SERVICE MANUAL

MODEL
L14, L16 & L18 SERIES
ENGINES

NISSAN

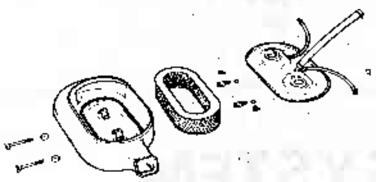
NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

SECTION EF

FUEL SYSTEM

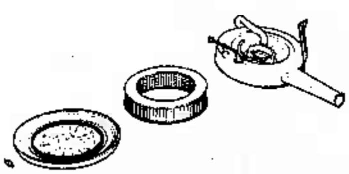
EF

AIR CLEANER



EF001

Fig. EF-1 Air cleaner for twin carburetor



EF002

Fig. EF-2 Air cleaner for single carburetor

DESCRIPTION

The air cleaner element is of a viscous paper type. It does not require any cleaning service between renewals. This element should be replaced every 40,000 km (24,000 miles) under normal conditions. In areas where dust conditions are severe, it is necessary to replace it more often than under normal conditions.

Caution: Never attempt to clean this element with a brush or air blast.

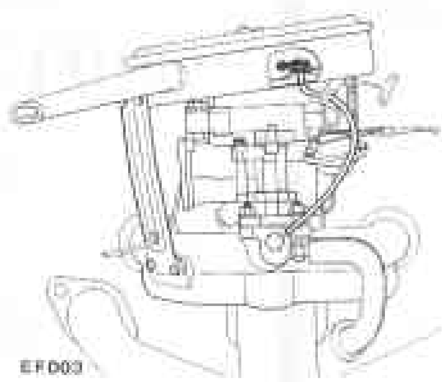
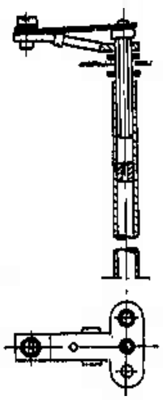


Fig. EF-3 Piping of idle compensator



EF004

Fig. EF-4 Schematic of idle compensator

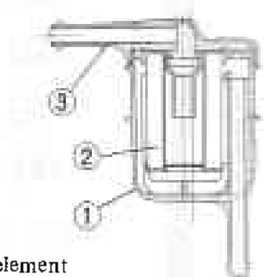
The air cleaner used on the single carburetor is equipped with an idle compensator. This compensator is essentially a thermostatic valve and controls the excessive enriching of the mixture as a result of high idle temperatures. When the under-the-hood temperatures are high, the bimetal located in the air cleaner is heated by intake hot air and lifts the valve to open. This permits additional fresh air into the intake manifold and compensates for the increased richness of the air-fuel mixture in order to maintain smooth idle engine operation.

The idle compensator thermostatic valve partially opens at 55°C and (131°F) fully opens at 65°C (149°F). Never attempt to disassemble this unit since it is sealed for tightness and properly adjusted for valve timing.

FUEL STRAINER

DESCRIPTION

The fuel strainer is of a cartridge type. It uses fiber mat as strainer element which can be checked for condition from the outside. This strainer should be replaced every 20,000 km (12,000 miles) under normal conditions.



1 Body
2 Paper element
3 Cover

EF005

Fig. EF-5 Sectional view of cartridge type fuel strainer

REMOVAL

Disconnect inlet and outlet fuel lines from fuel strainer, and remove fuel strainer.

Note: Before disconnecting fuel lines, use a container to receive the remaining fuel in lines.

FUEL PUMP

CONTENTS

DESCRIPTION

The fuel pump transfers fuel from the tank to the carburetor in sufficient quantity to meet the engine requirements at any speed or load.

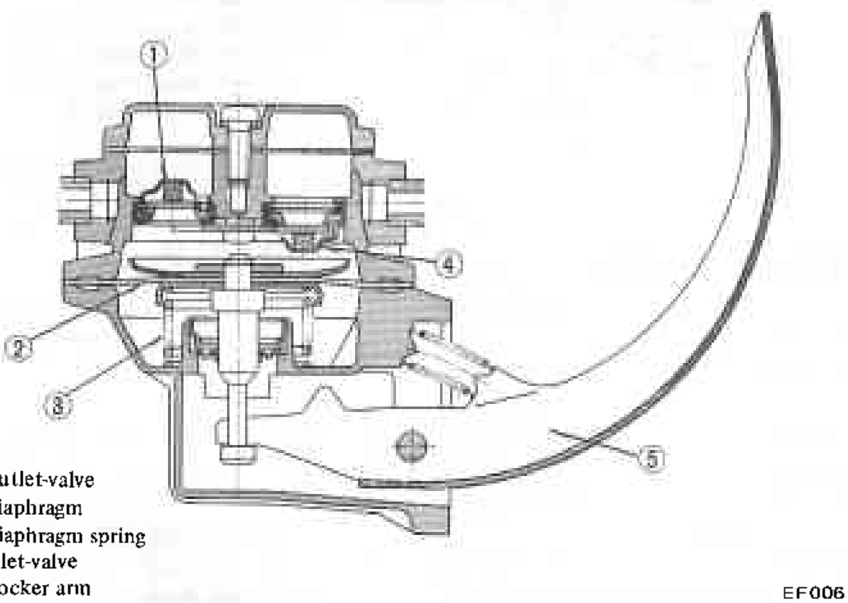
The fuel pump is of a pulsating type designed for easy maintenance. It consists of a body, rocker arm assembly, fuel diaphragm, fuel diaphragm spring, seal inlet- and outlet-valve. Figure EF-6 shows a cross-sectional view of the pump.

The fuel diaphragm consists of specially treated rubber, which is not affected by gasoline and held in place by two metal discs and a pull rod.

This type of fuel pump is used in the L14, L16 and L18 engines.

FUEL PUMP TESTING

A fuel pump is operating properly when its pressure is within specifications and its capacity is equal to the engine's requirements at all speeds. Pressure and capacity must be determined by two tests, while the pump is still mounted on the engine. Be sure there is fuel in the tank when carrying out the tests.



1 Outlet-valve
2 Diaphragm
3 Diaphragm spring
4 Inlet-valve
5 Rocker arm

Fig. EF-6 Schematic view of fuel pump

Static pressure test

The static pressure test should be conducted as follows:

1. Disconnect fuel line between carburetor and fuel pump.
2. Connect a rubber hose to each open end of a T-connector, and connect this connector-hose assembly between carburetor and fuel pump.

Note: Locate this T-connector as close to carburetor as possible.

3. Connect a suitable pressure gauge to the opening of T-connector, and fasten the hose between carburetor and T-connector with a clip securely.
4. Start and run the engine at varying speeds.
5. The pressure gauge indicates static fuel pressure in the line. The gauge reading should be within the following range.

   0.18 to 0.24 kg/cm^2
   (2.56 to 3.41 lb/in^2)

Note: If the fuel in the carburetor float chamber has run out and engine has stopped, remove clip and pour fuel into carburetor. Fasten clip securely and repeat static pressure test.

Pressure below the lower limit indicates extreme wear on one part or a small amount of wear on each working part. It also indicates ruptured diaphragm; worn, warped, dirty or gumming valves and seats, or a weak diaphragm return spring. Pressure above the upper limit indicates an excessively strong tension of diaphragm return spring or a diaphragm that is too tight. Both of these conditions require the removal of pump assembly for replacement or repair.

Capacity test

The capacity test is conducted only when static pressure is within the specification. To conduct this test, proceed as follows:

1. Disconnect pressure gauge from T-connector and, in its vacant place, install a suitable container as a fuel sump.
2. Start engine and run at 1,000 rpm.
3. The pump should deliver 1,000 cc (2.11 U.S. pts.) of fuel in one minute or less.

If little or no fuel flows from the open end of pipe, it is an indication that fuel line is clogged or pump is malfunctioning.

REMOVAL AND DISASSEMBLY

Remove fuel pump assembly by unscrewing two mounting nuts and disassemble in the following order.

1. Separate upper body and lower body by unscrewing body set screws.
2. Take off cap and cap gasket by removing cap screws.
3. Unscrew elbow and connector.
4. Take off valve retainer by unscrewing two valve retainer screws and two valves are easily removed.
5. To remove diaphragm, press down its center against spring force. With diaphragm pressed down, tilt it until the end of pull rod touches the inner wall of body. Then, release the diaphragm to unhook push rod. Use care during this operation not to damage diaphragm or oil seal.

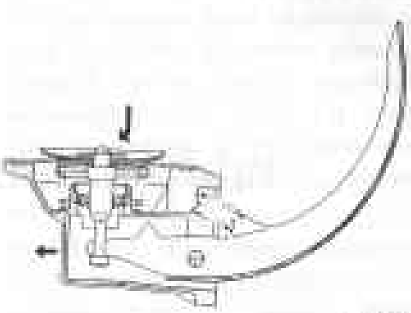
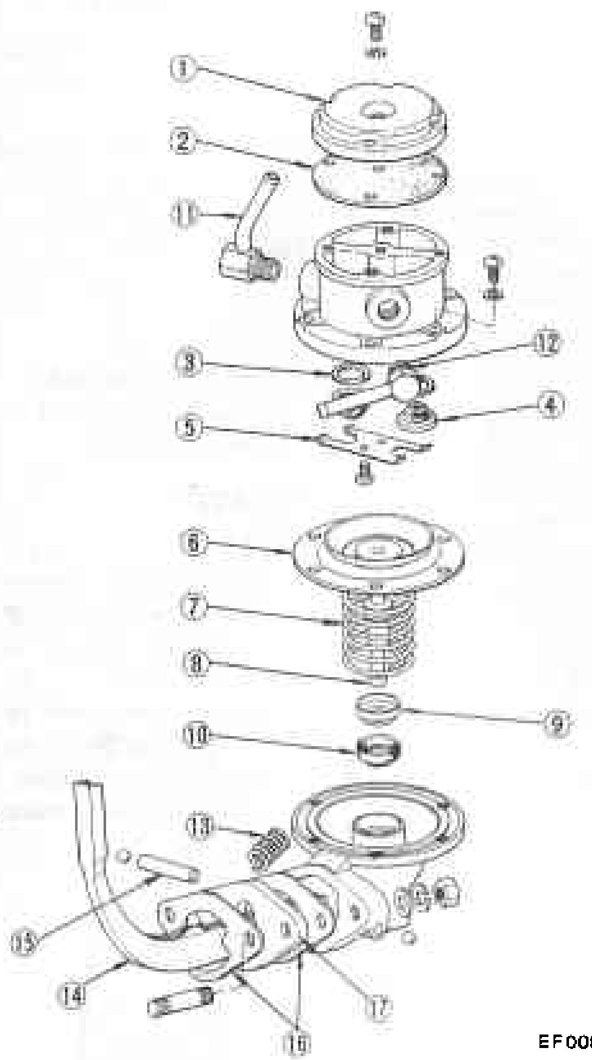


Fig. EF-7 Removing pull rod

6. Drive out rocker arm pin by using a press or hammer.



1 Fuel pump cap
2 Cap gasket
3 Valve packing Ass'y
4 Fuel pump valve Ass'y
5 Valve retainer
6 Diaphragm Ass'y
7 Diaphragm spring
8 Pull rod
9 Lower body seal washer
10 Lower body seal
11 Inlet connector
12 Outlet connector
13 Rocker arm spring
14 Rocker arm
15 Rocker arm side pin
16 Fuel pump packing
17 Spacer-fuel pump to cylinder block

Fig. EF-8 Structure of fuel pump

INSPECTION

1. Check upper body and lower body for cracks.
2. Check valve assembly for wear on valve and valve spring. Blow valve assembly with breath to examine its function.
3. Check diaphragm for small holes, cracks or wear.
4. Check rocker arm for wear at the portion in contact with camshaft.
5. Check rocker arm pin for wear. A worn pin may cause oil leakage.
6. Check all other components for any abnormalities and replace with new parts if necessary.

