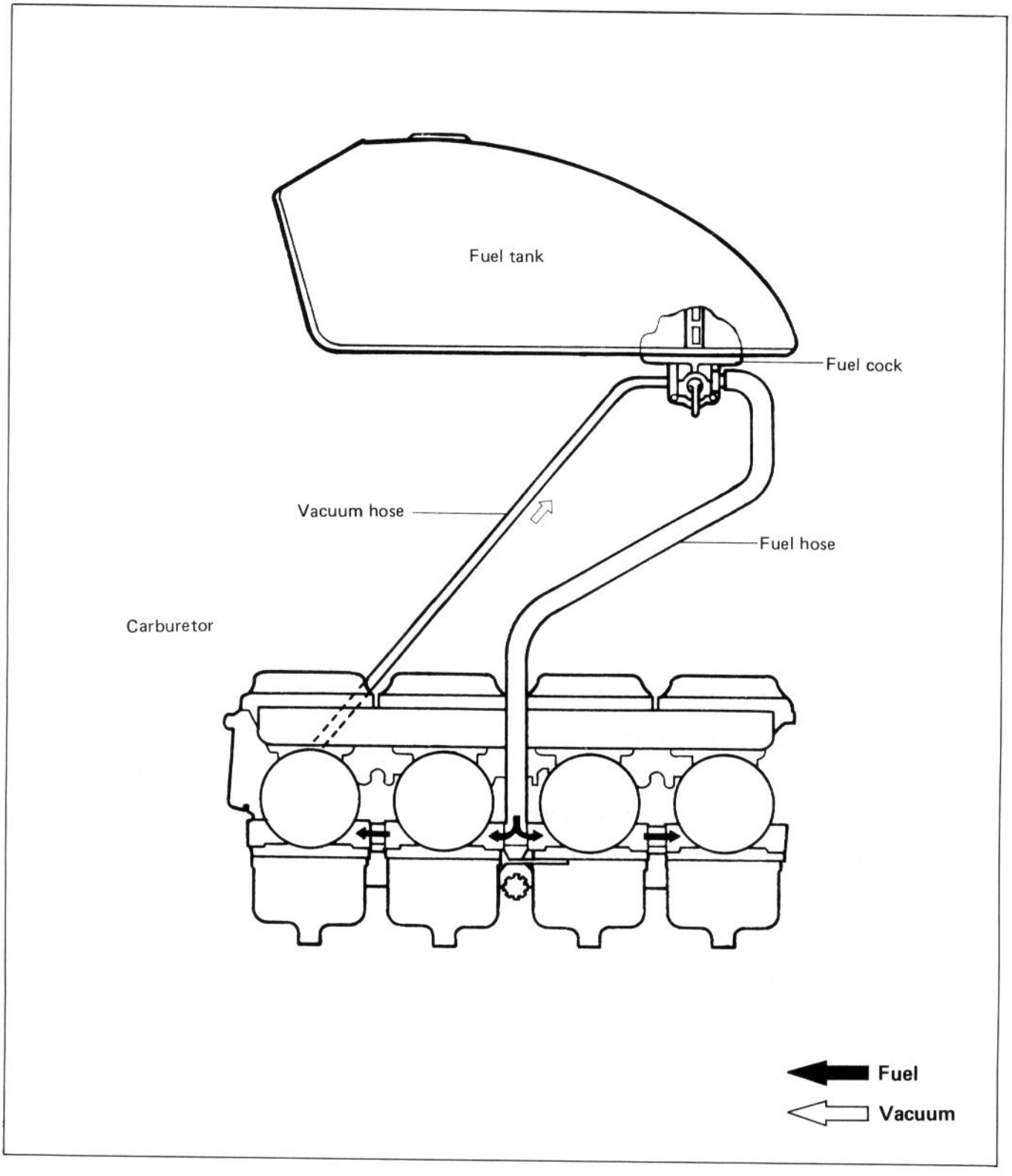
FUEL AND LUBRICATION SYSTEM

CONTENTS

FUEL SYSTEM

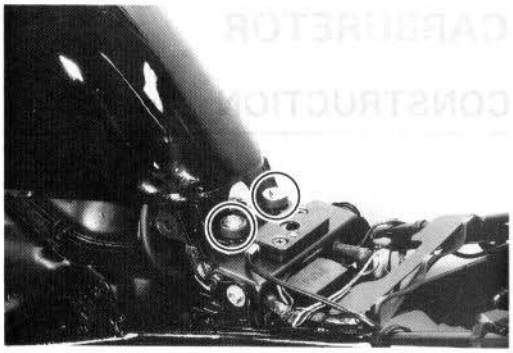
When turning the starter motor, negative pressure is generated in the combustion chamber. This negative pressure works on the diaphragm of fuel cock through passage way provided in the carburetor main bore and vacuum hose, and diaphragm builds up a negative pressure which is higher than the spring pressure. Fuel valve in the fuel cock is forced to open due to diaphragm operation, and thus allows fuel to flow into the carburetor float chamber.



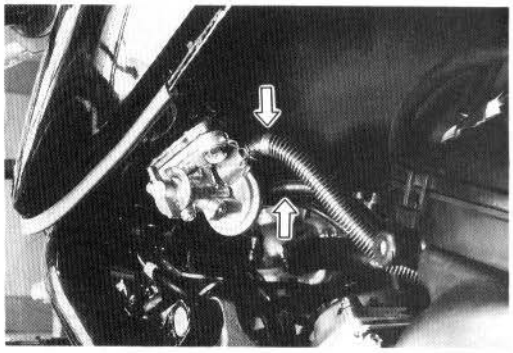
FUEL TANK AND FUEL COCK

FUEL TANK REMOVAL

- Remove the seat and air cleaner side cover. (See page 1-12.)
- Remove the fuel tank mounting bolts.

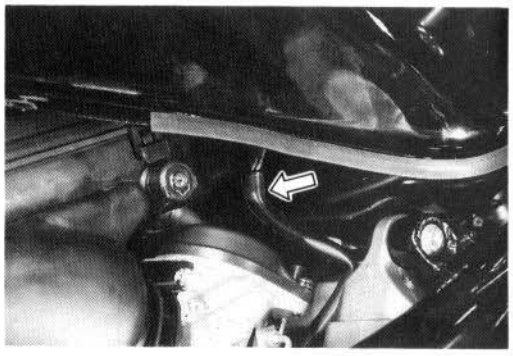


- Disconnect the fuel hose and vacuum hose from the fuel cock.



