

Fuel System Service for the VM2000 Mikuni Carburetor

For Models Ace 90, Ace 92, Ace 92B, Ace 92B+ and the 96 Dirt Squirt

1. Carburetor

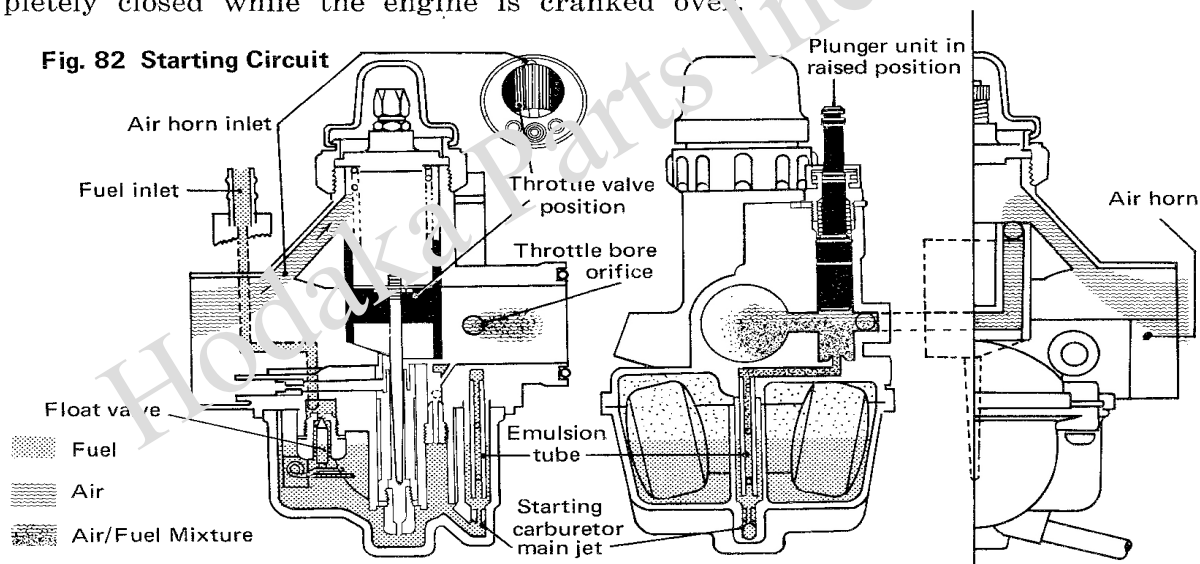
The 20mm Mikuni, fitted as standard equipment to ACE 90 engines, is die cast alloy construction with brass fittings. Air vents and an overflow pipe prevent the engine from filling with raw fuel in the event of a leaking float valve. The carburetor design is conventional sliding throttle type with integral float chamber, and incorporates a built-in starting carburetor instead of the more usual choke or flooding device. A dual float controls the spring-loaded float valve insuring an even fuel supply under all riding conditions.

The carburetor's function is to proportion and atomize the fuel/air mix drawn in by the engine. The twistgrip controls the volume of the indrawn mixture; therefore, the power.

Briefly, the Mikuni carburetor operates as follows:

A. Starting Circuit

Depressing the starter lever lifts the plunger unit inside the mixing chamber (Fig. 82). As the engine is cranked over, vacuum in the crankcase draws fuel up through the starter main jet where it mixes with air from the float chamber and again with air from the air horn inlet passage, the mixture spraying into the throttle bore to supply the engine. It should be noted that in order for the starter device to work the throttle valve must remain nearly or completely closed while the engine is cranked over.



B. Idle to Intermediate Speed Circuit

At idle speed the throttle valve is almost closed, allowing only a small amount of air to pass under the valve. Air also enters through the air inlet, is metered past the pilot air screw and into the engine through the low speed orifices in the throttle bore (Fig. 83). As air passes through the orifice well, it mixes with fuel drawn up through the pilot jet. When the throttle valve is opened, air is directed initially across the low speed orifices and then across the needle jet, drawing fuel up through, first, the low speed orifices and then the needle jet. In this manner the transition from the idle to intermediate circuit is accomplished. The cut-away on the throttle valve influences air stream direction from just off idle setting to approximately $\frac{1}{4}$ throttle opening. The fuel/air mixing ratio in the idle to intermediate speed circuit is controlled by the externally adjustable pilot air screw and the height of the throttle valve cutaway.