ASSEMBLY

Reverse the order of disassembly. Closely observe the following instructions.

1. Use new gaskets.
2. Lubricate rocker arm, rocker arm link and rocker arm pin before installation.
3. To test the function, proceed as follows:

Position fuel pump assembly about 1 meter (3.3 ft) above fuel level of fuel strainer and connect a pipe from strainer to fuel pump.

Operate rocker arm by hand. If fuel is drawn up soon after rocker arm is released, fuel pump is functioning properly.

TWO-BARREL CARBURETOR

CONTENTS

DESCRIPTION

Carburetor type	Applied engine
213304-361	L18 with manual transmission
213304-421	L18 with automatic transmission
213282-331	L16 with manual transmission
213282-341	L16 with automatic transmission
213282-221	L14 with manual transmission

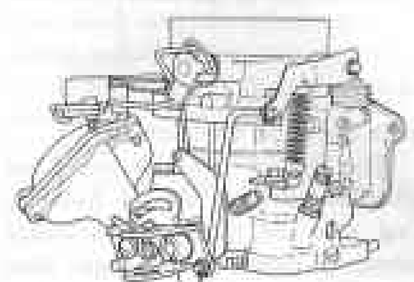


Fig. EF-9 External view for manual transmission

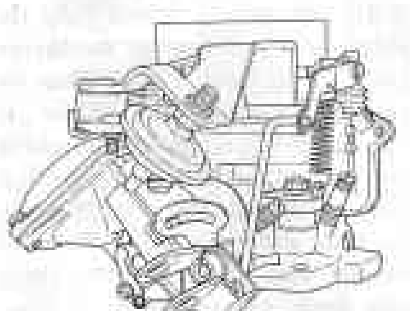


Fig. EF-10 External view for automatic transmission

As almost all the mechanism of these carburetors are quite similar, the general explanation applies with all except for some variations.

These are downdraft type and are designed to increase power and fuel economy.

These carburetors present several distinct features of importance to the vehicle owners.

A summary of features is as follows:

1. Secondary throttle valve is operated by the diaphragm which is actuated by the vacuum so that the higher power and better acceleration are achieved as compared with the mechanical throttle valve type.
2. The power valve mechanism, so-called vacuum piston type, affords high speed performance.
3. Accelerating pump gives excellent acceleration.
4. The carburetor for automatic transmission is equipped with so-called dash pot; that is, it makes smooth deceleration without engine stall at any operating condition.

These carburetors are almost similar in appearance as explained above except the dash pot for the automatic transmission models.

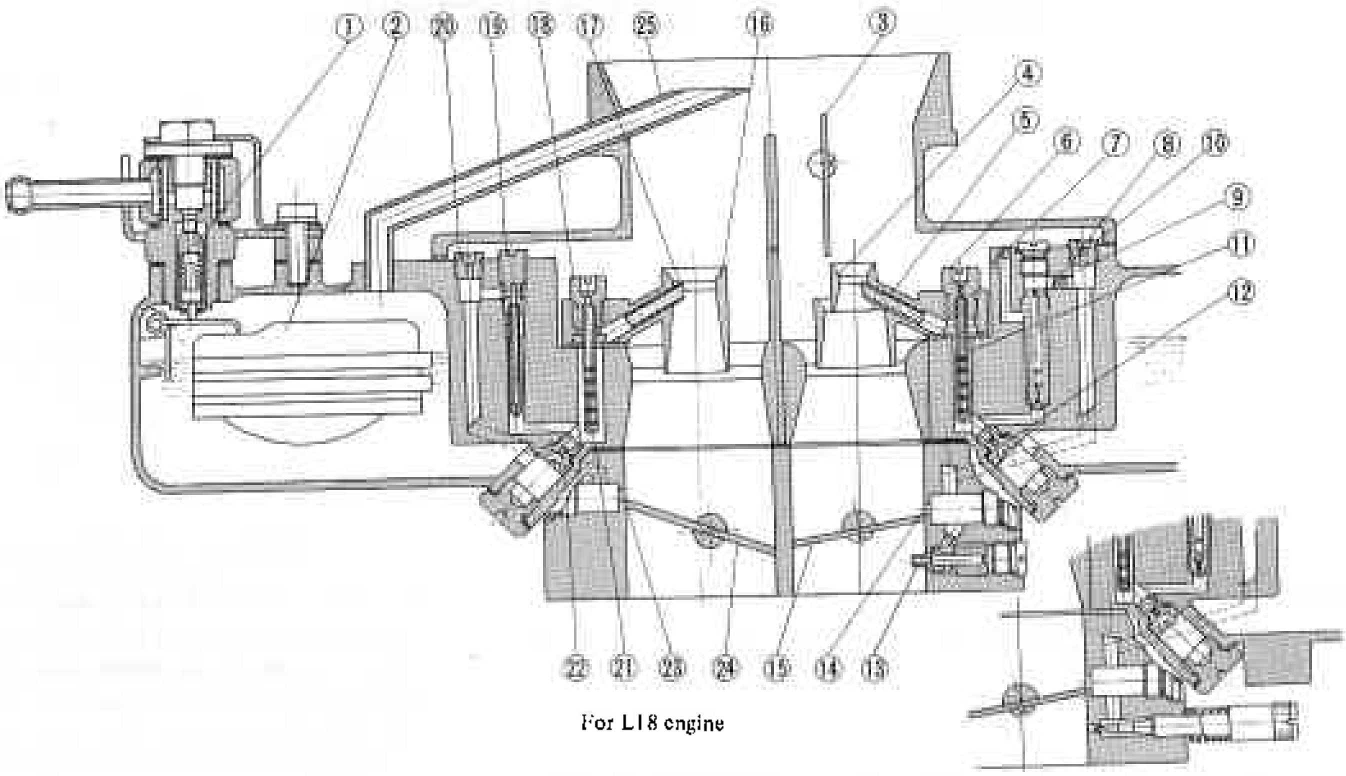
The differences in performance are explained in the following specifications table.

STRUCTURE AND OPERATION

These carburetors consist of the primary system for normal running and the secondary system for full load running.

The float system which is commonly used by primary and secondary systems, the secondary switchover mechanism, the starting mechanism, accelerating mechanism, etc. are also attached.

On these carburetors, both primary and secondary main systems adopt zenith stromburg type nozzle.



For L18 engine

For L16 engine

1 Float valve
2 Float
3 Choke valve
4 P. Small venturi
5 P. Main nozzle
6 P. Main air bleed
7 1st slow air bleed
8 Slow jet
9 Slow economizer jet
10 2nd slow air bleed
11 P. Emulsion tube
12 P. Main jet
13 Idle nozzle
14 Bypass hole
15 P. Throttle valve
16 S. Small venturi
17 S. Main nozzle
18 S. Main air bleed
19 Step jet
20 Step air bleed
21 S. Emulsion tube
22 S. Main jet
23 Step hole
24 S. Throttle valve
25 Air vent pipe

EF011

Fig. EF-11 Sectional view of two-barrel carburetor

Primary system

1. Primary main system

The primary main system is of zenith stromburg type. Fuel flows as shown in Figure EF-11 through the main jet, mixing with air which comes in from the main air bleed and passes through the emulsion tube, and is pulled out into the venturi through the main nozzle.

2. Idling and slow system

During low engine speed, as shown in Figure EF-11, fuel flows through the slow jet located in rear left side of main jet, mixing with air coming from the 1st slow air bleed, and passes through the slow economizer jet, again mixing with air coming from the 2nd slow air bleed and then is pulled out into the engine through the idle hole and bypass hole.

Adoption of the submerged type of slow jet eliminates such hesitation as occurs on sudden deceleration of the vehicle.

Slow economizer system is useful to obtain smooth deceleration at high speed. Models 213304-361 and -421 are equipped with the idle nozzle as shown in Figure EF-11. Through this nozzle, idling mixture is further atomized by air stream below throttle valve and ensures the stable idling.

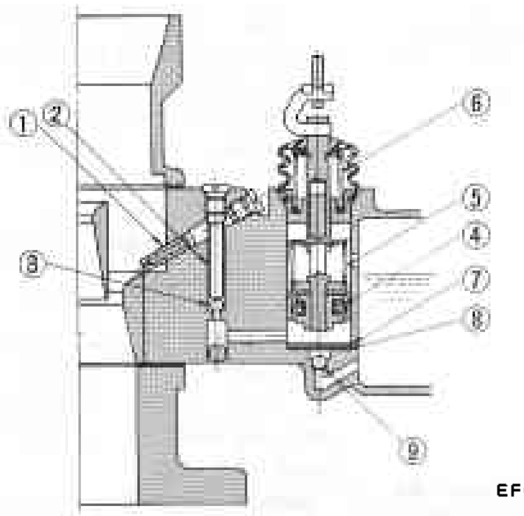
Small opening of the throttle valve in idling or partial load creates a large negative pressure in the intake manifold.

By this negatic pressure, fuel is measured through the slow jet located behind the main jet. And air coming from the 1st slow air bleed is mixed with fuel in the emulsion hole.

This mixture is further mixed and atomized with air coming from the 2nd slow air bleed. The atomized mixture is supplied to the engine from the idle hole and bypass hole via the slow system passage.

3. Accelerating mechanism

The carburetor is equipped with the piston type accelerating mechanism linked to the throttle valve. When the primary throttle valve, shown in Figure EF-12, is closed, the piston goes up, and fuel flows from the float chamber through the inlet valve into the space under the piston. When the throttle valve is opened, the piston goes down, opening the outlet valve, and fuel is forced out through the injector.



1 Pump injector
2 Weight
3 Outlet valve
4 Piston
5 Damper spring
6 Piston return spring
7 Clip
8 Strainer
9 Inlet valve

EF012

Fig. EF-12 Acceleration mechanism

4. Starting mechanism

Pull the choke button to close the choke valve fully, then start the engine. This provides a rich mixture, making it possible to start the engine quickly. When the engine is started, the choke valve is opened at an adequate angle automatically, which prevents overchoking and ensures a smooth engine performance. While the engine is being warmed up, it increases in speed at steps, and by releasing the choke button an optimum engine speed can be obtained. With the choke valve closed fully, the primary throttle valve is caused to open at an angle best suited for starting through a link mechanism.

5. Power valve mechanism

The power valve mechanism, so-called vacuum piston type, utilizes the vacuum below the throttle valve.

When the throttle valve is slightly opened during light load running, a high vacuum is created in the intake manifold. This vacuum pulls the vacuum piston upward against the spring, leaving the power valve closed. When the vacuum below the throttle valve is lowered during full load or accelerating running, the spring pushes the vacuum piston downward, opening the power valve to furnish fuel.

6. Dash pot device

≪ Provided only for model 213304-421 and 213282-341 carburetor for automatic transmission ≫

These carburetors are equipped with a dash pot interlocked with the primary throttle valve through a link mechanism. The dash pot, which is exclusively installed on vehicles equipped with automatic transmission, is intended to prevent engine stall that would result from quick application of the brake immediately after driving the vehicle, or from the quick release of the accelerator pedal after treading it slightly.

