FUEL AND LUBRICATION SYSTEM

CONTENTS

⚠ WARNING

Gasoline must be handled carefully in an area well ventilated and away from fire or sparks.

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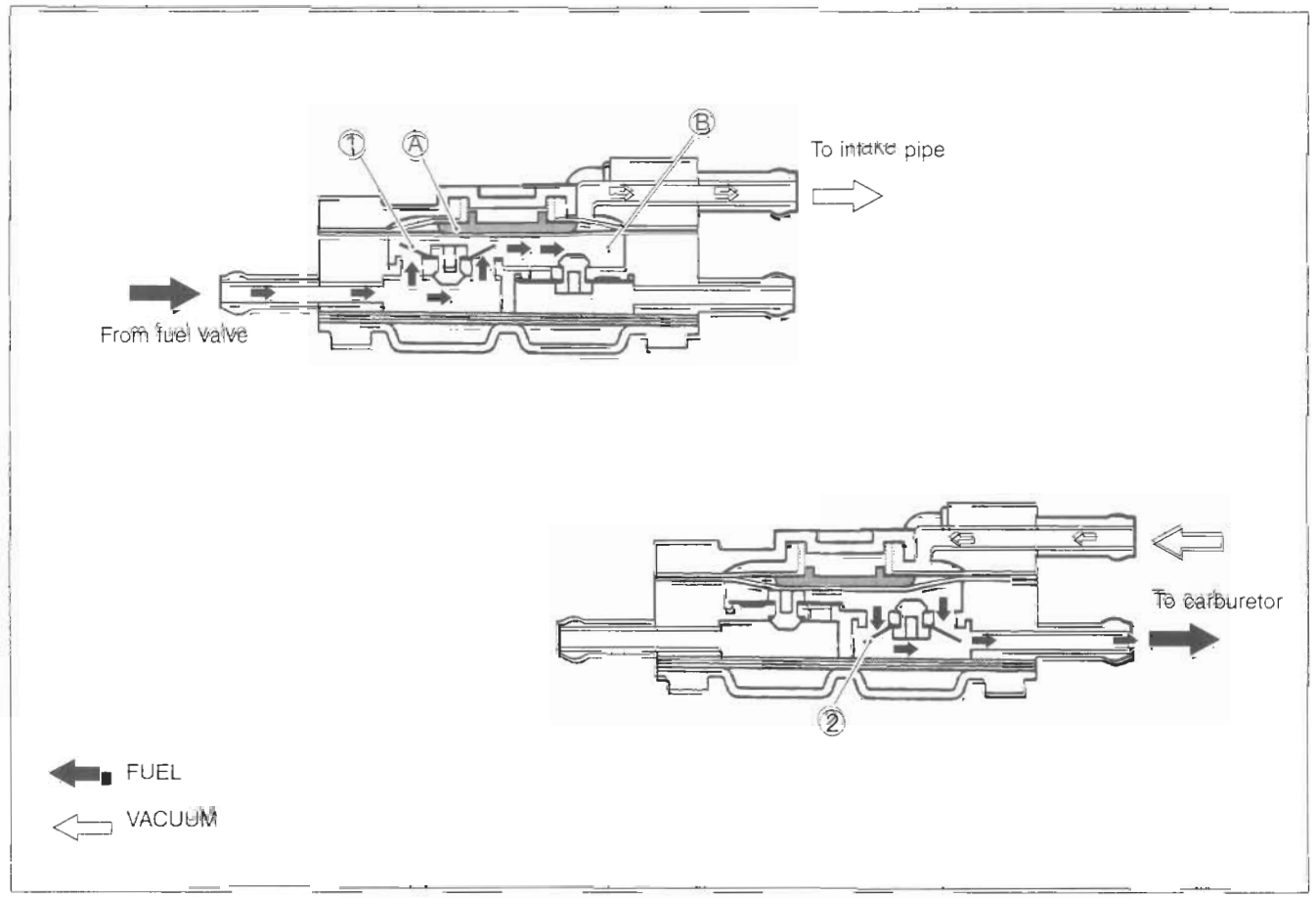
FUEL SYSTEM

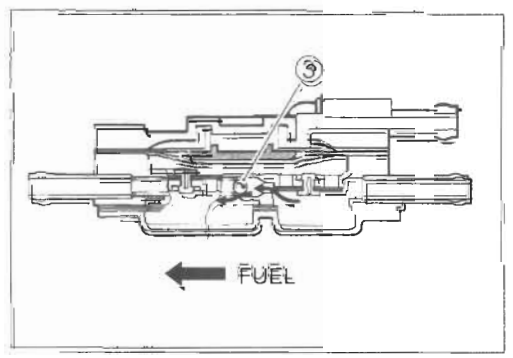
The fuel pump is operated by a vacuum force which is supplied from the carburetor intake pipe. The fuel sent under pressure by the fuel pump flows into the float chamber when the float of the carburetor has dropped and the needle valve is open. When the needle valve closes, the pressure of the fuel in the hose connecting the carburetor and the fuel pump increases, and when the set pressure is reached, the operation of the fuel pump is stopped by the fuel pressure to prevent excessive supply.

FUEL PUMP

Vacuum pulsations from the carburetor intake pipe are used to operate the pump diaphragm Ⓐ. When vacuum is applied to the diaphragm Ⓐ, fuel is drawn from the tank into the diaphragm's chamber Ⓑ. As positive pressure is applied, the diaphragm backs, pushing the fuel through the outlet to the carburetor.
A series of check valves (① and ②) is used in the fuel flow route to allow the fuel to move in only one direction, through the pump body.



If the fuel pressure in the chamber of carburetor side is too high, the return valve ③ is opened so that the fuel pressure is released to the chamber of fuel cock side.



FUEL TANK/FUEL VALVE

REMOVAL

⚠ WARNING

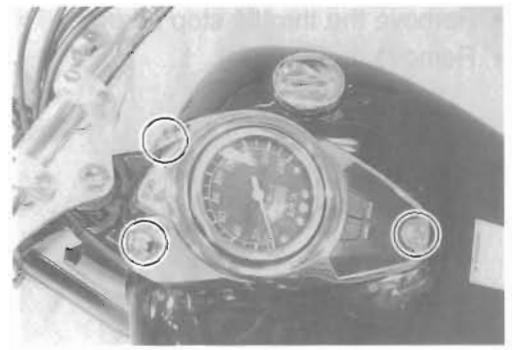
Gasoline is highly flammable and explosive. Keep heat, sparks, and flames away from gasoline.

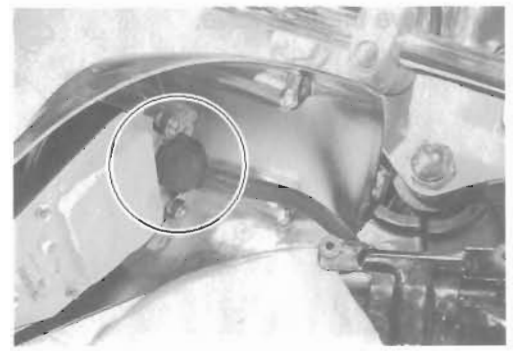
- Remove the front seat. (☞7-2)

- Remove the speedometer.
- Disconnect the speedometer coupler.

⚠ CAUTION

Be careful not to scratch the fuel tank.

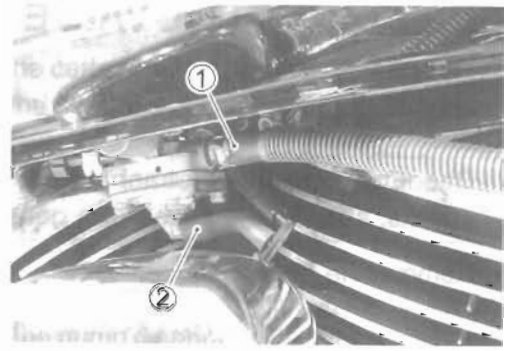




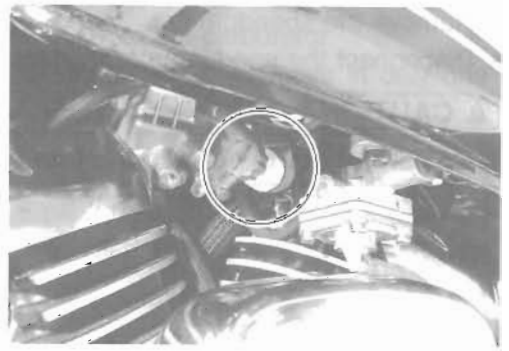
- Remove the fuel tank mounting bolt.

- Disconnect the fuel level gauge coupler.

- Disconnect the fuel hose ① and vacuum hose ②.



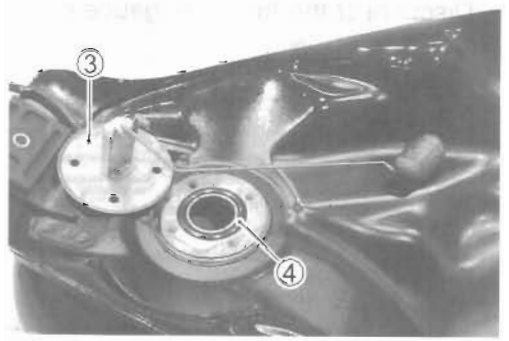
- Remove the throttle stop screw.
- Remove the fuel tank.



- Remove the fuel valve.

- Remove the fuel level gauge mounting bolts.

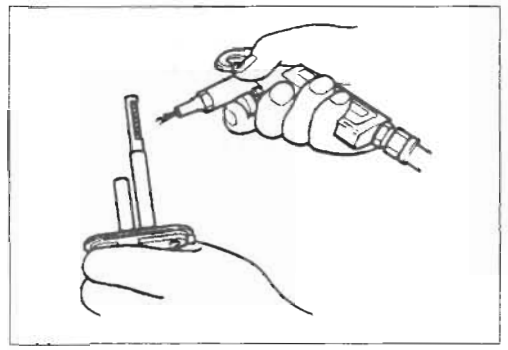
- Remove the fuel level gauge ③.
- Remove the O-ring ④.



INSPECTION

FUEL VALVE

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. Also check the fuel valve for cracks.