C. Intermediate to High Speed Circuit

As the throttle valve is opened past the $\frac{1}{4}$ open position, the air stream mixes with fuel drawn through the needle jet from the main jet (Fig. 84). Incoming air also enters the air jet and mixes with fuel passing through the needle jet, creating a bubbling mixture which is more easily atomized by the venturi air stream. From $\frac{1}{4}$ to $\frac{3}{4}$ throttle valve openings the height of the needle in the needle jet controls the fuel/air mixing ratio and from $\frac{3}{4}$ to full open the main jet size controls the mixture ratio.

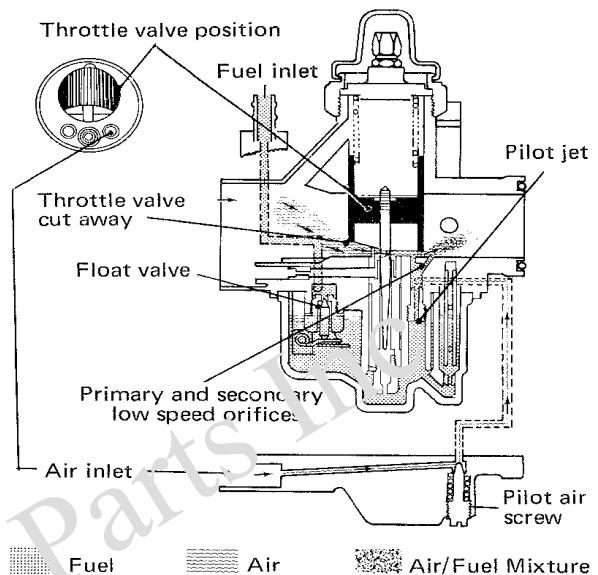


Fig. 83 Idle to Intermediate Speed Circuit

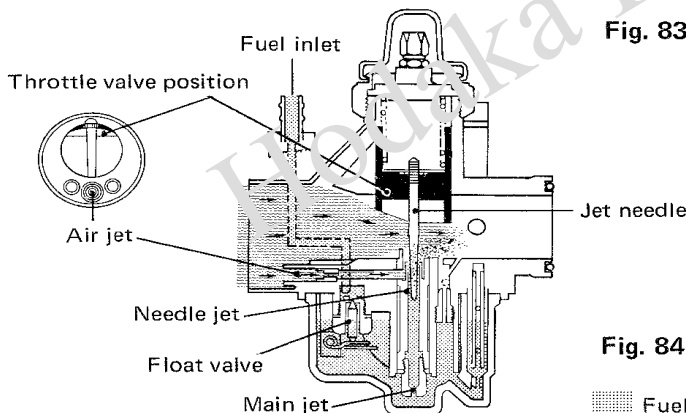
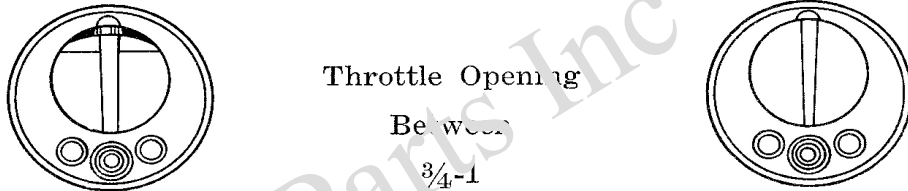


Fig. 84 Intermediate to High Speed Circuit

D. Mixture Adjustments

The carburetor operation is automatic throughout the throttle range. Adjust the carburetor in the following sequence to avoid disturbing completed adjustments. It is assumed normal fuels are used, ignition timing is standard and the engine is in good condition and free of air leaks.

1st) Main Jet



Road test the machine at full throttle on a straight and level road (if the machine is geared 15T x 32T, use 3rd gear; if geared 15T x 46T, use 4th gear). If the engine rpm increases when the throttle is backed off slightly, the main jet is too small. If the engine rpm drops when the throttle is backed off slightly, the main jet size is correct or slightly large. If the engine “4 strokes,” smokes heavily, or stutters at full throttle setting, the main jet is too large. The standard main jet is a #85, the next largest jet is #90, the next smallest #80.