When the primary throttle valve is closed at 11° point from fully closed position, a throttle lever strikes against the dash pot stem and makes the primary throttle valve gradually close, thus keeping the engine running.

Secondary system

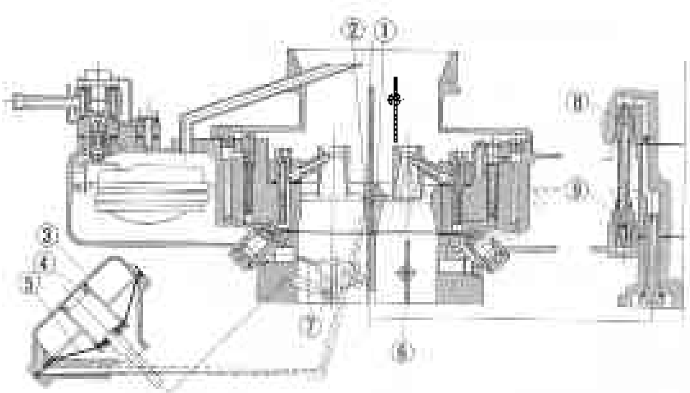
1. Secondary main system

The secondary main system is of zenith stromburg type.

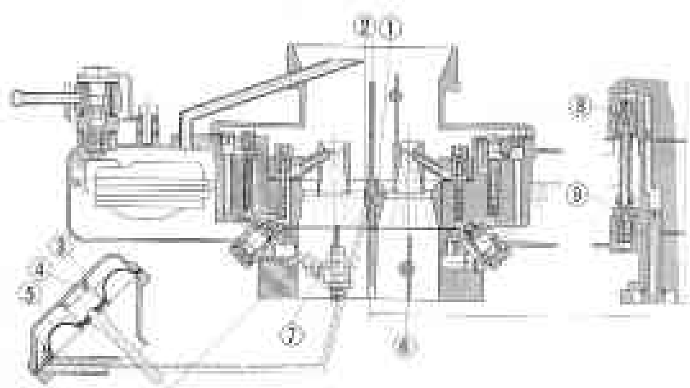
Fuel-air mixture produced by the functions of the main jet, main air bleed and emulsion tube, in the same manner as in the primary system, is pulled out through the main nozzle into the small venturi.

Due to the double venturi of the secondary system, the higher velocity air current passing through the main nozzle promotes the fuel atomization.

The structure is almost the same as the primary side, but emulsion tube and venturi are different. Take care not to assemble improperly.



EF013



EF014

1 P. Vacuum port
2 S. Vacuum port
3 Diaphragm chamber cover
4 Diaphragm spring
5 Diaphragm
6 S. Throttle valve
7 P. Throttle valve
8 Vacuum piston
9 Power jet

Fig. EF-13 Full throttle at low speed

Fig. EF-14 Full throttle at high speed

2. Step system

The construction of this system may correspond to the idling and slow system of the primary system.

This system aims at the proper filling up of the gap when fuel supply is transferred from the primary system to the secondary one. The step port is located near the secondary throttle valve edge in its fully closed state.

3. Secondary - switchover mechanism

The secondary throttle valve is linked to the diaphragm which is actuated by the vacuum created in the venturi. A vacuum jet is provided at each of the primary and secondary venturies, and the composite vacuum of these jets actuates the diaphragm.

As the linkage, shown in Figure EF-13, causes the secondary throttle valve not to open until the primary throttle valve opening reaches approximately 50°, fuel consumption during normal operation is not excessive.

During high speed running, as shown in Figure EF-14, as the vacuum at the venturi is increased, the diaphragm is pulled against the diaphragm spring force, and then secondary throttle valve is opened.

The other side, during low speed running (as the primary throttle valve opening does not reach 50°), the secondary throttle valve is locked to close completely by the locking arm which is interlocked with primary throttle arm by linkage.

When the primary throttle valve opening reaches wider position than 50°, the secondary throttle valve is ready to open, because the locking arm revolves and leaves from the secondary throttle arm.

Float system

There is only one float chamber, while two carburetor systems, primary and secondary, are provided.

Fuel fed from the fuel pump flows through the filter and needle valve into the float chamber. A constant fuel level is maintained by the float and needle valve.

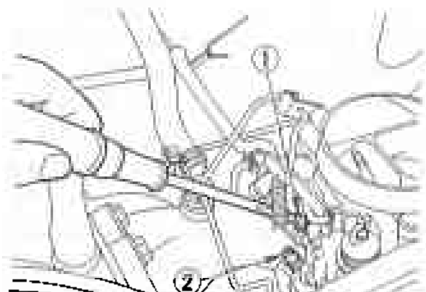
Because of the inner air vent type of the float chamber ventilation, the fuel consumption will not be influenced by some dirt accumulated in the air cleaner.

The needle valve includes special hard steel ball and will not wear for all its considerably long use. Besides, the insertion of a spring will prevent the flooding at rough road running.

ADJUSTMENT

Idling adjustment

Idling adjustment is made by throttle adjust screw and idle adjust screw as shown in Figure EF-15.



1 Throttle adjust screw
2 Idle adjust screw

EF015

Fig. EF-15 Idling adjustment

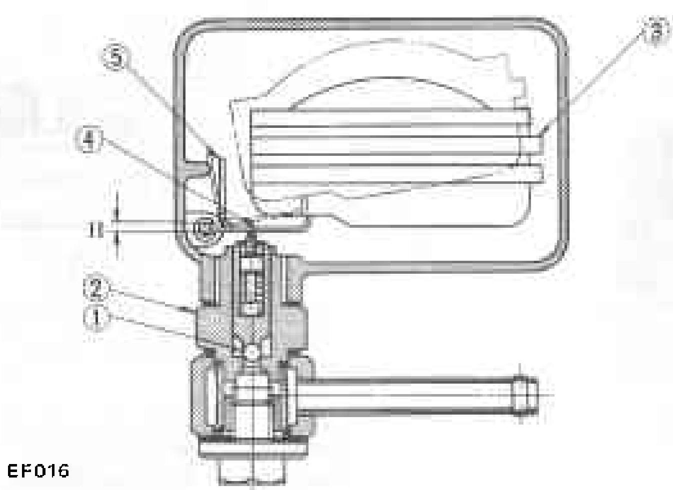
1. Check to be sure that float level is correct while running engine at idle speed.
2. Using a suitable screwdriver, turn out idle adjust screw approximately 2 ¼ (L14 and L16) or 1 ½ (L18) turns, starting from fully closed position. Turn in throttle adjust screw two or three turns and start engine.
3. Turn out throttle adjust screw gently until specified engine idle speed is approximately obtained.
4. Turn in or out idle adjust screw until engine runs smoothly at the highest speed.
5. Turn out throttle adjust screw until specified engine speed is obtained.
6. Readjust idle screw until engine runs smoothly at the highest speed (with highest vacuum reading).
7. Then, readjust throttle screw until specified engine speed is obtained.

Repeat these operations until smooth and specified engine speed has been obtained.

	L14, L16 and L18
Engine vacuum idle speed (rpm)	600 or above
Standard value (at idle speed) mmHg (inHg)	450 (17.72)

Fuel level adjustment

A constant fuel level is maintained by float level and ball valve.



1 Ball valve
2 Valve seat
3 Float
4 Float arm
5 Float stopper

Fig. EF-16 Adjusting fuel level

If the fuel level is in accord with level gauge line, float level is properly set. If float level is not correct, adjust it by bending float seat as shown in Figure EF-17.

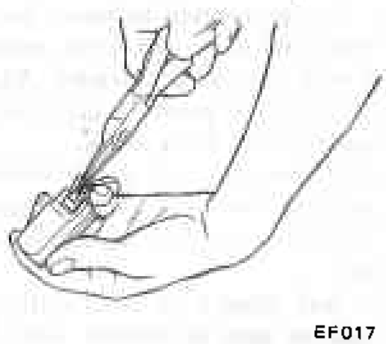


Fig. EF-17 Adjusting float seat

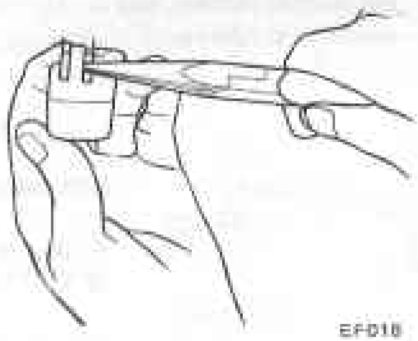


Fig. EF-18 Adjusting float stopper

Approximately *H mm is required for effective stroke of needle valve. So adjust gap between valve stem and float seat to *H mm with float fully lifted up by bending float stopper.

*H: 1.0 mm (0.0394 in)

Adjustment of fast idle opening

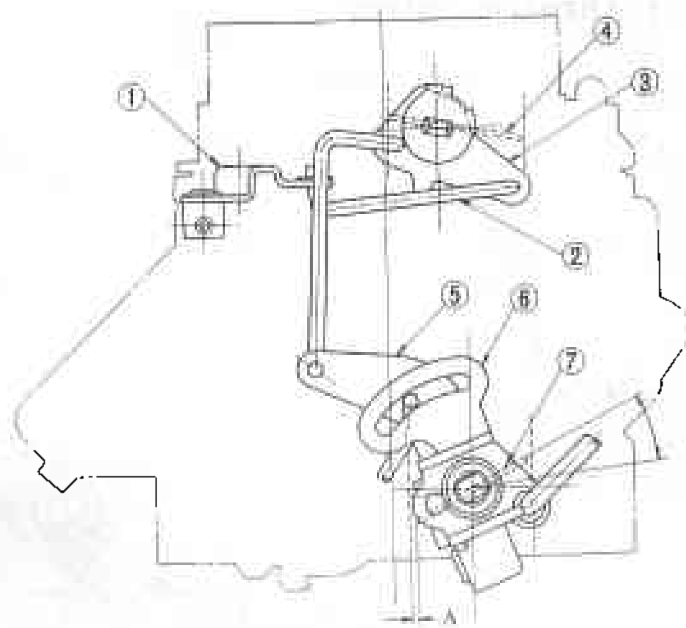


Fig. EF-19 Adjusting fast idle opening

Choke valve at fully closed position automatically opens throttle valve at an optimum angle for starting engine through a link mechanism.