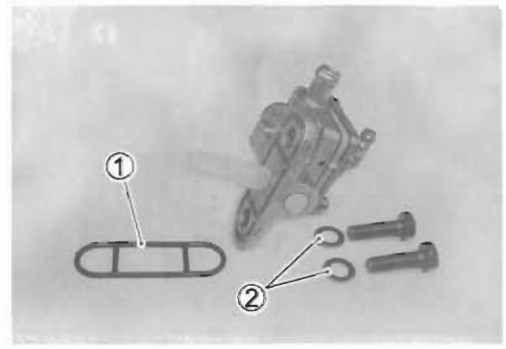


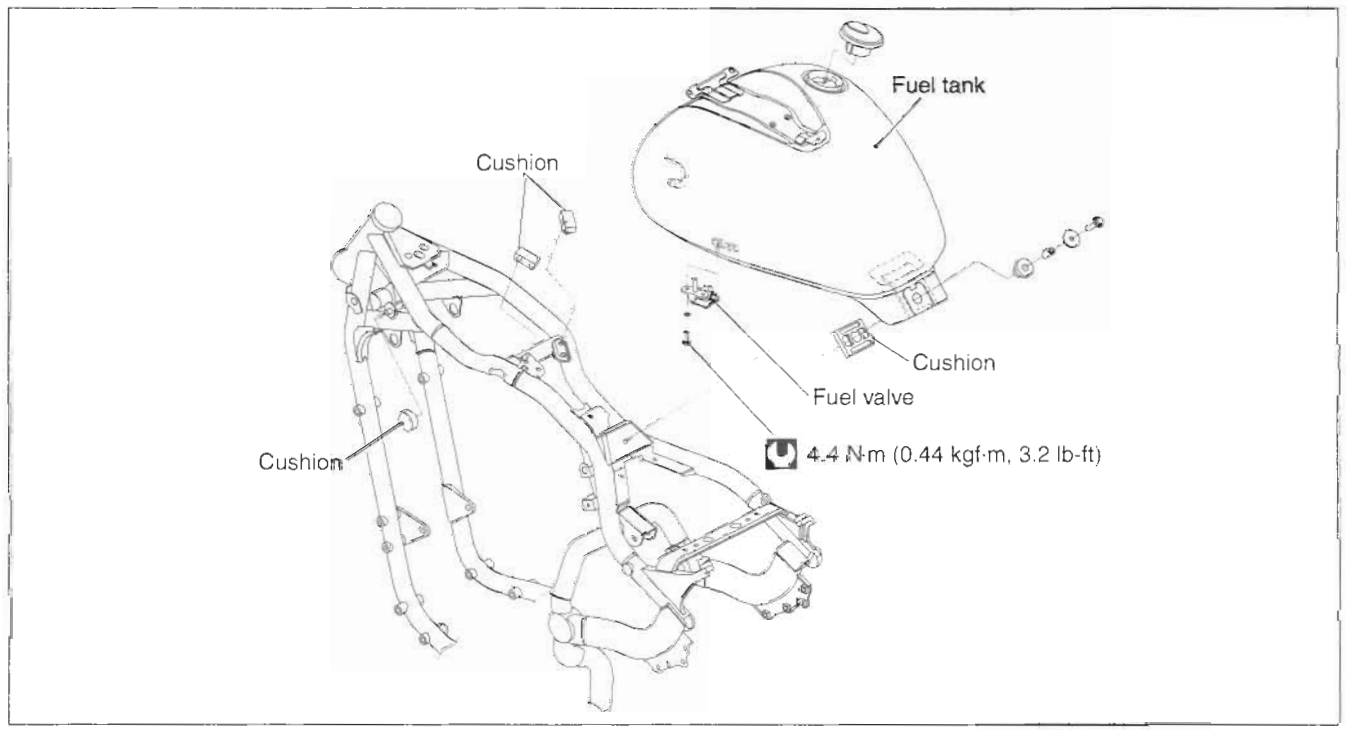
REMOUNTING

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

⚠ WARNING

*** Gaskets ① and ② must be replaced with new ones to prevent fuel leakage.**
*** Tighten the fuel valve bolts evenly.**

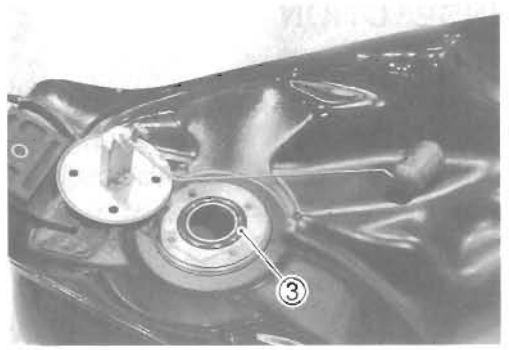


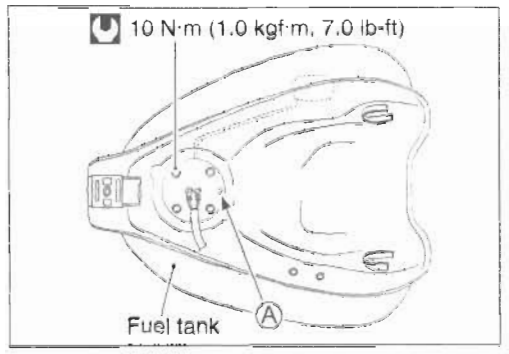


⚠ WARNING

- **Gasket ③ must be replaced with new ones to prevent fuel leakage.**
- **Tighten the fuel level gauge bolts evenly.**

NOTE:
Face △ mark Ⓐ on the fuel level gauge forward.

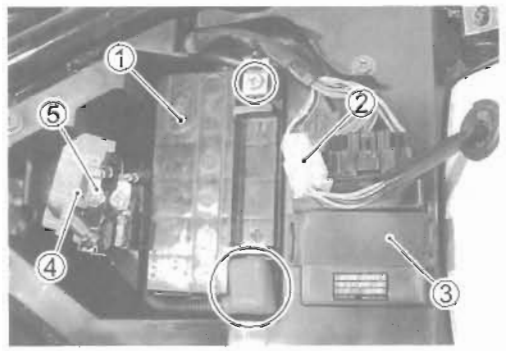




FUEL PUMP

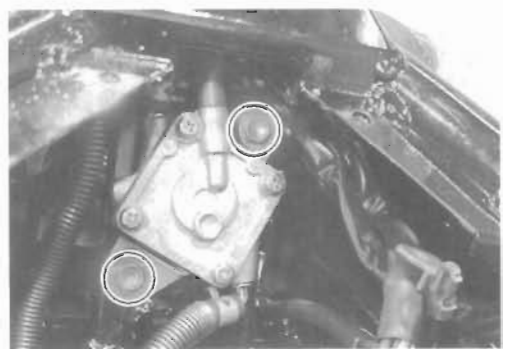
REMOVAL

- Remove the battery ①.
- Disconnect the lead wire coupler ②.
- Remove the ignitor ③.
- Disconnect the fuse case coupler ④.
- Remove the starter lead wire ⑤.

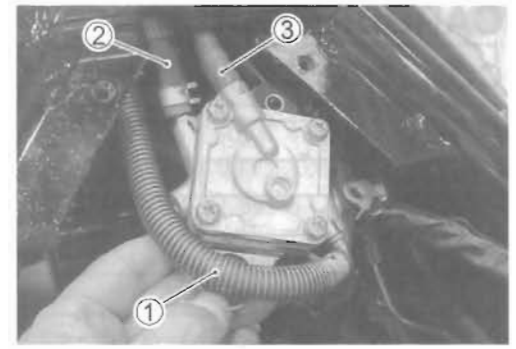


- Remove the battery case.

- Remove the fuel pump mounting bolts.



- Disconnect the fuel hoses ①, ② and vacuum hose ③.



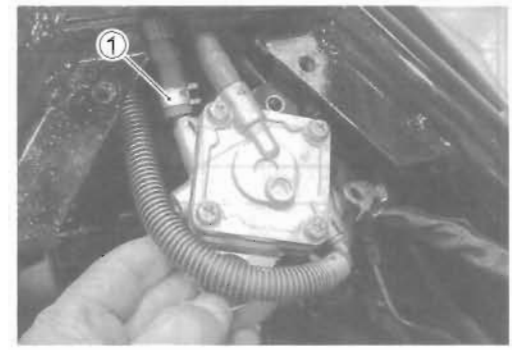
INSPECTION

⚠ WARNING

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

- Disconnect the fuel hose ①, connect the suitable hose and insert the free end of the hose into a receptacle.

Check the fuel flow when cranking the engine for few seconds by pressing the starter button.
If the fuel flow is not found, check the fuel valve. (☞5-5)
If the fuel valve and hoses are not fault, replace the fuel pump.

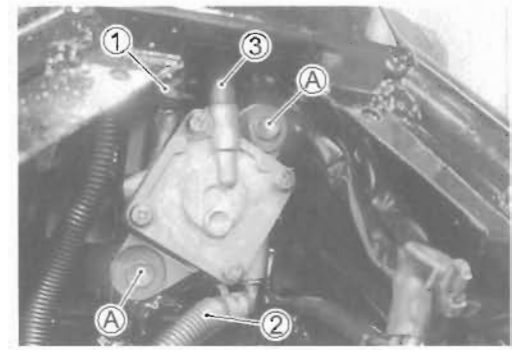


REASSEMBLY

Carry out the assembly procedure in the reverse order of disassembly.

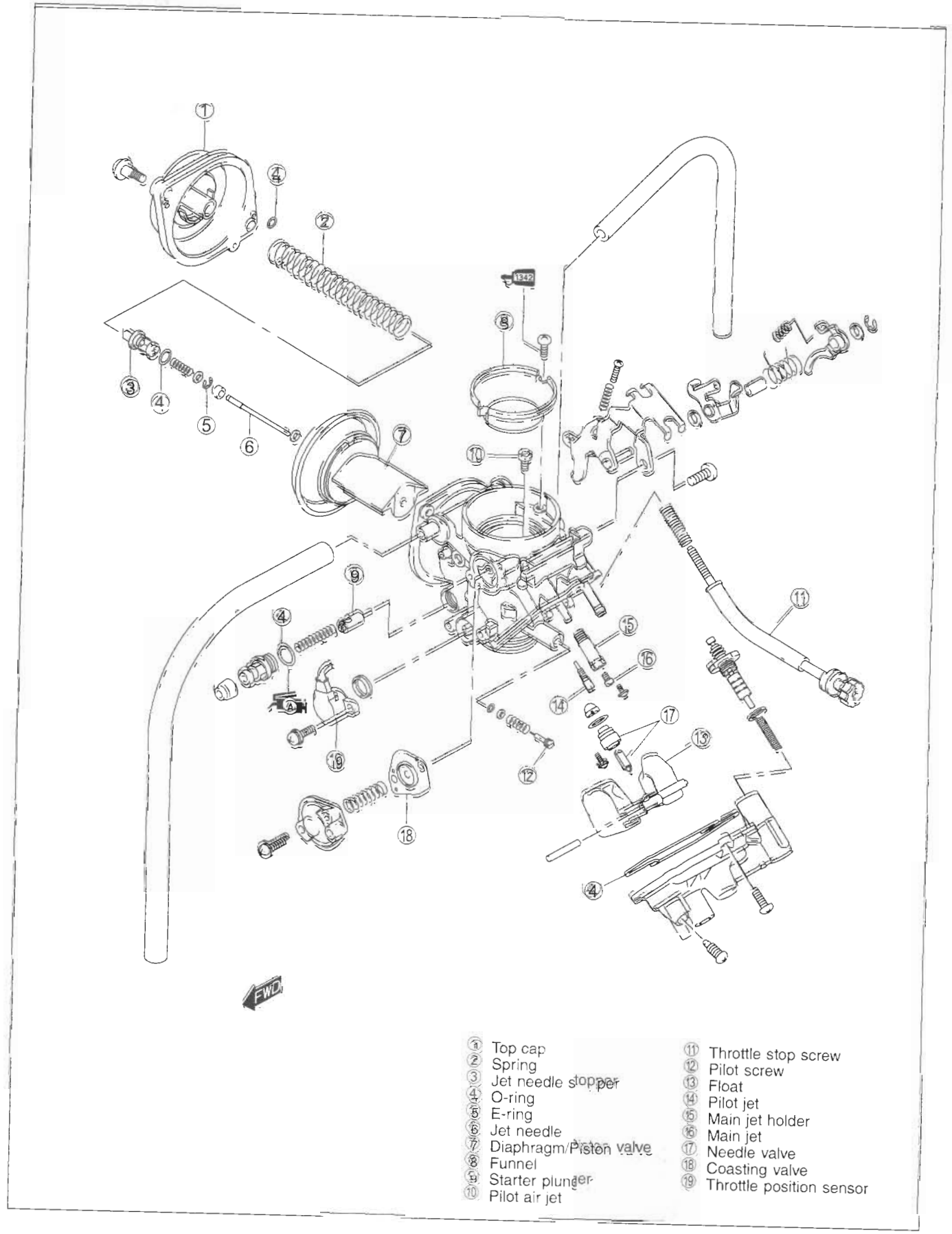
- Connect the fuel hoses ①, ② and vacuum hose ③ securely.
- Tighten the bolts Ⓐ.