To change main jet, begin by turning off fuel cocks, and removing air cleaner rubber hose. Next, remove carburetor from manifold, using a 10mm wrench to back off setting nuts counterclockwise. Unscrew the four Phillips head screws holding the float chamber in place and tap chamber lightly with the heel of the screwdriver to break gasket seal. Lift float chamber cover free and remove main jet with 6mm wrench (Fig. 85). Replace main jet with chosen size and reassemble in reverse order. Road test for result. Cross check adjustment by examining the condition of the spark plug firing end (see Chapter X).

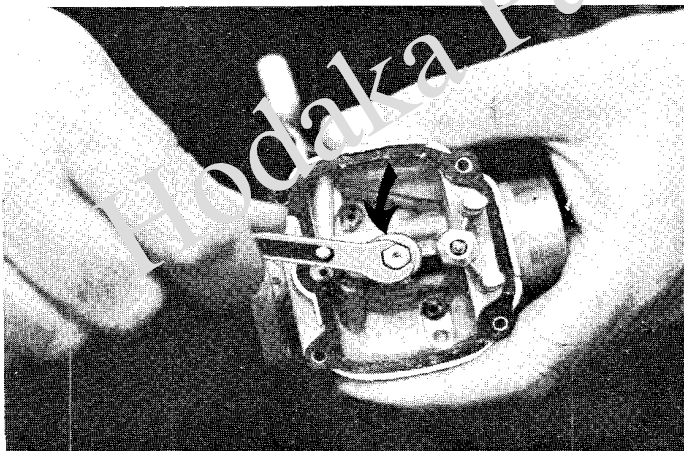
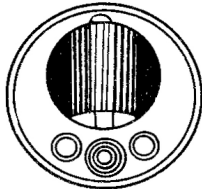
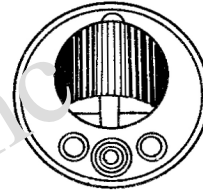


Fig. 85 Removing Main Jet

2nd) Pilot Jet



Throttle Opening
Between
 $0 - \frac{1}{8}$



Turn pilot screw lightly down onto its seat and back out $1\frac{1}{4}$ turns. Start engine and allow it to warm up thoroughly. Turn knurled throttle adjuster (Fig. 86) in the mixing chamber top counterclockwise until engine speed is approximately 1800 rpm (fast idle). Turn the pilot air screw (Fig. 87) clockwise until engine runs at its slowest speed. After finding slowest speed, back the air screw $\frac{1}{4}$ turn counterclockwise (engine speed will still be high at this stage). Next, turn throttle adjuster clockwise until the engine almost stops (approx. 1200 rpm). Turn pilot air screw in and out within $\frac{3}{4}$ of a turn to find the position where the engine runs best. The mixture adjustment is complete at this point.

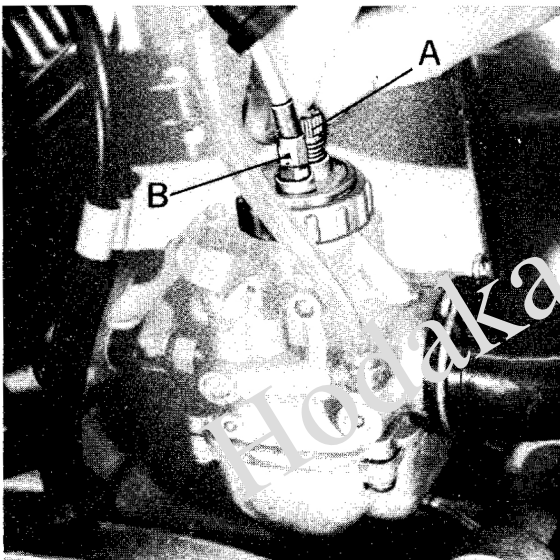


Fig. 86 Using knurled throttle adjuster (A) to regulate engine idle speed. Note cable adjuster (B) used to adjust cable housing slack.

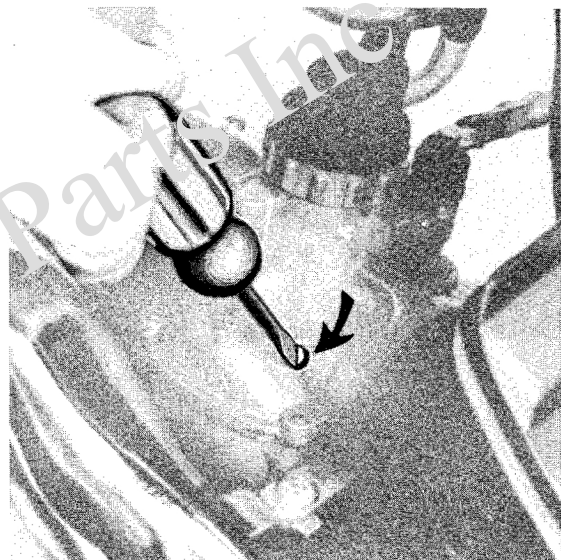
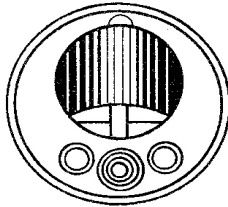
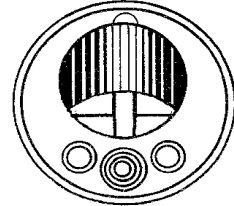


