The carburetor in the front facing forward (hereinafter refer to as F) applies to the 1st, 2nd and 3rd cylinders, and the other rear carburetor (hereinafter refer to as R) applies to the 4th, 5th and 6th cylinders. The operation of these two carburetors is identical except for the positioning arrangement of the vacuum nipple and float chamber.

The needle valve is made of specially hardened steel and, therefore, is not appreciably worn even when used over long periods of time.

Carburetor features are as follows:

1. The venturi area is automatically changed according to engine air intake. Thus, the speed of the air flowing through the Venturi is nearly constant under all engine operating conditions.

2. Thus, air flow speed in the Venturi is high even when the engine is operated at low speed, fuel spray is satisfactory, and fuel is distributed to the individual engine cylinders evenly. Vehicle fuel consumption is minimized, and the driving features such as acceleration and deceleration, are highly superior.

3. During high speed operation, the Venturi opens wide. Thereby reducing intake resistance to provide high output.

4. Moreover, engine output and vehicle accelerating characteristics are greatly improved by the use of two parallel carburetors.

5. None of the various fuel systems such as those required in conventional stationary Venturi carburetors are required. Individual fuel system operations of idling, deceleration, acceleration, and output are accomplished using a single nozzle. Thus, the construction is extremely simple.

STRUCTURE AND OPERATION

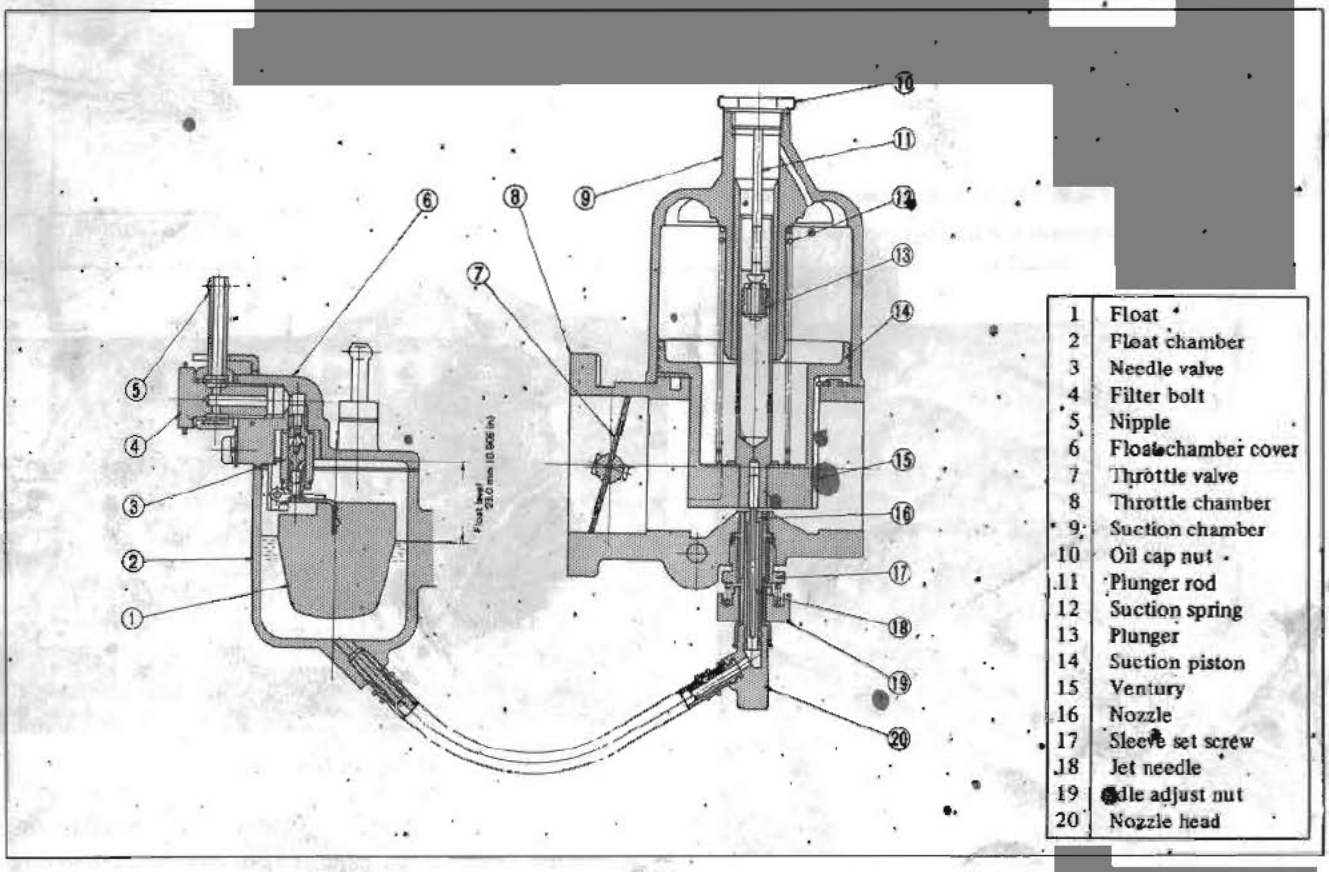
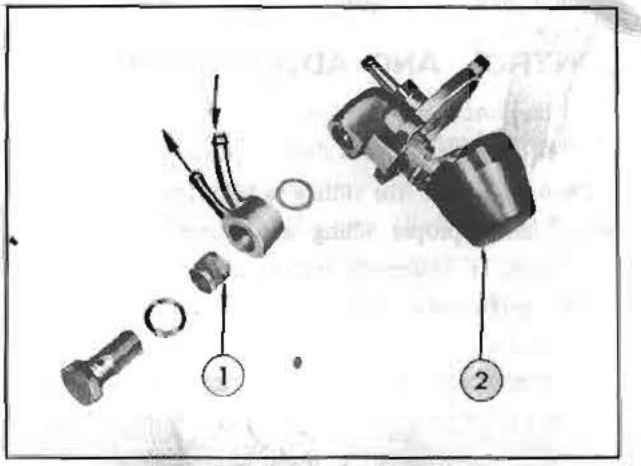


Fig. EF-31 · Sectional view

Structure of these carburetors are shown in Figure EF-31

Float chamber

Fuel fed from the fuel pump enters the float chamber through the needle valve. The fuel in the float chamber is maintained in the rated level by the combined operation of the needle valve and float.



1	Filter	2	Float

Fig. EF-32 Fuel return system

Fuel return system

This is a device which prevent vapor lock or percolation and to ensure a constantly stable idling in a hot engine compartment.

Venturi control system

The suction chamber is located in the upper part of the throttle chamber, the suction piston slides vertically within the vacuum chamber thus changing the Venturi opening. Venturi vacuum pressure applied to the head of the suction piston through the suction port, and atmospheric pressure in the air cleaner is introduced through the air intake port below the piston.

The suction piston automatically moves up and down due to differences between upper and lower pressures, and the balance maintained between the pressure of the piston and suction spring force.

For example, when the throttle valve is opened for increased output, the flow of engine intake air is increased. Thus, vacuum pressure of the Venturi increases, the suction piston is lifted until the piston is balanced with the pressure, and the Venturi opening enlarged.

