

# FUEL AND LUBRICATION SYSTEM

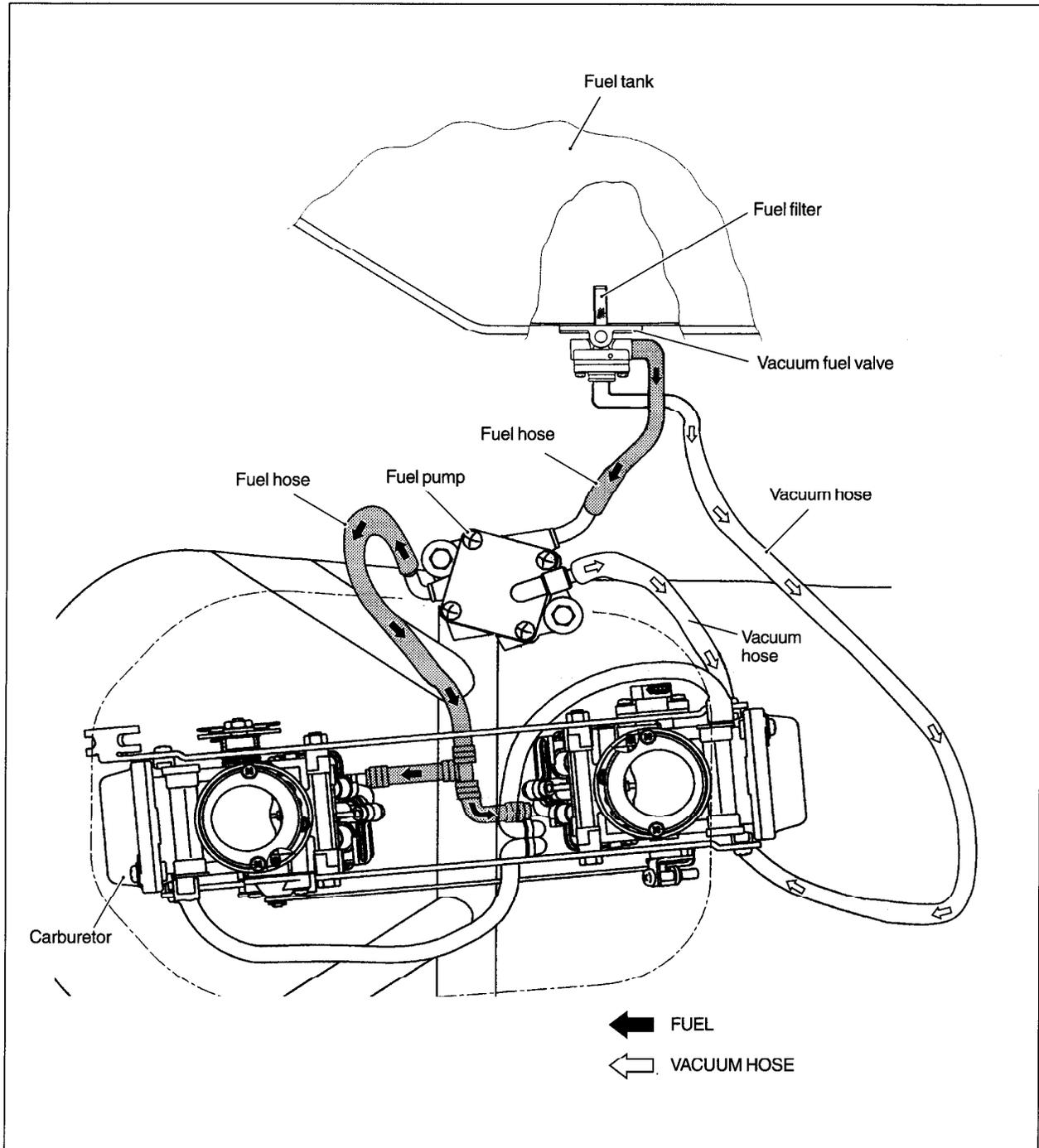
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## FUEL SYSTEM

A vacuum operated fuel pump is used to supply fuel from the fuel tank to the carburetor. The pump is necessary when the level in the fuel tank is lower than the carburetor fuel bowl.

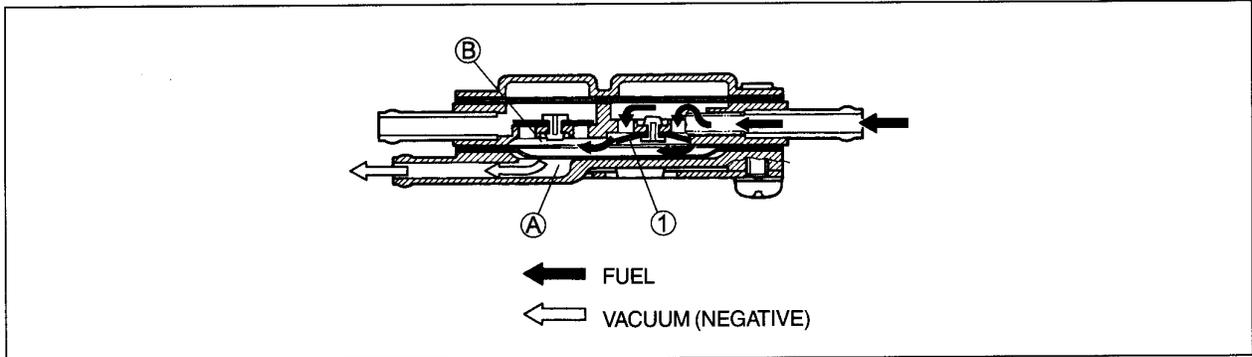
The fuel sent under pressure by the fuel pump flows into the float chamber when the float of the carburetor has dropped and the needle valve is open. When the needle valve closes, the pressure of the fuel in the hose connecting the carburetor and the fuel pump increases, and when the set pressure is reached, relief valve (ball valve) in the fuel pump is opened by the fuel pressure to prevent excessive supply. (☞ 4-3)



## FUEL PUMP OPERATION

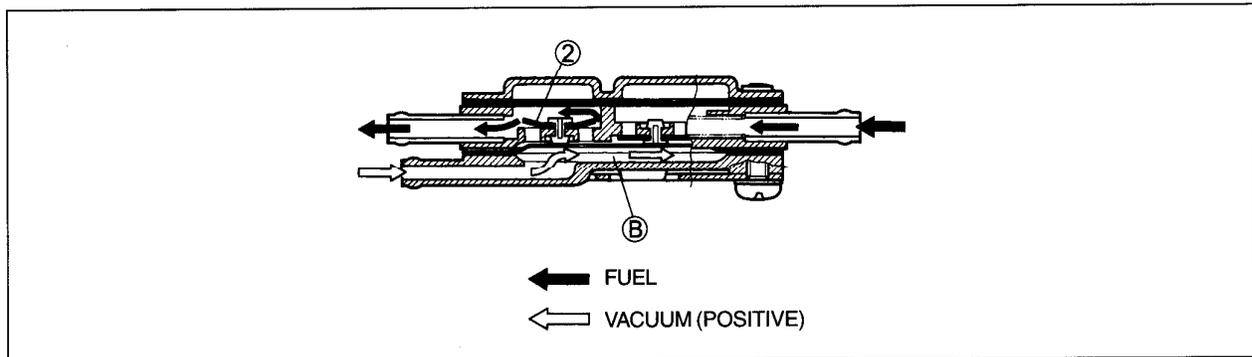
### INTAKE PROCESS

As the crankcase internal pressure decreases, negative pressure is applied to the diaphragm chamber (A) pressing the diaphragm to go down. The volume of the diaphragm chamber (B) increases and the intake valve (1) is opened.



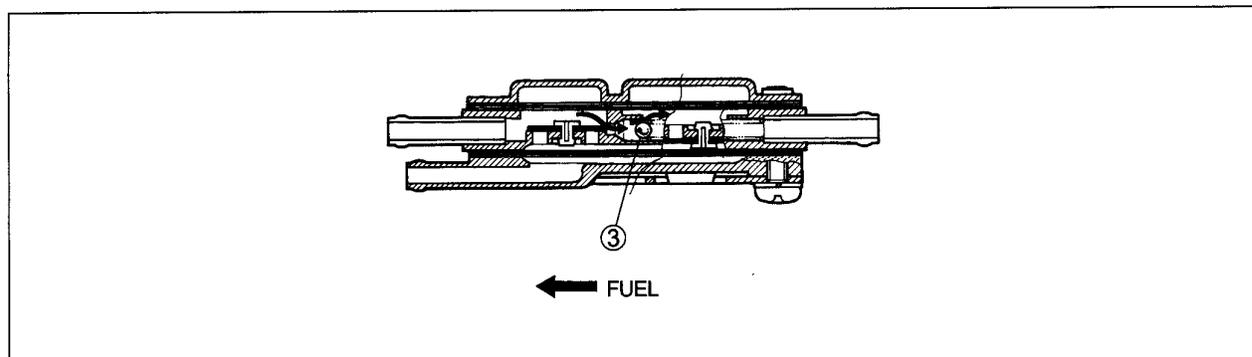
### DISCHARGE PROCESS

As the crankcase internal pressure increases, the diaphragm goes up and gasoline is discharged out of the diaphragm chamber (B) through the discharge valve (2).



### CONTROL OF FUEL PRESSURE

As the engine speed and the negative pressure cycle in the crankcase increase, fuel pressure from the discharge side toward the carburetor increases. Under such a condition, the ball valve (3) is opened to return the gasoline to the intake side, controlling the fuel pressure.



## FUEL TANK LIFT-UP

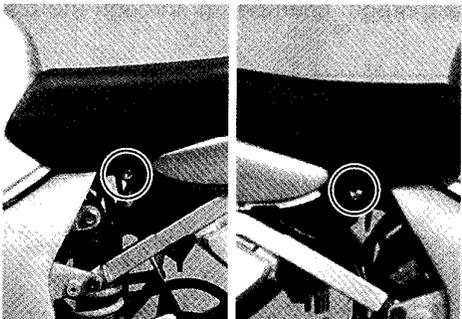
- Remove the frame cover bolt.



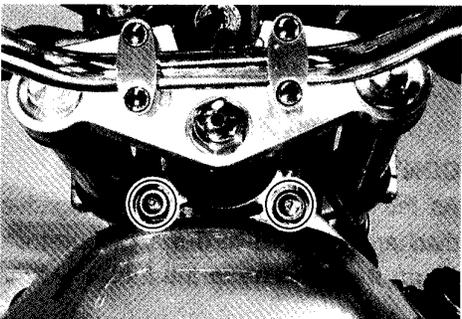
- Depress the head of fastener center piece and pull out the fastener.
- Remove the frame cover (R).
- Remove the frame cover (L) as same as.



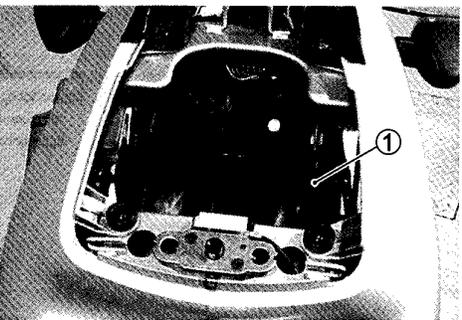
- Remove the front seat.



- Remove the fuel tank mounting bolts.



- Take up the fuel tank prop ①.

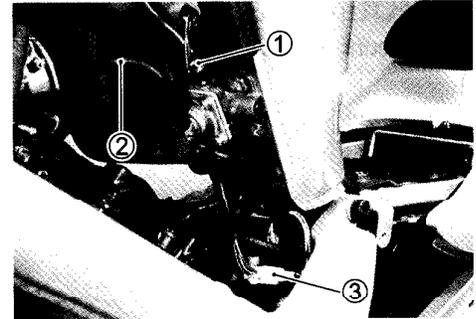


- Lift and support the fuel tank with its prop stay.



## FUEL TANK REMOVAL

- Remove the front seat.
- Lift and support the fuel tank with its prop stay. (➔ 4-4)
- Disconnect the fuel hose ① and vacuum hose ② from the vacuum fuel valve and fuel level indicator switch lead wire coupler ③.



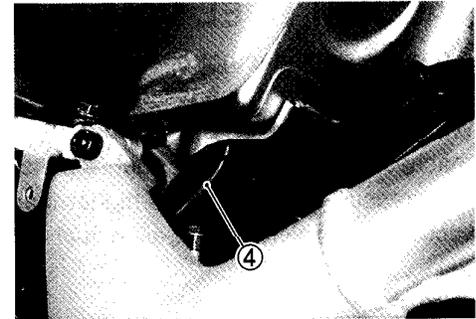
### ⚠ WARNING

**Gasoline is highly flammable and explosive.  
Keep heat, spark and flame away.**

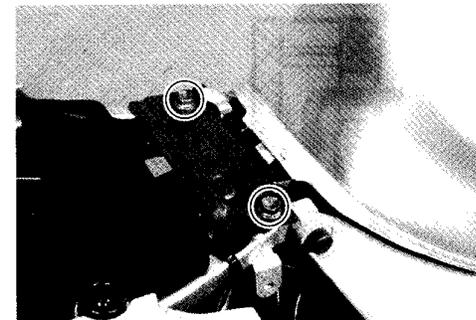
- Disconnect the breather hose ④.

### ⚠ CAUTION

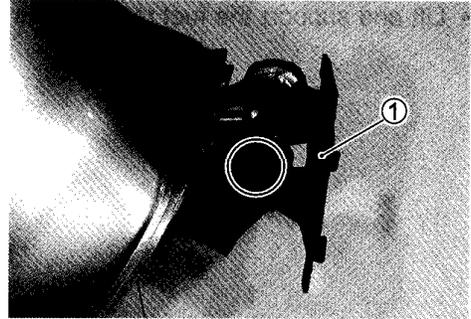
**Avoid bending the fuel tank air breather hose when re-mounting the fuel tank to prevent the stoppage of fuel flow. (Refer to page 8-18 for the air breather hose routing.)**



- Remove the fuel tank prop and lower down the fuel tank.
- Remove the fuel tank bracket bolts.
- Remove the fuel tank.

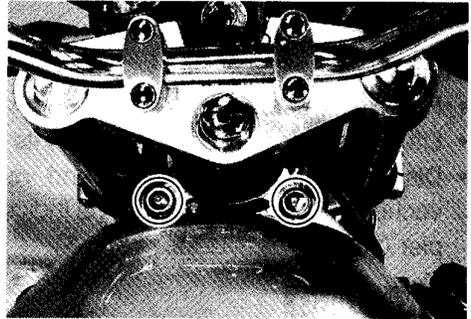


- Remove the fuel tank bracket ①.