- Disconnect the fuel tank water drain hose.
- Remove the fuel tank.

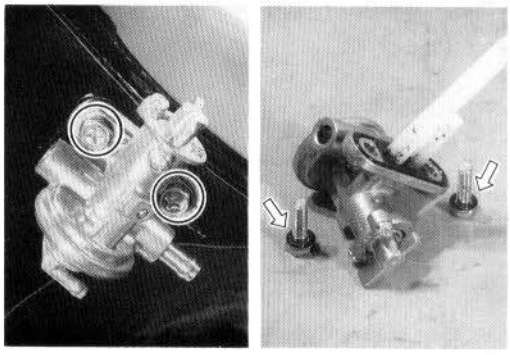
WARNING:
Gasoline is very explosive. Extreme care must be taken.



FUEL COCK REMOVAL

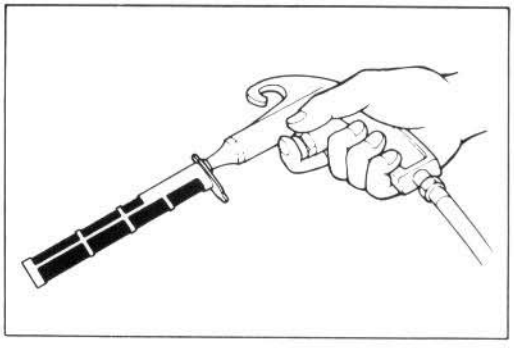
- Remove the fuel cock by removing the bolts.

WARNING:
Gasoline is very explosive. Extreme care must be taken.
Gaskets must be replaced with new ones to prevent fuel leakage.



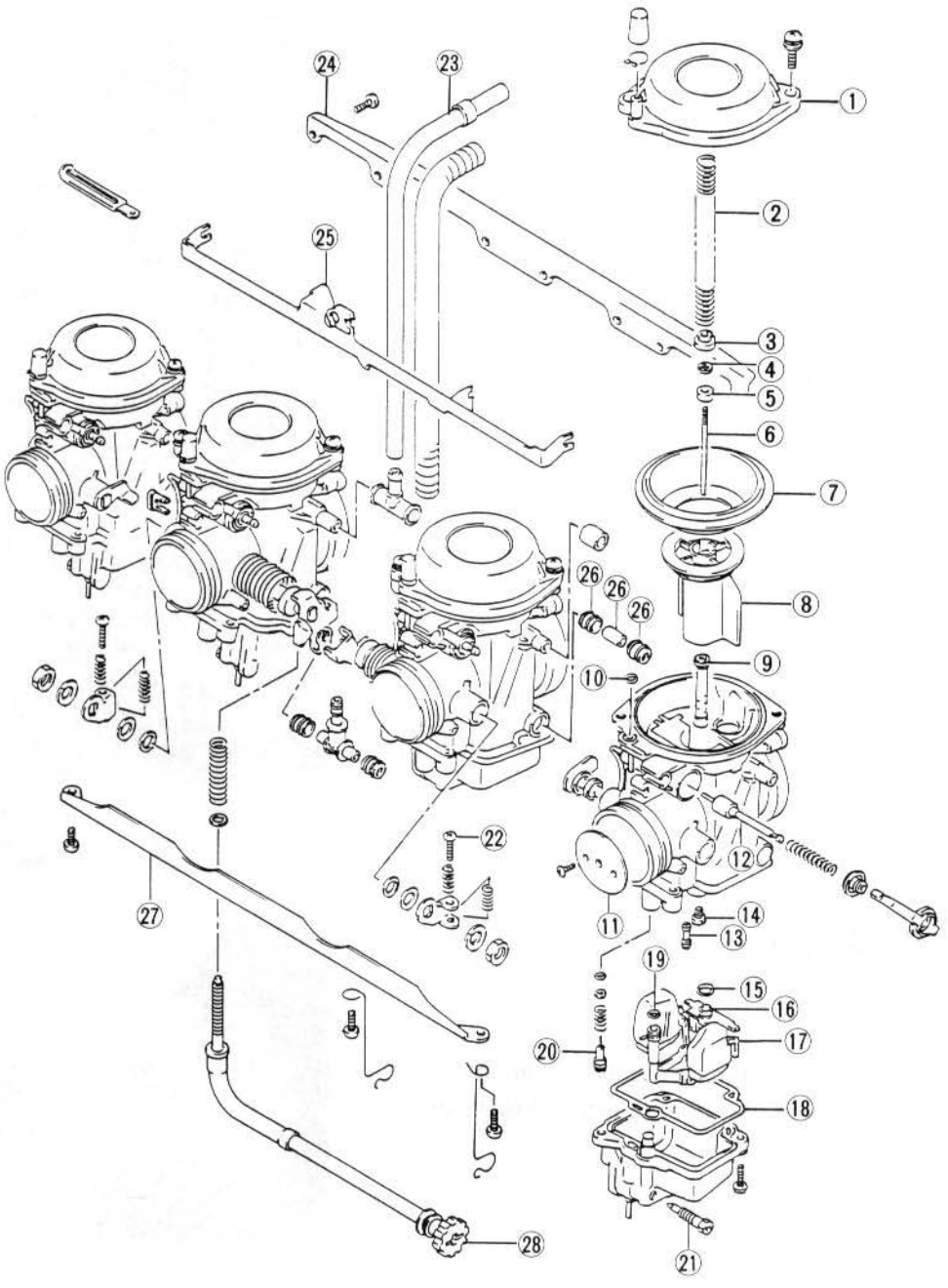
INSPECTION AND CLELANING

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



CARBURETOR

CONSTRUCTION



① Top cap
② Spring
③ Spring seat
④ E-ring
⑤ Washer
⑥ Jet needle
⑦ Diaphragm
⑧ Piston valve
⑨ Needle jet
⑩ O-ring
⑪ Throttle valve
⑫ Starter plunger
⑬ Pilot jet
⑭ Main jet
⑮ O-ring
⑯ Needle valve
⑰ Float ass'y
⑱ Gasket
⑲ O-ring
⑳ Pilot screw
㉑ Drain screw
㉒ Throttle valve balance screw
㉓ Air vent hose
㉔ Carburetor set upper plate
㉕ Starter shaft lever
㉖ Fuel hose connector set
㉗ Carburetor set lower plate
㉘ Throttle stop screw