When the throttle valve is closed to reduce output, the flow of engine intake air is decreased. Thus, vacuum pressure of the Venturi is reduced, the suction piston lowers until the piston is balanced with the pressure, and the Venturi is constricted. The pressure of the suction piston and suction spring force are properly calibrated so that the Venturi opening is optimum for any engine operating conditions.

In addition, the suction piston rod is equipped with an oil damper to improve vehicle acceleration performance. The oil damper protects the suction piston from opening too suddenly during acceleration.

Fuel system

Air velocity through the venturi (vacuum pressure) causes fuel to be sprayed from the float chamber, through the opening between the nozzle and jet needle into the Venturi.

The jet needle below the suction piston moves up and down in the nozzle according to the motion of the suction piston. Fuel flow changes automatically due to the tapered shape of the jet needle.

Moreover, operating conditions under various driving conditions from idling to the fully opened, maximum speed are shown in Figures EF-33 through 36.

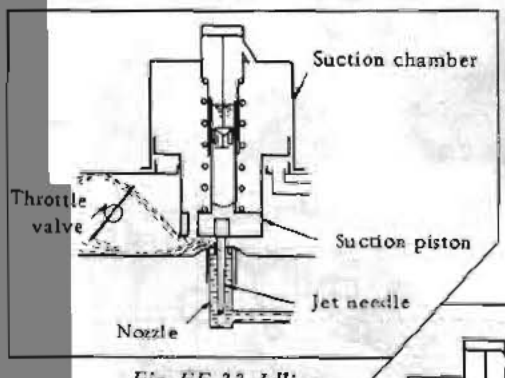


Fig. EF-33 Idling

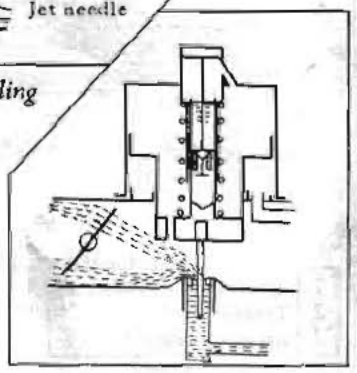


Fig. EF-34 Intermediate and low speed

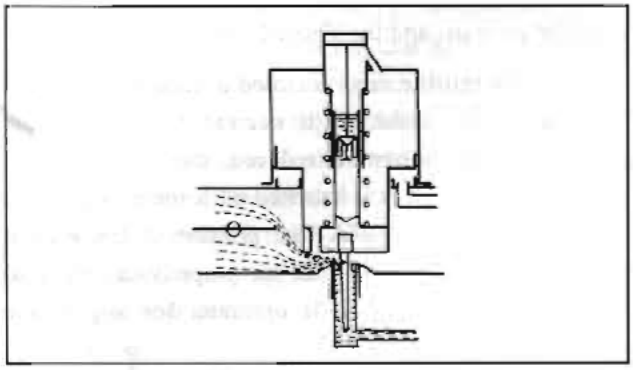


Fig. EF-35 Fully-opened low speed

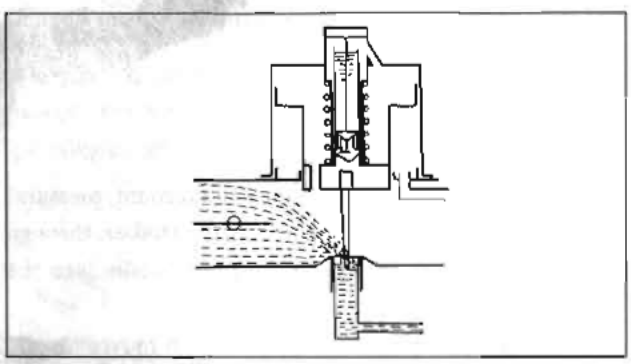


Fig. EF-36 Fully-opened high speed

1. Throttle valve synchronization adjustment (using a flow meter) and idling adjustment.

Starting mechanism

By pulling the choke knob, the starting lever is moved, and the nozzle is drawn down by a link mechanism. As a result, the clearance between the nozzle and jet needle is increased, and an increased amount of fuel required for starting is fed to the system. Moreover, the throttle valve is automatically set to proper opening for starting (approximately 6) by the connecting linkage.

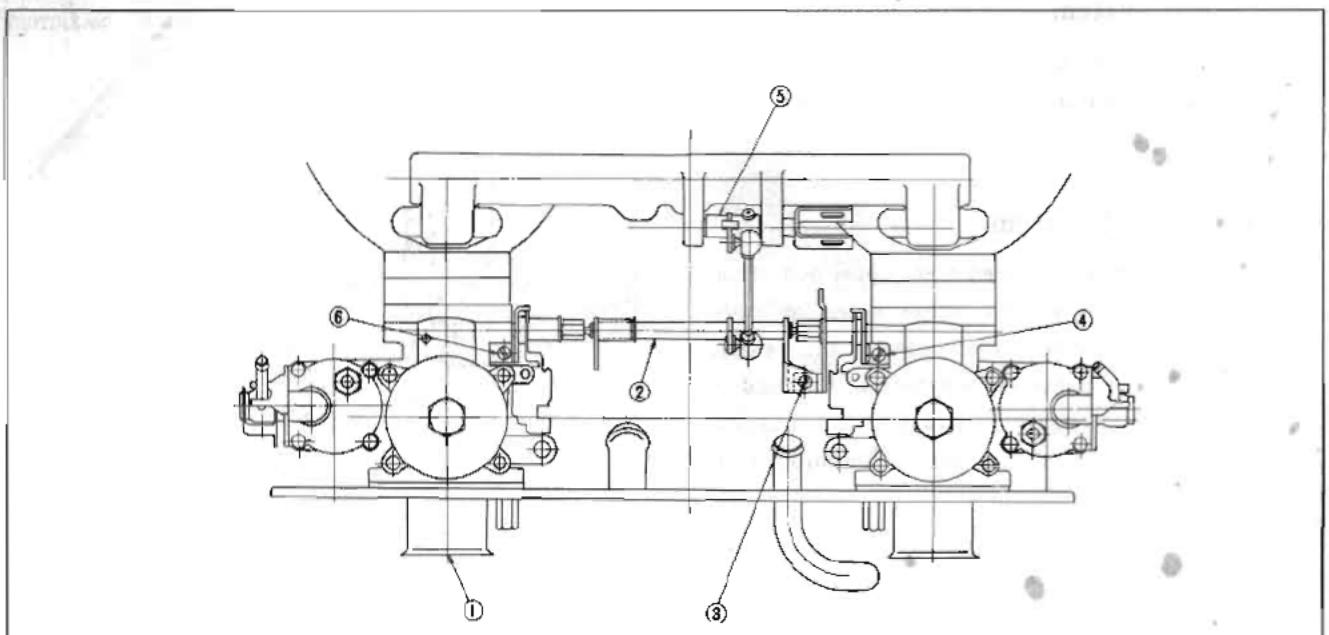
CONTROL AND ADJUSTMENT

Idling adjustment

The procedure for idling adjustment is described herein, since proper idling adjustment of these two carburetors is extremely important in obtaining peak vehicle performance and in effectively reducing fuel consumption.