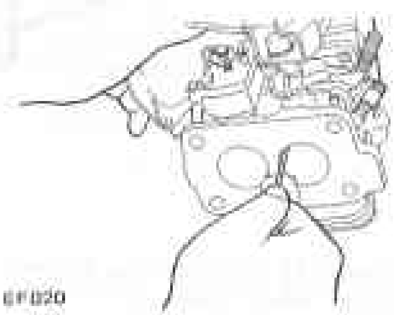
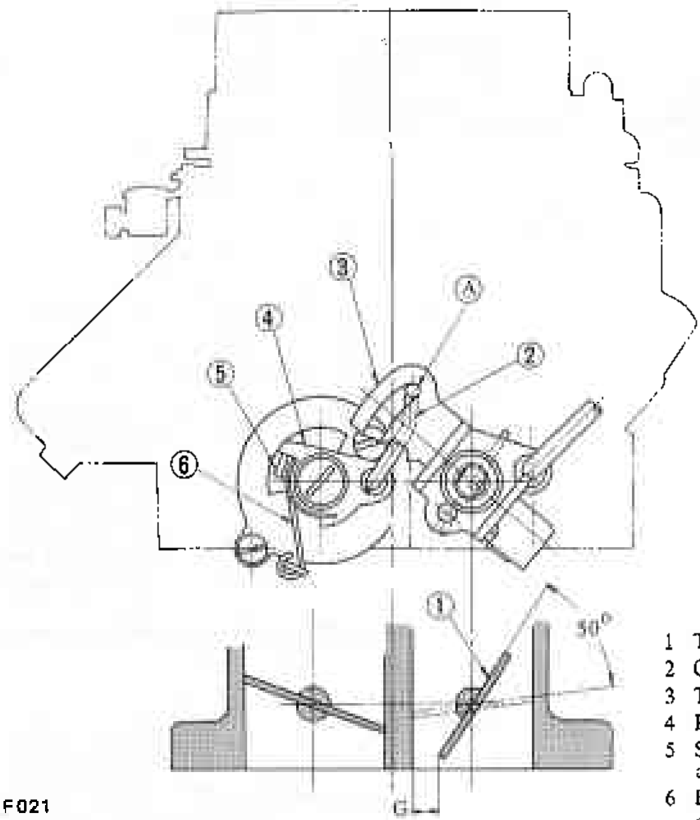


Fig. EF-20 Measuring fast idle opening

After reassembly, or in a check on interlock opening angle, bend choke connecting rod for adjustment so that a fully closed choke valve will bring clearance A shown in Figure EF-19.

Carburetor type	Approximate fast idle opening	Dimension "A" mm (in)
213304-361 213304-421	18°	1.55 (0.0610)
213282-331 213282-341	19°	1.3 (0.0512)
213282-221	20°	1.4 (0.0563)

Adjustment of interlock opening of primary and secondary throttle valves



EF021

Fig. EF-21 Adjusting interlock opening

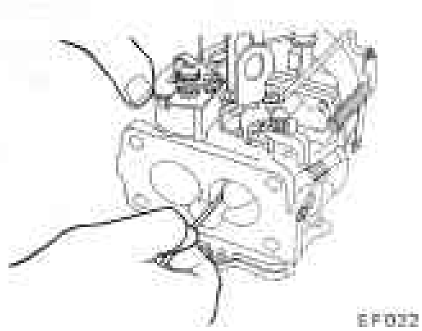
Figure EF-21 shows that primary throttle valve opens 50°. When primary throttle valve opens 50°, connecting link is contacted with right hand end of a groove on primary throttle arm Ⓐ.

When throttle valve further opens, locking arm is detached from secondary throttle arm, permitting the start of secondary system actuation.

Linkage between primary and secondary throttles will operate properly if distance G between throttle valve and inner wall of throttle chamber, amounts to specifications as shown below:

Model	G Dimension
213304-361 } 213304-421 }	6.3 mm (0.2480 in)
213282-331 } 213282-341 }	7.4 mm (0.2913 in)
213282-221	6.3 mm (0.2480 in)

Adjustment is made by bending connecting link.



EF022

Fig. EF-22 Measuring interlock opening

Adjustment of dash pot

≪ Provided only for Model 213304-421, 213282-341 carburetors for automatic transmission ≫

Proper contact between throttle lever and dash pot stem provides normal dash pot performance. Adjustment of the proper contact can be made by dash pot set screw.

If normal set can not be obtained between dash pot stem and throttle arm, rotate dash pot to the right and left.

And adjust it so that throttle arm touches stem at throttle valve 11° opening.

Clearance **B** between throttle valve and throttle chamber wall at this time should be as follows:

Model	B Dimension
213304-421	0.780 mm (0.0307 in)
213282-341	0.586 mm (0.0231 in)

Then fasten loosened lock nut.

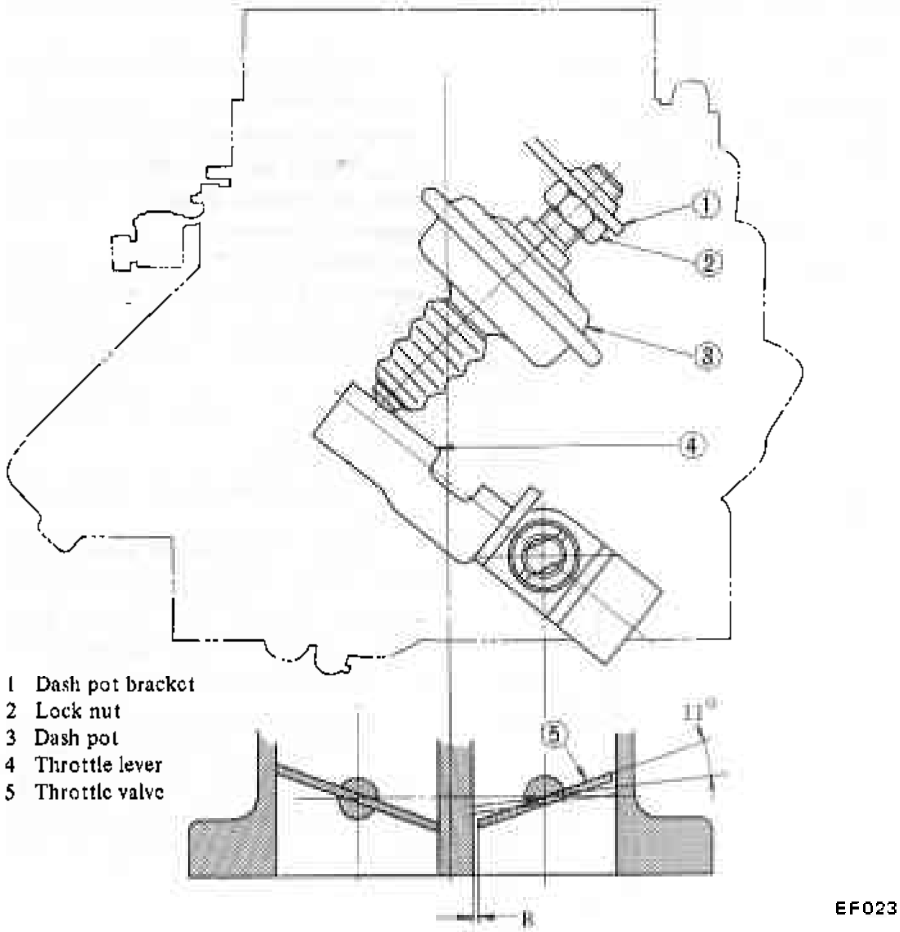


Fig. EF-23 Measuring dash pot operating clearance

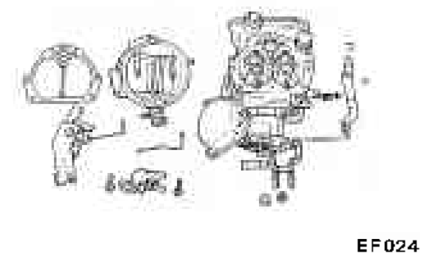


Fig. EF-24 Removing choke chamber

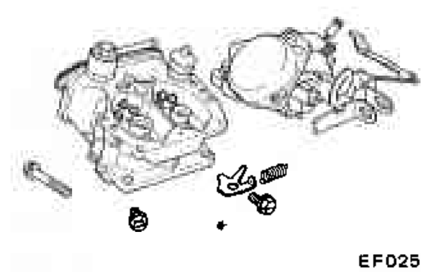


Fig. EF-25 Removing throttle chamber

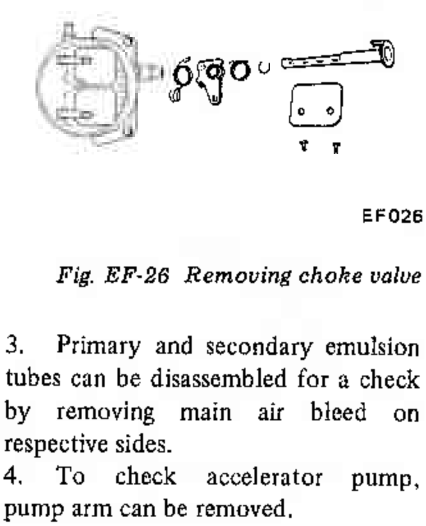


Fig. EF-26 Removing choke valve

MAJOR SERVICE OPERATION

The perfect carburetor delivers the proper fuel and air ratios for all speeds of the particular engine for which it was designed. By completely disassembling at regular intervals, which will allow cleaning of all parts and passages, the carburetor can be returned to its original condition and it will then deliver the proper ratios as it did when new.

To maintain the accurate carburetion of passages and discharge holes, extreme care must be taken in cleaning.

Use only carburetor solvent and compressed air to clean all passages and discharge holes. Never use wire or other pointed instrument to clean as calibration of carburetor will be affected.

Removal

1. Remove air cleaner.
2. Disconnect fuel line, vacuum line and choke wire from carburetor.
3. Remove throttle lever.
4. Remove four nuts and washers retaining carburetor to manifold.
5. Lift carburetor off manifold.
6. Remove and discard the gasket used between carburetor and manifold. Replace it, if necessary.

Disassembly

1. Main jets and slow jets on both primary and secondary sides are accessible from outside carburetor for disassembly.
2. Choke chamber can be detached by removing connecting rod, pump connecting rod, return spring, stop pin and three set screws that hold it.
3. Primary and secondary emulsion tubes can be disassembled for a check by removing main air bleed on respective sides.
4. To check accelerator pump, pump arm can be removed.

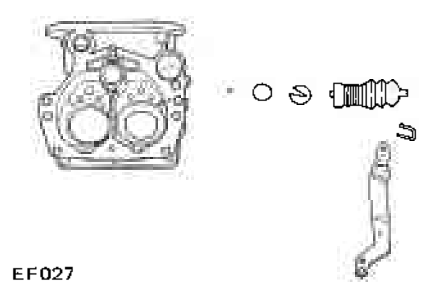
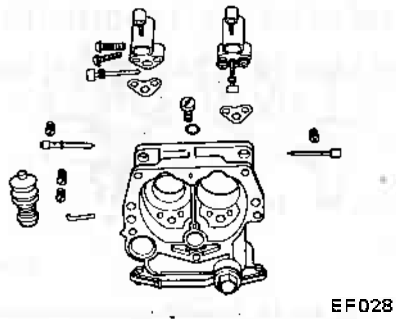


Fig. EF-27 Removing accelerator pump



EF028

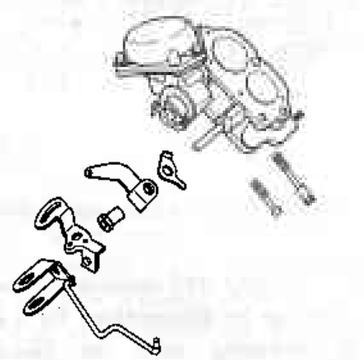
Fig. EF-28 Removing emulsion tubes

5. Throttle chamber can be detached from float chamber by removing rod linking diaphragm with the secondary throttle valve, and loosening three set screws that hold it.

It is preferable to leave throttle valve intact unless otherwise required.

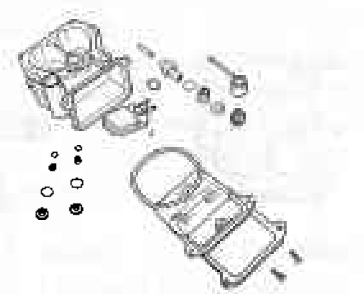
If throttle valve must be disassembled to remedy a defect, secondary throttle valve must be installed to be gap free.