FUEL HOSE ROUTING: ☞9-17
Fuel hose ① (To carburetor)
Fuel hose ② (To fuel valve)
Vacuum hose ③ (To intake pipe)



CARBURETOR

CONSTRUCTION



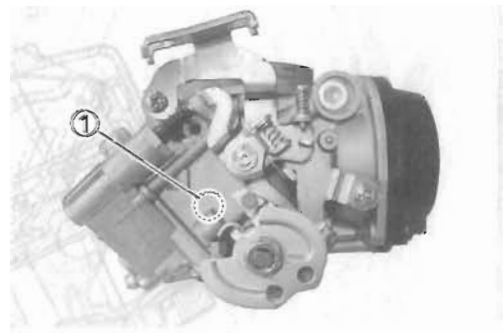
① Top cap
② Spring
③ Jet needle stopper
④ O-ring
⑤ E-ring
⑥ Jet needle
⑦ Diaphragm/Piston valve
⑧ Funnel
⑨ Starter plunger
⑩ Pilot air jet
⑪ Throttle stop screw
⑫ Pilot screw
⑬ Float
⑭ Pilot jet
⑮ Main jet holder
⑯ Main jet
⑰ Needle valve
⑱ Coasting valve
⑲ Throttle position sensor

SPECIFICATIONS

ITEM		SPECIFICATION		
		E-02, 19, 24	E-03, 28	E-33
Carburetor type		MIKUNI BDSR34	←	←
Bore size		34 mm	←	←
I.D. No.		41F1	41F2	41F3
Idle r/min.		1 100 ± 100 r/min.	←	←
Fuel level		—	—	—
Float height		7.0 ± 0.5 mm (2.76 ± 0.02 in)	←	←
Main jet	(M.J.)	#132.5	#132.5	←
Main air jet	(M.A.J.)	φ 1.8	←	←
Jet needle	(J.N.)	5E22-3	5E23	←
Needle jet	(N.J.)	P-0M	P-0M	←
Throttle valve	(Th.V.)	#95	←	←
Pilot jet	(P.J.)	#27.5	#27.5	←
Pilot screw	(P.S.)	PRE-SET (3.0 turns back)	PRE-SET	←
Throttle cable play		2 – 4 mm (0.08 ± 0.16 in)	←	←

LOCATION OF CARBURETOR I.D. NO.

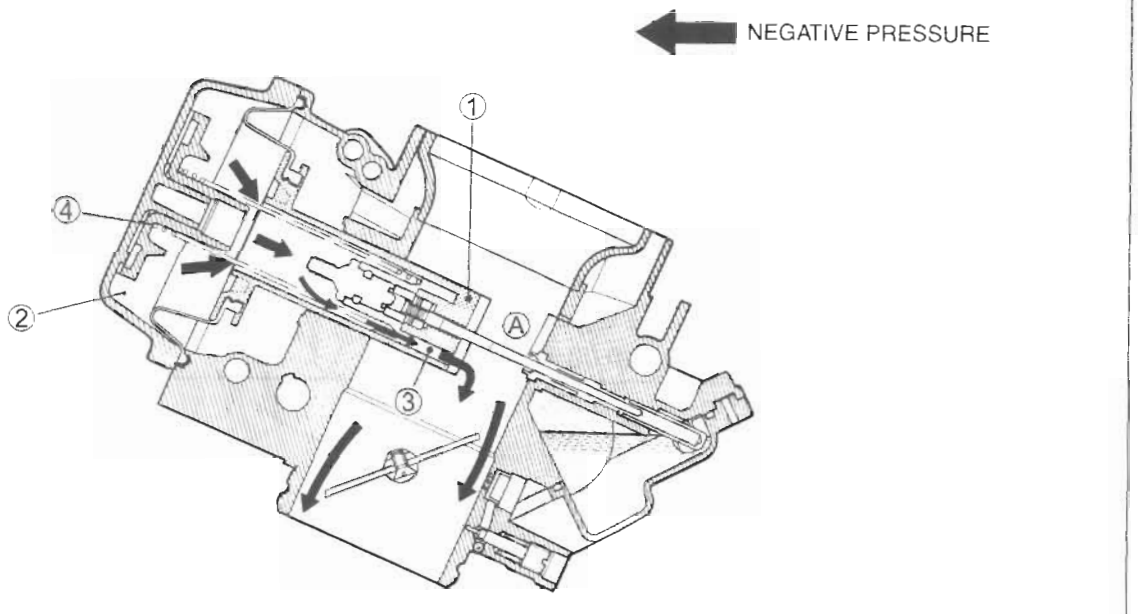
The carburetor I.D. is stamped on the location ① on the carburetor as shown in the right photo.



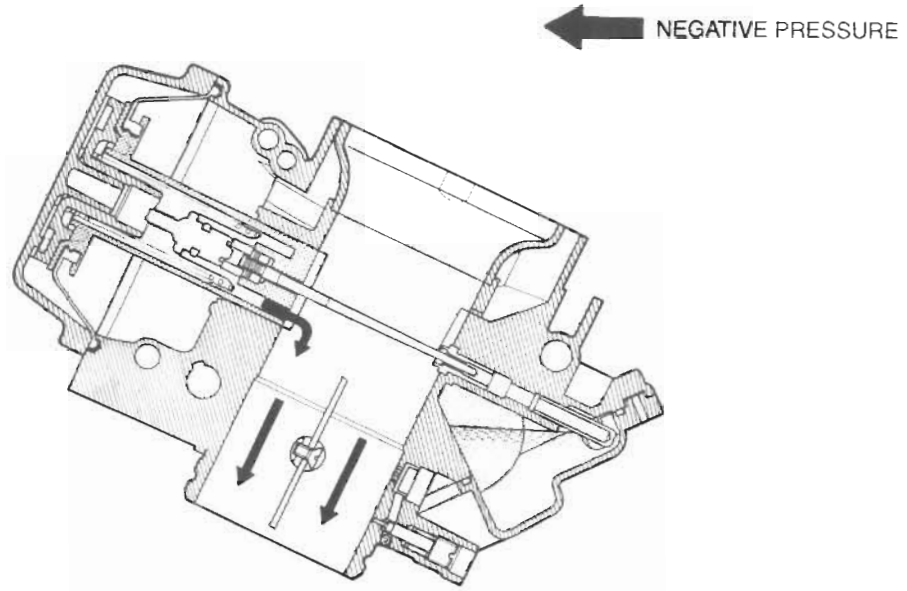
DIAPHRAGM AND PISTON OPERATION

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 Ⓐ. 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.



LOWER POSITION OF THE PISTON VALVE



UPPER POSITION OF THE PISTON VALVE

SLOW SYSTEM

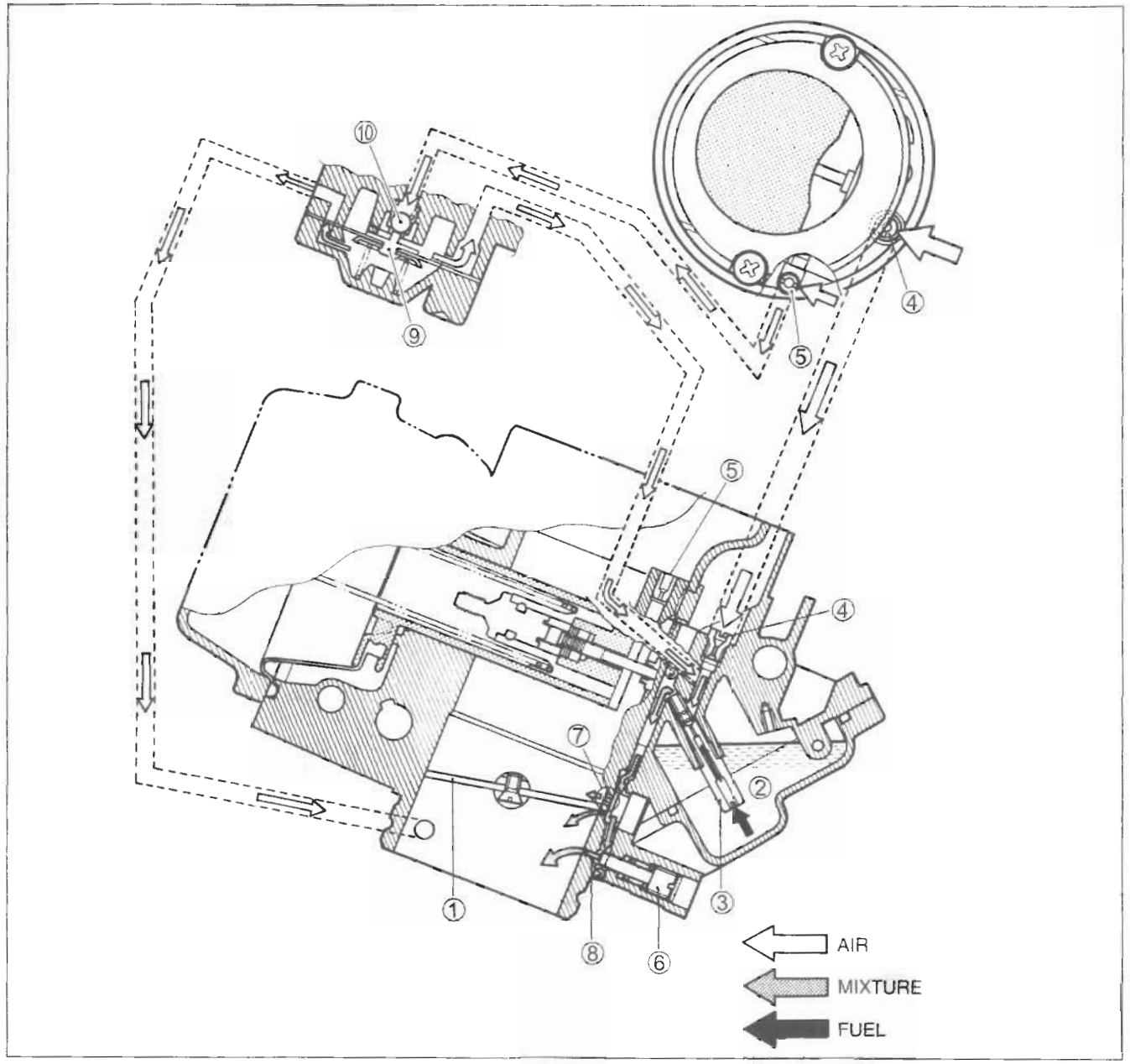
This system supplies fuel to the engine during engine operation with throttle valve ① closed or slight opened. The fuel from the float chamber ② is first passage and metered by the pilot jet ③ where it mixes with air coming in through #1 pilot air jet ④ and #2 pilot air jet ⑤.