It should also be noted that improper carburetor adjustment not only has an adverse affect upon idling but also upon acceleration, output, fuel consumption, and other vehicle performance factors.

≪Throttle Valve Shaft Interlock and Throttle valve Full Closing Adjustment≫



1	Air cleaner, air horn	4	Throttle adjusting screw
2	Throttle shaft	5	Auxiliary throttle shaft
3	Balance screw	6	Throttle adjusting screw

Fig. EF-37 Throttle valve synchronization and idling adjustment

Operating procedure	Precautions and confirmation
1. Remove the air cleaner.	a. Warm up the engine prior to adjustment.
2. Loosen both F and R carburetor's throttle adjusting screws. See Figure EF-37.	a. Make sure F and R carburetor are disconnected.
3. Tighten both F and R carburetor's idling adjusting nuts in the upper direction once, and gradually back them off. When turned approximately on two and half turns, the nut will contact with the stopper Return the idling adjusting nut from this position approximately half of a turn. (Refer Figure EF-38)	a. Set both F and R carburetor idling adjusting nuts to their standard positions. Under this conditions, dimension "A" (between jet bridge nozzle head) is approximately 2.2 mm (0.0866 in). Refer to Adjustment of "A" Dimension.
4. Thread F and R carburetor's throttle adjusting screws in a few turns, and start engine.	a. Make sure that the engine is at normal operating temperature.

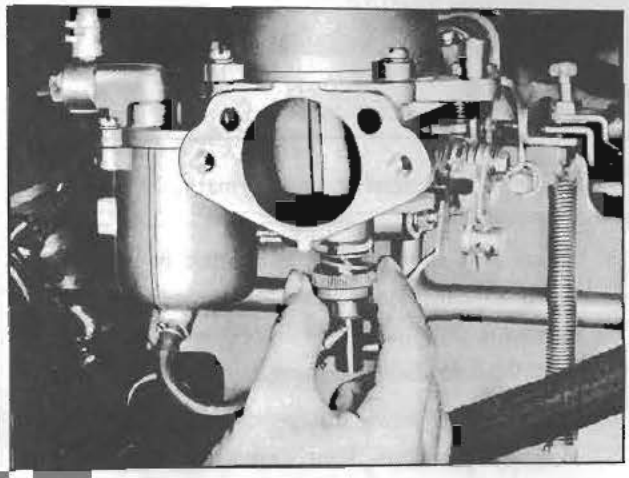


Fig. EF-38 Idle adjust nut

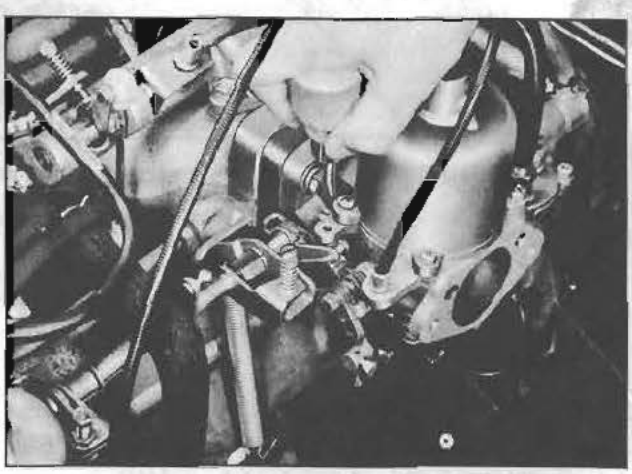


Fig. EF-39 Throttle adjust screw

Operating procedure	Precautions and confirmation
5. Adjust the engine speed to 600 to 700 rpm, turning F and R's throttle adjusting screws.	a. Reduce engine speed to the extent that the engine operates stably.
6. Apply a flow meter to the front carburetor air cleaner flange, turn the air flow adjusting screw, and align the upper end of the float in the glass tube to the scale.	a. Stand the flow meter float vertically.

7. Then apply a flow meter to the rear carburetor air cleaner flange. (Do not move the flow meter air flow adjusting screw.) If the flow meter float is not aligned with the front carburetor sclae, turn the rear carburetor throttle adjusting screw and align the float with the front carburetor scale.	a. Match front and rear throttle valve openings. b. Throttle valve openings are even, and air flow is also uniform when the positions of the floats in the glass tubes of the flow meters stop at the same position for both front and rear carburetors.

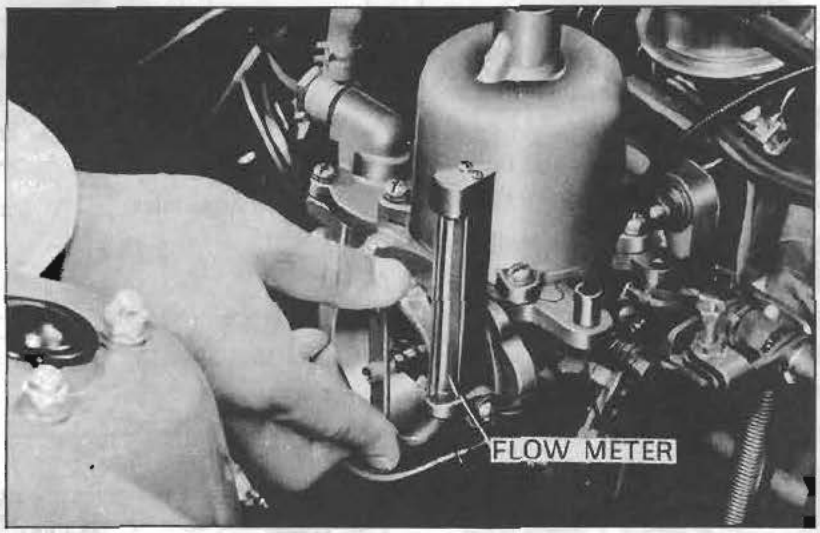
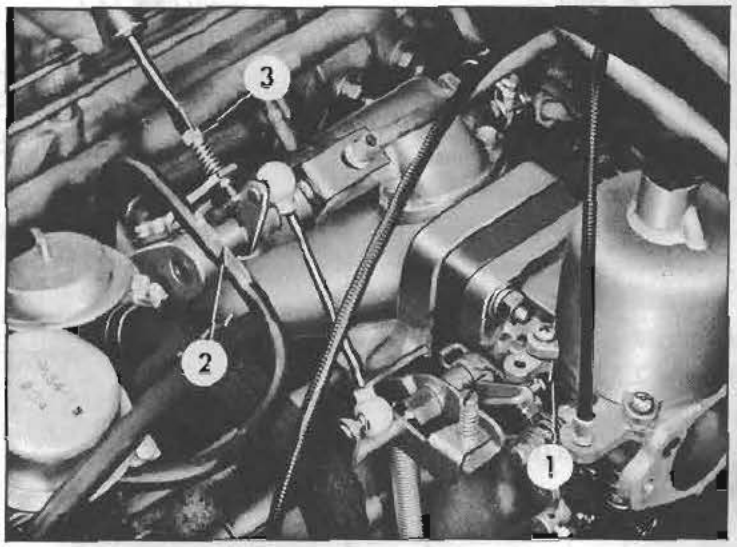