### RECOUNTING

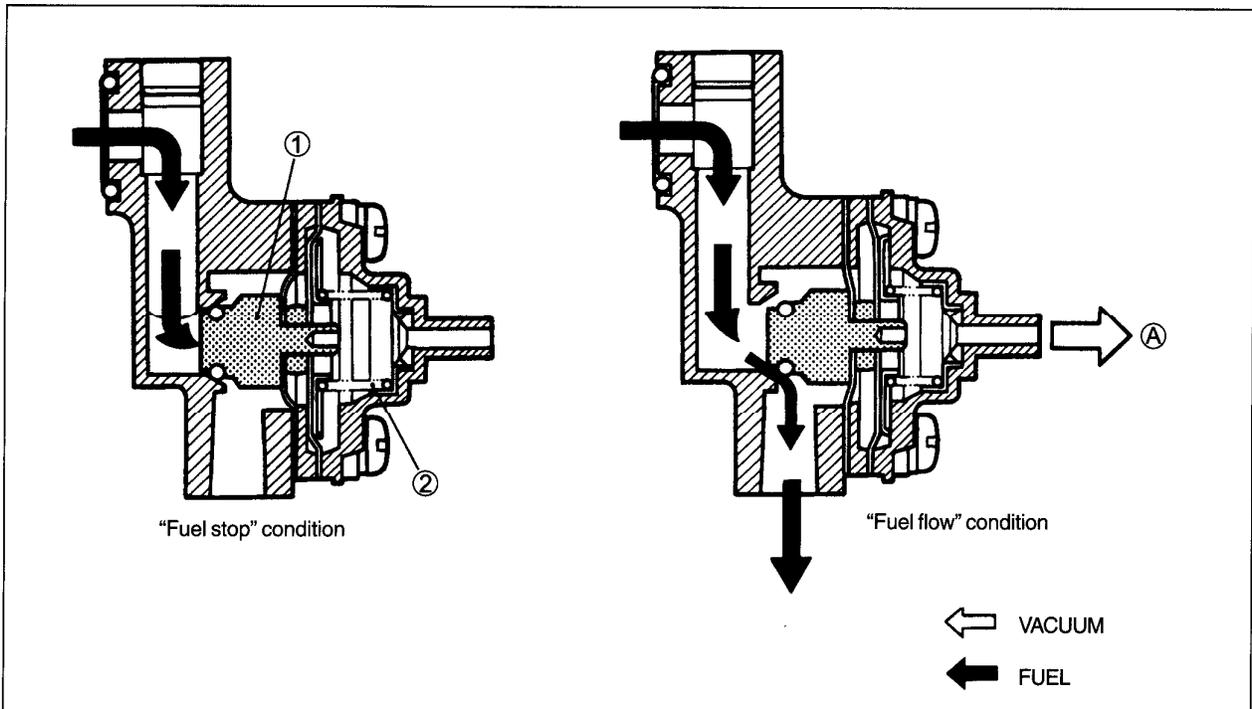
- Remount the fuel tank in the reverse order of removal.



### VACUUM FUEL VALVE

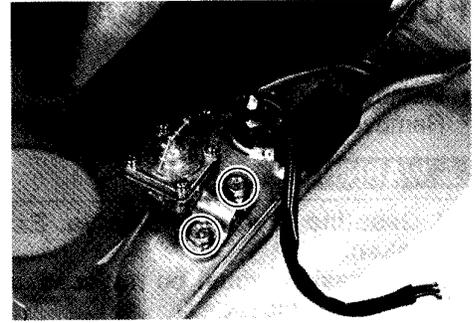
When the engine is not operating, the vacuum fuel valve ① is kept closed by the tension of the spring ②, which closes the fuel passageway and stops the flow of fuel to the carburetors.

When the engine has started, negative pressure (vacuum) Ⓐ is generated in the combustion chamber and reaches the diaphragm through a passage in the carburetor's main bore and the vacuum hose. This negative pressure (vacuum) Ⓐ is higher than the spring pressure which causes the diaphragm to force open the vacuum fuel valve ① and allow fuel to flow to the carburetor assembly.



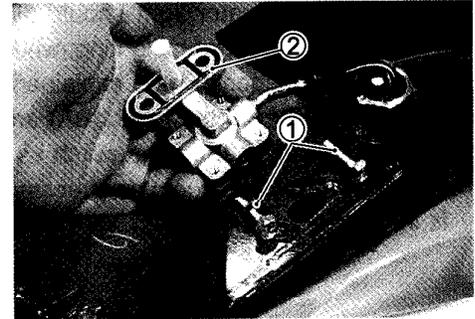
## REMOVAL

- Remove the fuel tank. (☞ 4-5)
- Remove the vacuum fuel valve by removing the mounting bolts.



### ⚠ WARNING

- \* Gasoline is very explosive. Extreme care must be taken.
- \* The gaskets ① and O-ring ② must be replaced with new ones to prevent fuel leakage.



## INSPECTION AND CLEANING

Connect the vacuum pump gauge to the vacuum port of the vacuum fuel valve. Apply negative pressure to the vacuum fuel valve and blow into the fuel outlet port. If air does not flow out, replace the vacuum fuel valve with a new one.

 09917-47010: Vacuum pump gauge set

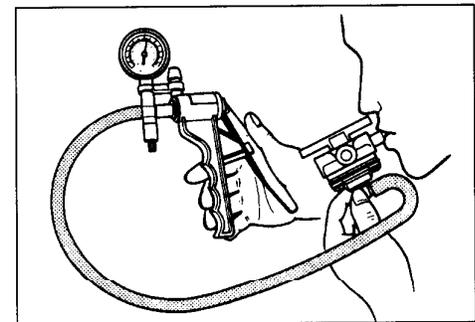
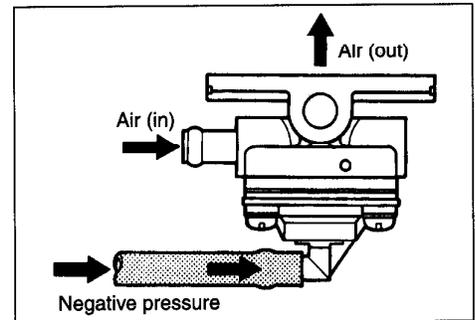
 **DATA** Negative pressure: 6.8 – 13.6 kPa  
(0.068 – 0.136 kgf/cm<sup>2</sup>, 0.97 – 1.93 psi)

### ⚠ WARNING

Gasoline and gasoline vapors are toxic. There usually remains a small amount of fuel in the vacuum fuel valve, so when checking the valve make sure you do not swallow the fuel when blowing into the fuel outlet port.

### ⚠ CAUTION

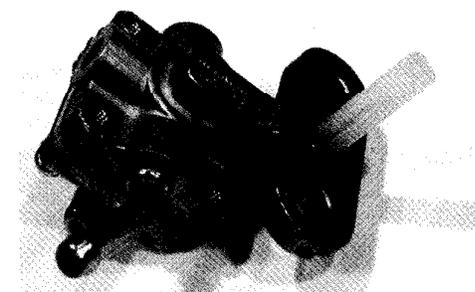
Only use a hand operated vacuum pump. Do not apply high negative pressure to (more than 13.6 kPa) prevent the vacuum fuel valve from being damaged.



If the fuel filter is dirty with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Clean the fuel filter with compressed air.

## REMOUNTING

Remount the vacuum fuel valve in the reverse order of removal.



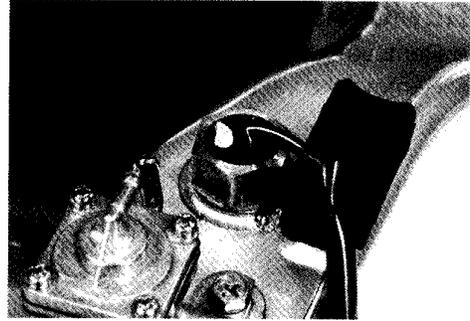
## FUEL LEVEL INDICATOR LIGHT SWITCH

### REMOVAL

- Remove the fuel tank. (☞ 4-5)
- Remove the fuel level indicator light switch.

#### ⚠ WARNING

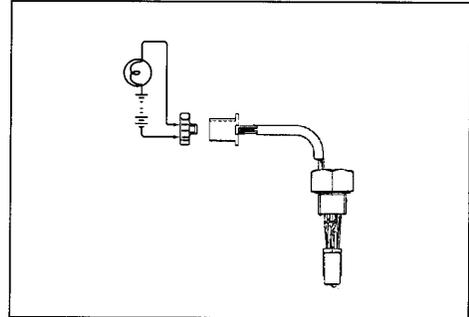
- \* Gasoline is very explosive. Extreme care must be taken.
- \* The gaskets must be replaced with new ones to prevent fuel leakage.



The fuel level indicator light should flicker, when its switch ① turn "ON" and should keep lighting, when its switch ② turn "ON". These system inspection are explained as follows.

- Connect a 12V battery fuse (10A) and test bulb (14V, 3W) to the fuel level indicator light switch as shown.

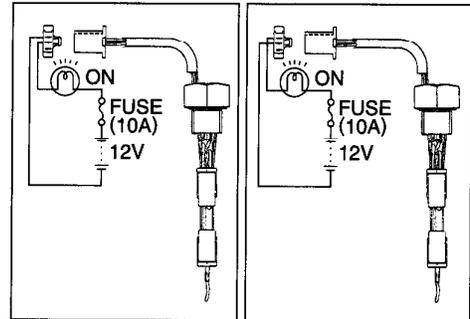
The test bulb should come on after several seconds if the switch is in good condition.



- When the switch is immersed and stirred in gasoline under the above condition, the bulb should go out. If the bulb remains lit, replace the unit with a new one.

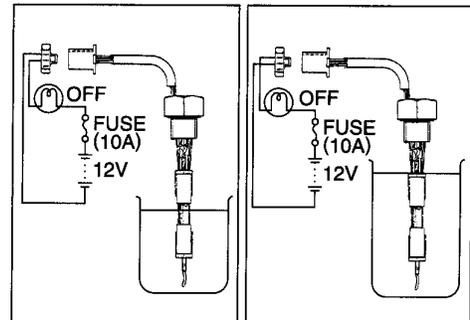
#### ⚠ WARNING

Always use extreme caution when handling gasoline.



### RECOUNTING

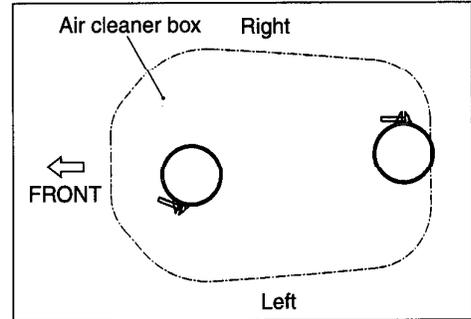
- Remount the fuel tank in the reverse order of removal.



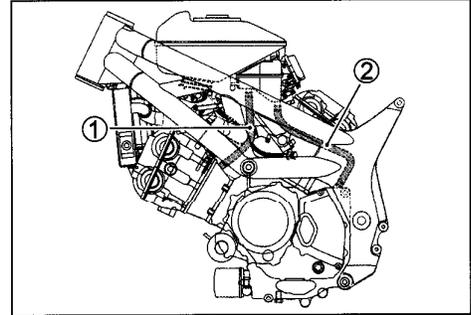
## FUEL PUMP

### REMOVAL

- Lift and support the fuel tank.
- Loosen the carburetor clamp screws at the air cleaner box side.



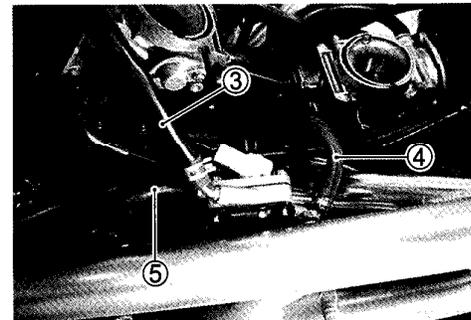
- Disconnect the cylinder breather hose ① and the crankcase breather hose ②.
- Remove the air cleaner with the oil catch tank and the drain hose.



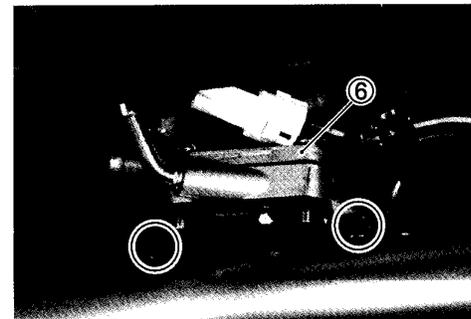
- Disconnect the fuel hoses ③, ④ and the vacuum hose ⑤.

#### **⚠ WARNING**

**Gasoline is highly flammable and explosive.  
Keep heat, spark and flames away from gasoline.**

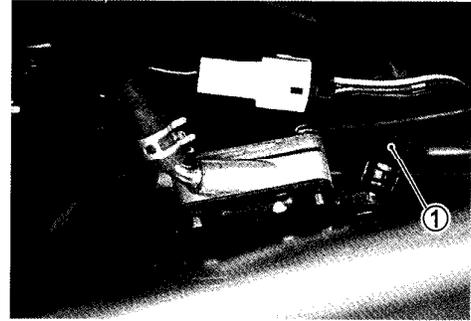


- Remove the fuel pump ⑥.



## INSPECTION

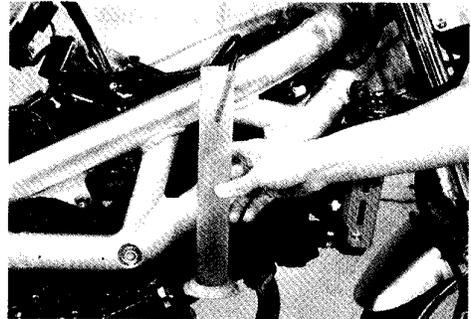
- Lift and support the fuel tank (☞ 4-4 and -5)
- Remove the air cleaner. (☞ 4-9)
- Disconnect the fuel hose ① and insert the free end of the hose into a receptacle.



- Shift the transmission into the neutral and turn the ignition switch "ON".
- Crank the engine a few seconds with starter motor by depressing starter button and then check if fuel flow.

### ⚠ WARNING

**Gasoline is highly flammable and explosive.  
Keep heat, spark and flames away from gasoline.**

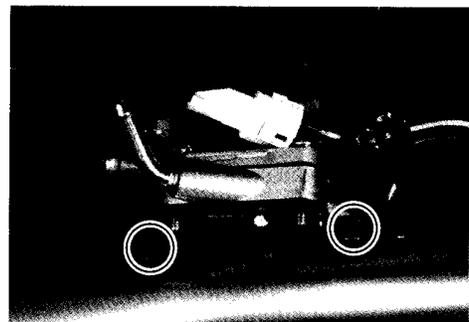


- If fuel does not flow check the vacuum fuel valve. If vacuum fuel valve is correct, replace the fuel pump with a new one.