Otherwise, stable idling and slow speed performance will not be obtained.



EF029

Fig. EF-29 Removing throttle valve



EF030

Fig. EF-30 Disassembling float chamber

6. To check float, float chamber cover can be removed as instructed in a separate paragraph.

7. Diaphragm can be disassembled by removing three set screws that hold diaphragm chamber and other three set screws that hold diaphragm chamber cover. In reassembling it, take care so that edge of diaphragm will not be turned up.

EF031

Fig. EF-31 Disassembling diaphragm

8. In disassembling and reassembling interlocking links, take care so that each linkage has a smooth action, and that it is not fitted in any forced position.

Cleaning and inspection

Dirt, gum, water or carbon contamination in or on exterior moving parts of a carburetor are often responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection while servicing.

1. Blow all passages and castings with compressed air and blow off all parts until dry.

Note: Do not pass drills or wires through calibrated jets or passages as this may enlarge orifice and seriously affect carburetor calibration.

2. Check all parts for wear. If wear is noted, defective parts must be replaced. Note especially the following:

(1) Check float needle and seat for wear. If wear is noted, assembly must be replaced.

(2) Check throttle and choke shaft bores in throttle chamber and choke chamber for wear or out-of-roundness.

(3) Inspect idle adjusting needle for burrs or ridges. Such a condition requires replacement.

3. Inspect gaskets to see if they appear hard or brittle or if edges are torn or distorted. If any such condition is noted, they must be replaced.

4. Check filter screen for dirt or lint. Clean, and if it is distorted or remains plugged, replace.

5. Check linkage for operating condition.

6. Inspect operation of accelerating pump. Pour fuel into float chamber and make throttle lever operate. And check condition of fuel injection from the accelerating nozzle.

7. Push connecting rod of diaphragm chamber and block passage of vacuum by finger. And when connecting rod becomes free, check for leakage of air and damage of diaphragm.

Assembly and installation

Follow disassembly and removal procedures in reverse.

Replace gaskets, if necessary.

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

Careful reassembly will restore smooth operation of all interlock parts.

JETS

The carburetor performance depends on jets and air bleeds. That is why these components must be fabricated with utmost care. To clean them, use cleaning solvent and blow air on them. Larger inner numbers stamped on the jets indicate larger diameters. Accordingly, main and slow jets with larger numbers provide richer mixture, and the smaller numbers the leaner mixture. Inversely, the main and slow air bleeds, which are for air to pass through, make the fuel leaner if they bear larger numbers, and the smaller numbers the richer fuel.

Replacement of designated jets to meet the service condition of the vehicle must be carried out keeping in mind the above directions. To cite a practical example, when it becomes necessary to economize fuel at a limited sacrifice of output to meet frequent light-load operation, use smaller main jets or slow jets, or larger main air bleeds or slow air bleeds than regularly specified. This should meet the purpose. Inversely, when increase in output is desired at the limited sacrifice of fuel consumption, use larger main jets or slow jets, or smaller main air bleeds or slow air bleeds, and that should bring a satisfactory result.

Carburetor secondary jets such as secondary main jet, secondary main air bleed, step jet and step air bleed could be distinguished by their white color painting from jets or air bleed of primary system.

TROUBLE DIAGNOSES AND CORRECTIONS

In the following table, the symptoms and causes of carburetor troubles and remedies for them are listed to facilitate quick repairs.

There are various causes of engine troubles. It sometimes happens that the carburetor which has no defect seems apparently to have some troubles, when electric system is defective. Therefore, whenever the engine has troubles, electric system must be checked first before taking to carburetor adjustment.

Condition	Probable cause	Corrective action
Overflow	Dirt accumulated on needle valve.	Clean needle valve.
	Fuel pump pressure too high.	Repair pump.
	Needle valve seat improper.	Lap or replace.
Excessive fuel consumption	Fuel overflow.	See above item.
	Each main jet, slow jet too large.	Replace.
	Each main air bleed clogged.	Clean.
	Choke valve does not fully open.	Adjust.
	Outlet valve seat of accelerator pump improper.	Lap.
	Linked opening of secondary throttle valve too early.	Adjust.
Power shortage	Each main jet clogged.	Clean.
	Each throttle valve does not fully open.	Adjust.
	Idling adjustment incorrect.	Repair.
	Fuel strainer clogged.	Clean.
	Vacuum jet clogged.	Clean.
	Air cleaner clogged.	Clean.
	Diaphragm damaged.	Replace.
	Power valve operated improperly.	Adjust.
Improper idling	Slow jet clogged.	Clean.
	Each throttle valve does not close.	Adjust.
	Secondary throttle valve operated improperly.	Overhaul and clean.
	Each throttle valve shaft worn.	Replace.
	Packing between manifold/carburetor defective.	Replace packing.

FUEL SYSTEM

Condition	Probable cause	Corrective action
Improper idling	Manifold/carburetor tightening improper.	Correct tightening.
	Fuel overflow.	See the first item.
Engine hesitation	Main jet or slow jet clogged.	Clean.
	By pass hole, idle passage clogged.	Clean tube.
	Emulsion tube clogged.	Clean.
	Idling ajdustment incorrect.	Correct adjustment.
	Secondary throttle valve operated improperly.	Overhaul and clean.
Engine does not start.	Fuel overflows.	See the first item.
	No fuel.	Check pump, fuel pipe and needle valve.
	Idling adjustment incorrect.	Adjust.
	Fast idle adjustment incorrect.	Adjust.

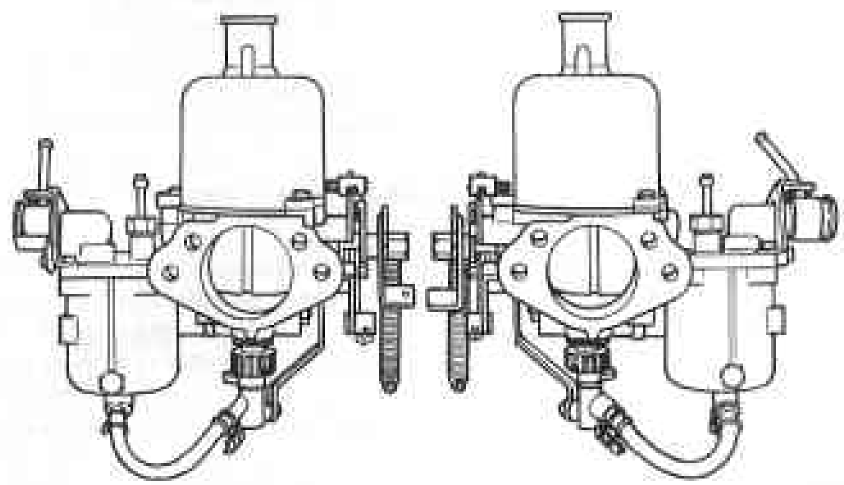
SPECIFICATIONS AND SERVICE DATA

		213304-361 213304-421		213282-331 213282-341		213282-221	
Applied engine		L18		L16		L14	
		Primary	Secondary	Primary	Secondary	Primary	Secondary
Outlet dia.	mm (in)	30 (1.1811)	34 (1.3386)	28 (1.1024)	32 (1.2598)	28 (1.1024)	32 (1.2598)
Venturi dia.	mm (in)	23 x 14 x 7 (0.9055 x 0.5512 x 0.2756)	30 x 10 (1.1811 x 0.3937)	22 x 7 (0.8661 x 0.2756)	29 x 10 (1.1417 x 0.3937)	21 x 7 (0.8268 x 0.2756)	28 x 10 (1.1024 x 0.3937)
Main jet		#102	#170	#102	#165	#96	#165
Main air bleed		#60	#60	#60	#60	#60	#60
1st slow air bleed	mm (in)	1.0 (0.0394)		1.0 (0.0394)		1.0 (0.0394)	
2nd slow air bleed	mm (in)	#210	#100	#180	#100	#220	#100
Slow economizer	mm (in)	1.6 (0.0630)		1.6 (0.0630)		1.6 (0.0630)	
Power jet		#55		#45		#50	
Float level	mm (in)	22 (0.8661)		22 (0.8661)		22 (0.8661)	
Fuel pressure	kg/cm^2 (lb/sq in)	0.24 (3.414)		0.24 (3.414)		0.24 (3.414)	
Main nozzle	mm (in)	2.3 (0.0906)	2.8 (0.1102)	2.3 (0.0906)	2.5 (0.0984)	2.2 (0.0866)	2.5 (0.0984)

SU TYPE TWIN CARBURETOR

CONTENTS

DESCRIPTION



EF032

Fig. EF-32 External view of carburetors

The model HJL38W6 carburetor is of a horizontal, variable venturi type, which is used in the L16 and L18 engines. This carburetor is designed to keep constant flow of intake air through the venturi under all engine speeds. That is, the venturi opening is automatically adjusted by sliding the suction piston in accordance with change in the volume of intake air.

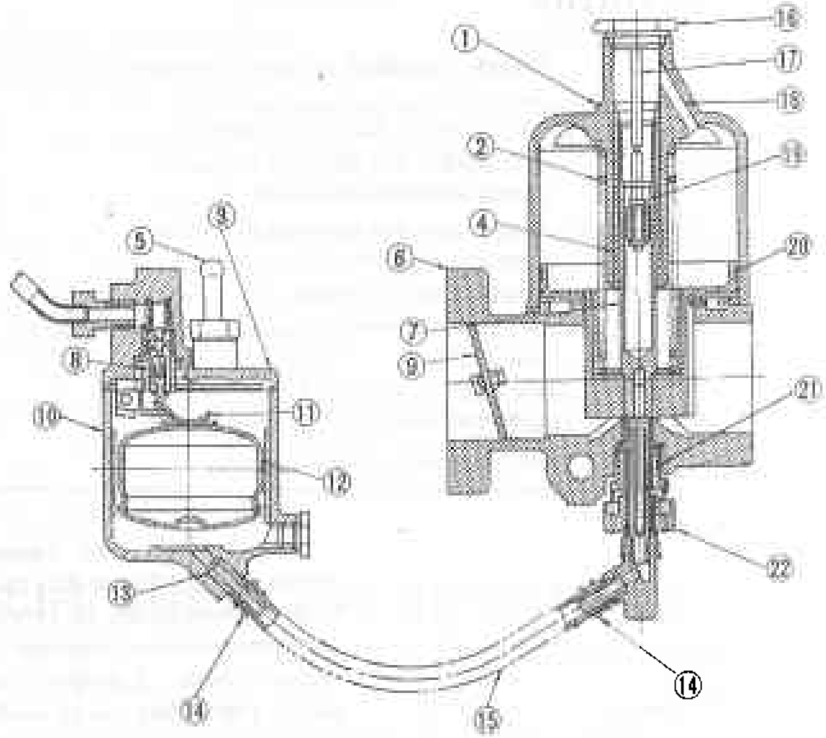
Metering calibration is accomplished by only the jet needle fixed into the suction piston. Then, the related situation between the taper jet needle and nozzle gives the correct air-fuel mixture covering all operating speeds.

When starting the engine, the nozzle is lowered by pulling the choke knob. Consequently, an enriched air-fuel mixture is obtained. Under normal running, a proper mixture is supplied by sliding the jet needle, and vacuum in the suction chamber operates the suction piston.