Fig. EF-40 Setting flow meter

Operating procedure	Precautions and confiremation
8. Tighten the front and rear idling adjusting nuts simultaneously by approximately 1/8 turns, and stop at the points where engine speed is fastest and most stable. When the idling adjusting nuts are tightened and the point at which engine speed is fastest and most stable can not be determined, back off (loosen) the idling adjusting nuts to their initial positions, loosen the F and R nuts alternately by 1/8 turns to determine this point, and stop turning the nuts when this point is located.	a. Idling fuel flow volume is reduced by tightening idling adjusting nut (turning it to the right), and is increased by loosening the idling adjusting nut (turning it to the left). b. The idling adjusting nut positions are set at their standard positions. Thus, the idling adjusting nut adjusting range should be less than approximately + 1/2 of a full turn. c. The front and rear idling adjusting nut adjusting positions (number of turns by which both nuts are backed off) must be the same.
9. Back off (loosen) the front and rear throttle adjusting screws, and set engine speed to rated speed.	a. Repeat steps 6 and 7 above, and set engine speed to rated speed by adjusting the front and rear carburetors so that the air flow of both front and rear carburetors is the same. Rated idling speed is as follows.

	650 rpm/at 17° BTDC..... ..with manual transmission
10. Thread in the throttle adjusting screw until the screw head contacts the throttle connecting lever.	a. Interlock the front and rear throttle shaft. b. Make sure that idling speed does not change.



1	Carburetor (Rear)
2	Auxiliary shaft
3	Adjust screw (Auxiliary shaft)

Fig. EF-41 Adjust screw-auxiliary shaft

Operating procedure	Precautions and confirmation
11. Move the auxiliary shaft, and rapidly accelerate the engine (race the engine) a few times. Make sure that idling speed does not change.	a. Make sure that interlock adjustment is proper.
12. Turn the auxiliary shaft adjusting screw to increase engine speed from 800 to 1,000 rpm, apply flow meters to both front and rear carburetors, and verify that the flow meter float positions are even. If uneven, readjust the length of connecting rod.	a. Increase engine speed, and insure that the link interlock action operates properly. b. Readjust connecting rod length and match the air flow of the front and rear carburetors.
13. Back off the auxiliary shaft adjusting screw, and decrease engine speed. Apply flow meters to the front and rear carburetors, and re-confirm that the float position are even. If uneven, adjust the front and rear throttle adjusting screws so that engine speed does not change, and equalize the flow meter float positions.	a. Correction of difference between the front and rear interlock links. b. Match the idling air flow of the front and rear carburetors. c. Adjust idling speed.

14. Stop the engine, and install the air cleaner and duct.	

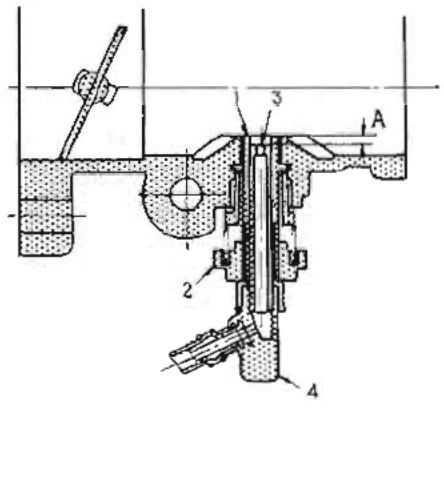
2. Adjustment of "A" dimension

When the number of turns by which the idling adjusting nut has been backed off (loosened) cannot be accurately determined with the carburetors installed on the engine, adjust as follows. (See Figure EF-42.)

(1) Loosen the suction chamber access screw, and disconnect the suction chamber and suction piston. Proceed carefully so that the nozzle and jet needle are not damaged or bent.

(2) Turn the idling adjusting nut, measure dimension "A" (between the jet bridge and nozzle head with slide calipers) and adjust the nozzle position so that dimension "A" is approximately 2.2 mm (0.0866 in). The pitch of the idling adjusting nut thread is 1 mm (0.0394 in). Thus, the nozzle moves 1 mm (0.0394 in) by turning this screw one full turn.

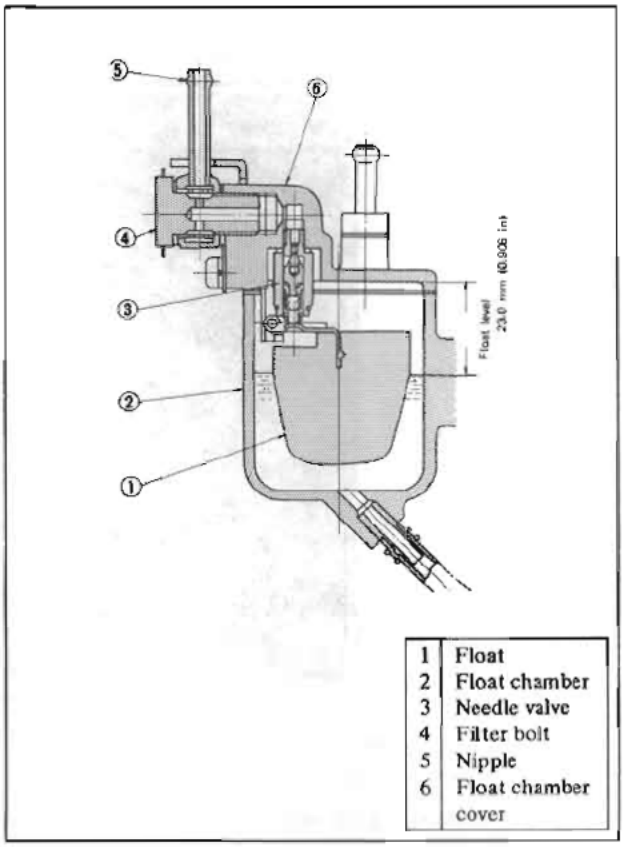
(3) Reinstall the suction chamber and suction piston, and make sure that the suction piston operates smoothly.



1	Jet bridge	3	Nozzle
2	Idle adjust nut	4	Nozzle head

Fig. EF-42 Adjustment of "A" dimension

Adjustment of float level



1	Float
2	Float chamber
3	Needle valve
4	Filter bolt
5	Nipple
6	Float chamber cover

Fig. EF-43 Adjustment of float level

1. Remove the four set screws from the float chamber cover. The float chamber cover and the float lever can then be removed together. Place the cover on a work bench (with the float lever attached to the cover) with the float lever side up.

2. Lift up the float lever with the tip of your finger and then slowly lower the float lever. Stop lowering the float lever at the position at which the float lever seat just contacts the valve stem.

3. The float level is correct if dimension "H" in Figure EF-43 is 14 to 15 mm (0.5512 to 0.5906 in) under the foregoing conditions. If the dimension is not correct, adjust by bending float lever.