## REMOUNTING

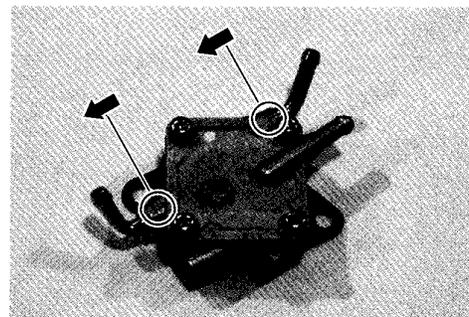
- Connect the fuel hoses and the vacuum hose.
- Remount the fuel pump.

**🔩 Fuel pump mounting bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)**

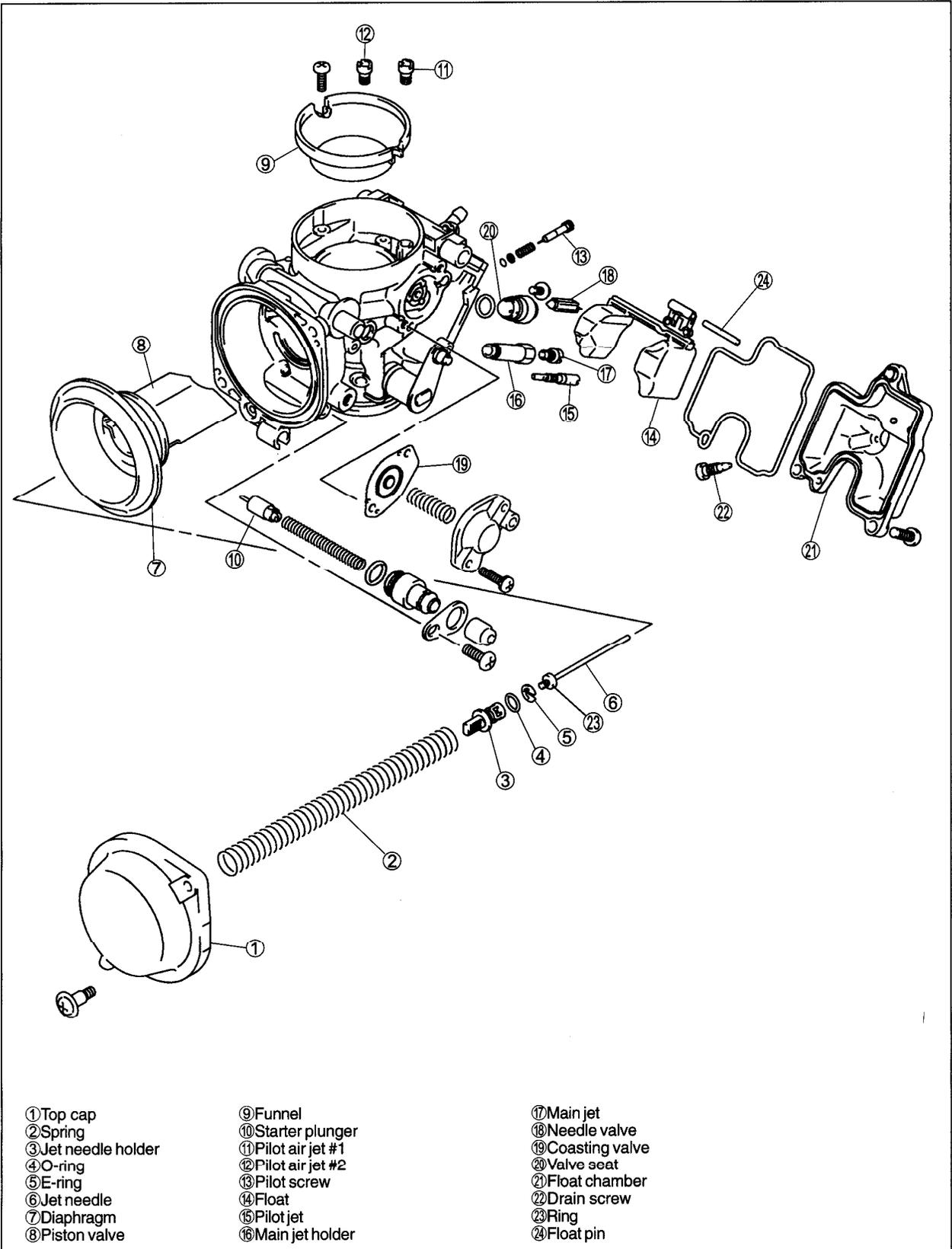


### NOTE:

- \* The arrows on the fuel pump indicate the directions of fuel flows.
- \* Connect the fuel hoses according to the arrow directions.



# CARBURETOR CONSTRUCTION



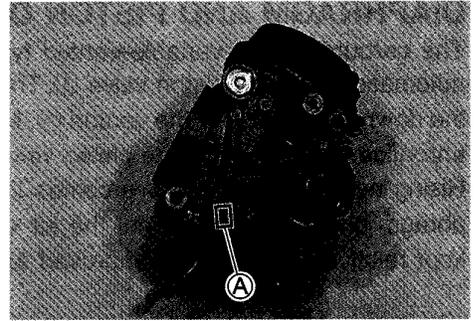
## SPECIFICATIONS

| ITEM                  | SPECIFICATION                     |                    |
|-----------------------|-----------------------------------|--------------------|
|                       | E-02, 04, 17, 22, 24, 25, 34      | E-03, 28           |
| Carburetor type       | MIKUNI BDSR39                     | <                  |
| Bore size             | 39 mm                             | ←                  |
| I.D. No.              | 20F0                              | 20F2               |
| Idle r/min.           | 1 300 ± 100 r/min.                | ←                  |
| Float height          | 7.0 ± 0.5 mm<br>(0.28 ± 0.02 in)  | ←                  |
| Fuel level            | 16.9 ± 0.5 mm<br>(0.68 ± 0.02 in) | ←                  |
| Main jet (M.J)        | #137.5                            | # <del>137.5</del> |
| Jet needle (J.N)      | 6E38-54-2                         | 6E42-54            |
| Needle jet (N.J)      | P-0                               | <del>P-0M</del>    |
| Throttle valve (Th.V) | #95                               | ←                  |
| Pilot jet (P.J)       | #17.5                             | # <del>15</del>    |
| Pilot screw (P.S)     | PRE-SET<br>(2 1/2 turns back)     | PRE-SET            |
| Throttle cable play   | 2.0 – 4.0 mm<br>(0.08 – 0.16 in)  | ←                  |

| ITEM                  | SPECIFICATION                     |                               |
|-----------------------|-----------------------------------|-------------------------------|
|                       | E-33                              | E-22 (U-TYPE)                 |
| Carburetor type       | MIKUNI BDSR39                     | ←                             |
| Bore size             | 39 mm                             | ←                             |
| I.D. No.              | 20F4                              | 20F5                          |
| Idle r/min.           | 1 300 ± 100 r/min                 | ←                             |
| Float height          | 7.0 ± 0.5 mm<br>(0.28 ± 0.02 in)  | ←                             |
| Fuel level            | 16.9 ± 0.5 mm<br>(0.68 ± 0.02 in) | ←                             |
| Main jet (M.J)        | # <del>137.5</del>                | #137.5                        |
| Jet needle (J.N)      | 6E43-54                           | 6E38-54-2                     |
| Needle jet (N.J)      | <del>P0-M</del>                   | P-0                           |
| Throttle valve (Th.V) | #95                               | <                             |
| Pilot jet (P.J)       | # <del>15</del>                   | #17.5                         |
| Pilot screw (P.S)     | PRE-SET                           | PRE-SET<br>(3 1/2 turns back) |
| Throttle cable play   | 2.0 – 4.0 mm<br>(0.08 – 0.16 in)  | ←                             |

**I.D. NO. LOCATION**

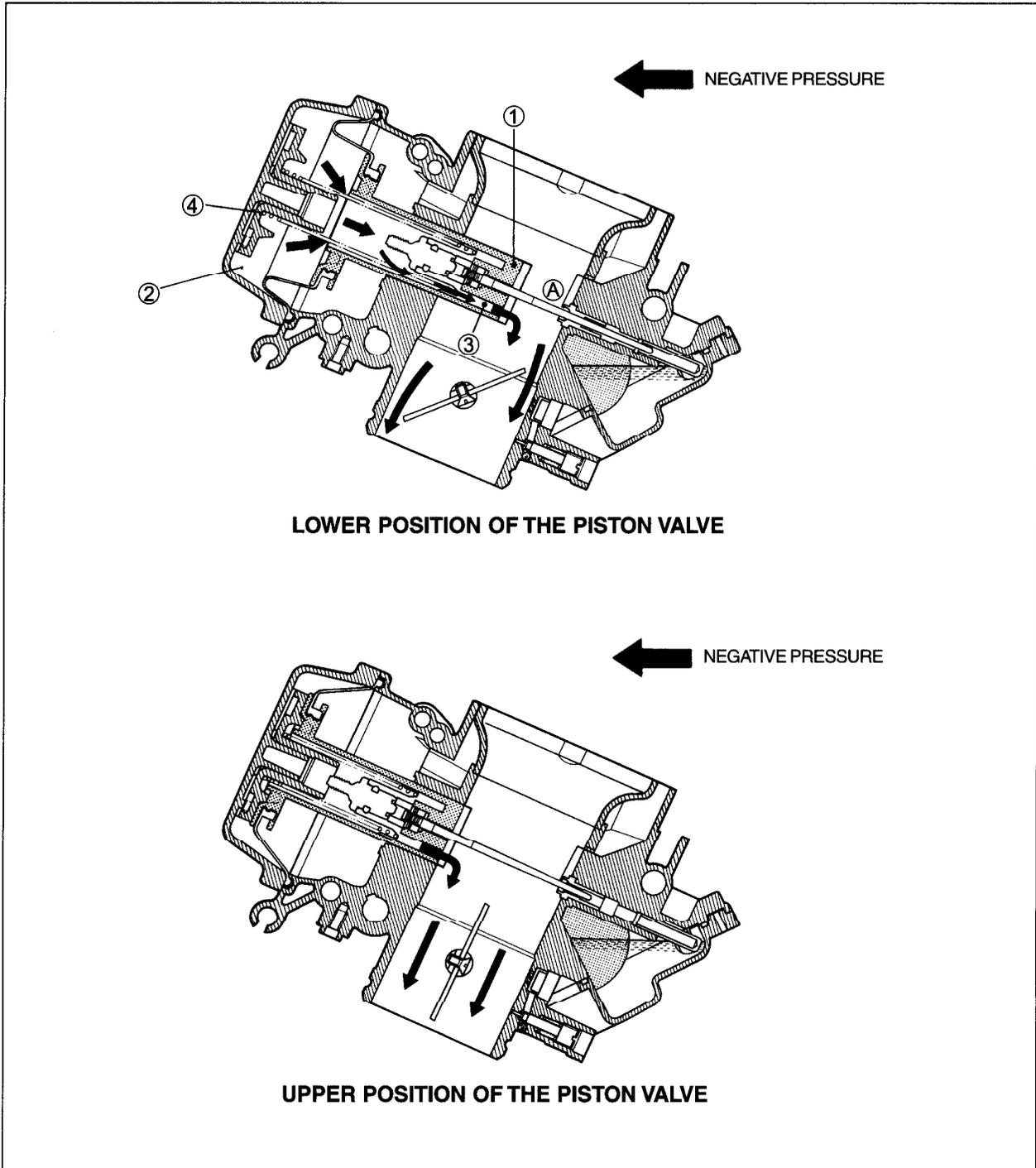
Each carburetor has I.D. Number (A) stamped on the carburetor body according to its specifications.



### DIAPHRAGM AND PISTON OPERATION

The carburetor is a variable-venturi type, whose venturi cross sectional area is increased or decreased automatically by the piston valve ①. The piston valve moves according to the negative pressure present on the downstream side of the venturi (A). Negative pressure is admitted into the diaphragm chamber ② through an orifice ③ provided in the piston valve ①.

Rising negative pressure overcomes the spring ④ force, causing the piston valve ① to rise into the diaphragm chamber and prevent the air velocity from increasing. Thus, air velocity in the venturi passage is kept relatively constant for improved fuel atomization and the precise air/fuel mixture.



### SLOW SYSTEM

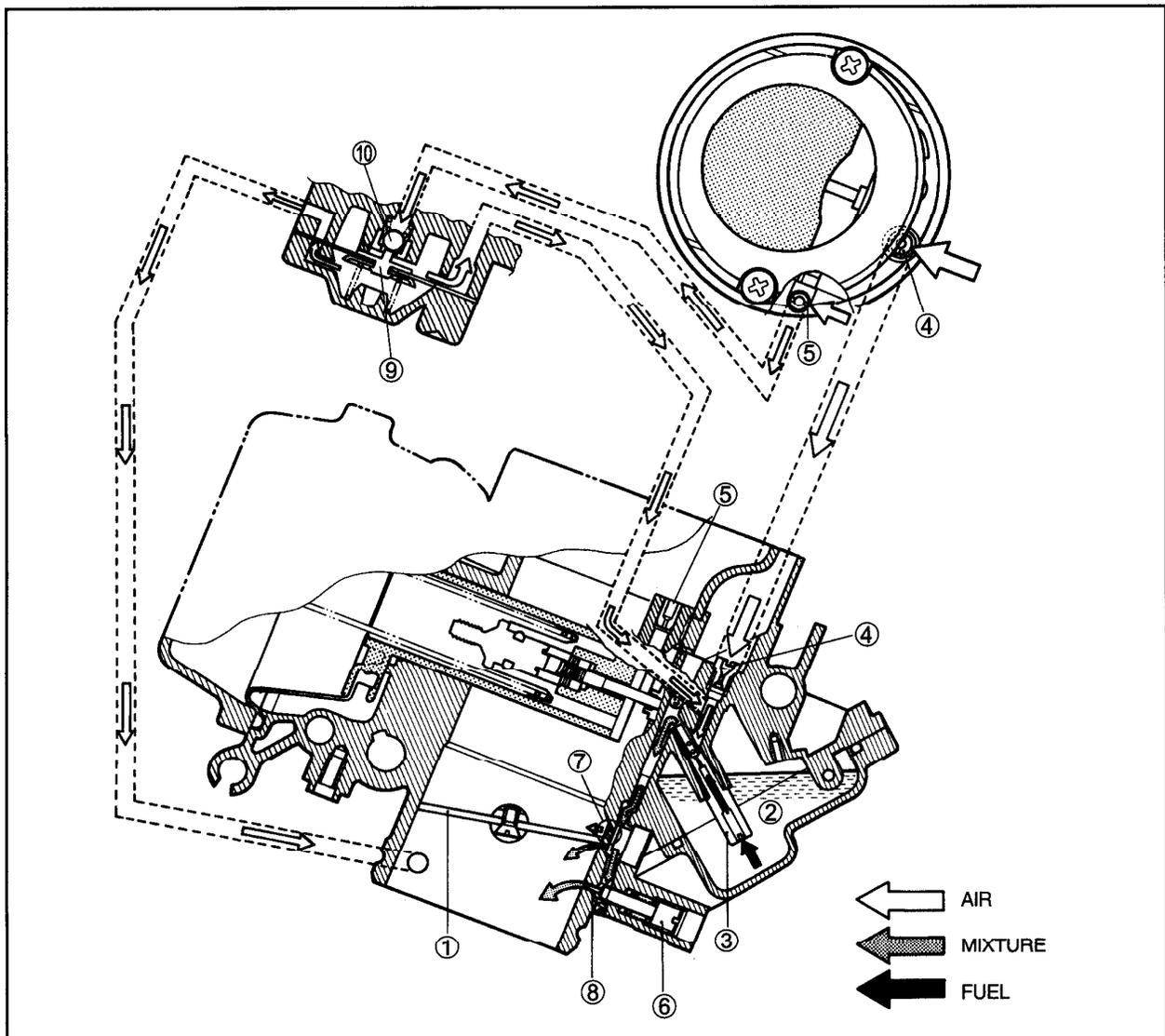
This system supplies fuel to the engine during engine operation with throttle valve ① closed or slight opened. The fuel from the float chamber ② is first passage and metered by the pilot jet ③ where it mixes with air coming in through #1 pilot air jet ④ and #2 pilot air jet ⑤.