This carburetor has the following characteristics:

1. Air flows fast in the venturi when the engine runs at low speeds. Therefore, fuel is fully turned into spray, so that good driveability can be obtained.
2. As the venturi opens wide at high speed running, high output can be provided to reduce fuel intake resistance.
3. The fuel control mechanism is simple in construction because of single nozzle, thus affording trouble-free operation and smoother acceleration.
4. Engine output and accelerating characteristics are greatly improved by the use of two parallel synchronized carburetors. This means that the fuel is fed to two engine cylinders by the front and rear carburetors evenly.

STRUCTURE AND OPERATION



1 Suction chamber
2 Suction spring
3 Float chamber cover
4 Suction guide
5 Nipple
6 Throttle chamber
7 Suction piston rod
8 Needle valve
9 Throttle valve
10 Float chamber
11 Float lever
12 Float
13 Sleeve
14 Clip
15 Fuel hose
16 Oil cap nut
17 Plunger rod
18 Transverse hole
19 Oil damper
20 Suction piston
21 Nozzle
22 Idle adjusting nut

EF033

Fig. EF-33 Cross-sectional view of carburetor

Float chamber

The float system is basically the same in operation as that used in the conventional type carburetor. The level of fuel is controlled by the float system.

Fuel fed from the fuel pump enters into the float chamber through the needle seat. Flow continues until fuel level raises the float to the position where the needle closes valve seat.

As the float drops, the needle moves down and opens the valve seat. Then, fuel enters the float chamber, thus keeping the fuel level constant.

Venturi control system

The suction chamber is mounted above the venturi, and the suction piston slides vertically within the suction chamber, changing the venturi opening area.

Venturi vacuum pressure operates on the upper surface of the suction piston through the suction port, and atmospheric pressure is applied to the bottom of the suction piston through the air hole from the air cleaner. The difference between the upper vacuum pressure and lower atmospheric pressure moves the suction piston up and down. The suction piston stops as a balanced condition exists between the pressure difference and the piston weight plus spring tension. The vacuum pressure is produced by the air flow velocity. For instance, when the throttle valve is opened by depressing the accelerator pedal, the flow velocity of the intake air increases. This also increases vacuum pressure in the venturi, and the suction piston is lifted until the piston is balanced, and the venturi opening area enlarges.

When the throttle valve is closed by releasing the accelerator pedal, the flow velocity of the engine intake air in the venturi is reversely decreased. The piston goes down and the venturi opening area becomes small. The intake air flow velocity recovers as the venturi opening decreases. The piston stops going down because of a balance between the upper and the lower forces operating the suction piston.

Thus, the opening area is adjusted automatically to keep the flow of the intake air at constant velocity in the venturi. Consequently, the venturi opening is optimum for any engine operating conditions. In addition, the suction piston rod is equipped with an oil damper to prevent the piston rising quickly as a result of sharp throttle opening. As the plunger rod positioned in an oil well operates on a fluid brake on rapid rising stroke but exerts no restriction on its fall, it provides an approximate degree of enrichment for acceleration.

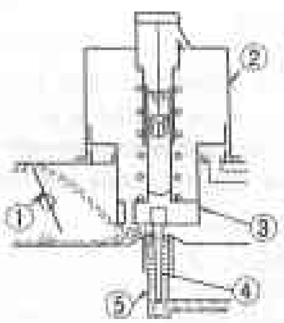
The oil reservoir in the suction piston rod in which the oil damper plunger is equipped should be topped up to the level periodically every three months or 5,000 km (3,000 miles) with thin engine oil of preferably SAE 20 or the oil not thicker than SAE 30.

Fuel control system

Fuel is sprayed into the venturi by intake air flow through the opening between the nozzle and taper jet needle fixed into the suction piston. The static pressure at the nozzle of the venturi is almost constant so that fuel control for various engine speeds can be done by changing the nozzle opening.

The suction piston rises or falls under the influence of engine suction controlled by the degree of throttle opening. Accordingly, nozzle opening (clearance between the nozzle and needle) changes, and optimum air-fuel mixture can be obtained for any engine speed.

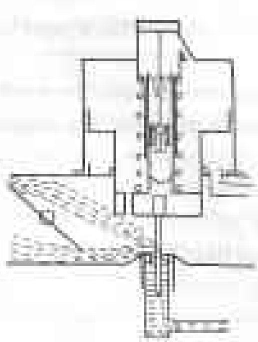
The operating conditions of the variable venturi and fuel control are shown in figures below:



EF034

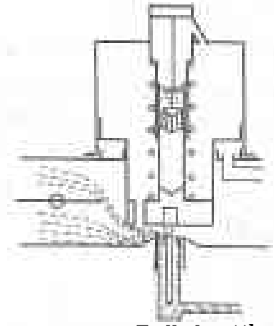
1 Throttle valve
2 Suction chamber
3 Suction piston
4 Jet needle
5 Nozzle

Fig. EF-34 Idling



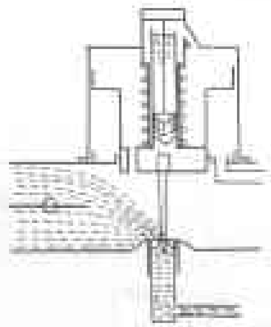
EF035

Fig. EF-35 Partial throttle



EF036

Fig. EF-36 Full throttle open (low speed)



EF037

Fig. EF-37 Full throttle open (high speed)

When starting the engine, the nozzle is drawn down by a link mechanism, pulling the choke knob. As a result, the nozzle opening between the nozzle and jet needle is increased, and enriched fuel mixture required for starting is fed to the system.

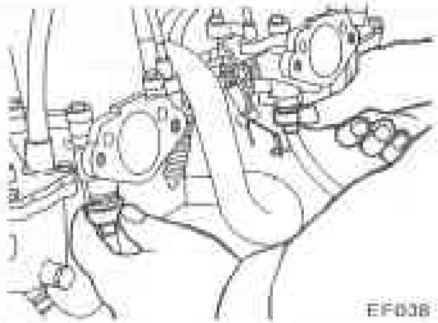
Furthermore, the throttle valve is set at the proper position for starting (approximately 6.5°) by the linkage.

CONTROL AND ADJUSTMENT

Idling adjustment

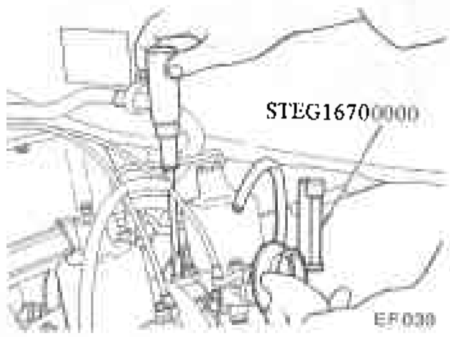
The procedure for idling adjustment is described herein since proper idling adjustment of these two carburetors is extremely important in obtaining peak vehicle performance and in effectively reducing fuel consumption.

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



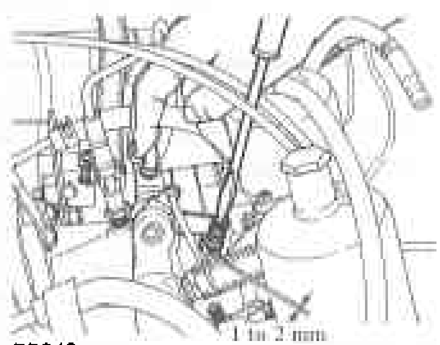
EF038

Fig. EF-38 Idle adjust nut



EF039

Fig. EF-39 Flow meter



EF040

Fig. EF-40 Adjusting clearance of fast idle setting screw

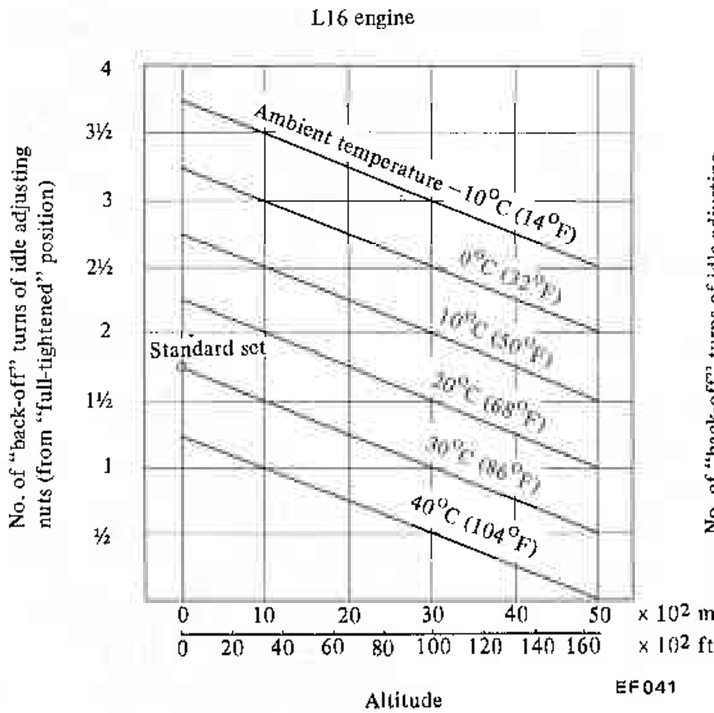


Fig. EF-41 Relationship between altitude and idle adjusting nut setting (L16 engine)

