Triple Maintenance Manual

Section 3 - Fuel System Service

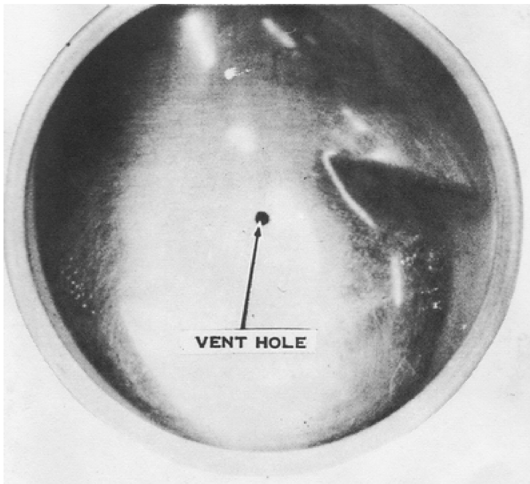
Index

Chapter 3
FUEL SYSTEM SERVICE

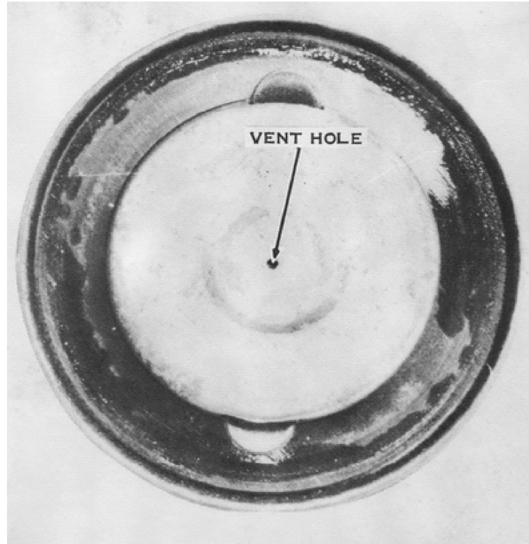
The fuel system is composed of the fuel tank and cap, fuel cock or valve, fuel lines, and carburators. The carburetor air cleaner and its ducting will also be covered here.

FUEL TANK CAP

The Kawasaki triples have had four different fuel tank caps. One is a twist-on type with a rubber gasket, which appeared on the H1 and H1A. It has a vent hole in the center of the inside and outside walls. There is a baffle in between to prevent fuel loss on acceleration and braking. If the vent clogs, the fuel will not be able to flow to the carburetors. To check the vent, blow through it from the outside.

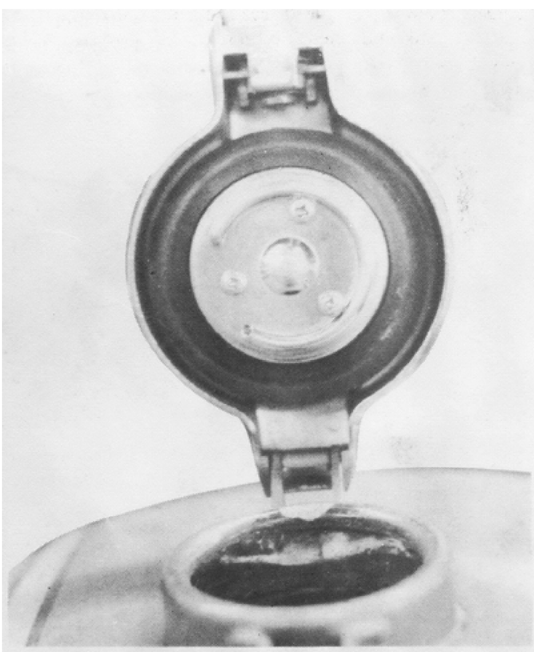


This screw-on type of fuel tank cap is used on 1969 through 1971 models. The vent in the center allows air into the tank to displace the fuel used. Without adequate venting, the fuel flow slows or stops altogether, resulting in lost power or even engine seizure.