This mixture, rich with fuel, then goes up through pilot pipe to pilot screw ⑥. A part of the mixture is discharged into the main bore out of by-pass ports ⑦. The remainder is then metered by pilot screw and sprayed out into the main bore through pilot outlet ⑧.

### TRANSIENT ENRICHMENT SYSTEM

The transient enrichment system is a device which keeps fuel/air mixture ratio constant in order not to generate unstable combustion when the throttle grip is returned suddenly during high speed driving. For normal operation, sum of the air from the #1 pilot air jet ④ and #2 pilot air jet ⑤ keeps proper fuel/air mixture ratio. But when the throttle valve is closed suddenly, a large negative pressure generated on cylinder side works on to a diaphragm ⑨. The ball ⑩ held by the diaphragm ⑨ closes the air passage from #2 pilot air jet ⑤, therefore, the fuel/air mixture becomes rich with fuel.

This system is to keep the combustion condition constant by varying the fuel/air mixture ratio by controlling air flow from the pilot air jet.



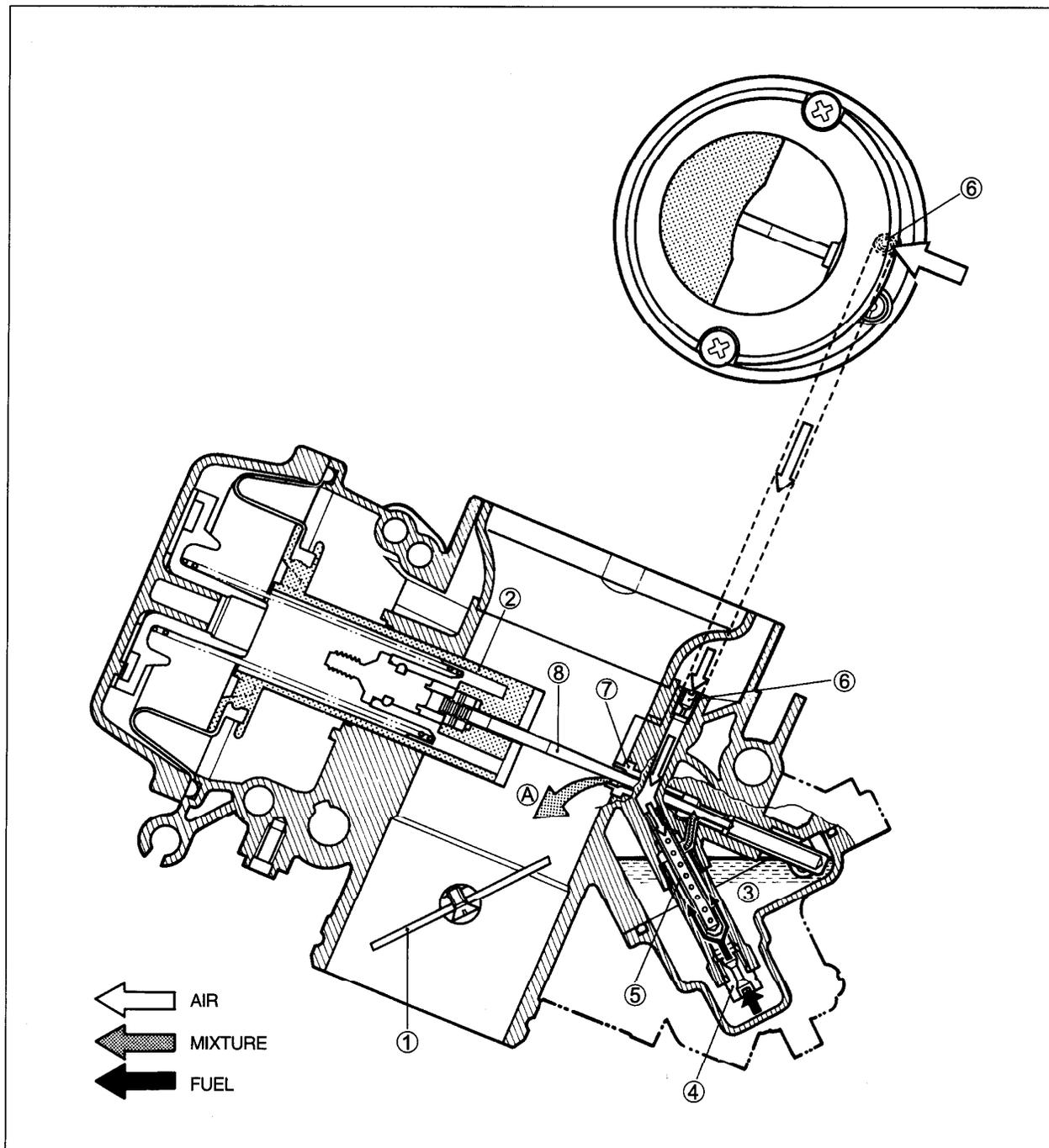
## MAIN SYSTEM

As the throttle valve ① is opened, engine speed rises and negative pressure in the venturi (A) increases. This causes the piston valve ② to move upward.

The fuel in the float chamber ③ is metered by the main jet ④. The metered fuel passes around main air bleed pipe ⑤, mixes with the air admitted through main air jet ⑥ to form an emulsion and emulsion fuel enters needle jet ⑦.

The emulsified fuel then passes through the clearance between the needle jet ⑦ and jet needle ⑧ and is discharged into the venturi (A), where it meets the main air stream being drawn by the engine.

Mixture proportioning is accomplished in the needle jet ⑦. The clearance through which the emulsified fuel must flow ultimately depends on throttle position.



### STARTER (ENRICHER) SYSTEM

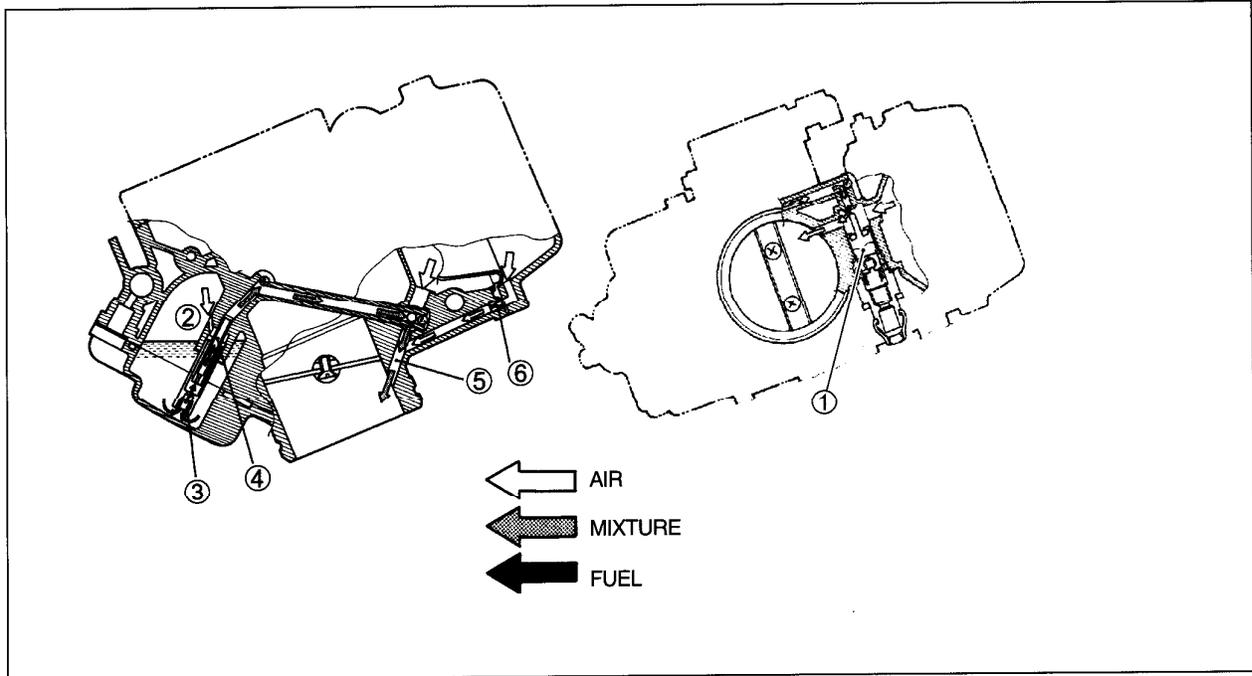
Pulling the starter (enricher) plunger ① causes fuel to be drawn into the float chamber ②.

The starter jet ③ meters this fuel. The fuel then flows into the fuel pipe ④ and mixes with the air coming from the float chamber ②. The mixture, rich in fuel, reaches starter plunger ① and mixes again with the air coming through starter air jet ⑥ from the diaphragm chamber.

The three successive mixings of the fuel with the air provided the proper fuel/air mixture for starting. This occurs when the mixture is sprayed through the starter outlet port ⑤ into the main bore.

**NOTE:**

*A starter (enricher) system is operated almost the same way as a choke.*



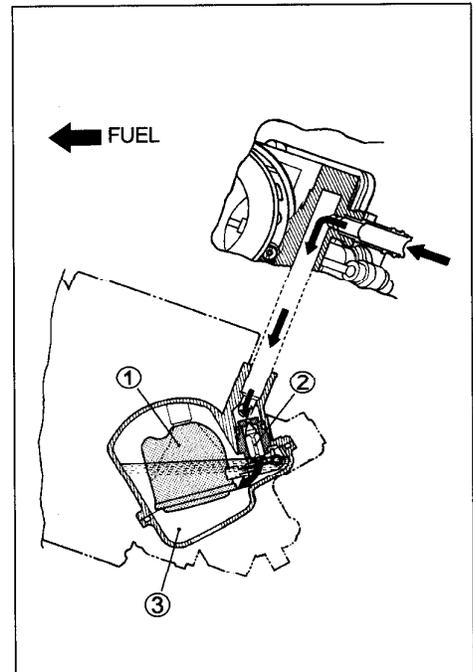
### FLOAT SYSTEM

The float ① and needle valve ② work in conjunction with one another. As the float ① moves up and down, so does the needle valve ②.

When there is a high fuel level in float chamber ③, the float ① rises and the needle valve ② pushes up against the valve seat. When this occurs, no fuel enters the float chamber ③.

As the fuel level falls, the float ① lowers and the needle valve ② unseats itself; admitting fuel into the float chamber ③.

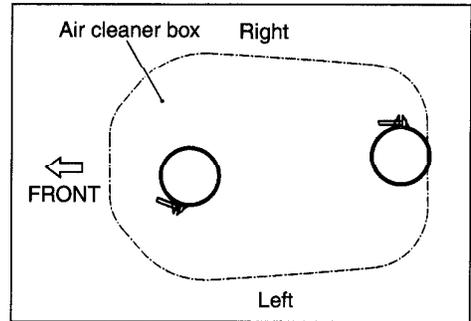
In this manner, the needle valve ② admits and shuts off fuel to maintain the appropriate fuel level inside the float chamber ③.



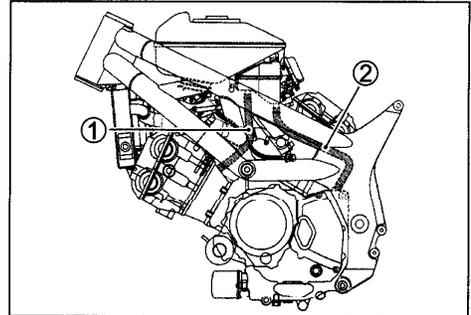
## CARBURETOR

### REMOVAL

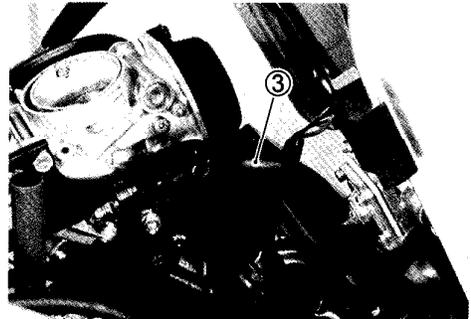
- Lift and support the fuel tank.
- Loosen the carburetor clamp screws at the air cleaner box side.



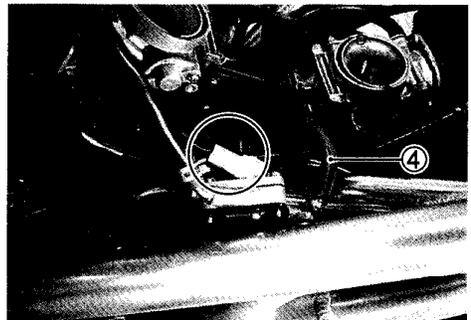
- Disconnect the cylinder breather hose ① and the crankcase breather hose ②.
- Remove the air cleaner with the oil catch tank and the drain hose.



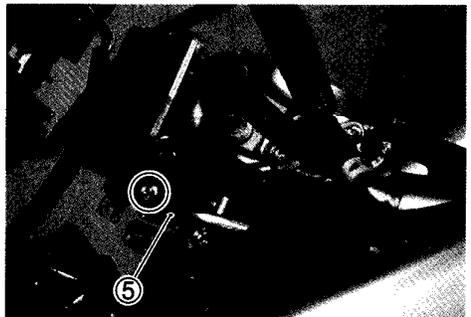
- Disconnect the vacuum hose ③ (for vacuum fuel valve).