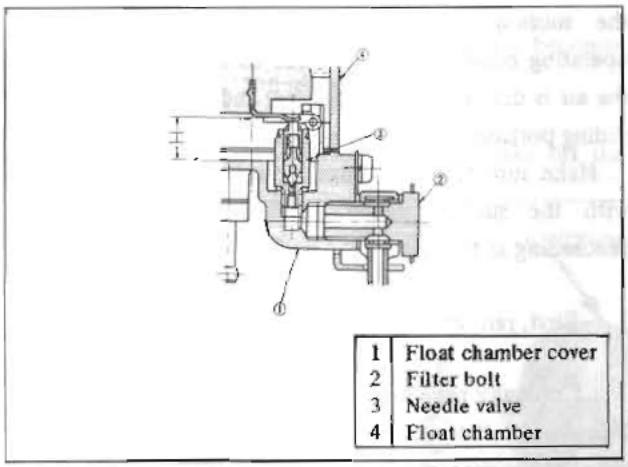


Fig. EF-44 Adjustment of float level

Adjustment of starting interlock valve opening

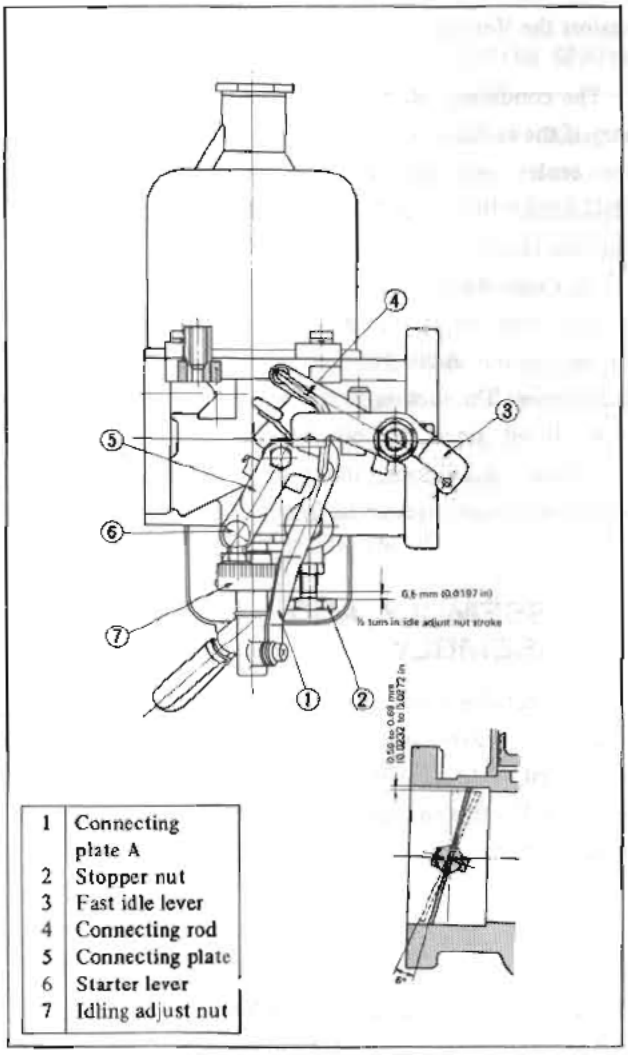


Fig. EF-45 Adjustment of starting interlock opening

For the adjustment of starting interlock opening, bend the connecting rod as shown in Figure EF-45 with an appropriate tool such as radio pinchers to change its length.

The interlock opening is increased by increasing the length of the connecting rod and is reduced when the rod is shortened. The interlock opening is correct, if clearance between the throttle valve and throttle chamber (dimension B) is 0.59 to 0.69 mm (0.0232 to 0.0271 in) when the starter lever is pulled all the way out. To measure dimensions B, move the throttle lever to full-closing, and make sure that there is no play in the first idling lever and adjusting lever interlocked unit.

Checking the damper oil

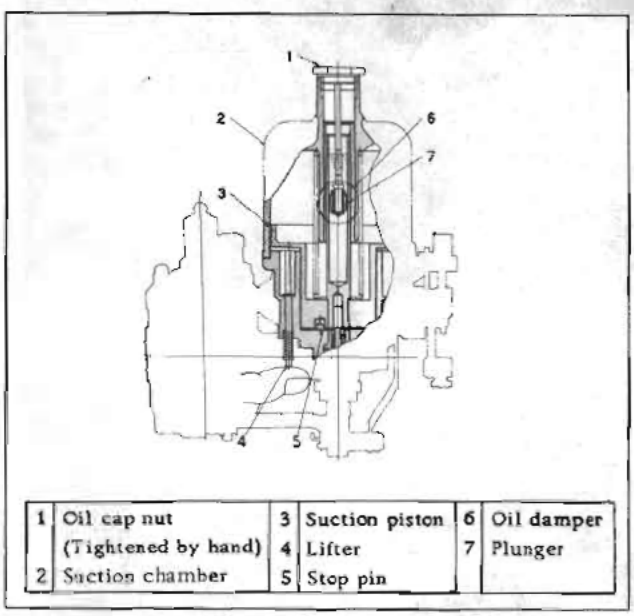


Fig. EF-46 Inspection of suction piston

When there is not a sufficient amount of damper oil, acceleration and other operating performance features become sluggish. When new carburetors are installed on the engine, or when overhaul is performed, damper oil must be added without fail. Use Mobile oil SAE #20 for damper oil. Do not use SAE #30 or higher weight oils.

Periodic inspection may vary depending upon driving conditions. However, the damper oil should be checked approximately every 5,000 km (3,000 miles) of driving (or approximately every 3 months).

To check damper oil level, remove the oil cap nut as shown in Figure EF-47 and check the oil level marking on the two grooves on the plunger rod. No difficulty will be

encountered and there is no danger until the oil level reaches the lower line. If the oil level drops below the lower line, add oil. Total oil volume is approximately 3 cc (0.18 cu in). Squirt oil into the damper little by little so that the oil level completely reaches the upper line.

When removing and replacing oil cap nut, be careful not to bend the rod. If the oil cap nut is loose, it may fall off. Be sure that it is sufficiently tightened by hand.