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.



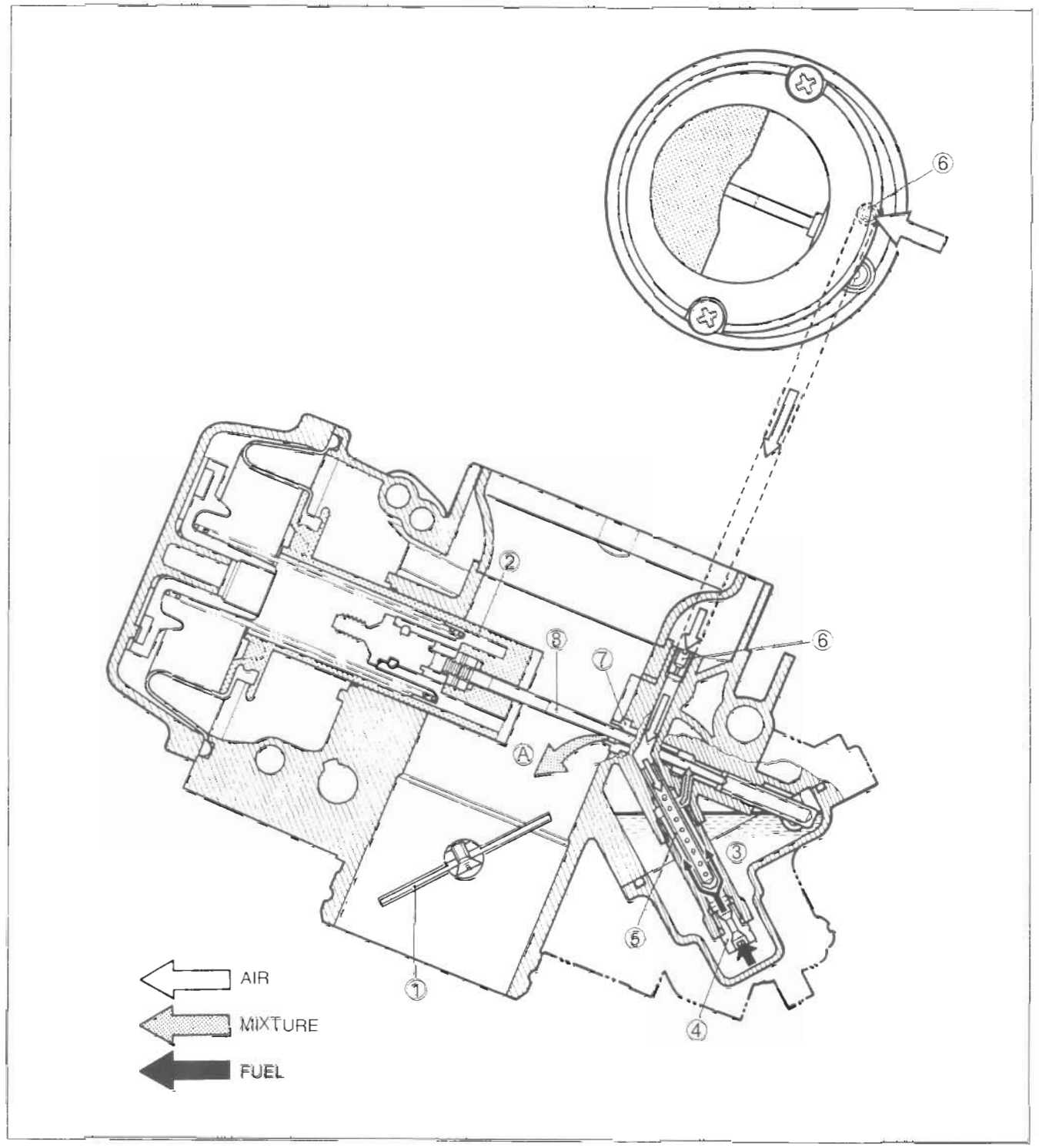
MAIN SYSTEM

As the throttle valve ① is opened, engine speed rises and negative pressure in the venturi Ⓐ increases. This causes the piston valve ② moves 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 from 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 Ⓐ, 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

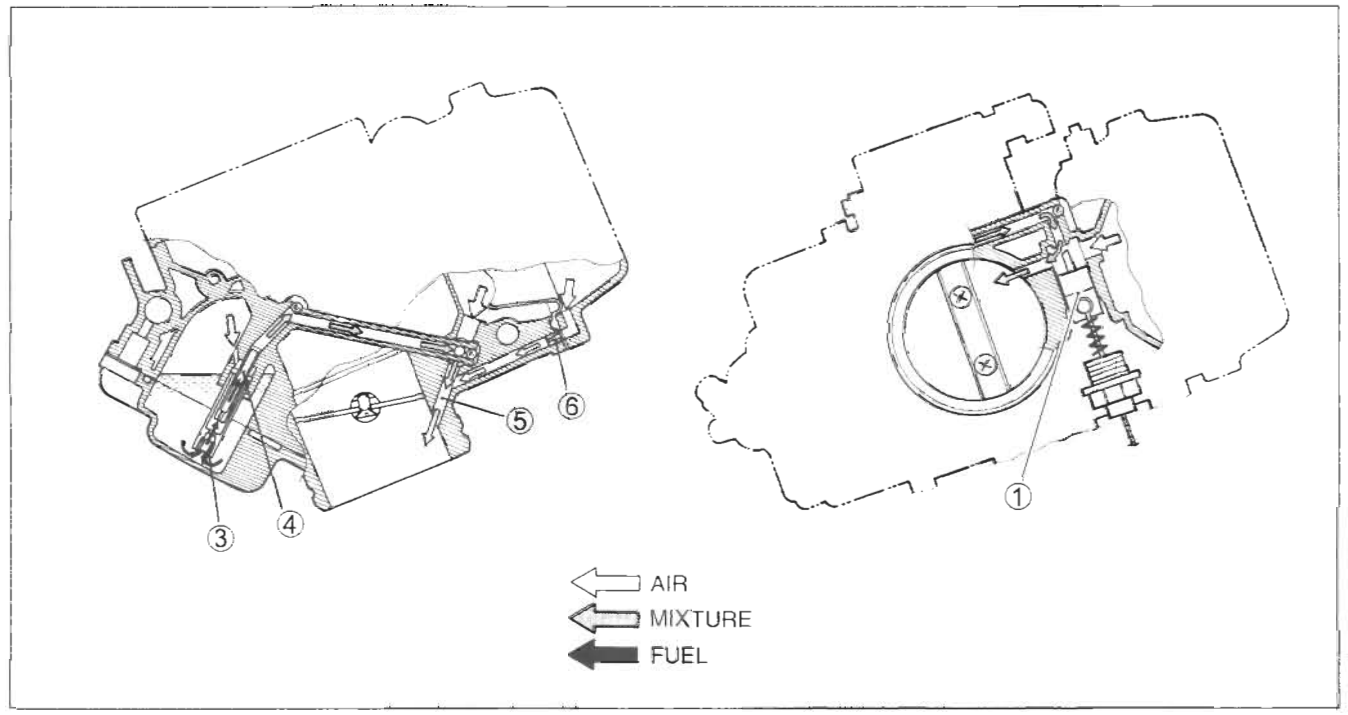
Pulling the starter (enricher) plunger ① causes fuel to be drawn into the starter circuit from the float chamber ②.

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.



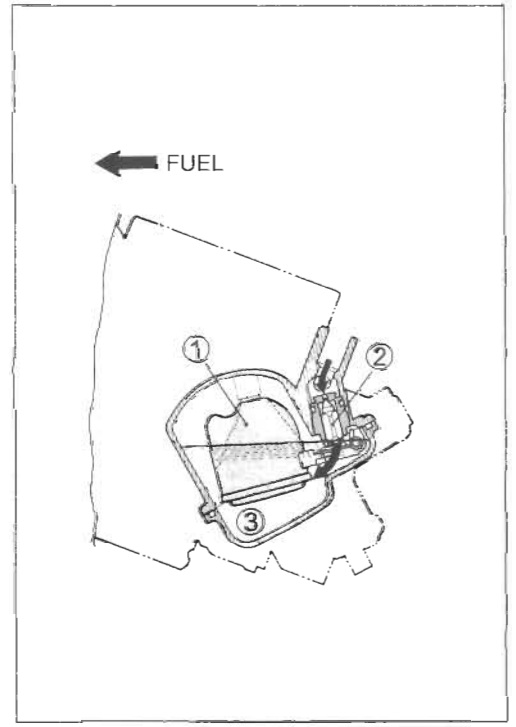
FLOAT SYSTEM

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.