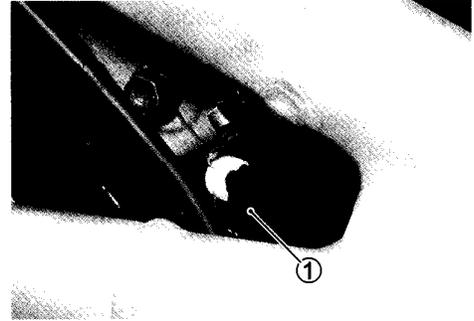
- Disconnect the fuel hose ④.
- Disconnect the throttle position sensor coupler.



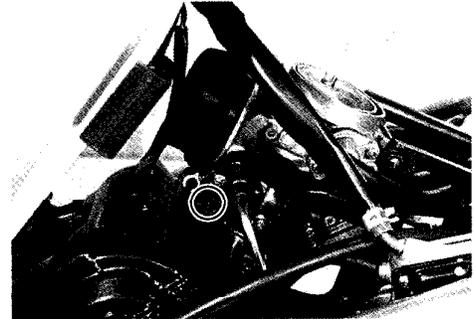
- Remove the starter (enricher) plunger ⑤ from the carburetor (rear side).



- Disconnect the throttle stop screw ①.



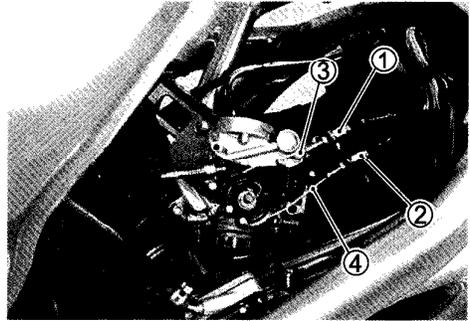
- Loosen the carburetor clamp screws.



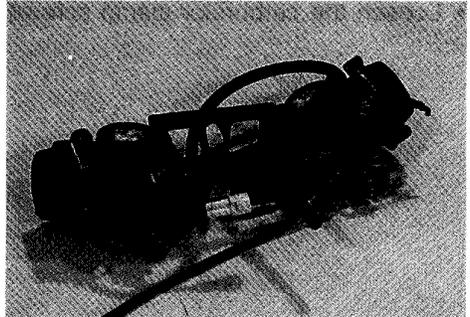
- Remove the starter (enricher) plunger ② from the carburetor (front side).



- Loosen the throttle cable lock nuts, ① and ②, on the returning cable ③ and pulling cable ④.
- Disconnect the throttle cable ③ and pulling cable ④.
- Disconnect the vacuum hose ⑤ (for fuel pump).



- Remove the carburetor assembly.



## DISASSEMBLY

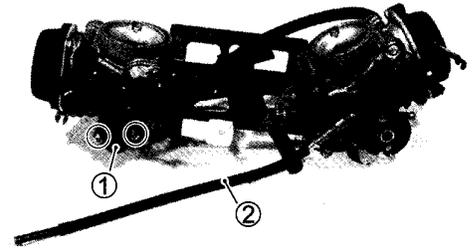
Before disassembly, prepare a clean and well lit work place where carburetor components can be laid out neatly and will not get lost. Study the service manual carburetor diagram and familiarize yourself with component locations and the different fuel circuits and their routing through the carburetor.

### ▲ CAUTION

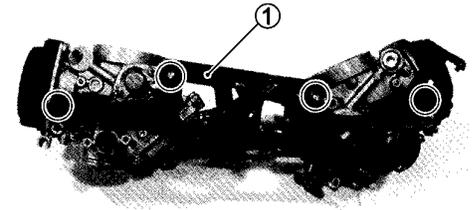
**Prior to disassembly, mark with a paint or notch the initial position of the throttle sensor which is PRE-SET accurately at the factory.**

**Avoid removing the throttle position sensor from the carburetor body unless you really need to do so.**

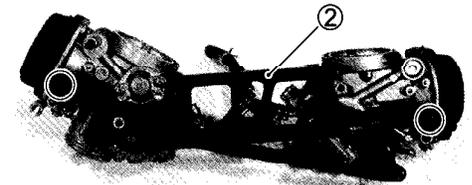
- Remove the throttle position sensor ①.
- Remove the throttle stop screw ②.



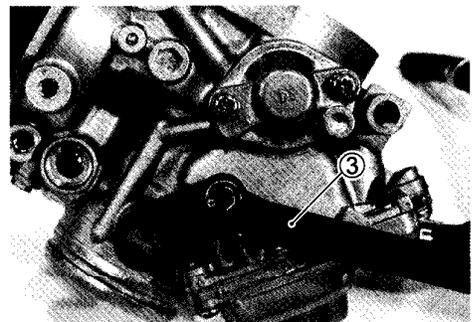
- Remove the carburetor link plate (R) ① by removing the fitting screws and bolts.



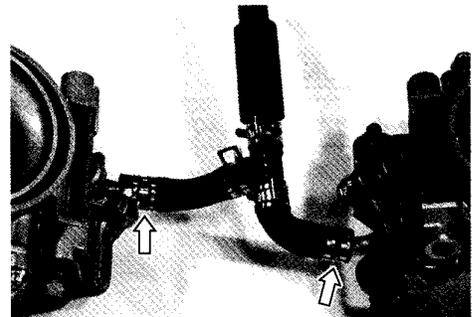
- Remove the carburetor link plate (L) ② by removing the fitting screws.



- Remove the cotter pins and washers.
- Remove the throttle link plate ③.



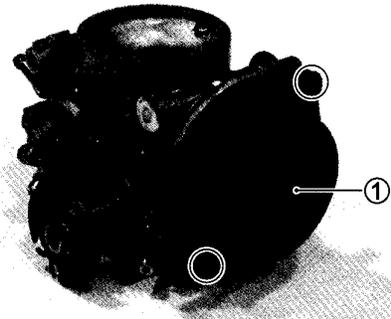
- Disconnect the fuel hoses.
- Separate the carburetor assembly.



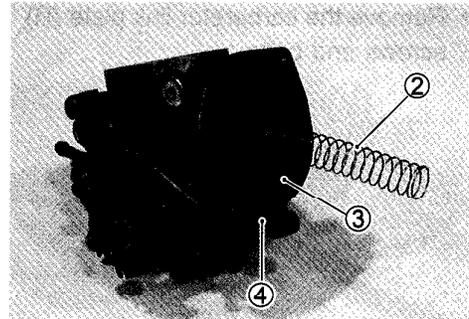
- Remove the carburetor top cap ①.

**▲ CAUTION**

Do not use compressed air on the carburetor body, before removing the diaphragm; this may damage the diaphragm.

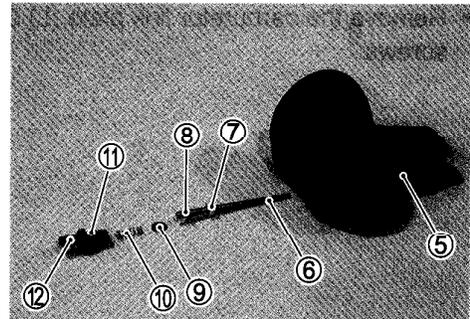


- Remove the spring ② and the piston valve along with its diaphragm ③.
- Remove the O-ring ④.



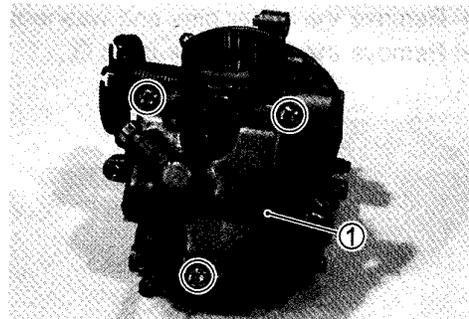
- Remove the jet needle from the piston valve.

- ⑤ Piston valve
- ⑥ Jet needle
- ⑦ Ring
- ⑧ E-ring
- ⑨ Washer
- ⑩ Spring
- ⑪ O-ring
- ⑫ Jet needle holder



- Remove the float chamber ①.

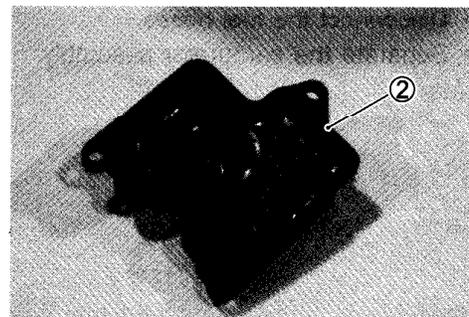
 09900-09004: Impact driver set



- Remove the O-ring ②.

**▲ CAUTION**

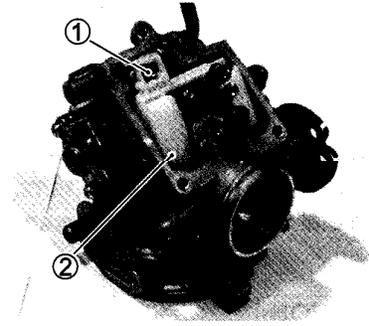
Use a new O-ring to prevent fuel leakage.



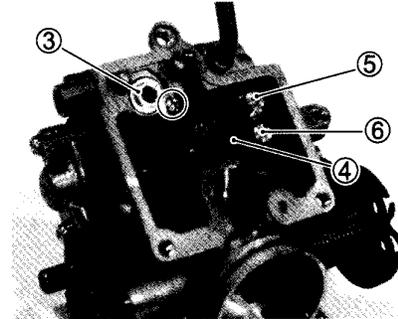
- Remove the float ① and needle valve ② by removing the float pin.

**▲ CAUTION**

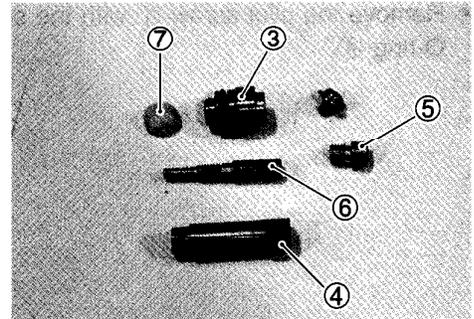
**Do not use a wire to clean the valve seat.**



- Remove the main jet ⑤, main jet holder ④, valve seat ③ and pilot jet ⑥.



- Remove the fuel filter ⑦.
- ③ Valve seat
- ④ Main jet holder
- ⑤ Main jet
- ⑥ Pilot jet
- ⑦ Filter



- Use a 1/8" size drill bit with a drill-stop to remove the pilot screw plug. Set the drill-stop 6 mm from the end of the bit to prevent drilling into the pilot screw. Carefully drill through the plug.

Thread a self-tapping sheet metal screw into the plug. Pull on the screw head with pliers to remove the plug. Carefully clean any metal shavings from the area. (For E-03, 18 and 33 models)

**▲ CAUTION**

**Replace the plug with a new one.**

- Slowly turn the pilot screw ① in clockwise and count the number of turns until the screw is lightly seated. Make a note of how many turns were made so the screw can be reset correctly after cleaning.

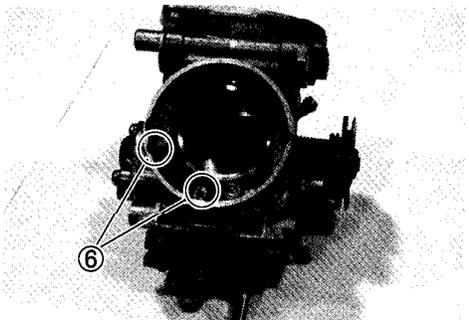
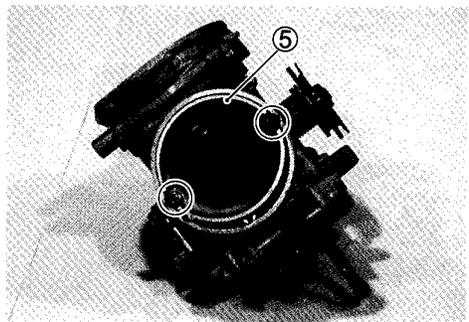
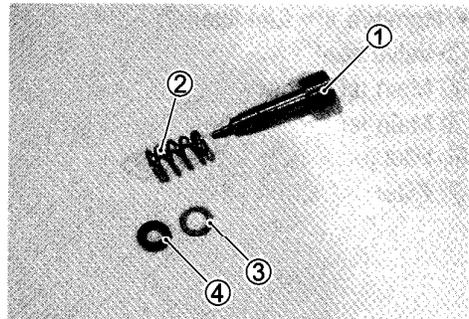
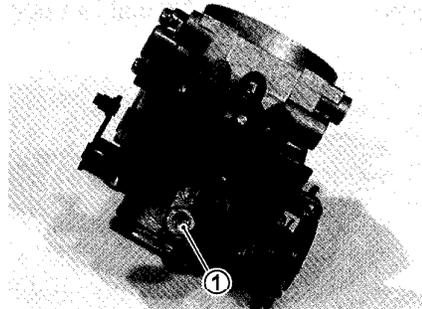
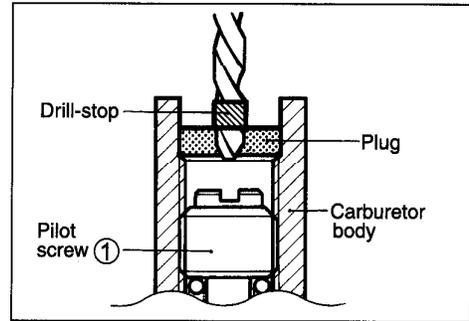
- Remove the pilot screw ① with the spring ②, washer ③, and O-ring ④.

- Remove the funnel ⑤.

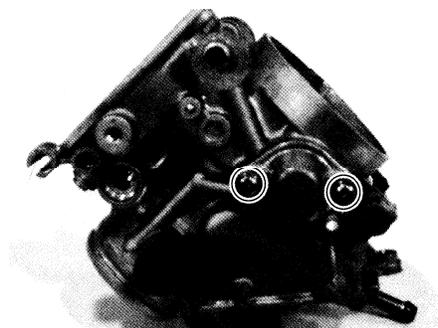
- Remove the pilot air jets ⑥.