SPECIFICATIONS

ITEM		SPECIFICATION	
		E-03	E-33
Carburetor type		MIKUNI BST32SS	←
Bore size		32 mm	←
I.D. No		10D2	10D4
Idle r/min.		1 400 ± 50 r/min.	←
Float height		14.6 ± 1.0 mm	←
Main jet	(M.J.)	#102.5	←
Main air jet	(M.A.J.)	0.6 mm	←
Jet needle	(J.N.)	5EZ74	←
Needle jet	(N.J.)	O-9	←
Throttle valve	(Th.V.)	#130	←
Pilot jet	(P.J.)	#32.5	←
By-pass	(B.P.)	#1 0.8, #2 0.8, #3 0.8 mm	←
Pilot outlet	(P.O.)	0.8 mm	0.9 mm
Valve seat	(V.S.)	2.0 mm	←
Starter jet	(G.S.)	#32.5	←
Pilot screw	(P.S.)	PRE-SET	←
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←

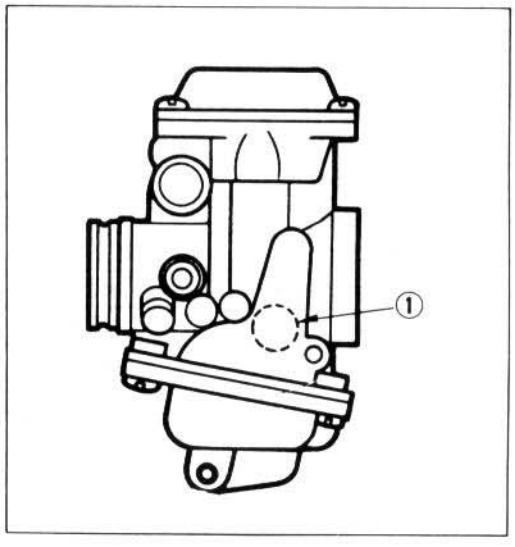
ITEM		SPECIFICATION		
		E-02,04,21,25,28,34	E-24	E-22
Carburetor type		BST33SS	←	←
Bore size		33 mm	←	←
I.D. No.		10D1	10D3	10D5
Idle r/min.		1 300 ± 100 r/min	←	1 400 ± 50 r/min
Float height		14.6 ± 1.0 mm	←	←
Main jet	(M.J.)	#100	←	←
Main air jet	(M.A.J)	0.6 mm	←	←
Jet needle	(J.N.)	5EZ67-3rd	←	←
Needle jet	(N.J.)	P-0	←	←
Throttle valve	(Th.V.)	#130	←	←
Pilot jet	(P.J.)	#32.5	←	←
By-pass	(B.P.)	#1 0.8, #2 0.8, #3 0.8 mm	←	←

ITEM		SPECIFICATION		
		E-02,04,21,25,28,34	E-24	E-22
Pilot outlet	(P.O.)	0.7 mm	←	←
Valve seat	(V.S.)	2.0 mm	←	←
Starter jet	(G.S.)	#32.5	←	←
Pilot screw	(P.S.)	PRE-SET (1½ turns back)	←	PRE-SET (1¼ turns back)
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←	←

E-02 : England
E-03 : U.S.A.
E-04 : France
E-21 : Belgium
E-22 : W. Germany
E-24 : Australia
E-25 : Netherland
E-28 : Canada
E-33 : California (U.S.A.)
E-34 : Italy

I.D.NO. LOCATION

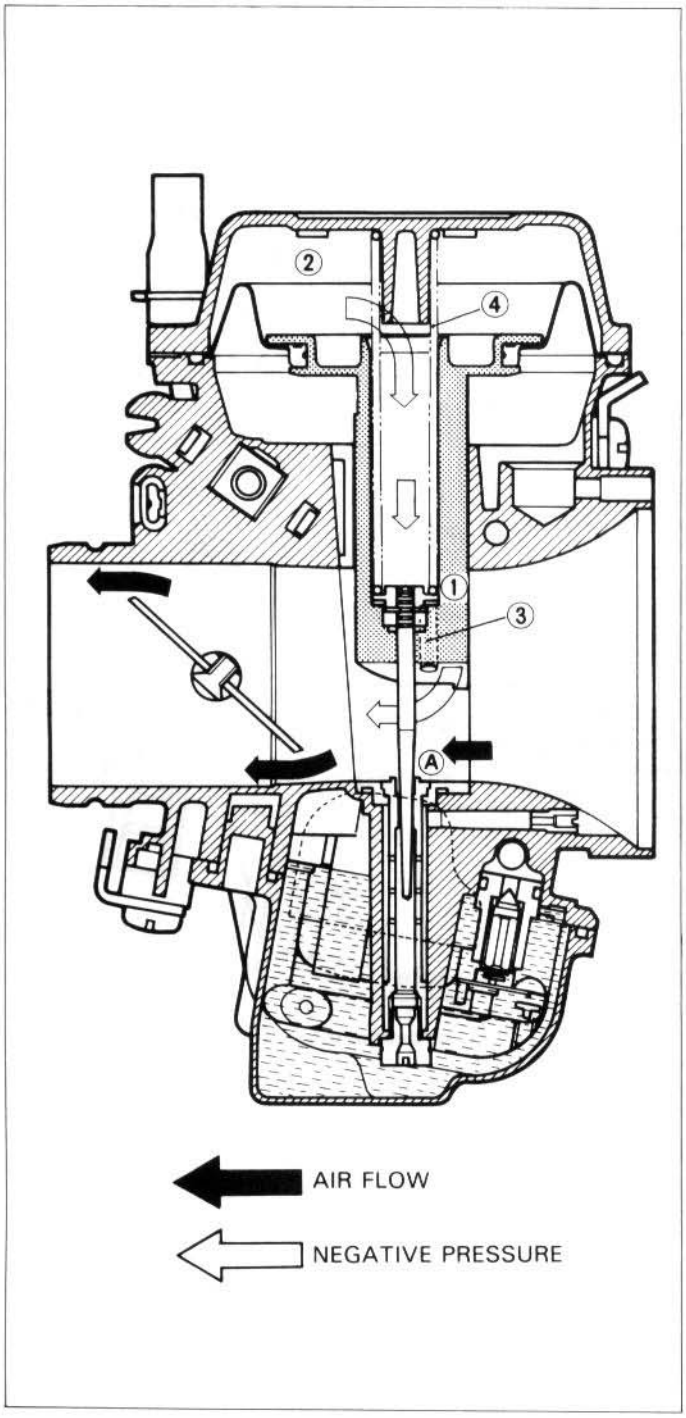
Each carburetor has I.D. Number ① printed on the carburetor body according to its specification.