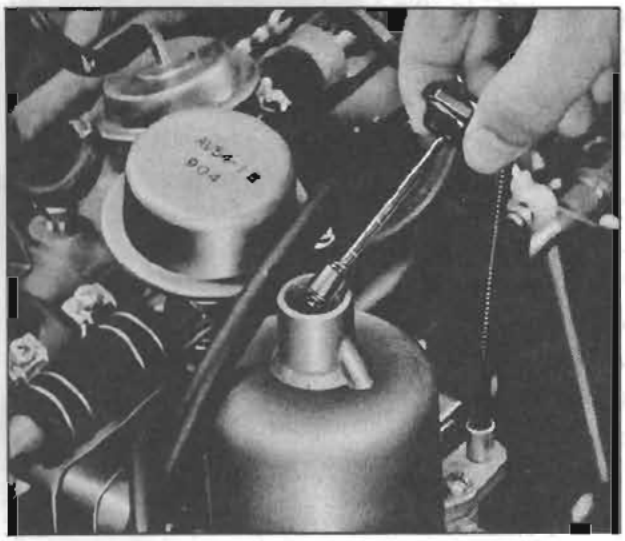


Fig. EF-47 Check damper oil

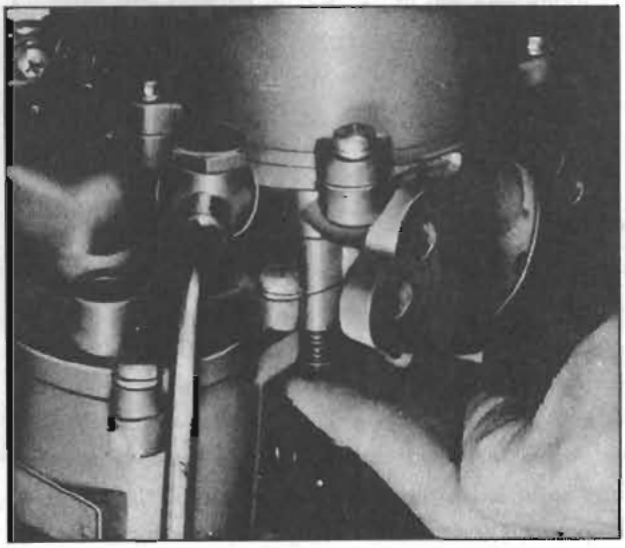


Fig. EF-48 Inspection of suction piston

Periodic inspection of suction chamber and suction piston

Periodic inspection is required to constantly maintain the suction chamber and suction piston in porper operating condition. This is due to the fact that dust in the air is drawn into the chamber and accumulates on the sliding portion of the suction piston.

Make sure that the suction piston operates smoothly with the suction piston installed on the engine by proceeding as follows:

1. First, remove the oil cap nut.

2. Gradually raise lifter with your finger. The lifter head will contact the suction piston when the lifter has been raised approximately 1.5 mm (0.0591 in). Raise the lifter further. The suction piston will then be raised approximately 8 mm (0.3150 in).

3. Release your finger from the lifter. The suction piston will drop, and the sound of the suction running against the Venturi will be heard.

The conditions of the piston and chamber are satisfactory if the suction piston rises smoothly. The condition of the center ring described in the following paragraph "DISASSEMBLY AND REASSEMBLY" can also be checked in this manner.

To check the bend of the plunger rod, remove the air cleaner, raise the suction piston with your finger tip with the oil cap nut applied to the assembly, and let the piston drop freely. The suction piston will offer strong resistance when lifted since the oil damper is actuated. Under satisfactory conditions, the piston will drop smoothly when your finger is removed from the suction piston.

DISASSEMBLY AND REASSEMBLY

The float chamber of this carburetor is almost identical to those in conventional carburetors. However, the carburetor must be disassembled and reassembled very carefully since the Venturi and fuel system are made of special high precision parts.

Disassembly and reassembly of suction piston and suction chamber

Disassemble and clean at least semi-annually. For

disassembly and cleaning, or if the carburetor becomes defective, disassemble and reassemble as follows:

1. Remove the four set screws and then take off the suction chamber.

2. Then remove the suction spring,nylon packing and suction piston from the suction chamber.

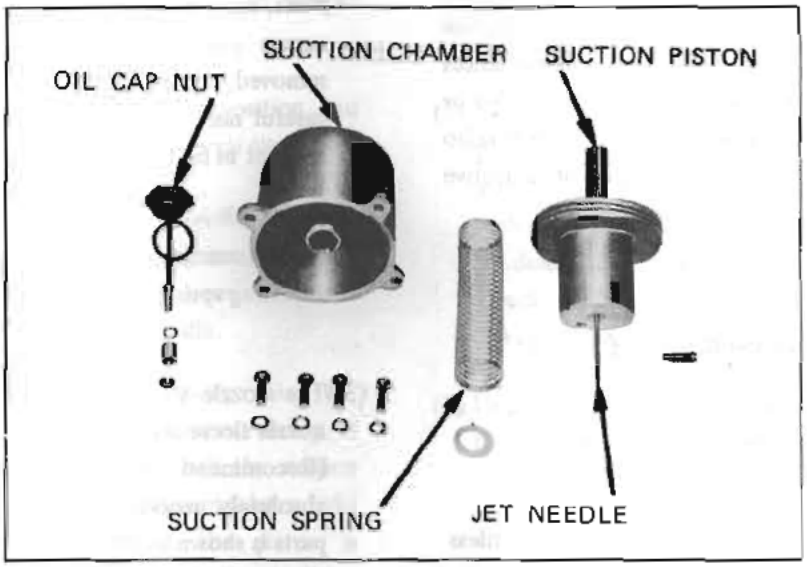


Fig. EF-49 Disassembly of suction chamber and suction piston

3. To remove these components, place the suction chamber and suction piston on a flat work bench so that the inside of the suction chamber and the sliding part of the suction piston are not damaged. Be extremely careful not to bend the jet needle on the lower part of the suction piston. (See figure EF-50.)

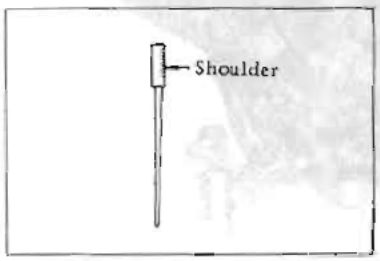


Fig. EF-50 Jet needle

4. Do not remove the jet needle from the suction piston unless absolutely necessary. When it must be removed, first loosen the jet needle set screw. To accomplish this, hold the jet needle within 2 mm (0.0787 in) from the shoulder with a pair of pliers so as not to damage the needle and remove the needle by pulling and turning slowly so as not to bend the needle.

5. Idling and other operating performance features will be adversely affected if the jet needle is not installed correctly in the suction piston. Set the jet needle in the suction piston so that the shoulder portion is flush with the bottom of the suction piston. Apply an appropriate tool having a horizontal (flat) surface such as slide calipers to the lower end, as shown in Figure EF-51, so that the shoulder of the jet needle contacts this surface, and tighten the jet needle set screw. The jet needle will then be installed correctly.

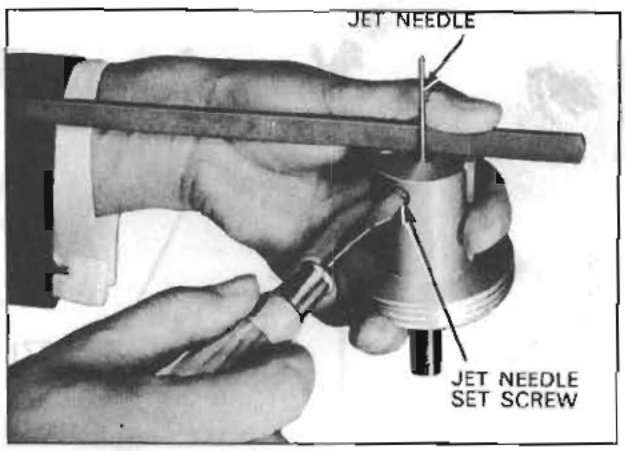


Fig. EF-51 Installing the jet needle

6. Wash the suction chamber and suction piston with clean gasoline, and dry with compressed air, so as to remove all dust, oil, etc. from the piston and chamber.

7. Then apply a few drops of light oil to the suction piston rod, and reassemble. Under no circumstances should oil be applied to the inside the suction chamber or to in Figure EF-45 with an appropriate tool such as radio pinchers to change its length. improper or defective operation.