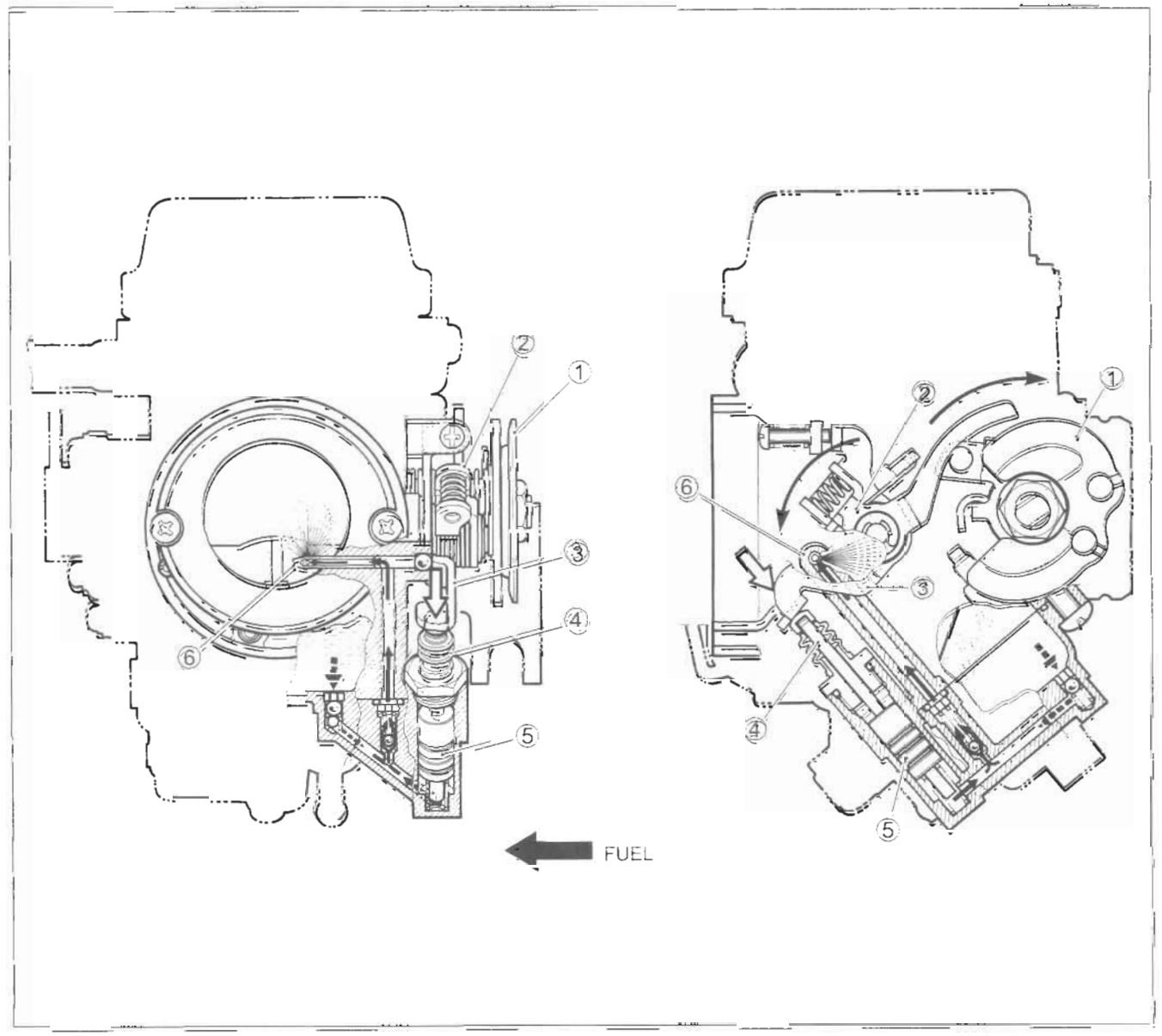
As the fuel level falls, the float ① lowers and the needle valve ② unseats itself; admitting fuel into the float chamber ③.

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



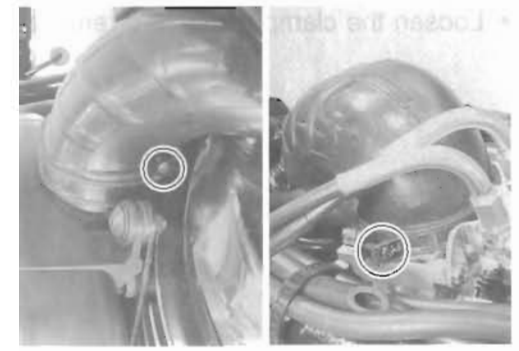
ACCELERATOR PUMP SYSTEM

This system works only when the rider opens throttle grip quickly as pump send the necessary amount of fuel to the carburetor bore for correcting fuel/air mixture ratio. When the rider open the throttle grip quickly, the intaken air volume becomes large and air velocity at the bottom of the throttle valve (piston valve) is slow and sucking volume of fuel is less.
The throttle valve lever ① turns lever ②, and lever ③ turns and pushes rod ④. The rod ④ pushes plunger ⑤. This plunger pushes out the fuel through outlet pipe ⑥, spraying fuel into the main bore.

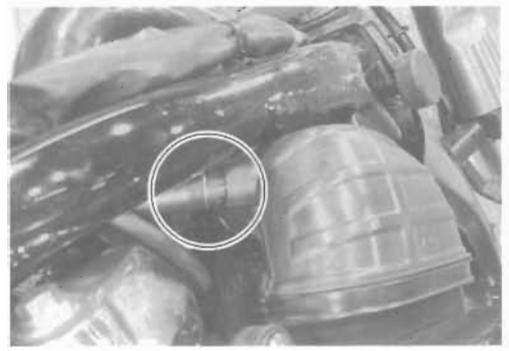


REMOVAL

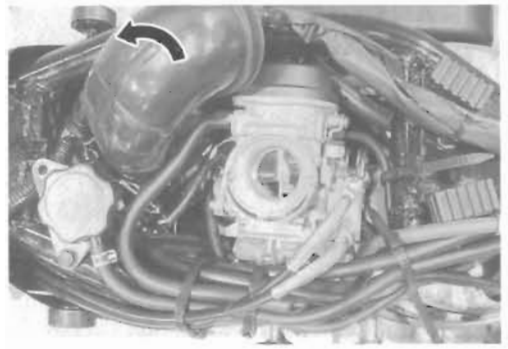
- Remove the fuel tank. (☞5-3)
- Loosen the air intake pipe clamp screws.



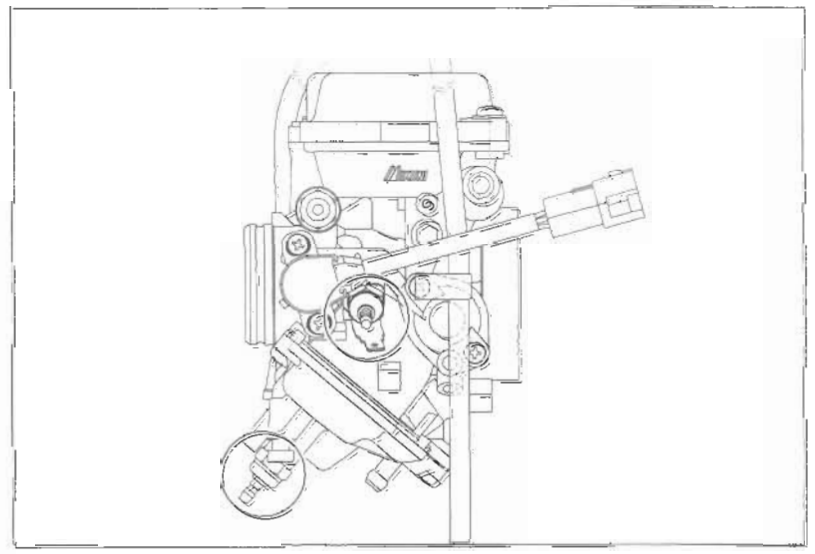
- Disconnect the breather hose.

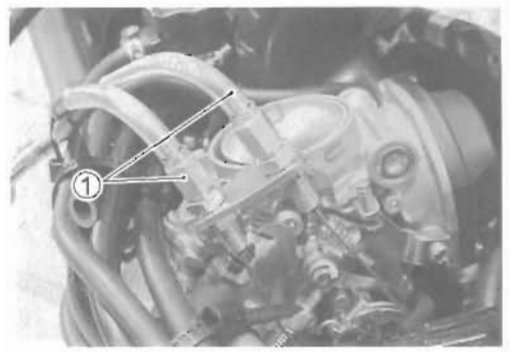


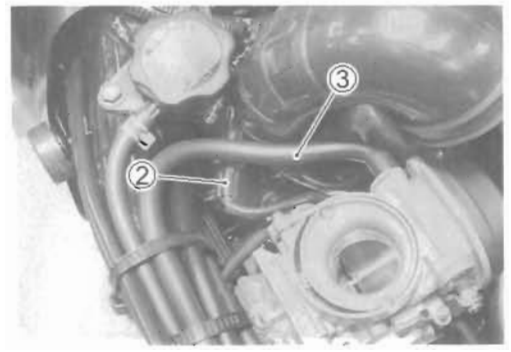
- Move the air inlet pipe to forward.



- Remove the throttle cables ①.
- Disconnect the throttle position sensor coupler ②.
- Disconnect the air vent hose ③.
- Disconnect the carburetor heater terminal lead wire.





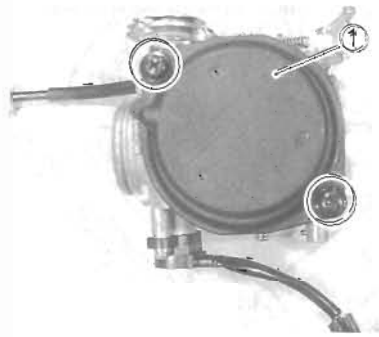


- Loosen the clamp screw and remove the carburetor.

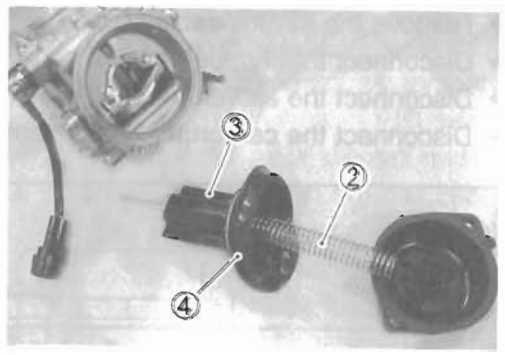
- Remove the starter plunger.

DISASSEMBLY

- Remove the carburetor top cap ①.

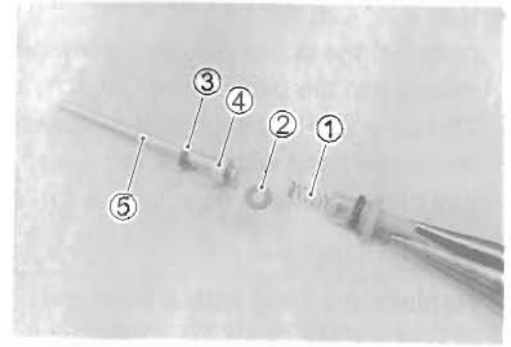


- Remove the spring ② and piston valve ③ along with diaphragm ④.