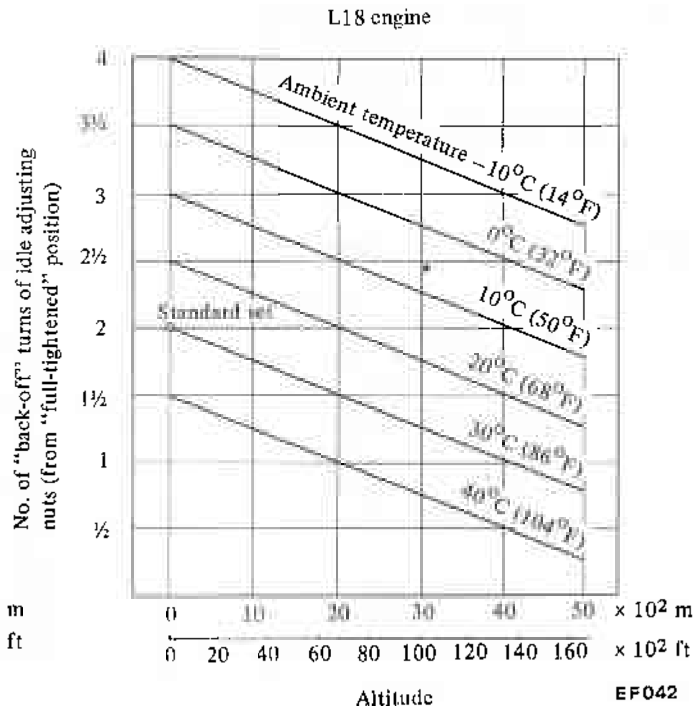


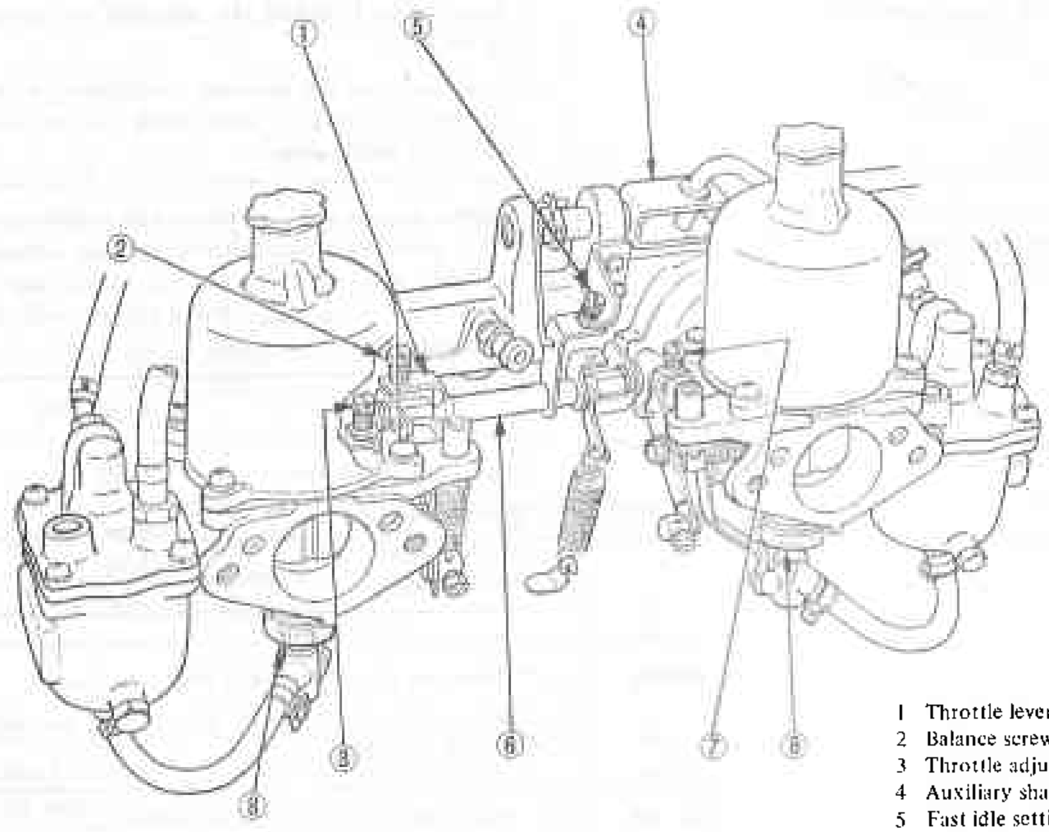
Fig. EF-42 Relationship between altitude and idle adjusting nut setting (L18 engine)

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

Operating procedure	Instructions
1. Remove air cleaner.	a. Warm up engine prior to adjustment, and fully return choke lever.
2. Loosen both front and rear carburetor throttle adjusting screws, balance screw, and fast idling setting screw.	a. Make sure front and rear throttle shafts are not connected.
3. Tighten front and rear idle adjusting nuts all the way, and turn out as required according to outside temperatures and altitude. Refer to Figures EF-41 and 42. **Note: Always turn in or out these nuts equally.**	a. Determine best idling mixture by referring to Figures EF-41 and 42. b. Also refer to Figures EF-41 and 42, for altitude at which vehicle is to be operated.
4. Turn in front and rear throttle adjusting screws a few turns, and start engine.	a. Make sure that the engine is at normal operating temperature.
5. Turn in or out front and rear throttle adjusting screws and reduce the engine speed to 600 to 700 rpm.	a. Reduce engine speed to the extent that the engine operates stably.
6. Apply a flow meter to front carburetor air cleaner flange, turn in or out 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.

<table>
<tr><th>Operating procedure</th><th>Instructions</th></tr>
<tr><td>7. Then apply the flow meter to 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 scale, turn in or out rear carburetor throttle adjusting screw and align float with the front carburetor scale.</td><td>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.</td></tr>
<tr><td>8. Turn in or out front and rear idle adjusting nuts simultaneously by each 1/8 turn until the fastest and most stable engine speed is obtained.</td><td>a. Idling fuel flow quantity is reduced by tightening idle adjusting nut (turning it to the right) and is increased by loosening idle adjusting nut (turning it to the left).
b. Front and rear idle adjusting nut adjusting positions (number of turns by which both nuts are backed off) must be the same.</td></tr>
<tr><td>9. Back off (loosen) front and rear throttle adjusting screws, and set engine speed to rated speed.</td><td>a. Repeat steps 6 and 7 above, and set engine speed to rated speed by adjusting front and rear carburetors so that the air flow of both front and rear carburetors is the same. Rated idling speeds of the L16 and L18 are as follows:
<table><tr><th></th><th>L16 and L18</th></tr><tr><td>Engine idle speed rpm</td><td>650</td></tr><tr><td>Standard vacuum (at idle speed) mmHg/(inHg)</td><td>400 or above (15.75)</td></tr></table></td></tr>
<tr><td>10. Turn in balance screw until screw head contacts the throttle connecting lever.</td><td>a. Make sure that idling speed does not change.
b. Adjust balance screw so that suction pistons act simultaneously.</td></tr>
<tr><td>11. Move throttle shaft, and rapidly accelerate the engine (race the engine) a few times. Make sure that idling speed does not change.</td><td>a. Make sure that adjustment is proper.</td></tr>
<tr><td>12. Turn fast idle setting screw to increase engine speed approximately 1,500 rpm., apply the flow meter to both front and rear carburetors, and verify that the flow meter float positions are even.
If uneven, readjust balance screw.</td><td>a. Increase engine speed, and insure that the link interlock action operates properly.
b. Readjust balance screw and match the air flow of front and rear carburetors.</td></tr>
<tr><td>13. Back off fast idle setting screw and decrease engine speed. After racing engine, apply the flow meter to front and rear carburetors, and re-confirm that the float positions are even. If uneven, adjust front and rear throttle adjusting screws so that engine speed does not change, and equalize the flow meter float positions. Then, repeat step 12.</td><td>a. Match the idling air flow of front and rear carburetors.
b. Adjust idling speed.</td></tr>
</table>

Operating procedure	Instructions
14. Set throttle shaft so that throttle valve starts to open, and adjust the clearance at fast idling setting screw to 1 to 2 mm (0.0394 to 0.0787 in).	———
15. Stop engine, and install air cleaner and duct.	———



EF043

1 Throttle lever
2 Balance screw
3 Throttle adjusting screw (Front)
4 Auxiliary shaft
5 Fast idle setting screw
6 Throttle shaft
7 Throttle adjusting screw (Rear)
8 Idle adjusting nuts

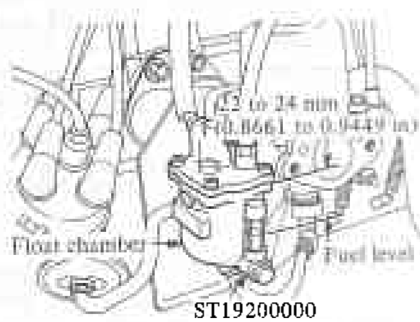
Fig. EF-43 Adjusting carburetor

Inspection of float level

To measure the fuel level, take off drain plug and set special tool "Float level gauge ST19200000." Then, operate engine at idling speed.

If the fuel level indicated on glass tube is 22 to 24 mm (0.8661 to 0.9449 in) below the top of float chamber, the fuel level is proper.

Also, the float level gauge is marked with a standard fuel level.



EF044

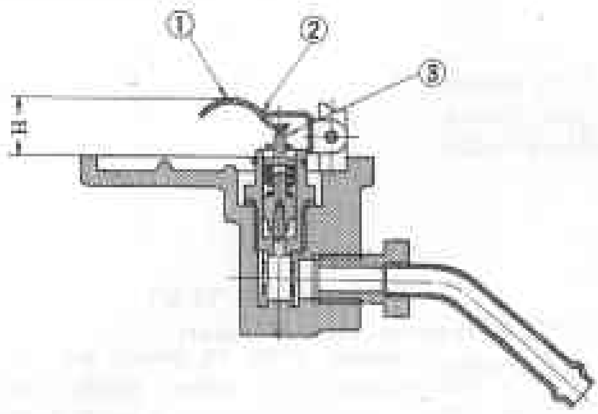
Fig. EF-44 Checking float level

Adjustment of float level

If level of fuel in float chamber is found to be more or less specified tolerances, this must be corrected as follows:

1. Remove four set screws securing float chamber cover in place. Cover and float lever can then be taken out as a unit.

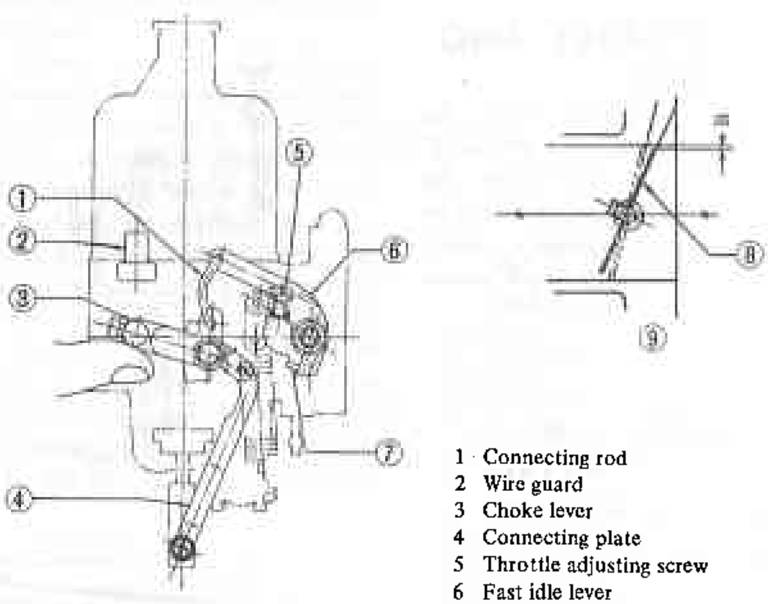
2. With float lever and cover assembled, hold them by hand, or on a work bench, horizontally, with back of float cover facing up.
3. Lift up float lever with your finger and then lower it slowly until lever seat contacts valve stem.
4. Adjustment is correct if dimension "H," Figure EF-45, is 11 to 12 mm (0.4331 to 0.4724 in). Adjustment can be made by bending float lever as required.



1 Float lever
2 Bend here to adjust dimension "H"
3 Valve stem

Fig. EF-45 Adjusting float level

Adjustment of starting interlock valve opening



1 Connecting rod
2 Wire guard
3 Choke lever
4 Connecting plate
5 Throttle adjusting screw
6 Fast idle lever
7 Throttle adjusting plate
8 Throttle valve
9 Throttle valve-to-chamber clearance

Fig. EF-46 Adjusting starting interlock opening

Adjustment of throttle opening is made by changing the length of connecting rod with a suitable tool such as radio pinchers. Opening becomes greater when the length of rod is increased. Adjustment is correct if clearance between throttle valve and air horn is 0.6 mm (0.0236 in), distance "B" in Figure EF-46, with the choke lever held all the way out.

Checking damper oil

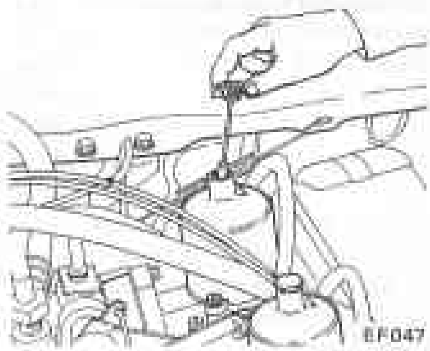


Fig. EF-47 Checking damper oil

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 engine oil (MS#20 or 10W-30) for damper oil. Do not use lower 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 oil cap nut as shown in Figure EF-48 and check oil level marking on the two grooves on plunger rod. No difficulty will be encountered and there is no danger until the oil level reaches the lower line. If the oil level drop below the lower line, add oil. Total oil volume is approximately 3 cc (0.18 cu in). Slowly fill damper with oil to upper line.

