cleaner side (A), it flows to the fuel tank side (F) and/or crankcase side (C).
4. This valve opens when the inner pressure is 1.3 kPa (13 mbar, 10 mmHg, 0.39 inHg). In case of improper operations or breakage, replace it.