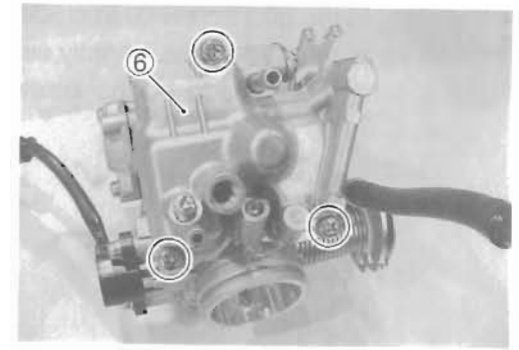
- Pull out the jet needle holder ⑤.

- Remove the spring ①, washers ②, ③, retainer ④ and jet needle ⑤.



- Remove the float chamber ⑥.

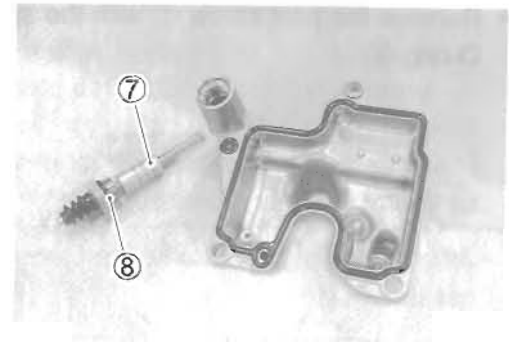
TOOL **09900-09004: Impact driver set**



- Remove the accelerator pump plunger ⑦.
- Remove the O-ring ⑧.

⚠ CAUTION

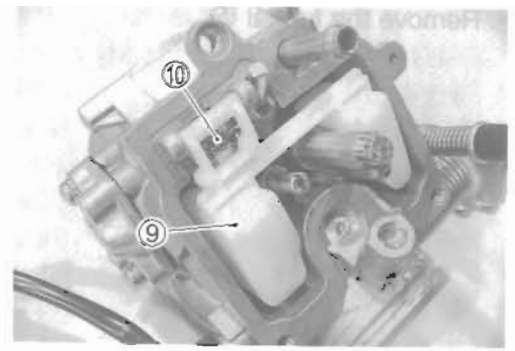
Use a new O-ring to prevent fuel leakage.



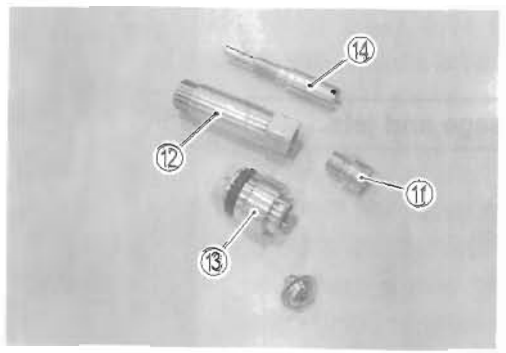
- Remove the float ⑨ and needle valve ⑩ by removing the float pin.

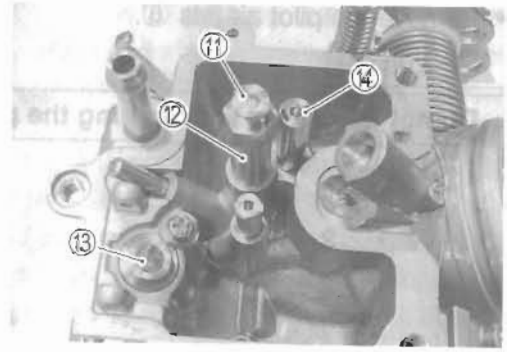
⚠ CAUTION

Do not use a wire to clean the valve seat.



- Remove the main jet ⑪, main jet holder ⑫, valve seat ⑬ and pilot jet ⑭.

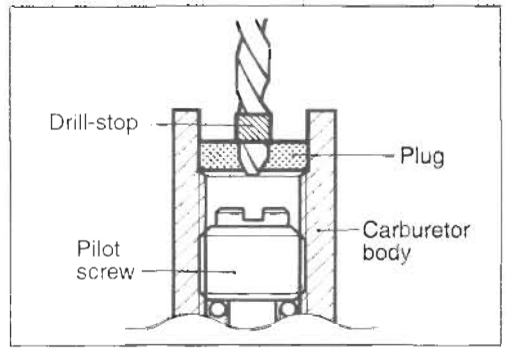




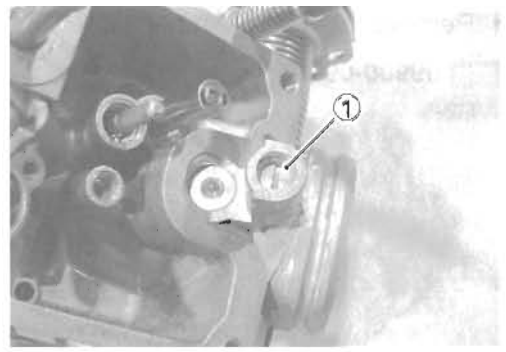
- Use a 1/8" size drill bit with a drill-stop to remove the pilot screw plug. Set the drill-stop 6 mm from the end of the bit to prevent drilling into the pilot screw. Carefully drill through the plug. Thread a self-tapping sheet metal screw into the plug. Pull on the screw head with pliers to remove the plug. Carefully clean any metal shavings from the area. (For E-03, 28, 33)

⚠ CAUTION

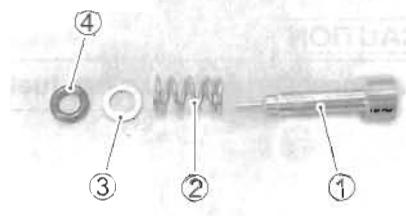
Replace the plug with a new one.



- 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.

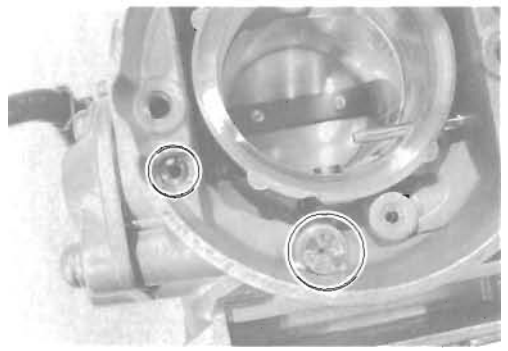


- Remove the funnel ⑤.

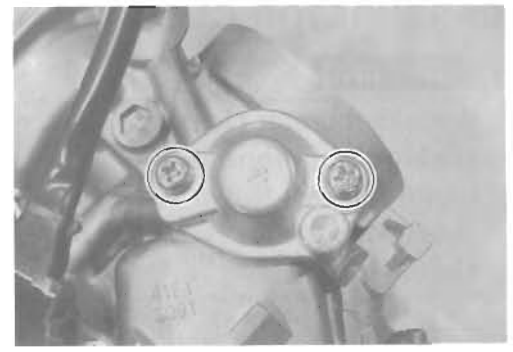
- Remove the pilot air jets ⑥.

⚠ CAUTION

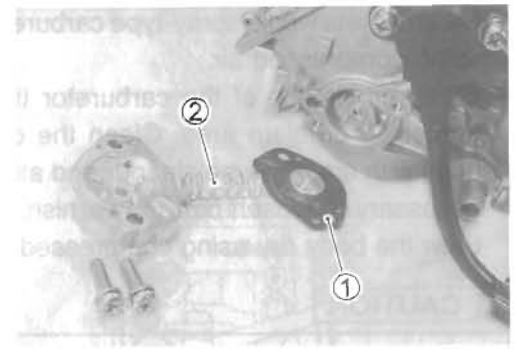
Do not use a wire for cleaning the passage and jets.



- Remove the casting valve cover.



- Remove the casting valve ① and the spring ②.

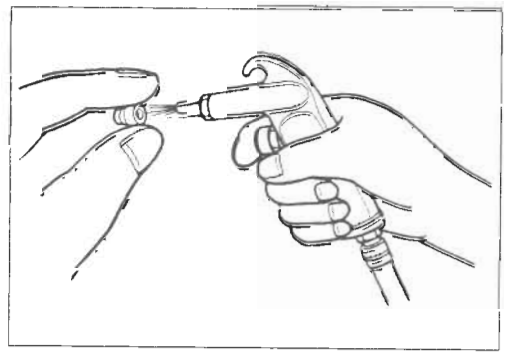


CARBURETOR CLEANING

⚠ WARNING

Some carburetor cleaning chemicals, especially diptype 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 neeessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the carburetor components.

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

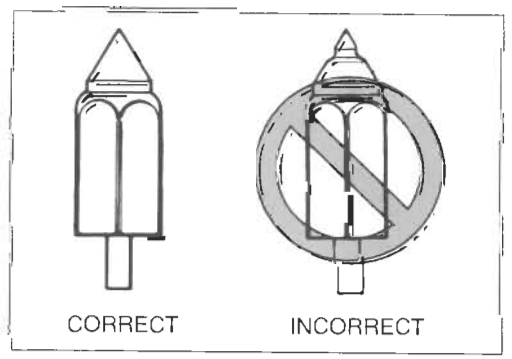
CARBURETOR INSPECTION

Check the following items for any damage or clogging.

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

NEEDLE VALVE INSPECTION

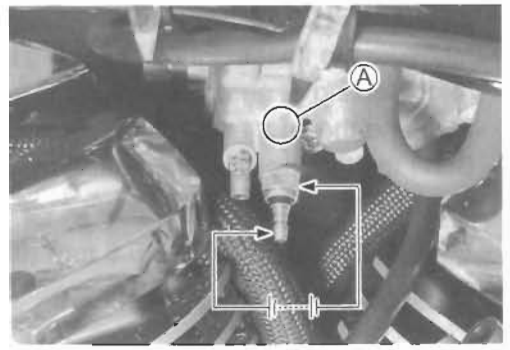
If foreign matter is cought between the valve seat and the needle valve, the gasoline will continue flowing and overflow. If the valve seat and needle valve are worn beyond the permissible limits, similar trouble will occur. Conversely, if the needle valve sticks, the gasoline will not flow into the 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.



CARBURETOR HEATER INSPECTION

(for E02, E19)

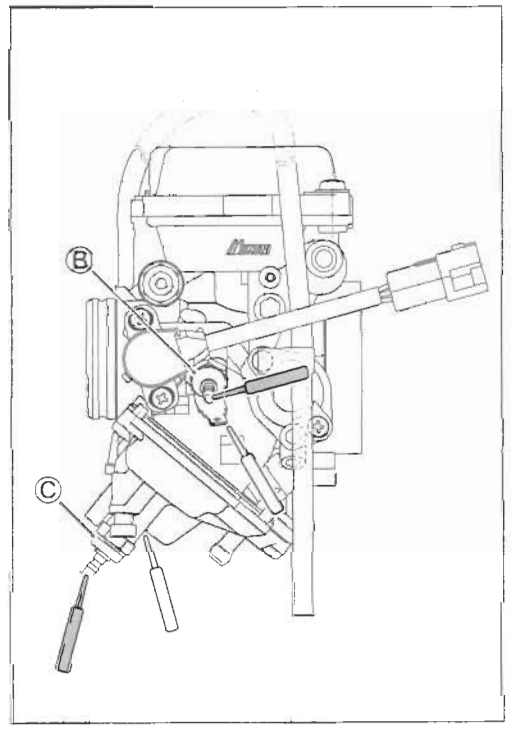
- Disconnect the carburetor heater terminal lead wires.
- Connect the positive ⊕ terminal of a 12V battery to the terminal of the carburetor heater and the battery negative ⊖ terminal to the terminal.
- Check that the heater section Ⓐ is heated in 5 minutes after the battery has been connected.