**▲ CAUTION**

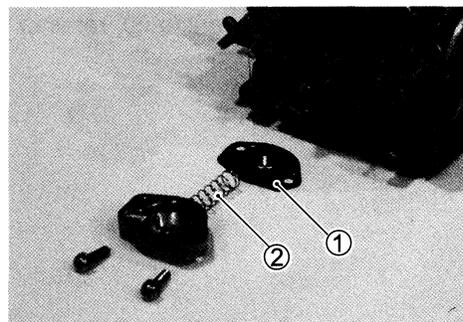
**Do not use a wire for cleaning the passage and jets.**



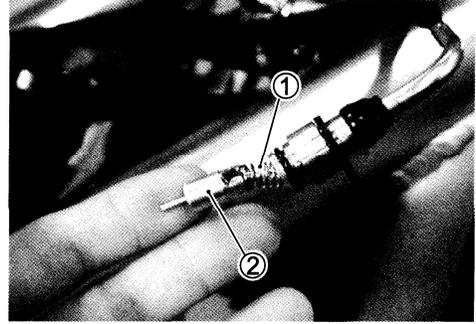
- Remove the coasting valve cover.



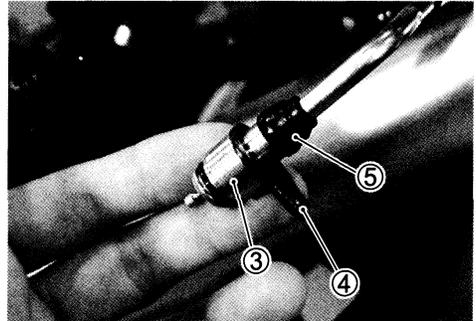
- Remove the coasting valve ① and the spring ②.



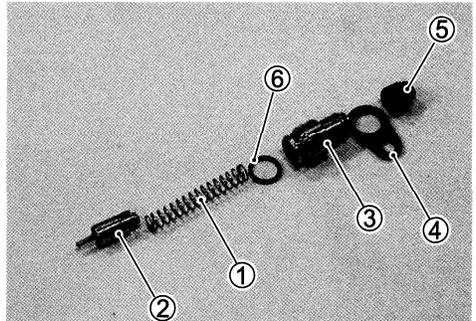
- Compress the spring ①.
- Disconnect the starter (enricher) plunger ②.



- Remove the cable guide ③, retainer ④ and cap ⑤.



- Remove the O-ring ⑥.
- ① Spring
  - ② Starter (enricher) plunger
  - ③ Cable guide
  - ④ Retainer
  - ⑤ Cap
  - ⑥ O-ring



**▲ CAUTION**

**Use a new O-ring to prevent fuel leakage.**

## CARBURETOR CLEANING

### ⚠ WARNING

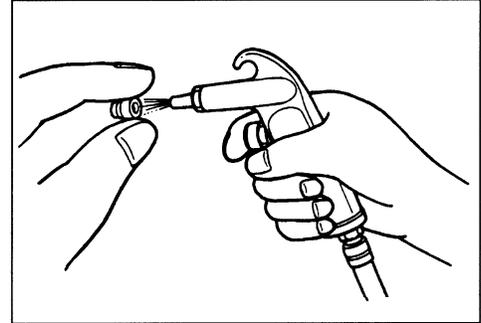
Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions on proper use, handling and storage.

- Clean all jets with a spray-type carburetor cleaner and dry them using compressed air.
- Clean all circuits of the carburetor thoroughly - not just the perceived problem area. Clean the circuits in the carburetor body with a spray-type cleaner and allow each circuit to soak if necessary to loosen dirt and varnish. Blow the body dry using compressed air.

### ⚠ CAUTION

Do not use a wire to clean the jets or passageways. A wire can damage the jets and passageways. If the components cannot be cleaned with a spray cleaner, it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning on the carburetor components.

- After cleaning, reassemble the carburetor with new seals and gaskets.



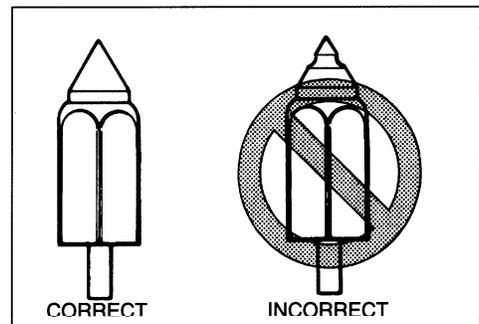
## CARBURETOR INSPECTION

Check the following items for any damage or clogging.

- |                               |               |                                 |
|-------------------------------|---------------|---------------------------------|
| *Pilot jet                    | *Float        | *Starter (enricher) jet         |
| *Main jet                     | *Needle valve | *Gasket and O-ring              |
| *Main air jet                 | *Jet needle   | *Throttle shaft oil seal        |
| *Pilot air jets               | *Valve seat   | *Pilot outlet and by-pass ports |
| *Needle jet air bleeding hole | *Piston valve | *Coasting valve                 |

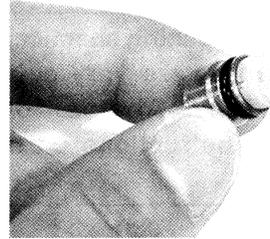
### NEEDLE VALVE INSPECTION

If foreign matter is caught between the valve seat and the needle valve, the gasoline will continue flowing and overflow. If the valve seat and needle valve are worn beyond the permissible limits, similar trouble will occur. Conversely, if the needle valve sticks, the gasoline will not flow into the float chamber. Clean the float chamber and float parts with gasoline. If the needle valve is worn, as shown in the illustration, replace it along with a new valve seat. Clean the fuel passage of the mixing chamber using compressed air.



**FUEL FILTER INSPECTION**

If the fuel filter is dirty with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Clean the fuel filter with compressed air.

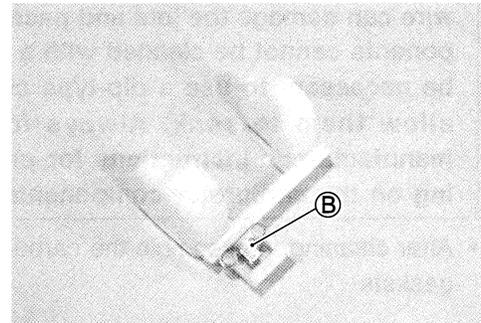
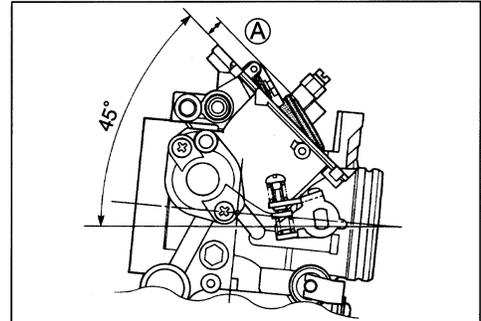


**FLOAT HEIGHT ADJUSTMENT**

- Measure the float height (A) by using a calipers with the carburetor slanting at an angle of 45° (as shown in the right illustration) and the float arm just contacting the needle valve.
- Bend the tongue (B) of the float arm as necessary to bring the height (A) to the specified value.

**DATA** Float height (A):  $7.0 \pm 0.5$  mm ( $0.28 \pm 0.02$  in)

**TOOL** 09900-20102: Vernier calipers



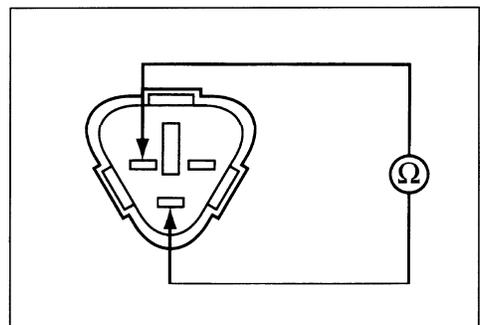
**THROTTLE POSITION SENSOR INSPECTION**

Using a tester, measure the resistance between the terminals as shown in the right illustration.

**DATA** Throttle position sensor resistance: 3.5 – 6.5 kΩ

**NOTE:**

When making above test, it is not necessary to remove the throttle position sensor.



**CARBURETOR HEATER INSPECTION****(ONLY FOR E-02 MODEL)**

Check the carburetor heater, which requires following two inspection:

- Disconnect each lead wire going into the respective carburetor heaters.
1. Check each heater coil for open and ohmic resistance with the multi circuit tester.
 

The coil is in good condition if the resistance is as follows.

**NOTE:**

When making this test, be sure that the carburetor heater is in a cold condition.

**TOOL** 09900-25008: Multi circuit tester set

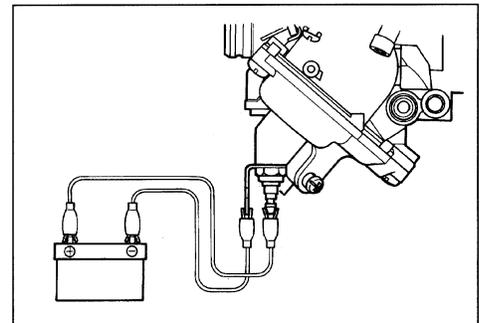
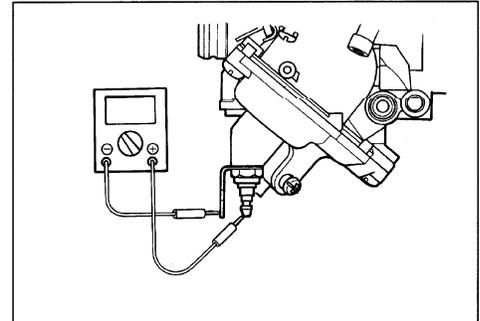
**TESTER** Tester knob indication: Resistance ( $\Omega$ )

**DATA** Heater coil resistance  
Standard: 12–18  $\Omega$

2. Connect 12V battery to the carburetor heater terminals and check the carburetor float chamber temperature with your hand which is warmed up after 5 minutes. If the carburetor float chamber temperature heater with a new one.

**⚠ WARNING**

Do not touch the carburetor heater directly to prevent burn.

**CARBURETOR THERMO-SWITCH INSPECTION****(ONLY FOR E-02 MODEL)**

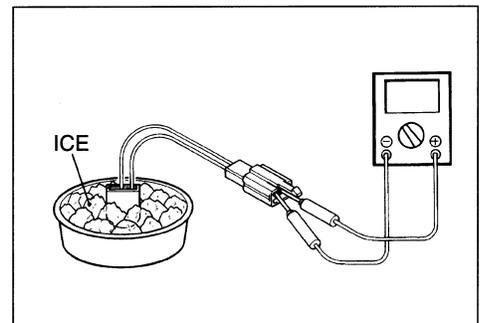
Check the thermo-switch in the following procedure.

- Immerse the thermo-switch in ice contained in a pan and wait about few minutes, then check the continuity between the lead wires of the thermo-switch with the multi circuit tester.
 

If there is no continuity, replace the thermo-switch with a new one.

**TOOL** 09900-25008: Multi circuit tester set

**TESTER** Tester knob indication: Continuity test (•••••)



## REASSEMBLY AND REMOUNTING

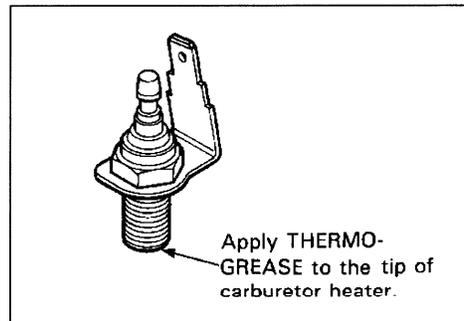
Reassemble and remount the carburetors in the reverse order of disassembly and removal. Pay attention to the following points:

### CARBURETOR HEATER (ONLY FOR E-02 MODEL)

- Before installing the carburetor heater, apply a small quantity of THERMO-GREASE to the carburetor heater and tighten it to the specified torque.

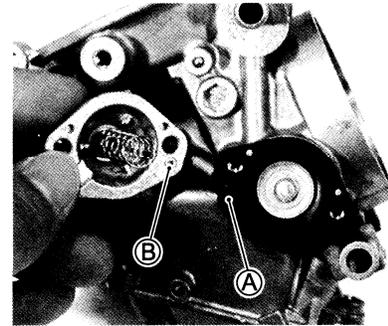
 99000-59029: THERMO-GREASE

 Carburetor heater: 3 N·m (0.3 kgf·m, 2.0 lb-ft)



**COASTING VALVE**

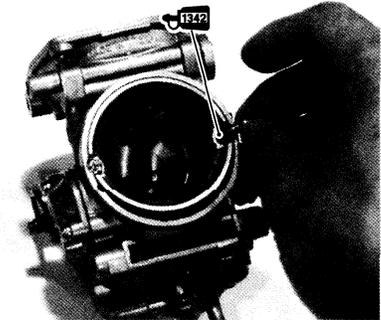
- When installing the coasting valve to the body, align the hole **A** of the diagram and air hole **B** of the cover.



**FUNNEL**

- Apply a small quantity of THREAD LOCK “1342” to the funnel stopper screws and tighten them.

 99000-32050: THREAD LOCK “1342”

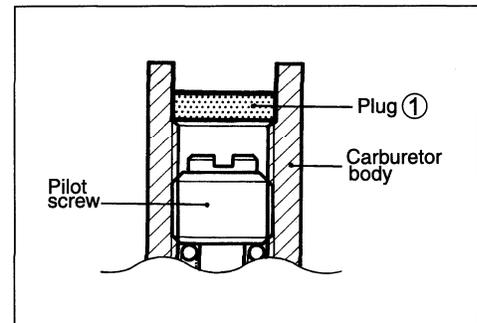


**PILOT SCREW**

- After cleaning, reinstall the pilot screw to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.
- Install new plug **①** by tapping it into place with a punch. (For E-03,18 and 33 models)

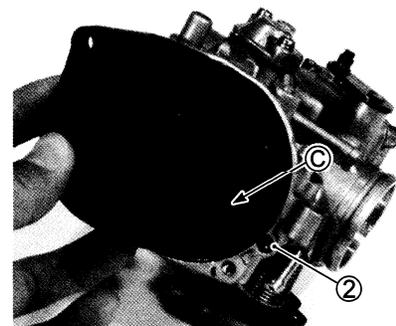
**▲ CAUTION**

Replace the O-ring with a new one.

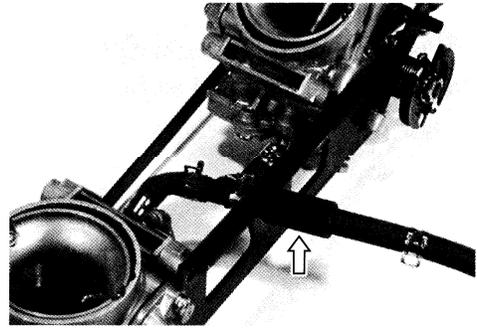


**CARBURETOR TOP CAP**

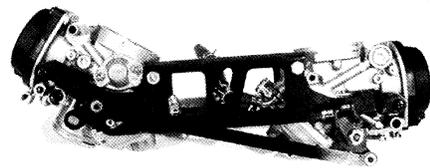
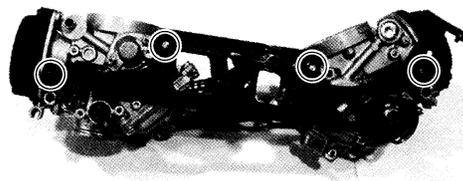
- Before installing the carburetor top cap, install the O-ring **②**.
- Align the protrusion **©** of the carburetor top cap with the O-ring **②**.