Fig. 87 Adjusting idle mixture with pilot air screw

3rd) Throttle Valve Cutaway

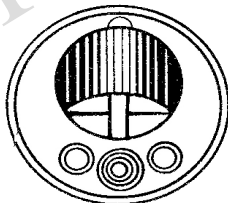


Throttle Opening
Between
 $\frac{1}{8}$ - $\frac{1}{4}$

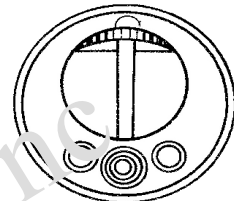


Throttle valves are numbered to indicate the height of the cutaway (Fig. 88) (for example a marking of 2.0 indicates the height of the cutaway to be 4mm). Fitting a replacement throttle valve with a higher number decreases air velocity over needle jet, resulting in a leaner mixture ratio, while a smaller numbered valve increases air velocity with the opposite result. Adjusting by changing cutaway, however, affects engine performance at speeds below $\frac{1}{4}$ throttle opening; therefore, unless there is an urgent necessity or a special racing application do not change from the standard cutaway.

4th) Jet Needle



Throttle Opening
Between
 $\frac{1}{4}$ - $\frac{3}{4}$



There are 5 grooves in the jet needle. Beginning with the topmost groove, they are counted 1, 2, 3, etc. on down (Fig. 89). The 3rd (or central) groove is the standard position. Road test the machine. If between $\frac{1}{2}$ and $\frac{3}{4}$ throttle openings the exhaust smoke is white in color or the engine is sluggish or "4 strokes," it indicates the mixture is rich. If the engine rpm fluctuates while riding at the same throttle setting as described above or the machine feels as though the brake were being lightly applied, the fuel mixture is too lean. To correct rich or lean condition, unscrew mixing chamber cap, and pull throttle valve assembly clear. Collapse throttle spring and pull it to one side of the valve. Push jet needle out through the top of the throttle valve, being careful to recover the jet needle spring seat. Use pliers to remove the jet needle clip and reposition higher (leaner) or lower (richer) as necessary. Reassemble in reverse order and road test for result. *Note: Jet needle changes of one notch affect main jet size by 10%, therefore, after adjusting jet needle, recheck main jet operation for rich or lean condition.*

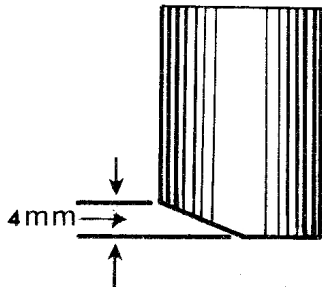


Fig. 88 Throttle Valve Cutaway

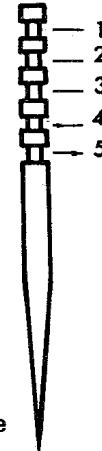
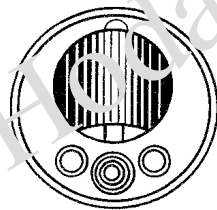
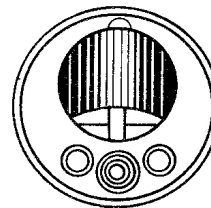


Fig. 89 Jet Needle

5th) Pilot Jet



Throttle Opening
Between
 $0 - \frac{1}{8}$



Finish the carburetor adjustments by touching up pilot air screw adjustment to insure crisp acceleration from idle.

E. Engine Idle Speed Adjustment

Adjust engine idle speed by turning knurled adjuster (Fig. 86) clockwise to slow idle speed or counterclockwise to increase idle speed. Before adjusting, check throttle cable housing to insure housing has between $\frac{1}{32}$ " to $\frac{1}{16}$ " free slack, turning cable adjuster (Fig. 80) in or out if necessary. Set idle speed for 1500 rpm with the headlight switched on (the alternator requires some engine power for operation).