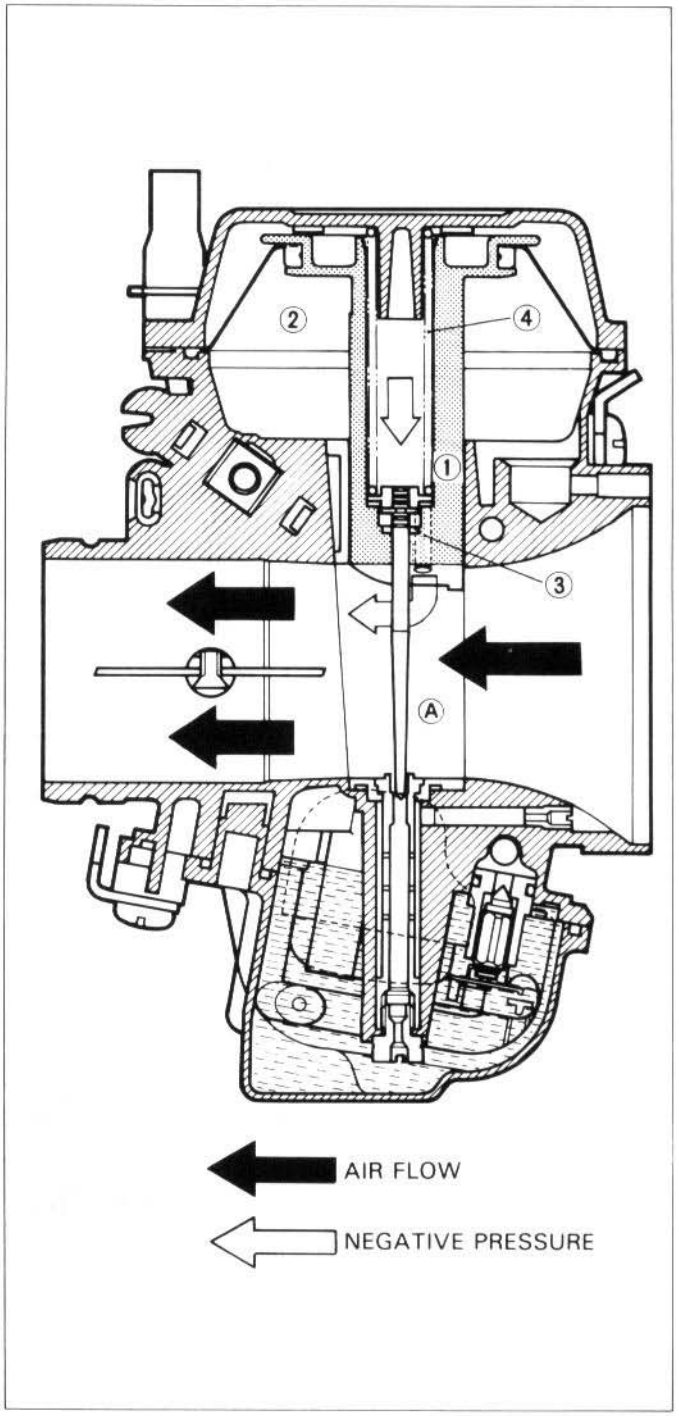


DIAPHRAGM AND PISTON OPERATION

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

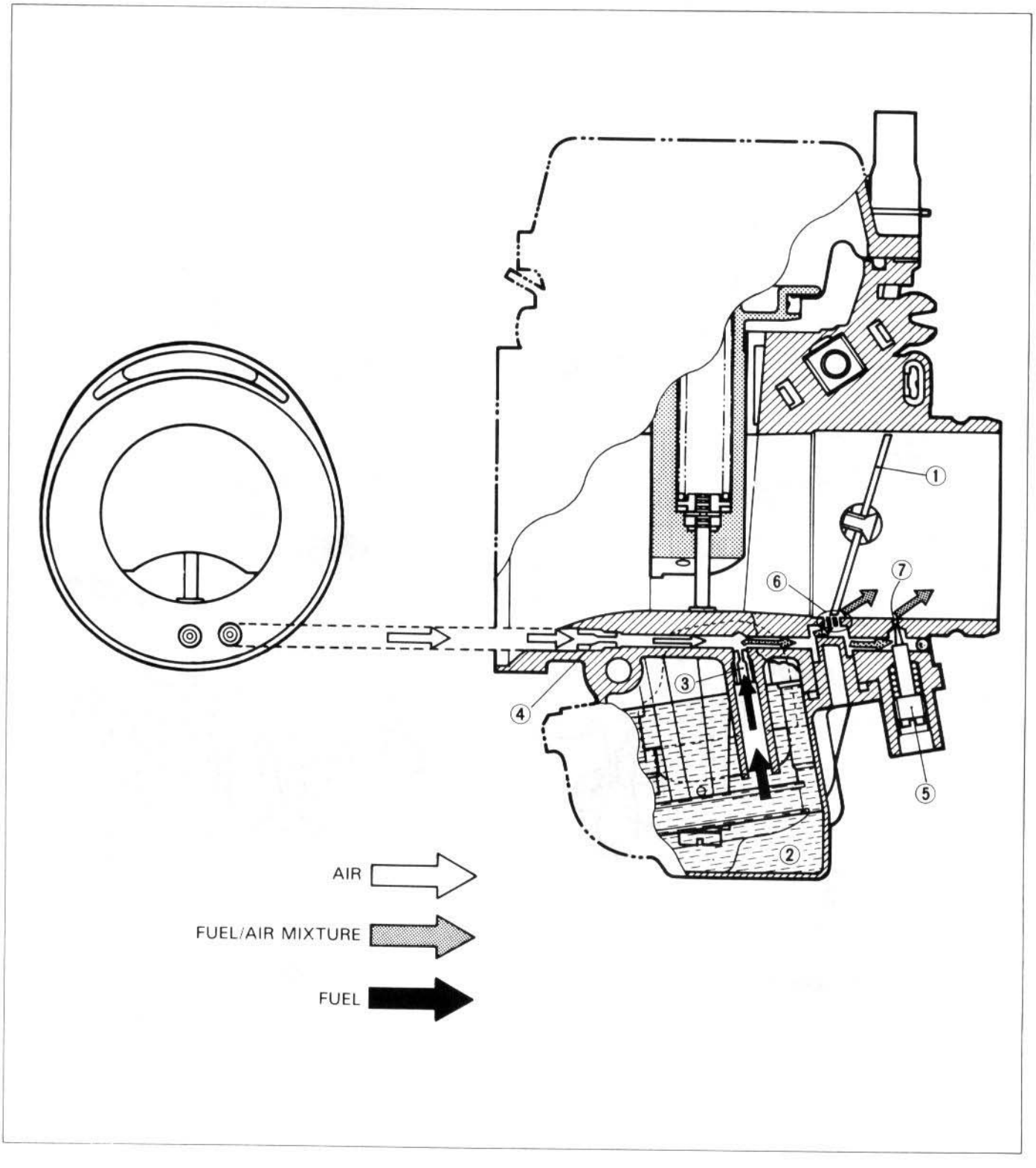
Rising negative pressure overcomes the spring ④ force, causing the piston valve ① to rise to increase the said area and thus prevent the air velocity from increasing. Thus, air velocity in the venturi passage is kept relatively constant for improved fuel atomization and for securing optimum ratio of fuel/air mixture.