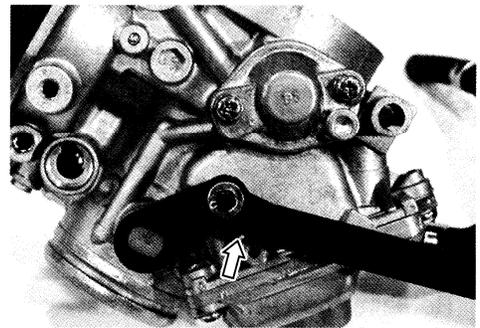
- Pass the fuel hoses through the center hole of carburetor link plate (R).
- Connect the fuel hoses.



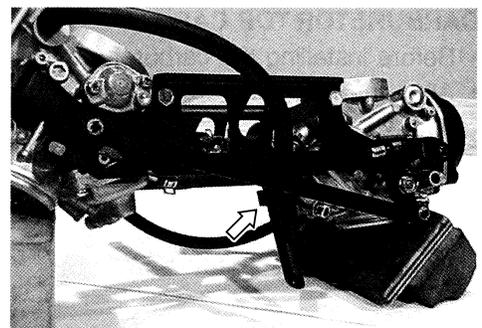
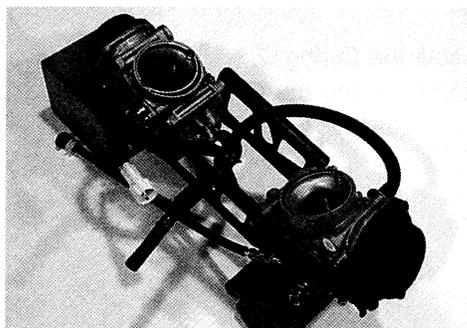
- Tighten the screws after tightening the bolts.



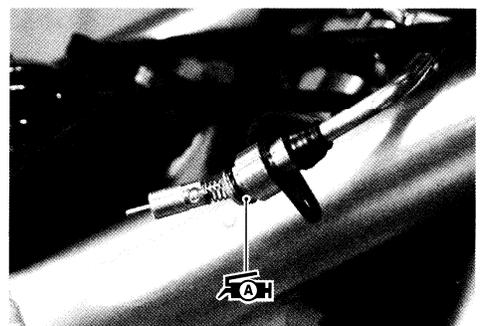
- Connect the throttle link plate with new cotter pins.



- Pass through the carburetor air vent hoses as shown in the right picture.



- When installing the starter (enricher) plunger, replace the O-ring with a new one and apply a small quantity of grease to it.



**THROTTLE POSITION SENSOR POSITIONING**

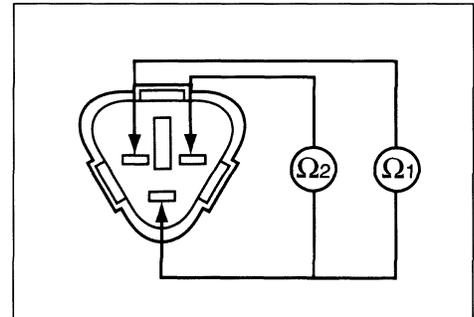
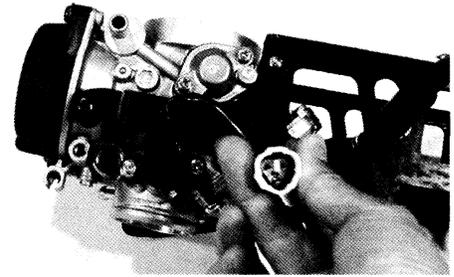
When removing the throttle position sensor from the carburetor body, install it to the exact position mentioned below;

- Measure the resistance  $\Omega_1$  between terminals of the throttle position sensor as shown in the right illustration.

**DATA** Throttle position sensor resistance  $\Omega_1$ : 3.5 – 6.5 k $\Omega$

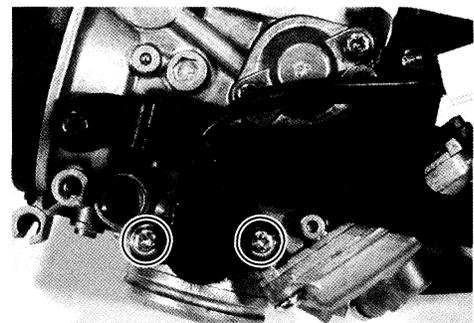
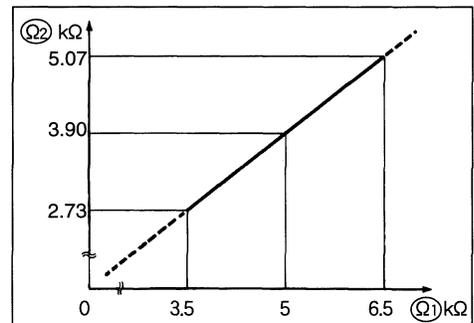
- Measure the resistance  $\Omega_2$  between terminals of the throttle position sensor as shown in the right illustration.
- Open the throttle valve fully by turning the throttle lever.
- Under above condition, see the throttle position sensor angle to have the resistance  $\Omega_2$  as 78% of the resistance  $\Omega_1$ .

**DATA** For example: When  $\Omega_1$  is 5 k $\Omega$ ,  $\Omega_2$  should be 3.9 k $\Omega$ .



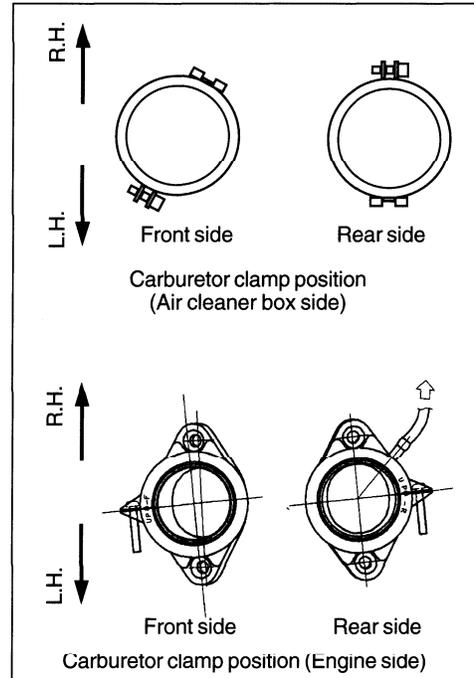
- When reading the above-mentioned resistance as  $\Omega_2$ , tighten the throttle position sensor mounting screws to the specified torque.

**🔧** Throttle position sensor mounting screw:  
 3.5 N·m (0.35 kgf·m, 2.5 lb-ft)



**CARBURETOR CLAMPS**

Locate the carburetor clamps as shown in the right illustrations.  
 (☞ 8-18)



- After all of the work has been completed, install the carburetor assembly onto the engine and perform the following adjustments.
- \* Engine idle speed..... ☞ 2-15
- \* Throttle cable play ..... ☞ 2-16
- \* Carburetor synchronization ..... ☞ 4-35 to -37

## CARBURETOR SYNCHRONIZATION

Check and adjust the carburetor synchronization between the two carburetors as follows.

### NOTE:

Keep the air cleaner box removing while performing this procedure.

### CALIBRATING EACH GAUGE

- Lift and support the fuel tank with its prop stay. (☞ 4-4 and -5)
- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Remove the air cleaner box. (☞ 4-9)
- Disconnect the vacuum hose (for vacuum fuel valve) ① from the carburetor (rear side).
- Connect the vacuum pump gauge to the vacuum port of the vacuum fuel valve. Apply negative pressure to the fuel valve.

**DATA** Negative pressure: 6.8 – 13.6 kPa  
(0.068 – 0.136 kgf/cm<sup>2</sup>, 0.97 – 1.93 psi)

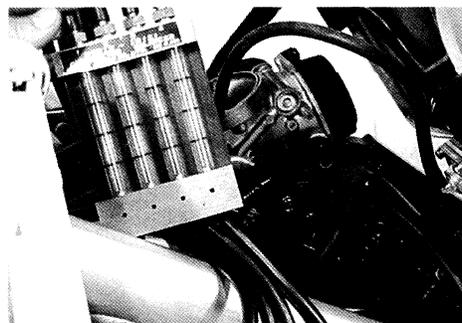
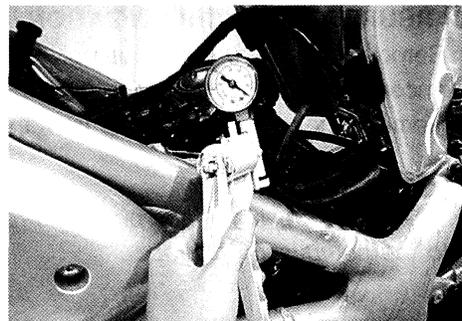
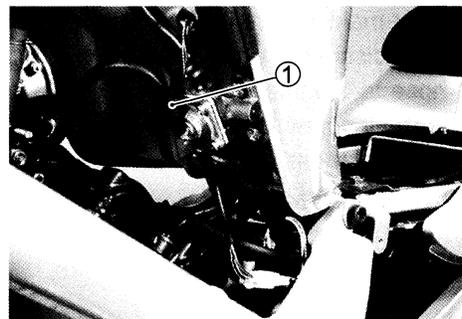
- Connect one of the four rubber hoses of carburetor balancer gauge to this inlet.

**TOOL** 09913-13121: Carburetor balancer

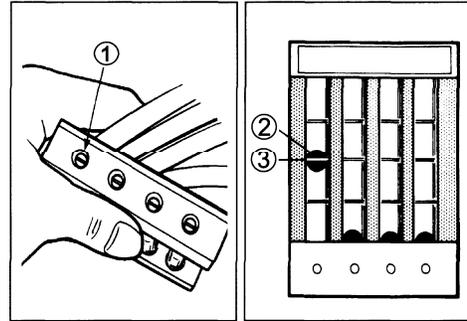
- Start up the engine and keep it running at 1 300 r/min by turning throttle stop screw ②.

### ▲ CAUTION

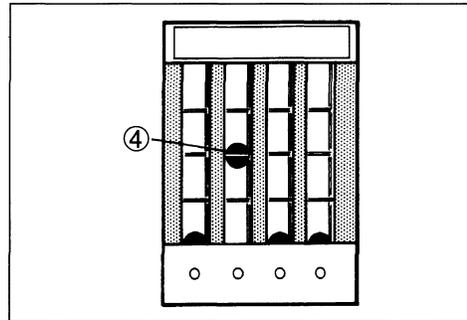
Avoid drawing dirt into the carburetor while running the engine without air cleaner box. Dirt drawn into the carburetor will damage the internal engine parts.



- Turn the air screw ① of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ② in the tube to the center line ③.



- After making sure that the steel ball stays steady at the center line, disconnect the hose from nipple and connect the next hose to the inlet.
- Turn air screw to bring the other steel ball ④ to the center line.
- The balancer gauge is now ready for use in balancing the carburetors.

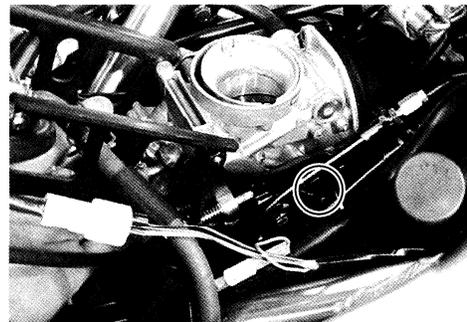


### CARBURETOR SYNCHRONIZATION

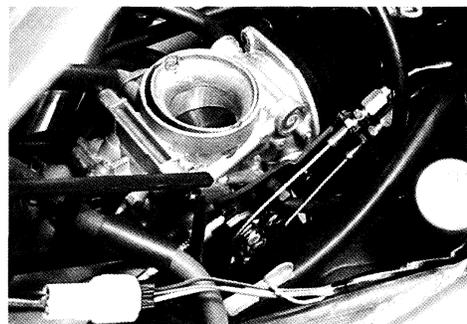
- Remove the carburetor assembly to connect carburetor balancer hoses to carburetor vacuum inlets. (☞ 4-18)
- Remove the vacuum inlet cap from the carburetor (front side).

**NOTE:**

*Place a rag over the intake pipes to prevent any parts dropping into the combustion chamber.*



- Connect the balancer gauge hoses to vacuum inlets respectively.
- Install the carburetor assembly properly.

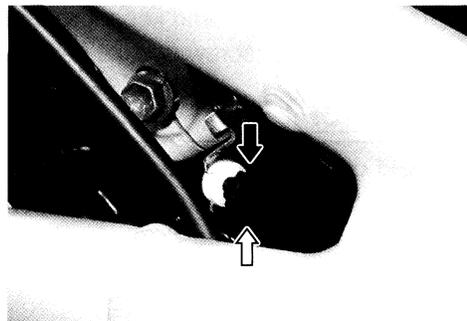


Adjust the balance of two carburetors as follows:

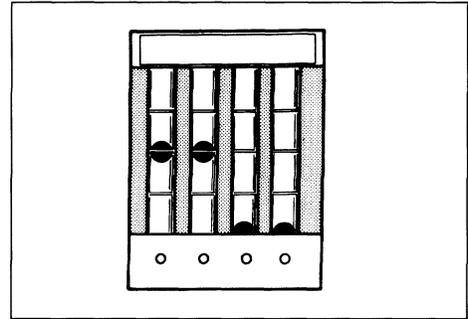
- Start the engine and keep it running at 1 300 r/min.

**▲ CAUTION**

**Avoid drawing dirt into the carburetor while running the engine without air cleaner box. Dirt drawn into the carburetor will damage the internal engine parts.**



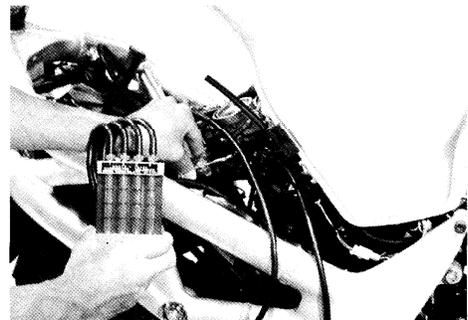
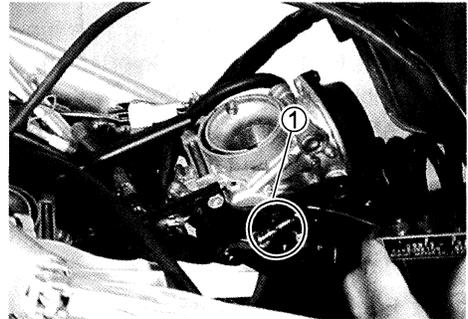
When the steel balls in tubes #1 and #2 are at the same level, the carburetor is correctly adjusted.