F. Float Level Adjustment

Assuming the carburetor is free of the engine, begin by removing the four Phillips head screws securing the float chamber cover and tap the cover with the heel of the screwdriver to break gasket seal. Lift cover free, and holding carburetor inverted, measure float height for $\frac{7}{8}$ " (22.5mm) between points shown in Fig. 90. If float requires adjusting, bend the needle actuating tab as shown in (Fig. 91).

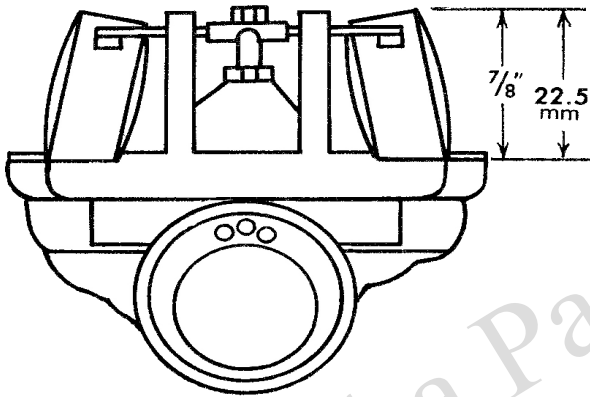


Fig. 90 Float height measurement

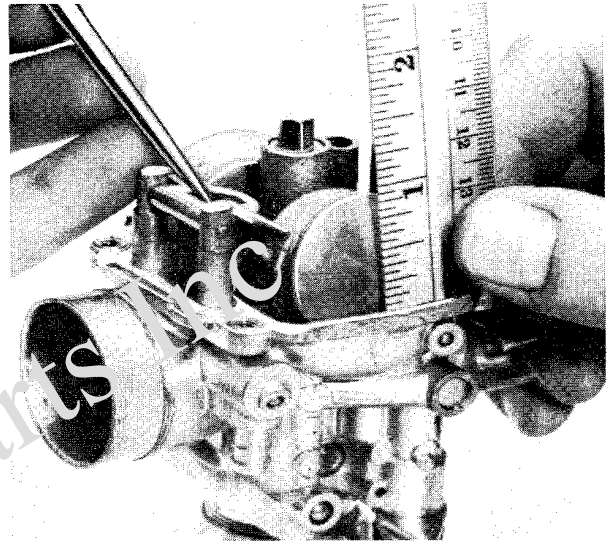


Fig. 91 Method of adjusting float height

Measure both sides to insure floats are matching height (correcting if necessary) and reassemble in reverse order.

Cautions:

Do not bend or twist floats to adjust float height, bend only the needle actuating tab.

Allow float to rest against float valve without pressure from tools or fingers while measuring float height.

G. Carburetor Service

1) Removing Carburetor From Engine

Turn fuel cocks to off position and disconnect fuel hose at carburetor inlet. Remove air cleaner rubber hose and back off carburetor setting nuts with 10mm wrench. Pull carburetor from manifold and slip rubber cover on mixing chamber cap upward on cable housing. Unscrew mixing chamber cap and pull throttle valve assembly clear of mixing chamber body. Remove drain tube from overflow pipe on float chamber body.

2) Removing Throttle Valve Assembly From Throttle Cable

Compress the throttle spring while holding the cable housing against the cable adjuster and slip the ball ended throttle cable free via the vertical groove in the throttle valve, then slip cable and housing from throttle valve assembly.

3) Dismantling Carburetor

Unscrew the four Phillips head screws securing float chamber body and tap cover to break gasket seal. Lift off body, remove and discard gasket. Push out float arm pin securing float and remove float and float needle. Use 6mm wrench and unscrew main jet counterclockwise. Remove brass main jet gasket. Remove float valve seat counterclockwise with 10mm box end wrench and discard fibrous valve seat gasket. Unscrew pilot air screw counterclockwise and remove air screw and spring. Tap needle jet out through throttle valve bore of mixing chamber with hammer and hardwood dowel. Unscrew pilot jet counterclockwise and shake out of mixing chamber casting. Use 12mm wrench to remove starter plunger unit and lever assembly. Pull starter plunger rubber cap off and pry retainer clip from brass plunger holder which allows plunger unit components to be separated. Remove and discard "O" ring from mixing chamber mounting flange.