SLOW SYSTEM

This system supplies fuel during engine operation with throttle valve ① closed or slight opened. The fuel from float chamber ② is metered by pilot jet ③ where it mixes with air coming in through pilot air jet ④. This mixture, rich with fuel, then goes up through pilot passage to pilot screw ⑤. A part of the mixture is discharged into the main bore out of bypass ports ⑥. The remainder is then metered by pilot screw ⑤ and sprayed out into the main bore through pilot outlet ⑦.



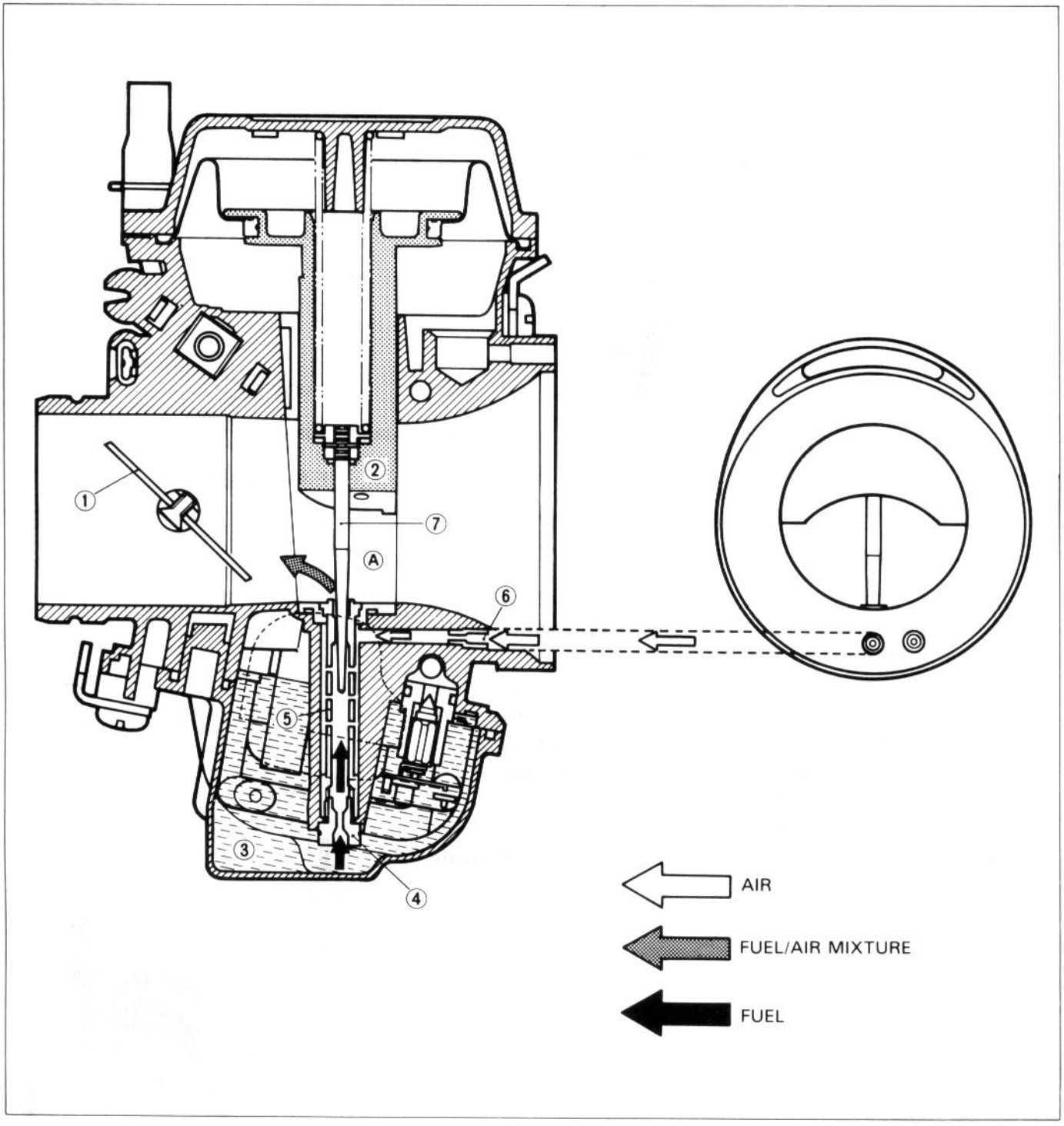
MAIN SYSTEM

As throttle valve ① is opened, engine speed rises, and this increases negative pressure in the venturi Ⓐ. Consequently the piston valve ② moves upward.

Meanwhile, the fuel in float chamber ③ is metered by main jet ④, and the metered fuel enters needle jet ⑤, in which it mixes with the air admitted through main air jet ⑥ to form an emulsion.