- Measure the resistance between the terminals.

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

DATA **Carbaretor heater resistance: STD:**
Ⓑ 35 W: 4 – 12 Ω
Ⓒ 25 W: 4.6 – 13.3 Ω



THERMO-SWITCH INSPECTION

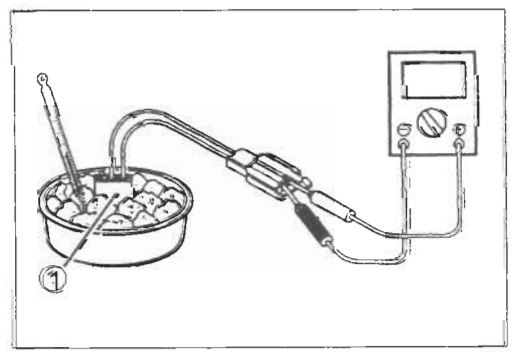
(for E02, E19)

- Cool the thermo-switch ① with ice water and check for continuity.

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

DATA **Thermo-switch continuity:**

Below 8 – 14°C	**Yes**
Above 13 – 25°C	**No**

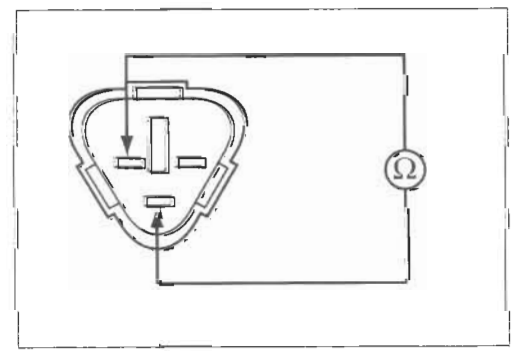


THROTTLE POSITION SENSOR INSPECTION

Measure the resistance between the terminals as shown in the illustration.

DATA **Throttle position sensor resistance: Approx. 5 kΩ**

NOTE:
When performing this test, it is not necessary to remove the throttle position sensor.

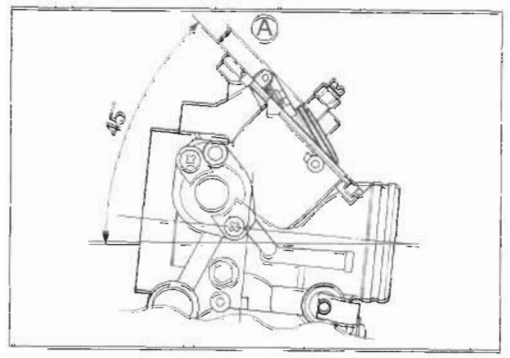


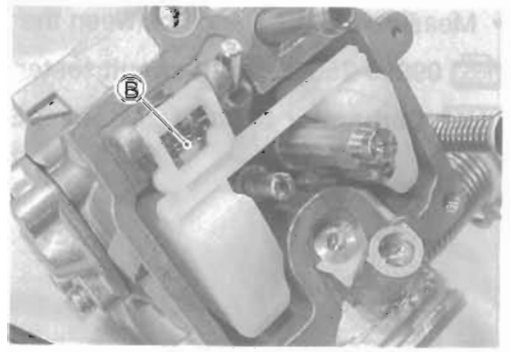
FLOAT HEIGHT ADJUSTMENT

- Measure the float height Ⓐ 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 Ⓑ of the float arm as necessary to bring the height Ⓐ to the specified value.

DATA **Float height Ⓐ: 7.0 ± 0.5 mm (0.28 ± 0.02 in)**

TOOL **09900-20102: Vernier calipers**





REASSEMBLY AND REINSTALLATION

Carburetor reassembly can be performed in the reverse order of disassembly. When reassembling, carefully observe the following instructions.

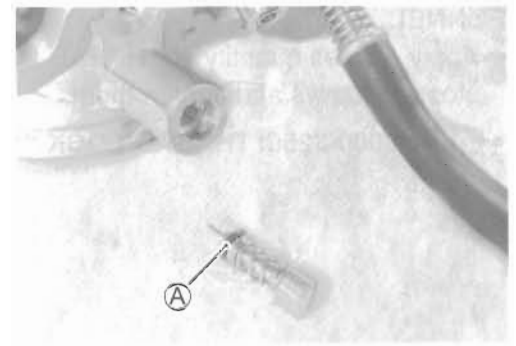
⚠ CAUTION

*** Assemble the parts taking consideration of their function.**
*** Replace O-rings and seals with new ones.**

- 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.

⚠ CAUTION

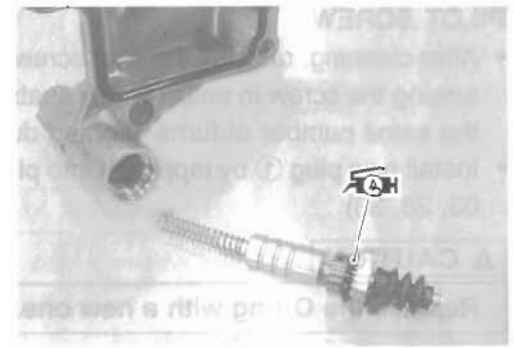
Replace the O-ring Ⓐ with a new one.



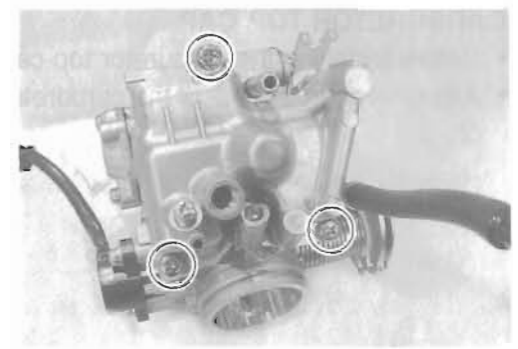
- Apply grease to the O-ring and install the accelerating plunger.

For USA
99000-25030: SUZUKI SUPER GREASE "A"

For the other countries
99000-25010: SUZUKI SUPER GREASE "A"

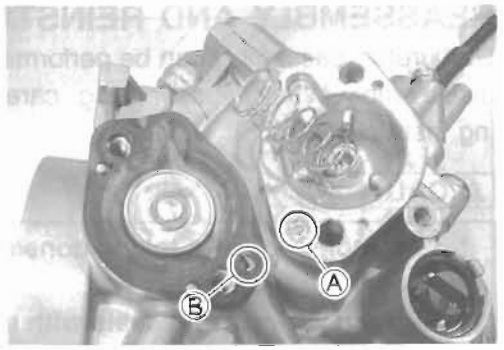


- Fit the seal rings securely to the float chamber and install the float chamber to the throttle body.



COASTING VALVE

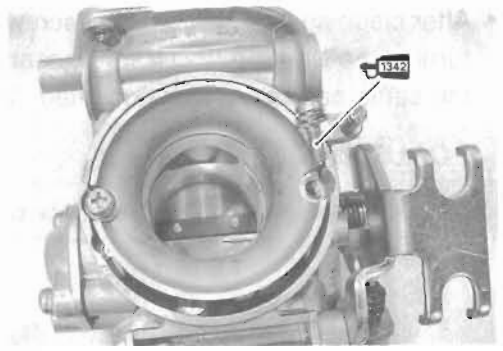
- When installing the coasting valve to the body, align the hole Ⓐ of the diagram and air hole Ⓑ of the cover.



FUNNEL

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

1342 **99000-3250: THREAD LOCK "1342"**

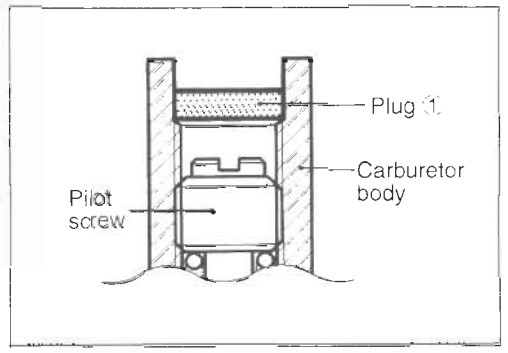


PILOT SCREW

- 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, 28, 33)

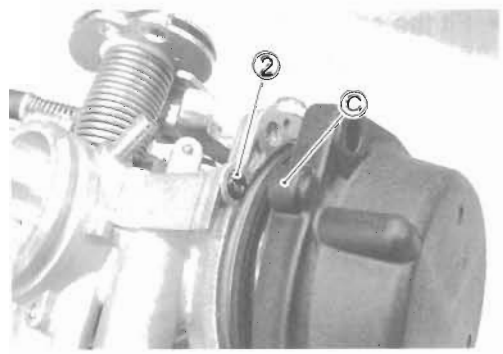
⚠ CAUTION

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.



STARTER PLUNGER

Apply a small quantity of grease to the starter plunger O-ring.

For USA

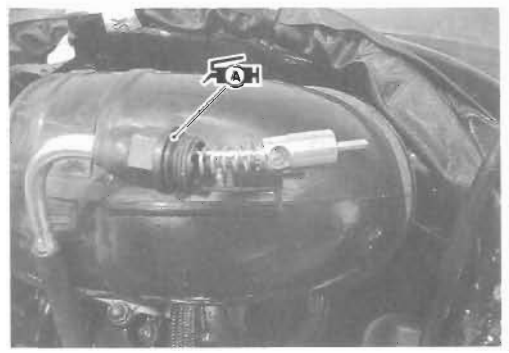
AH **99000-25030: SUZUKI SUPER GREASE "A"**

For the other countries

AH **99000-25010: SUZUKI SUPER GREASE "A"**

⚠ CAUTION

Replace the O-rings with new ones.



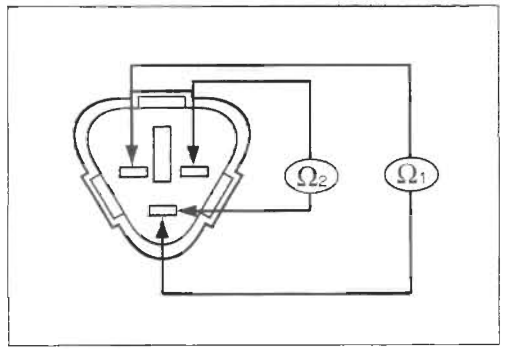
THROTTLE POSITION SENSOR POSITIONING

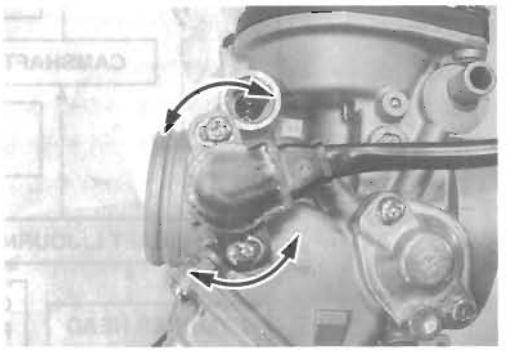
- Install the throttle position sensor with the flats on the throttle shaft end securely engaged with the slot on the throttle position sensor.
- Measure the resistance Ⓞ1 between the throttle position sensor terminals as shown in the illustration.