Disassembly and reassembly of the nozzle

1. Disassembly

The nozzle can be easily removed. However, unless absolutely necessary do not disassemble the nozzle since reassembly of the nozzle sleeve, washer, and nozzle sleeve set screw is extremely difficult.

(1) First, remove the 4 mm (0.1575 in) diameter screw, and then remove the connecting plate from the nozzle head. This can be done easily by pulling lightly on the starter lever.
Next, loosen the clip, and remove the fuel line. The nozzle can then be removed. When the nozzle is removed, the jet needle will remain inside. Thus, be careful not to damage either the jet needle or nozzle and not to bend the jet needle.

(2) Next, remove the idling adjusting nut and idling adjusting spring.

(3) The nozzle sleeve can be removed by removing the nozzle sleeve set screw.
(Recommend this not be disassembled unless absolutely necessary.) Exploded view of disassembled parts is shown in Figure EF-52.
The nozzle jet is the heart of the carburetor, and is a high precision component. To clean the nozzle, use gasoline and dry with compressed air.

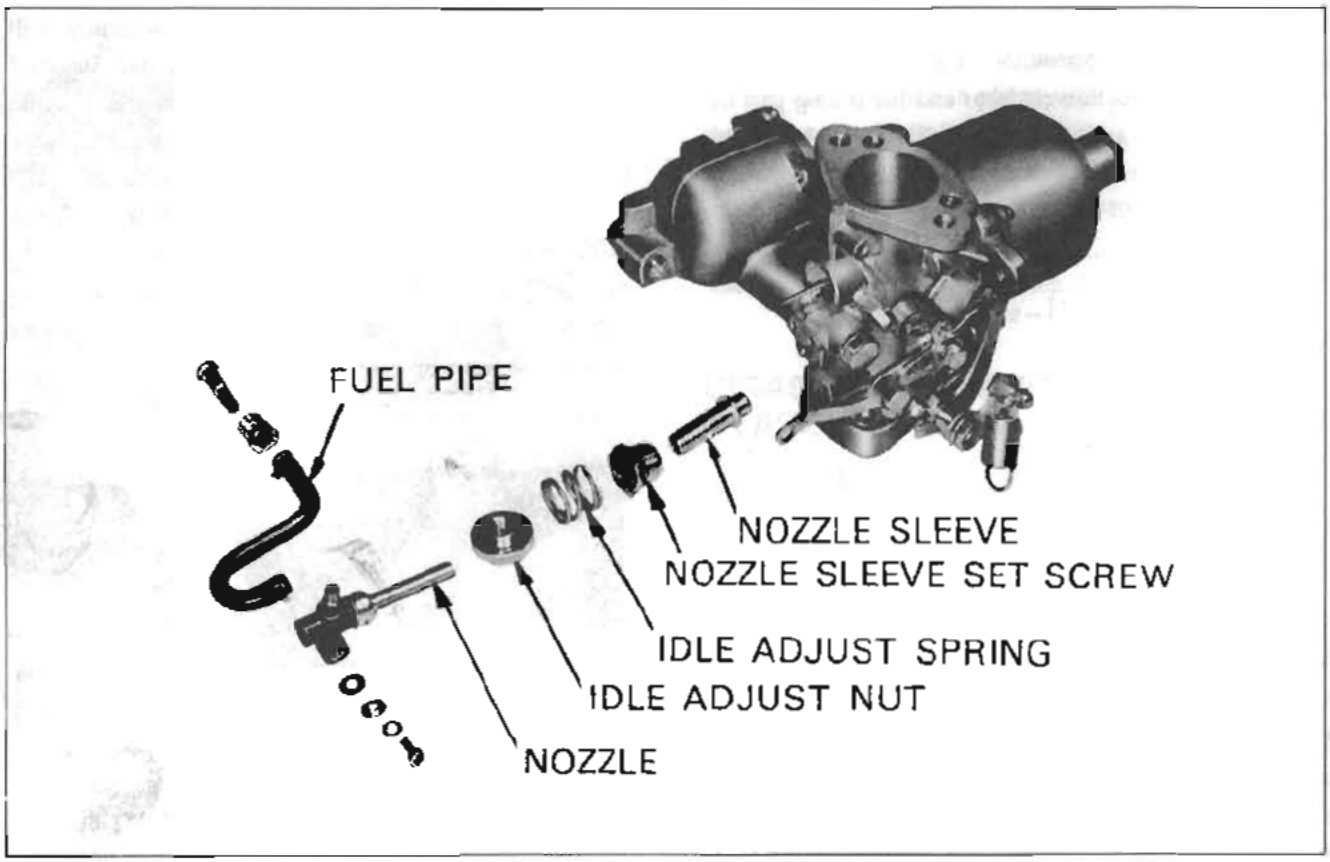


Fig. EF-52 Disassembly of nozzle

2. Assembly

(1) For centering the piston and suction chamber, remove the oil cap nut with the parts properly assembled (jet needle and suction piston assembled), without damper oil applied.

(2) Set the suction piston to its fully closed position, and insert the nozzle until it contacts the nozzle sleeve.

(3) When the nozzle jet contacts the jet needle, move the nozzle sleeve slightly so that it is at right angles to the center axis, and position the nozzle sleeve so that the nozzle jet does not contact the jet needle.

(4) Under the conditions described above, raise the suction piston with your finger, and lower it slowly. If the suction piston drops smoothly until the suction piston stop pin drops on the Venturi making a light striking sound, the condition of the piston is satisfactory. Securely tighten the nozzle sleeve at this position with the nozzle sleeve set screw.

(5) Remove the nozzle, install the idling adjusting spring and the idling adjusting nut on the nozzle sleeve, and re-apply the nozzle. Connect the fuel line leading to the float chamber to the nozzle nipple, and tighten the clip fully.
Tighten the fuel line at the position at which the enlarged part of the nipple holds and the fuel line is not twisted.

(6) Next, pull the starter lever lightly, hold connecting plate (A) with sleeve (C) and the 4 mm (0.1575 in) diameter washer, and tighten it on the nozzle head with the 4 mm (0.1575 in) diameter screw.
In doing this, move the starter lever slightly, and attach the sleeve (C) firmly to the connecting plate (A) opening.

(7) Upon completion of the reassembly, reconfirm that the suction piston drops smoothly.

Disassembly of the float chamber

Disassemble the float chamber in the sequence previously described under "Adjustment of the float level".