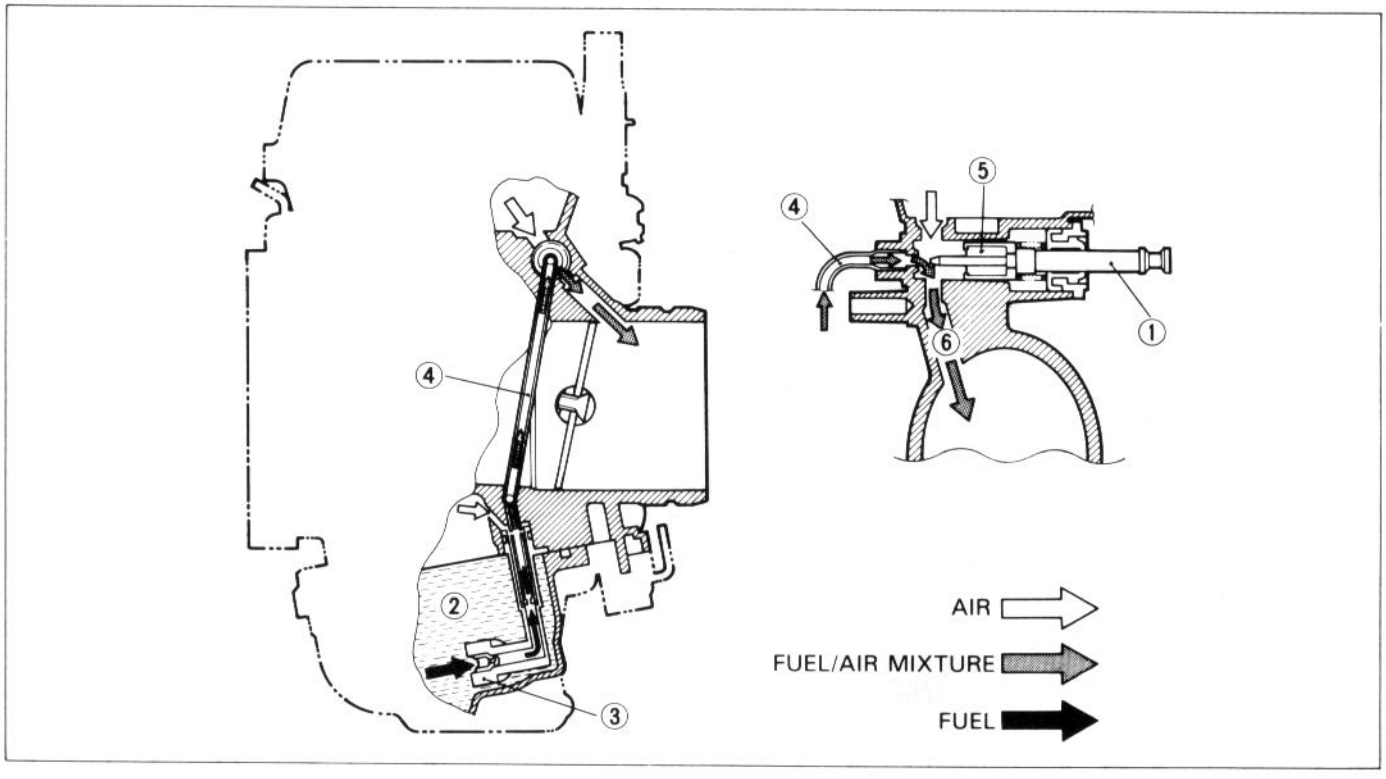
The emulsified fuel then passes through the clearance between needle jet ⑤ and jet needle ⑦, and is discharged into the venturi Ⓐ, in which it meets main air stream being drawn by the engine.

Mixture proportioning is accomplished in needle jet ⑤; the clearance through which the emulsified fuel must flow in large or small, depending ultimately on throttle position.



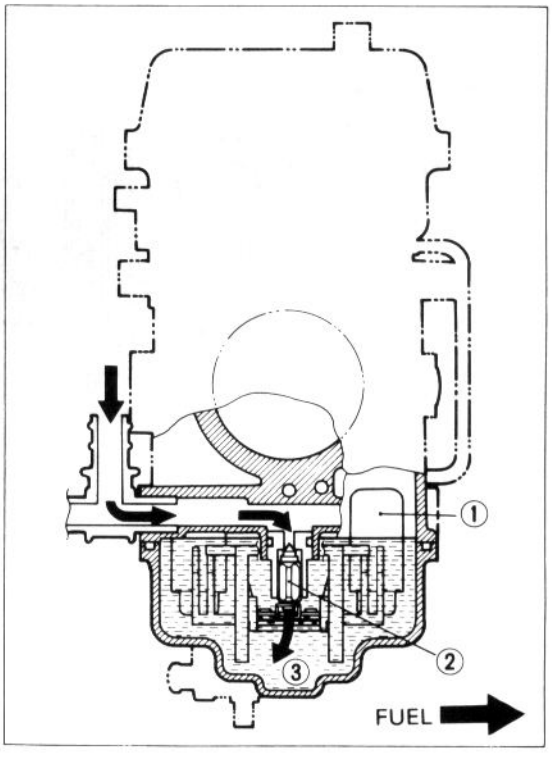
STARTER SYSTEM

Pulling up the starter shaft ①, fuel is drawn into the starter circuit from the float chamber ②. Starter jet ③ meters this fuel, which then flows into starter pipe ④ and mixes with the air coming from the float chamber ②. The mixture, rich in fuel content, reaches starter plunger ⑤ and mixes again with the air coming through a passage extending from behind the diaphragm.
The two successive mixings of fuel with air are such that proper fuel/air mixture for starting is produced when the mixture is sprayed out through starter outlet ⑥ into the main bore.



FLOAT SYSTEM

Floats ① and needle valve ② are associated with the same mechanism, so that, as the floats ① move up and down, the needle valve ② too moves likewise.
When fuel level is up in float chamber ③, floats ① are up and needle valve ② remains pushed up against valve seat. Under this condition, no fuel enters the float chamber ③. As the fuel level falls, floats ① go down and needle valve ② unseats itself to admit fuel into the chamber ③.
In this manner, needle valve ② admits and shuts off fuel alternately to maintain a practically constant fuel level inside the float chamber ③.



REMOVAL

Refer to page 3-5.

DISASSEMBLY

Disassemble the carburetor as shown in the illustration on page 4-3.

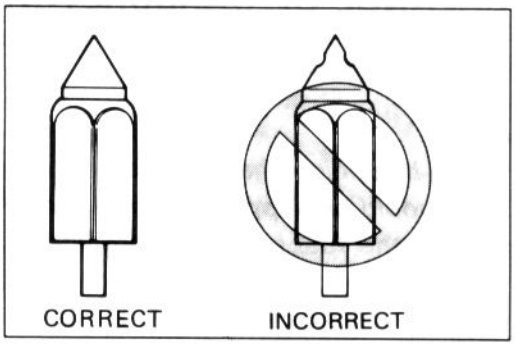
INSPECTION AND ADJUSTMENT

Check following items for any damage or clogging.