DATA **Throttle position sensor resistance Ⓞ1: Approx. 5 kΩ**

- Measure the resistance Ⓞ2 between the throttle position sensor terminals as shown in the illustration.
- Fully open the throttle valve with the throttle lever.
- Position the throttle position sensor until resistance Ⓞ2 is 3.09 – 4.63 kΩ.
- When the resistance Ⓞ2 is within specification, tighten the throttle position sensor mounting screws.

DATA **Throttle position sensor resistance Ⓞ2: 3.09 – 4.63 kΩ**





- After the assembly and installation on the engine have been completed, perform the following adjustment.
  * Throttle cable adjustment (☞ 2-11)
  * Idle speed adjustment (☞ 2-10)

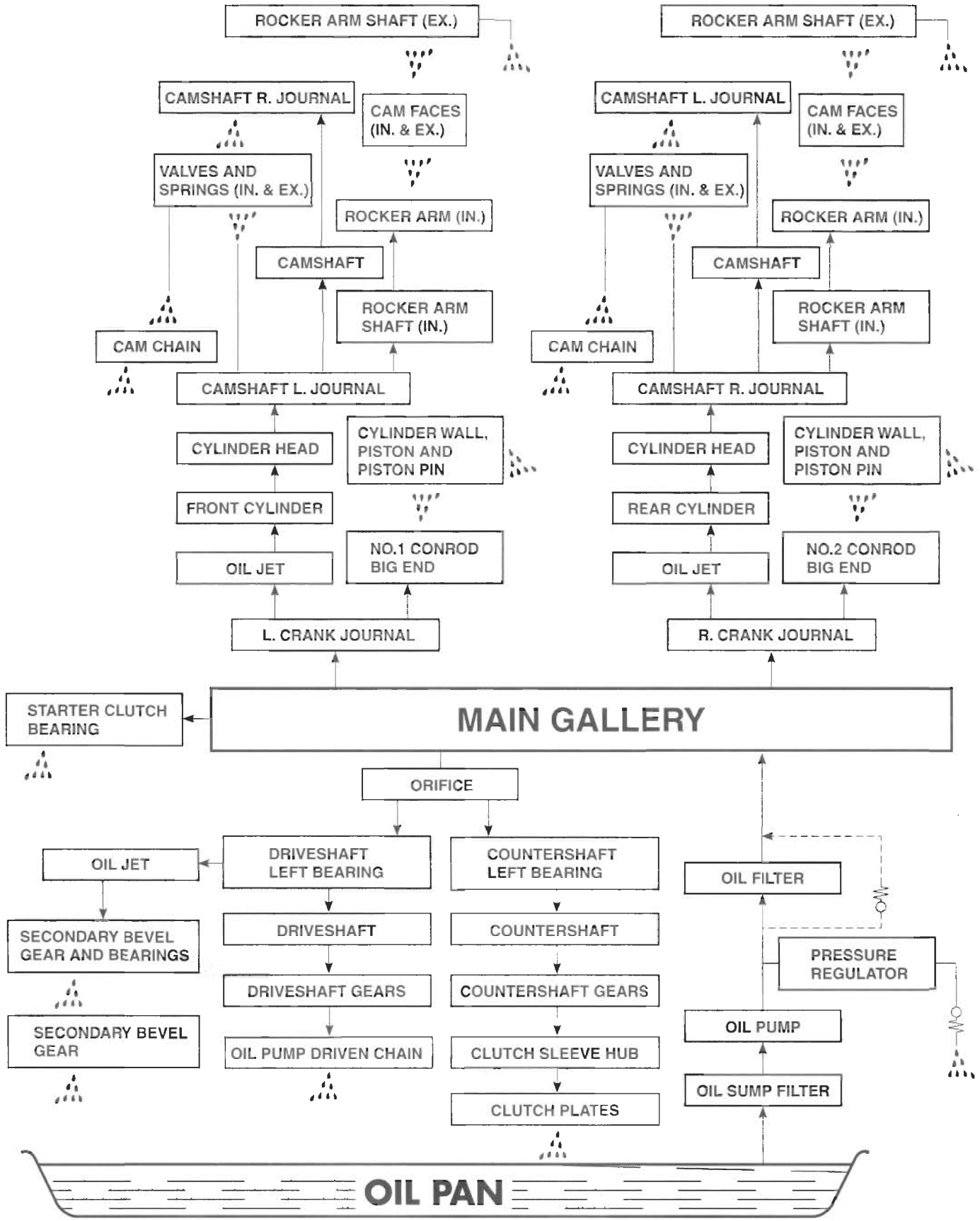
CARBURETOR HEATER

- Apply thermo-grease to the threads and tighten the carburetor heater. (for E-02, 19)

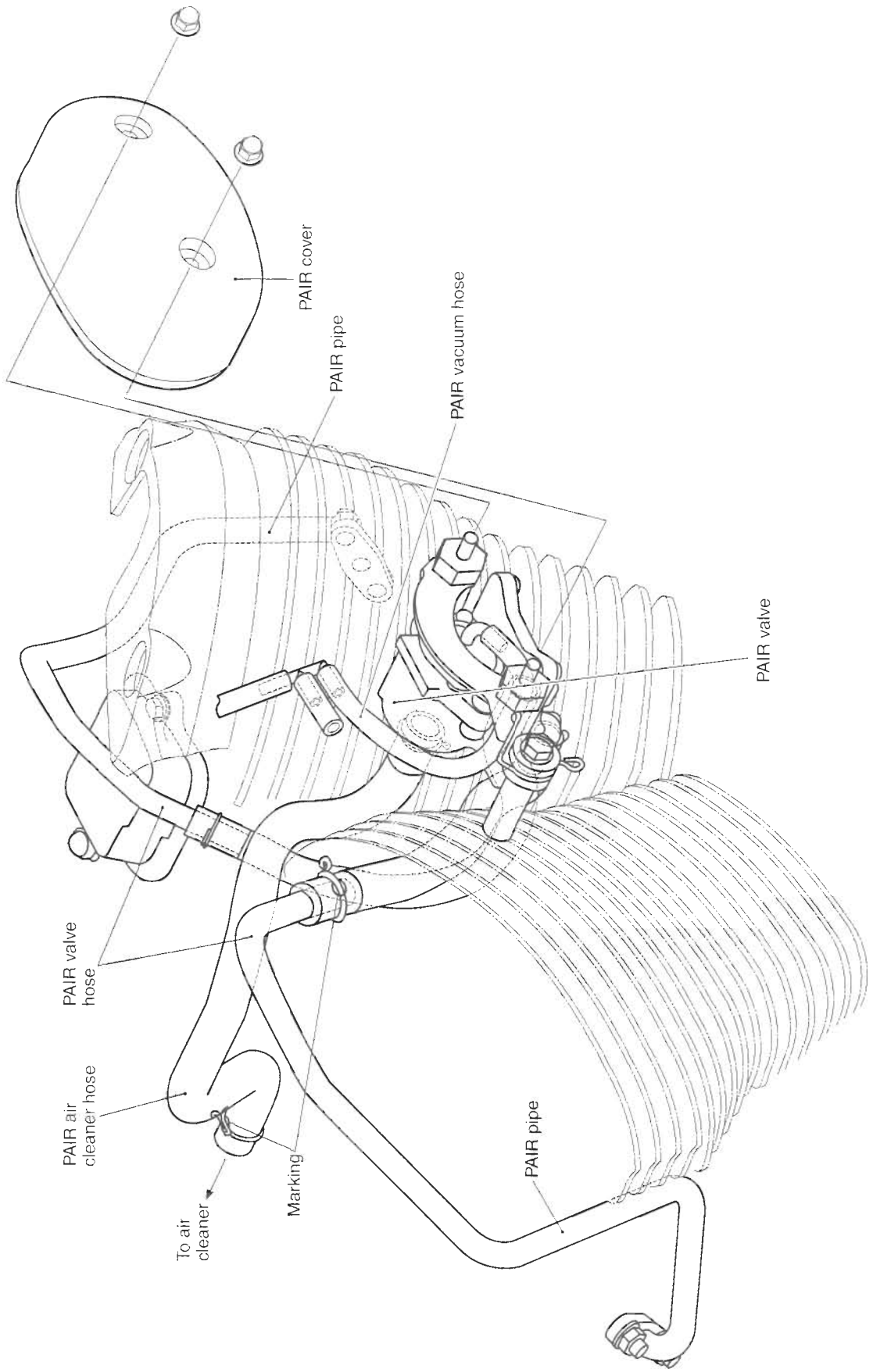
GH **99000-59029: THERMO-GREASE**

Carburetor heater: 3 N·m (0.3 kgf·m)

LUBRICATION SYSTEM CHART



PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



PAIR (AIR SUPPLY) SYSTEM INSPECTION

HOSES

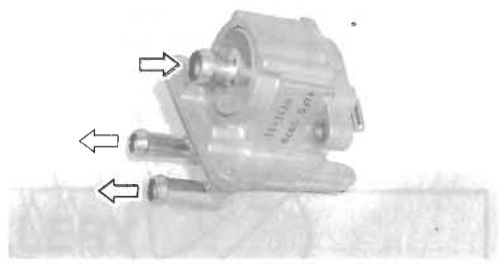
- Inspect the hoses for wear or damage.
- Inspect that the hoses and pipes are securely connected.

PAIR REED VAVLE

- Remove the PAIR valve cover.
- Inspect the reed valve for the carbon deposit.
- If the carbon deposit is found in the reed valve, replace the PAIR control valve with a new one.

PAIR CONTROL VALVE

- Inspect that air flows through the PAIR control valve air inlet port to the air outlet ports.
- If air does not flow out, replace the PAIR valve with a new one.



- Connect the vacuum pump gauge to the vacuum port of the control valve as shown in the photograph.
- Apply negative pressure of the specification slowly to the control valve and inspect the air flow.
- If air does not flow out, the control valve is in normal condition.
- If the control valve does not function within the specification, replace the control valve with a new one.

DATA **Negative pressure range: More than 72 kPa (540 mmHg)**

TOOL **09917-47010: Vacuum pump gauge**

⚠ CAUTION

Use a hand operated vacuum pump to prevent the control valve damage.