Remove cotter pin from throttle adjusting screw, allowing throttle valve assembly to separate. Unscrew cable adjuster and throttle adjusting screw from mixing chamber top. Push jet needle and spring seat out of throttle valve and pull clip from jet needle with pliers.

4) Cleaning and Inspecting

Wash parts in solvent and dry with air blast or clean cloth. Use high pressure air blast to clear all jets and passages of dirt or foreign materials. Test soft plugs in mixing chamber casting with air pressure and liquid soap for leakage. Should a loose soft plug be discovered, stake around the plug with a thin punch and coat the area with non-hardening gasket sealer. *Special Note! The nylon throttle valve guide in the mixing chamber casting is neither removable or replaceable, therefore, never clean the casting in a cleaning agent which could damage the valve guide. Never use a wire or pin to clear obstructions from jets and passageways. To do so invites damage to precisely drilled holes. The starter plunger is neoprene tipped, therefore, to avoid damaging the neoprene, clean only in gasoline or solvent.*



Inspect and replace mixing chamber casting if: fractured, throttle guide is worn or broken, mounting flange is warped, throttle valve bore is worn, threads are defective, or "home" modifications have been attempted.*

Compare markings on jets, float valve seat, throttle valve and jet needle with those listed for the stock carburetor, if other than stock parts have been fitted, change them out for stock parts.** Inspect jets, throttle valve, float pin, cable adjuster screw, throttle adjuster screw, mixing chamber cap and top for damage, wear, or modification attempts. Replace any questionable hardware. Examine float valve and seat for wear. Valve should be free of visible wear and spring pin should function, otherwise replace. Check float for leaking by shaking gently after holding submerged in gasoline for 10 minutes, inspect float also for bent or twisted conditions, repair or replace as necessary. Examine neoprene seal on starter plunger and replace if indented or rough appearing. As a matter of course, replace float chamber gasket, float valve seat gasket, "O" ring on mounting flange, jet needle clip and cotter pin on throttle adjusting screw. Finally, check float chamber body for warped gasket surface or fractures around mounting screw holes, replacing if such conditions are found.

* It is a fairly common occurrence for carburetor modifications to be carried out in an attempt to cure problems such as an air leak in the engine. Be sure to check out the engine condition thoroughly if this type of cure has

** Unless the engine is set up for special racing applications, the use of the other than stock components will only adversely affect carburetor operation.

5) Reassembling Carburetor

Arrange carburetor parts on clean cloth. Assemble starter plunger components and install in mixing chamber body. Install pilot jet, being careful to properly engage threads, and tighten snugly. Insert needle jet in mixing chamber with cutaway on topmost end facing rear of carburetor. Tap into position with wooden dowel. Next, install brass main jet washer and main jet. Tighten jet with 6mm wrench. Install new fiber washer over float valve seat and tighten seat into body casting. Insert float valve into float seat, position float over float valve and secure in place with float arm pin. Measure and adjust float height as per instructions under item F *Float Level Adjustment*. Position new float chamber gasket on mixing chamber casting. Install float chamber body onto gasket and secure to mixing chamber with four Phillips head screws. Install pilot air screw and spring; run screw down *lightly* on its seat and back out 1¼ turns. Insert new "O" ring in mounting flange groove. Slip drain tube onto overflow pipe and mount mixing chamber assembly onto manifold. Tighten carburetor setting nuts evenly from side to side to avoid warping or breaking mounting flange. Install air cleaner hose and setting clips. Push fuel hose over fuel inlet on carburetor and install fuel line clip.

Install new clip in central (3rd) notch of jet needle, place needle into throttle valve and position spring seat over jet needle.

Install cable adjuster, throttle adjusting screw and spring into mixing chamber top. Assemble throttle valve, spring, and mixing chamber top. Insert throttle bar from bottom of throttle valve and secure with cotter pin atop adjusting screw. Slip rubber cover and mixing chamber cap onto throttle cable assembly. Install throttle cable into throttle valve assembly. Insert assembly into mixing chamber with throttle valve cutaway facing air cleaner (be careful to engage jet needle in needle jet and nylon valve guide in groove on throttle valve). Tighten mixing chamber cap and adjust throttle cable housing slack between 1/32" and 1/16". Turn throttle adjuster screw down until throttle valve is closed, then back out one full turn. Start engine and proceed to tune carburetor according to instructions under item D *Mixture Adjustments*.