* Pilot jet
* Main jet
* Main air jet
* Pilot air jet
* Needle jet air bleeding hole
* Float
* Needle valve
* Starter jet
* Gasket and O-ring
* Throttle shaft oil seal
* Diaphragm
* Pilot outlet and by-pass holes

NEEDLE VALVE INSPECTION

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

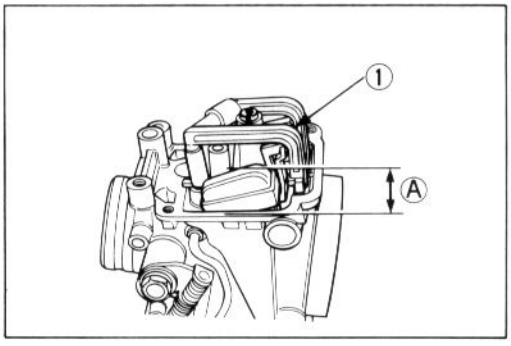


FLOAT HEIGHT ADJUSTMENT

To check the float height, invert the carburetor body, with the float arm kept free, measure the height Ⓐ while float arm is just in contact with needle valve by using calipers.
Bend the tongue ① as necessary to bring the height Ⓐ to this value.

Float height Ⓐ : 14.6 ± 1.0 mm (0.57 ± 0.04 in)

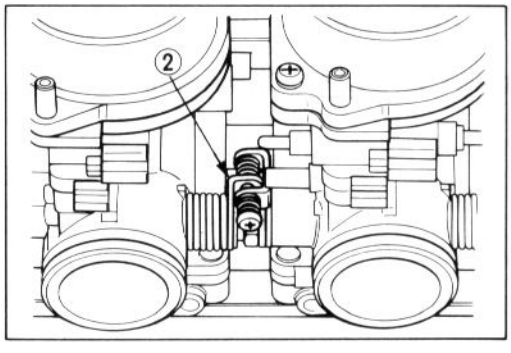
09900-20102 : Vernier calipers



REASSEMBLY AND REMOUNTING

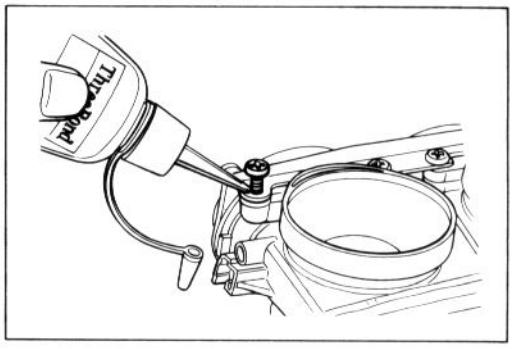
Reassemble and remount the carburetor assembly in the reverse order of disassembly and removal.
Pay attention to the following points:

- When engaging two carburetors, position the throttle valve control lever ② correctly.

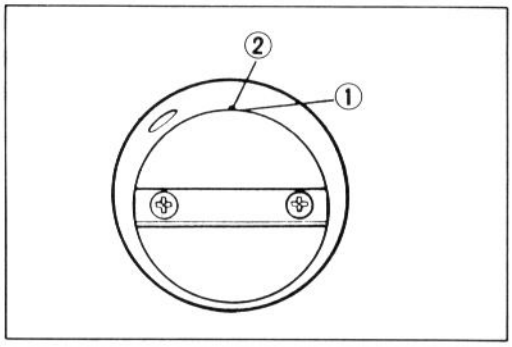


- Apply THREAD LOCK "1342" to the upper and lower plates' screws.

99000-32050: THREAD LOCK "1342"



- Set each throttle valve in such a way that its top end ① meets the foremost by-pass ②. This is accomplished by turning the throttle stop screw and throttle valve balance screw.
- After all work is completed, mount the carburetors on the engine and the following adjustments are necessary.
  * Engine idle r/min ..... Page 2- 9
  * Throttle cable play ..... Page 2- 9
  * Balancing carburetors ..... Page 4-12



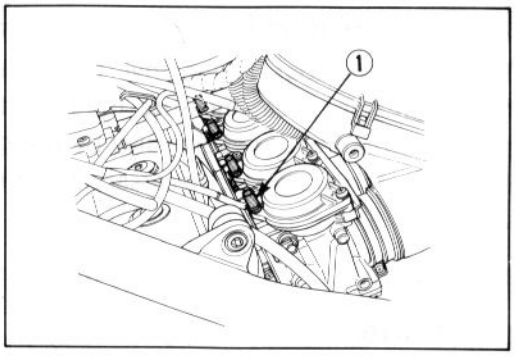
BALANCE OF CARBURETORS

Check the four carburetors for balancing movement according to the following procedures.

NOTE:
When balancing the carburetors, remove the fuel tank and fuel should be supplied by a separate fuel tank and be sure to plug the fuel cock vacuum line.

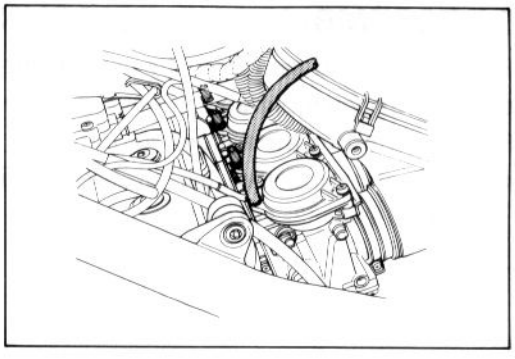
CALIBRATING EACH GAUGE

- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Remove the vacuum inlet cap ① for No. 1 or No. 4 cylinder.

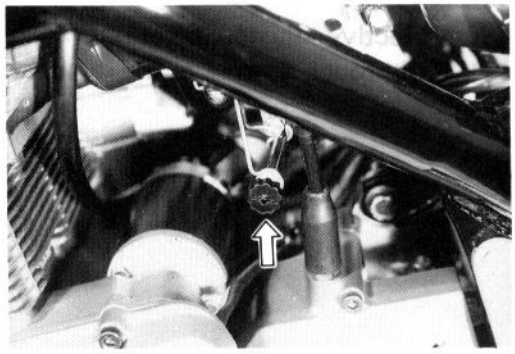


- Connect one of the four rubber hoses of balancer gauge to this inlet.