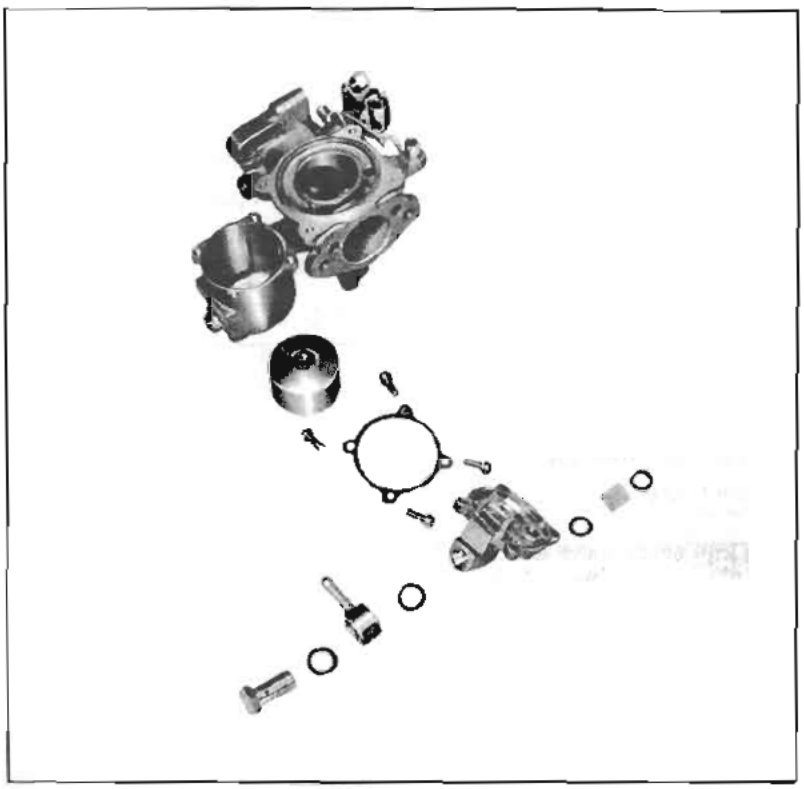


Fig. EF-53 Disassembly of float chamber

Disassembly of the link and related components

In disassembling and reassembling the interlock link and related components, be careful not to bend or deform any of the components.

Reassemble so that all interlock links operate smoothly.

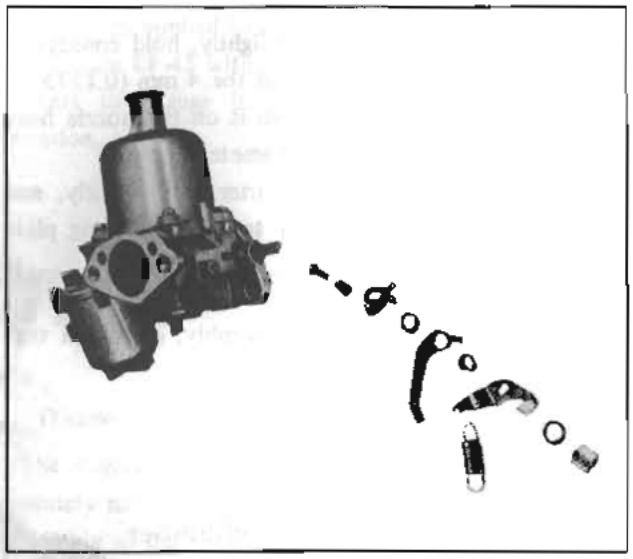


Fig. EF-53 Disassembly of throttle lever

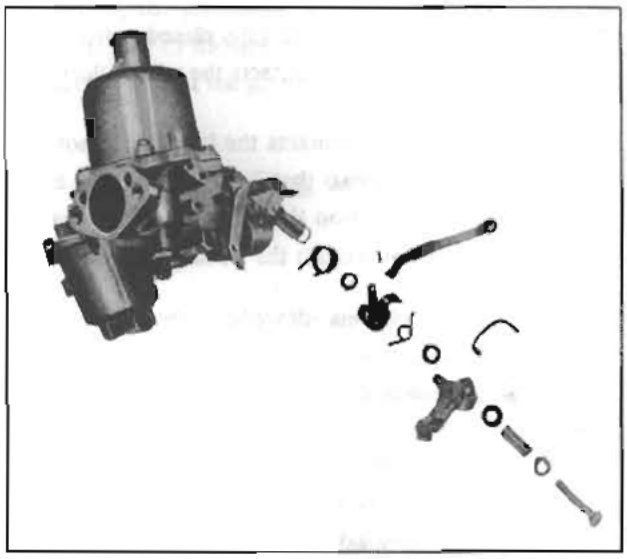


Fig EF-54 Disassembly of starter lever

TROUBLE DIAGNOSES AND CORRECTIONS

The causes of trouble and appropriate corrective actions are shown on Table to permit immediate repair of the carburetor in the event carburetor trouble develops.

Improper engine operation can be attributed to many different causes. Although the carburetor may be normal, if the electrical system is defective, the cause of trouble sometimes may seem to be in the carburetor. If the engine does not operate satisfactorily, first check the electrical system before attempting to adjust the carburetor.

Trobules	Possible causes	Corrective action
Overflow	Leakage from the float or damaged or bent float	Repair or replace
	Dirty needle valve seat	Clean the valve seat.
	Loose needle valve	Retighten.
	Defective needle valve seat	Refit or replace.
	Excessive fuel pump pressure	Adjust.
	Fuel pump drawing in air	Repair the pump.

Excessive fuel consumption	Overflow	Refer to the above.
	Faulty suction piston operation	Repair or replace.
	Defective nozzle return.	Readjust.
	Worn jet needle	Replace.
	Worn nozzle jet	Replace.
	Improper idling adjustment	Readjust.
	Jet needle not properly installed	Readjust.
	Improper throttle valve interlock adjustment	Readjust.
Insufficient output	Throttle valve does not open fully	Readjust.
	Faulty suction piston operation	Repair or replace.
	Faulty nozzle return	Readjust.
	Clogged nozzle or fuel line	Clean.
	Jet needle not properly installed	Readjust.
	Clogged needle valve	Clean
	Defective fuel pump	Readjust.
Improper idling	Faulty suction piston operation	Repair or replace.
	Faulty nozzle return	Readjust.
	Worn jet needle	Replace.
	Improper idling adjusting nut adjustment	Readjust.
	Worn throttle valve shaft	Replace.
	Air leakage due to defective packing between manifold and carburetor	Replace the gasket.
	Improper throttle valve interlock adjustment	Readjust.
	Loose throttle lever interlock link	Readjust or repair.
Engine operation is irregular or erratic	Defective suction piston	Repair or replace.
	Insufficient damper oil, or improper oil used	Replenish or replace.
	Improper idling adjustment	Readjust.
	Jet needle not properly installed	Readjust.

Engine does not start.	Overflow	Refer to the above.
	No fuel fed to the engine	Check the pump, the fuel line, and needle valve.
	Improper idling adjustment	Readjust.
	Defective suction piston	Repair or replace.
Faulty suction piston operation	Sticking due to dirt and other foreign matter	Clean.
	Sticking due to deformation (bulging or caving) of suction chamber or suction piston	Repair or replace.
	Nozzle not properly centered	Correct.
	Bent jet needle	Replace.
	Bent plunger rod.	Correct.

SPECIFICATIONS AND SERVICE DATA

Specifications

Applied engine (car model)	L24 (S30)
Make and type	HITACHI HJG46W-3A
Construction	Side-draft, SU type
Bore	46 mm (1.811 in)
Weight	3.1 kg (6.834 lb)

Service data

Venturi	34 mm (1.339 in)
Float level	23 .0 mm (0.906 in)
Fuel pressure	0.24 kg-cm^2 (3.414 lb/sq in)
Needle valve dia.	2.0 mm (0.0787 in)
Nozzle	A
Jet needle	N-27
Suction spring	#23

SERVICE JOURNAL OR BULLETIN REFERENCE

DATE	JOURNAL or BULLETIN No.	PAGE No.	SUBJECT

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