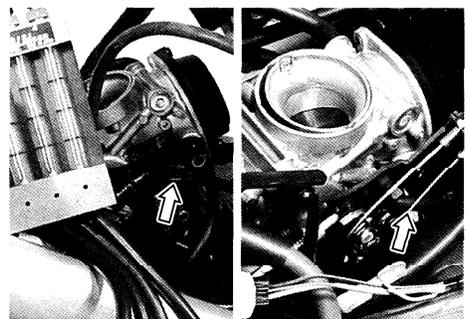
- If the steel balls are not at the same level, adjust the throttle valve synchronizing screws ①.

**⚠ WARNING**

**A hot engine can be burn you if you touch the engine. The engine will still be hot for sometime after stopping the engine.**



- After completing the carburetor synchronization, remove the carburetor assembly.
- Remove the balancer gauge hose from carburetor inlets and install vacuum hoses respectively.
- Reinstall the carburetor assembly onto the engine and air cleaner box onto the carburetor assembly respectively.
- Connect the fuel hose to fuel pump.

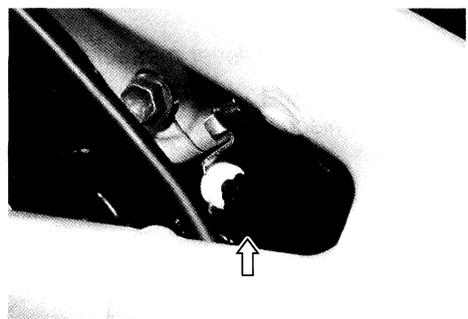


- Adjust the engine idle speed by turning the throttle stop screw.

**Engine idle speed**

**1 300 ± 50 r/min ..... for E-18 model**

**1 300 ± 100 r/min ..... for the other models**

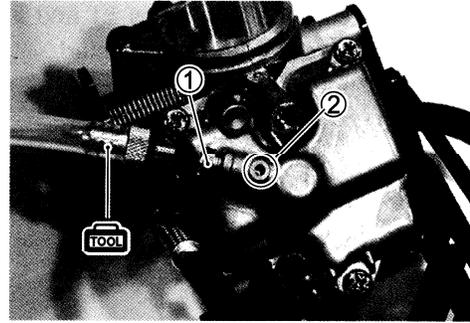


### FUEL LEVEL ADJUSTMENT

- Install the special tool to the carburetor drain outlet.
- Loosen the drain bolt ①.

**TOOL** 09913-10760: Fuel level gauge

- Adjust the carburetor to the proper angle holding the body with a vice or the like.



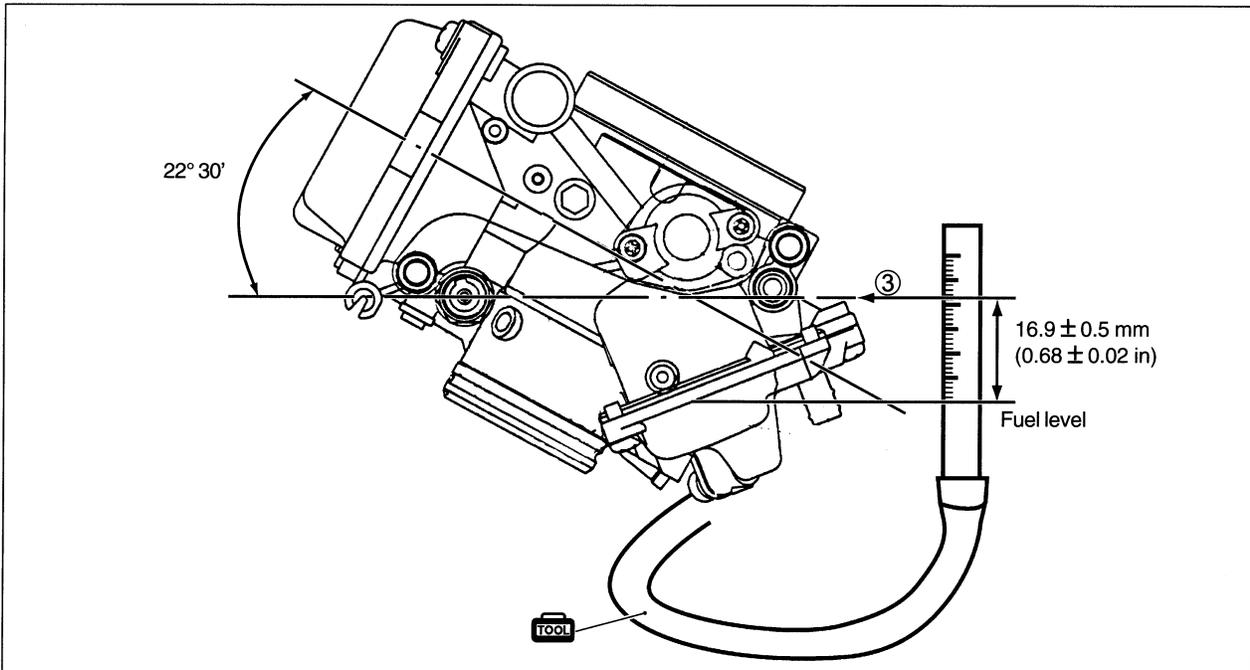
|                         |                               |
|-------------------------|-------------------------------|
| Carburetor set position | Lateral direction:Horizontal  |
|                         | Longitudinal direction:22°30' |

- Fill gasoline in the carburetor.
- Remove air completely from the fuel level gauge.
- With the level gauge held vertical, lower the gauge slowly and align the datum plane ③ with the gauge graduation. (See illustration below.)
- Wait until the fuel level stabilizes.
- Determine the zero point on the gauge graduation and after waiting again for level stabilization, measure the height from the datum plane.

**⚠ WARNING**

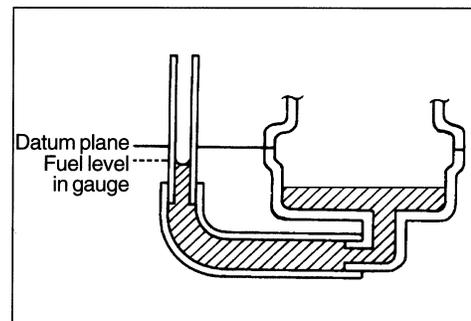
This inspection must be performed in an area well ventilated, away from fire or sparks since gasoline, an explosive fluid, is used in this operation.

**DATA** Fuel level:  $16.9 \pm 0.5\text{mm}$  ( $0.68 \pm 0.02\text{in}$ ) from datum plane



**NOTE:**

The apparent fuel level measured in the level gauge is higher than the actual level in the float chamber because of meniscus effect. (Meniscus is approximately 1 mm.)



## LUBRICATION SYSTEM

### OIL PRESSURE

 2-31

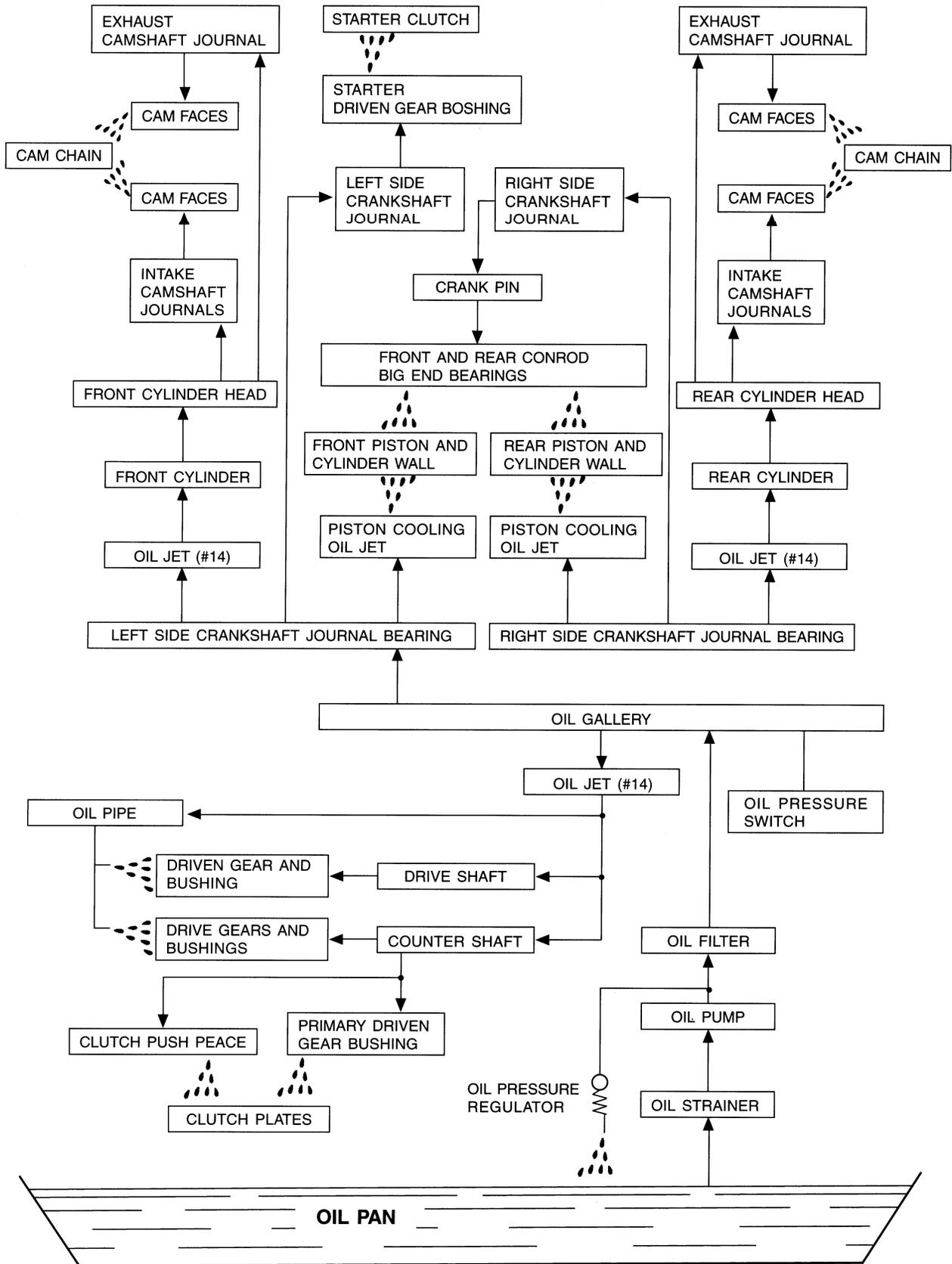
### OIL FILTER

 2-13

### OIL STRAINER

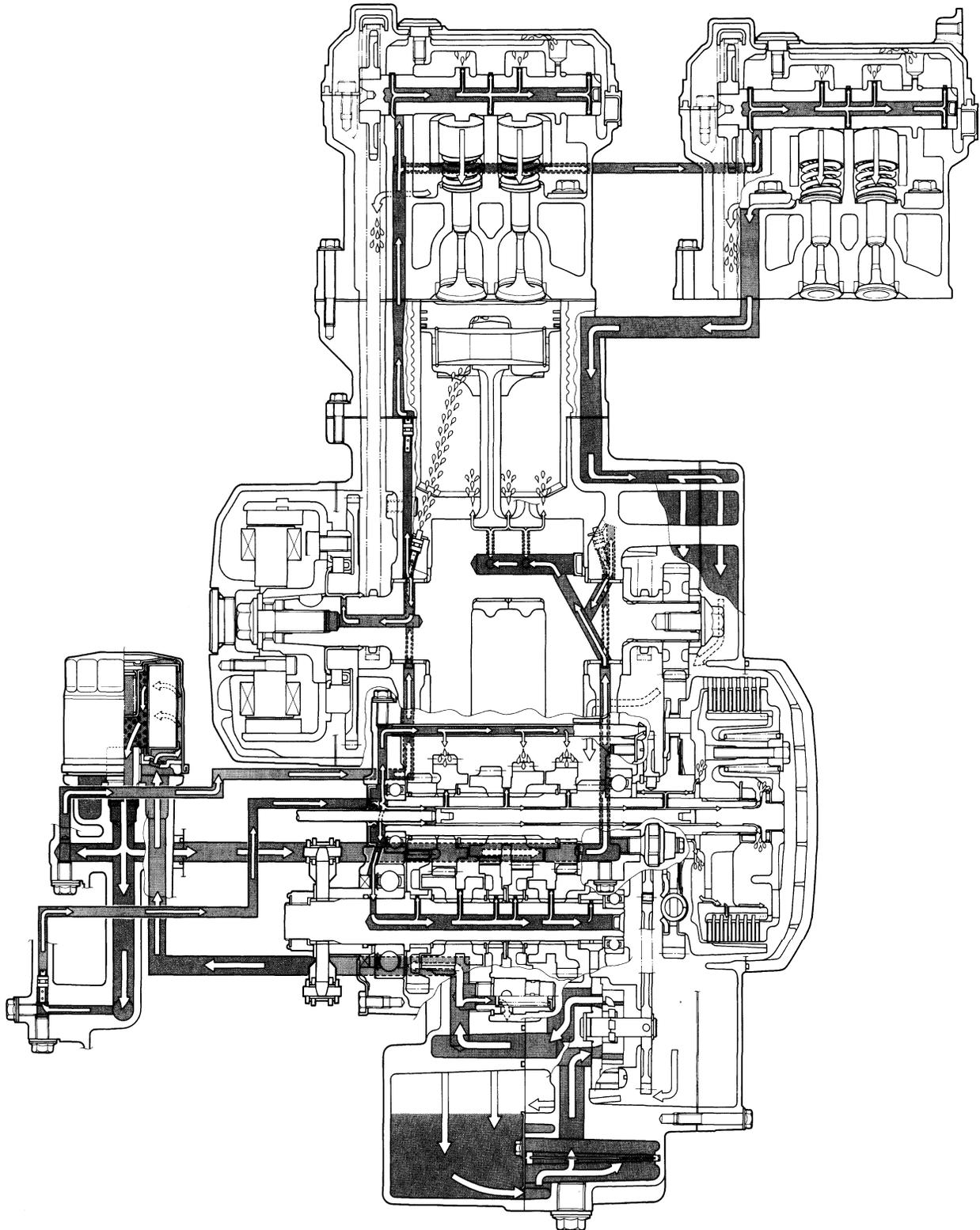
Check to be sure that the oil strainer is free from any sign of rupture, also wash the strainer clean periodically.

### ENGINE LUBRICATION SYSTEM CHART



# ENGINE LUBRICATION SYSTEM

## FRONT CYLINDER



REAR CYLINDER