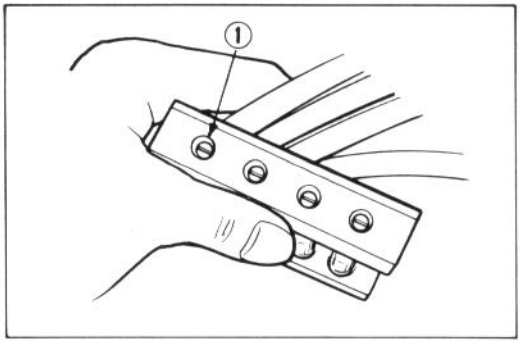
09913-13121 : Carburetor balancer

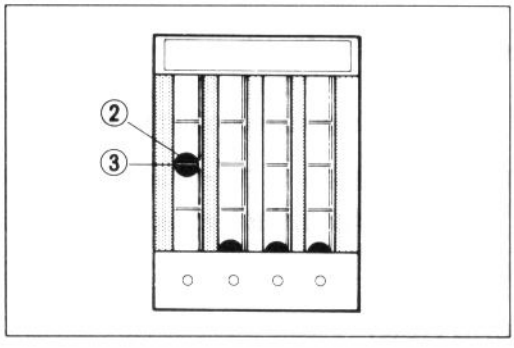


- Start up the engine and keep it running at 1 750 r/min by turning throttle stop screw.



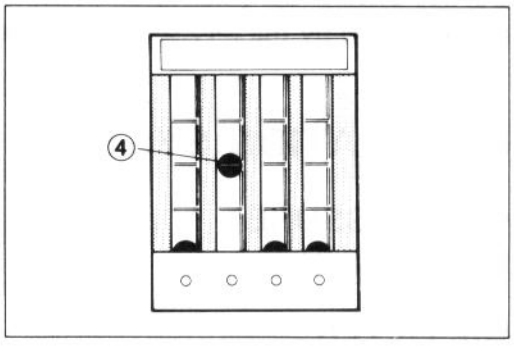
- Turn the air screw ① of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ② in the tube to the center line ③.





- After making sure that the steel ball stays steady at the center line, disconnect the hose from inlet and connect the next hose to the inlet.
- Turn air screw to bring the other steel ball ④ to the center line.
- Repeat the above process on the third and fourth hoses.

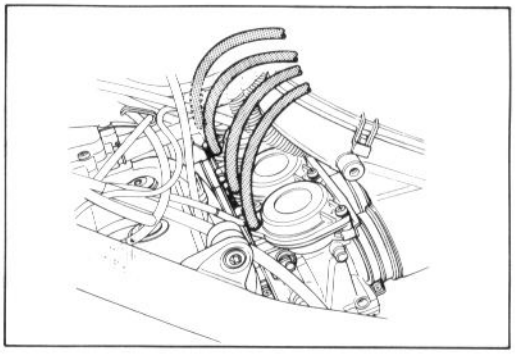
The balancer gauge is now ready for use in balancing the carburetors.



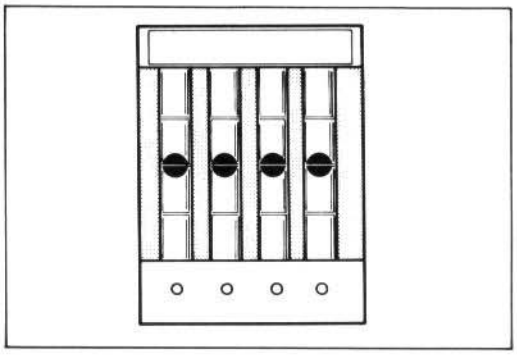
BALANCING CARBURETORS

For balancing all the carburetor movement, remove all the vacuum inlet caps from each carburetor. Connect the balancer gauge hoses to these vacuum inlets and adjust the balance of four carburetors as follows:

- Start up the engine and keep it running at 1 750 r/min to see engine tachometer reading.

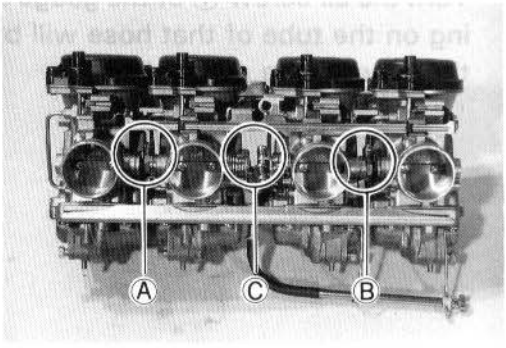


A correctly adjusted carburetor has the steel balls in the Nos. 1 through 4 tubes at the same level.



- If the steel balls are not in correct positions, adjust the throttle valve balance screws correctly.
- Adjusting order is as follows.

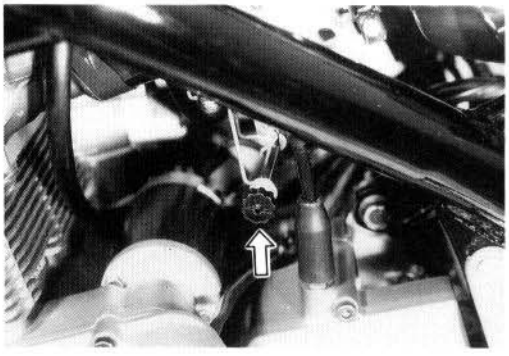
Ⓐ
↓
Ⓑ
↓
Ⓒ



- After balancing the carburetors, set there speed between 1350 and 1450 r/min. by turning the throttle stop screw referring engine tachometer reading.

Idle r/min: 1400 ± 50 r/min . . . . . for E03, 22 and 33.
: 1300 ± 100 r/min . . . . . for the others

E-03: U.S.A., E-22: W. Germany, E-33: California (U.S.A.)



CAUTION:
Do not disturb the pilot screw. This component is PRE-SET at the factory by the very specialized equipment.

LUBRICATION SYSTEM

OIL PRESSURE

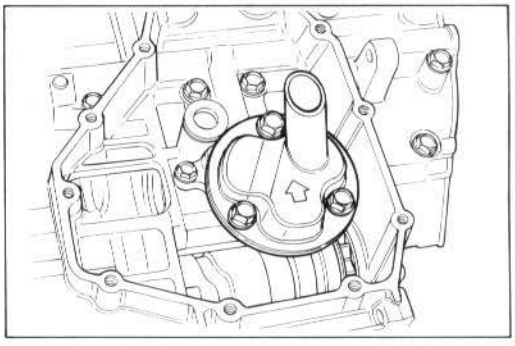
Refer to page 3-2.

OIL FILTER

Refer to page 2-8.

OIL SUMP FILTER

When you wash the oil pan, check to be sure that the oil sump filter is free from any sign of rupture, also wash the filter clean periodically.



CAUTION:
Replace the oil pan gasket with a new one to prevent oil leakage.

LUBRICATION SYSTEM CHART