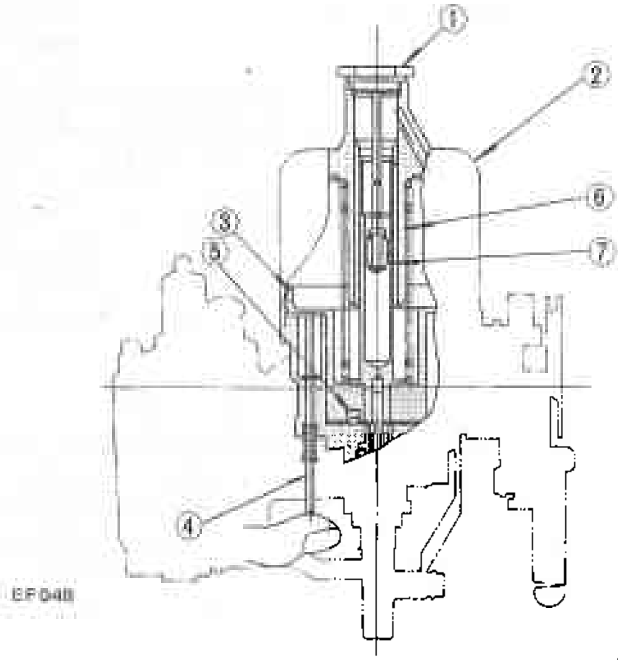
When removing and replacing oil cap nut, be careful not to bend rod. If oil cap nut is loose, it may fall off. Be sure that it is sufficiently tightened by hand.

Periodic inspection of suction chamber and suction pision

Periodic inspection is required to

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

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



1 Oil cap nut (Tightened by hand)
2 Suction chamber
3 Suction piston
4 Lifter
5 Stop pin
6 Oil damper
7 Plunger

Fig. EF-48 Inspecting suction piston

1. First, remove oil cap nut.
2. Gradually raise lifter with your finger. Lifter head will contact suction piston when lifter has been raised approximately 1.5 mm (0.0591 in). Raise lifter further. Suction piston will then be raised approximately 8 mm (0.3150 in).
3. Release your finger from lifter. Suction piston will drop, and the sound of suction piston striking against venturi will be heard.

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

DISASSEMBLY AND ASSEMBLY

Carburetor should not be disassembled unless absolutely necessary. When it must be disassembled, extra caution should be exercised to avoid damaging venturi and other components which consist of very high precision parts.

Disassembly and assembly of suction piston and suction chamber

1. Remove four set screws and take out suction chamber.
2. Remove suction spring, nylon packing and suction piston from suction chamber.

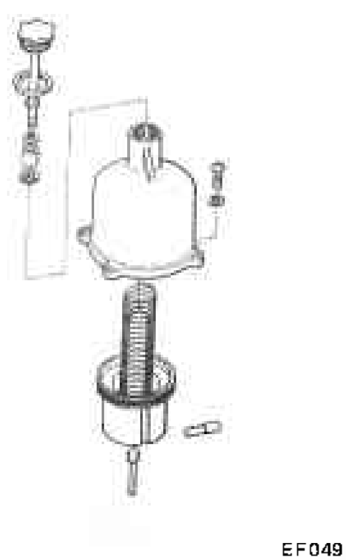


Fig. EF-49 Disassembling

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

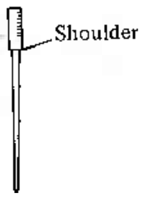
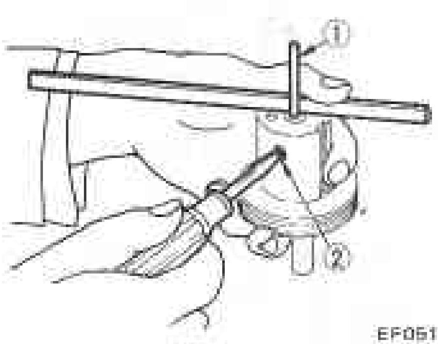


Fig. EF-50 Jet needle

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

5. Idling and other operating performance features will be adversely affected if jet needle is not installed correctly in suction piston. Set jet needle in suction piston so that the shoulder portion is flush with the bottom of 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 jet needle contacts the surface of tool, and tighten jet needle set screw. Jet needle will then be installed correctly.



1 Jet needle
2 Jet needle set screw

Fig. EF-51 Installing jet needle

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

7. Then apply a few drops of light oil to suction piston rod, and reassemble. Under no circumstances should oil be applied to the inside suction chamber or to the large end of suction piston since this may cause trouble and result in improper or defective operation.

Disassembly and assembly of nozzle

1. Disassembly

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

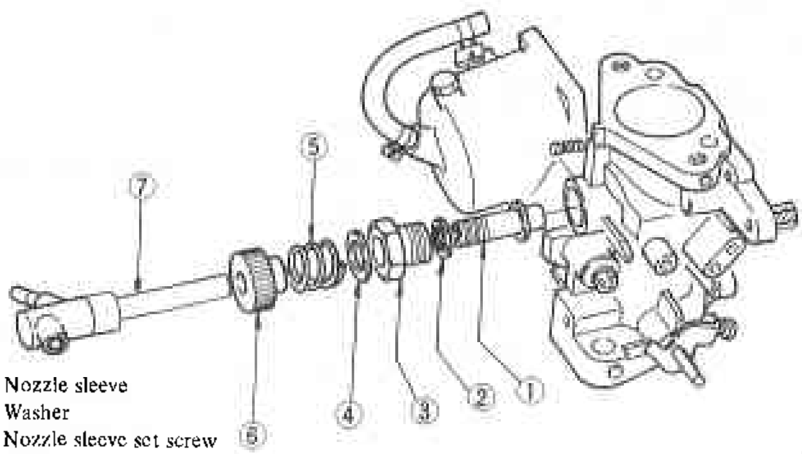
(1) First, remove the 4 mm (0.1575 in) diameter screw, and then remove connecting plate from nozzle head. This can be done easily by pulling lightly on starter lever.

Next, loosen clip, and remove fuel line. Nozzle can then be removed. When nozzle is removed, jet needle will remain inside. Thus, be careful not to damage either jet needle or nozzle and not to bend jet needle.

(2) Next, remove idle adjusting nut and idle adjusting spring.

(3) Nozzle sleeve can be removed by removing nozzle sleeve set screw. (Do not disassemble unless absolutely necessary.) Exploded view of disassembled parts is shown in Figure EF-52.

Nozzle jet is the heart of carburetor and is a high precision component. Clean nozzle with solvent and dry with compressed air.



1 Nozzle sleeve
2 Washer
3 Nozzle sleeve set screw
4 Adjusting shim
5 Idle adjust nut spring
6 Idle adjust nut
7 Nozzle

Fig. EF-52 Disassembling nozzle

2. Assembly

(1) For centering piston and suction chamber, remove oil cap nut with parts properly

assembled (jet needle and suction piston assembled) without damper oil applied.

(2) Assemble nozzle sleeve, washer, nozzle sleeve set screw by tightening nozzle sleeve set screw temporarily.

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

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

(5) Without disturbing the above setting, raise suction piston with your finger, and lower it slowly. If suction piston drops smoothly until suction piston stop pin drops on venturi, making a light striking sound, the condition of piston is satisfactory.

Securely tighten nozzle sleeve at this position with nozzle sleeve set screw.
(6) Remove nozzle, install idle adjusting spring and idle adjusting nut on nozzle sleeve, and reinstall nozzle. Connect fuel line leading to float chamber to nozzle nipple, and tighten clip fully.

Note: Exercise care not to twist fuel line.

(7) With choke lever lightly pulled out, place connecting plate between 4 mm (0.1575 in) washer and sleeve collar 4 mm (0.1575 in); fasten plate to nozzle head by means of screws, 4 mm (0.1575 in). In installing plate, check to be certain that collar is installed in hole in plate by moving choke lever as necessary.
(8) After the above steps have been completed, again check to be sure that suction piston lowers freely without binding.

Disassembly of float chamber

To disassemble, follow steps given under ADJUSTMENT OF FLOAT LEVEL in ENGINE TUNE-UP.

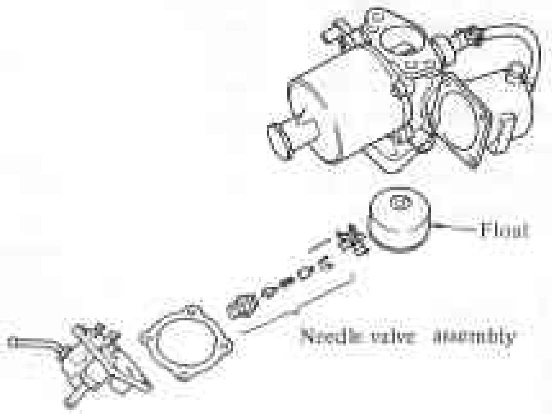


Fig. EF-53 Disassembling float chamber

Disassembly of link and related components

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

Before disassembly, mark links and levers so that they can be placed back to their original parts or locations from which they were removed.

After assembly, check to be sure that they operate smoothly.

Specifications

Item / Carburetor model		HJL38W6
Applied engine		L16 & L18
Bore	mm (in)	38 (1.4961)
Piston lift	mm (in)	29 (1.1417)
Jet needle		M-76
Nozzle jet dia.	mm (in)	2.34 dia. (0.0921)
Suction spring		#23
Float chamber needle valve inner dia.	mm (in)	1.5 dia. (0.0591)
Float level	mm (in)	23 (0.9055)
Float venting		Inner vent type
Fuel pressure	kg/cm^2 (lb/sq in)	0.24 (3.4140)
Throttle clearance at full throttle	mm (in)	0.6 (0.0236)
Position at full throttle		6.5°

TROUBLE DIAGNOSES AND CORRECTIONS

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

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

Condition	Probable cause	Corrective action
Overflow	Leakage from float, or float bent or damaged.	Replace float.
	Dirty needle valve seat.	Clean valve seat.
	Loose needle valve.	Retighten.
	Defective needle valve seat.	Refit or replace.
	Excessive fuel pump pressure.	Repair pump.
	Fuel pump drawing in air.	Repair pump.
Excessive fuel consumption	Overflow.	Described above.
	Faulty suction piston operation.	Described below.
	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.	Described below.
	Defective nozzle return.	Readjust.
	Nozzle or fuel line clogged.	Clean.
	Jet needle not properly installed.	Readjust.
	Needle valve clogged.	Clean.
	Defective fuel pump.	Readjust.
Improper idling	Faulty suction piston operation.	Described below.
	Defective nozzle return.	Readjust.
	Worn jet needle.	Replace.
	Improper idle adjusting nut adjustment.	Readjust.
	Worn throttle valve shaft.	Replace.
	Air leakage due to defective packing between manifold and carburetor.	Replace gasket.
	Improper throttle valve interlock adjustment.	Readjust.
	Loose throttle lever interlock link.	Readjust or repair.

Condition	Probable cause	Corrective action
Engine operation is irregular or erratic	Defective suction piston.	Described below.
	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.	Described above.
	No fuel fed to the engine.	Check pump, fuel line, and needle valve.
	Improper idling adjustment.	Readjust.
	Defective suction piston.	Described below.
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.