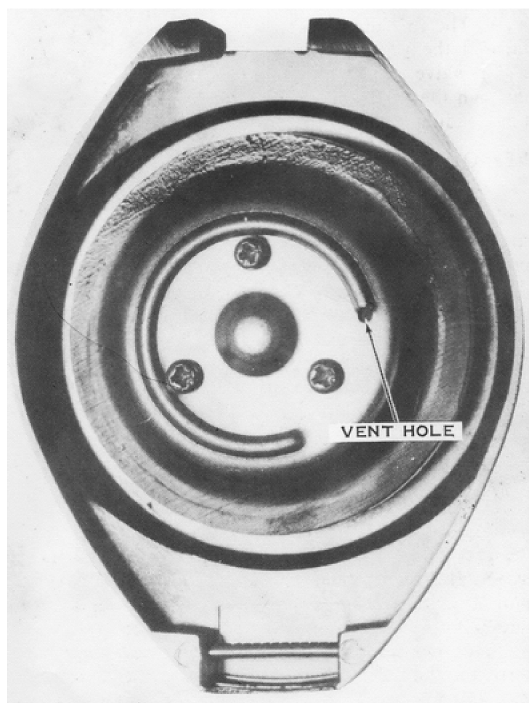


This is the bottom of the screw-on type of cap showing the vent. Suck on the vent to check it.

The second type of cap is found on all the 1972 models: H1B, H1C, S2, and H2. This cap is hinged to the tank at its front edge. To open, push the cap down, pull the latch up, and release the cap. The vent is a small hole on the bottom side of the cap outside the rubber gasket by way of a serpentine passage. Again, to check the vent, blow through the hole.



The vent on the locking-type cap leads to a serpentine passage. Suck on the vent to check it. This cap is used on all 1972 models.



The flip-type cap is used on 1973 and later models. It is vented in the same manner as the locking gas cap.

The third type of cap is similar to the second except it has a locking feature. To open, unlock the button, hold the cap down, push the button, then release the cap. This type is used on three 1973 models: the S1A, S2A, and the H2A.

The fourth type of cap is used on the 1973 H1D model, on the 1974 S1B, S3, H1E, and H2B models, and on the 1975 S1C, S3A, H1F, and H2C models. This type of cap is hinged at the rear. To open it, hold the cap down, push the latch down, and release the cap.

To clear a clogged fuel tank cap vent on any of the four types, blow it out with compressed air. The twist-on type of cap is riveted together and cannot be disassembled. The other three types are easily disassembled for cleaning by removing the three screws on the bottom of the cap. If the cap leaks fuel when the tank is full, check the rubber gasket for cracks or tears. To replace the gasket, just pull it over the center section of the cap.

To replace any of the hinged caps or their latches, drive the pin out of the hinge with a 1/16-inch pin punch and a small hammer. Be very careful not to hit the fuel tank with the hammer. Hold onto the cap or latch as the pin punch is withdrawn because the cap and latch are spring loaded. Do not lose the spring. Start the pin into the tab on the tank before compressing the spring and cap (or latch) into place. When it is positioned properly, drive the pin in.

FUEL TANK

REMOVING

Models H1, H1A, H1B, H1C

Lift the seat and remove the single bolt at the rear of the tank. Remove the two bolts on either side of the tank at the front. These bolts also hold on the yellow side reflectors. Turn the fuel cock to the ON or RESERVE position and then pull off all four tubes. *NOTE: Fuel will not run from the fuel cock unless it is in the PRIME position.* Lift the rear of the tank until the fuel cock clears the frame, then pull the tank straight back.

All Other Models

All other Kawasaki triples have an elastic strap or a "snap-in" type of rubber fitting instead of a bolt at the rear of the tank. The front is held in place by two rubber dampers, one on each side of the frame. The tank has channels that fit over the dampers. To remove this type of tank, lift the seat and remove the strap (if there is one). Turn the fuel cock to OFF in the case of S-series models, or to ON or RESERVE for all others, and then pull off the fuel hoses (three on S-series, four on all others). Lift the rear of the tank until the fuel cock clears the frame, and then pull the tank straight back.

Use a large open-end wrench (27mm for S-series, 30mm for H-series) to loosen the fuel cock ring nut. **CAUTION: Be prepared to drain the fuel into a container.**

CLEANING AND INSPECTING

Check all welded seams of the fuel tank for cracks and signs of leakage, especially around the mounting brackets and fuel valve threaded fitting. Leakage around the filler neck on a twist-on type of tank is usually caused by a deformed flange. To inspect for warping, place a flat surface on the neck flange and look for a gap that would allow leakage.

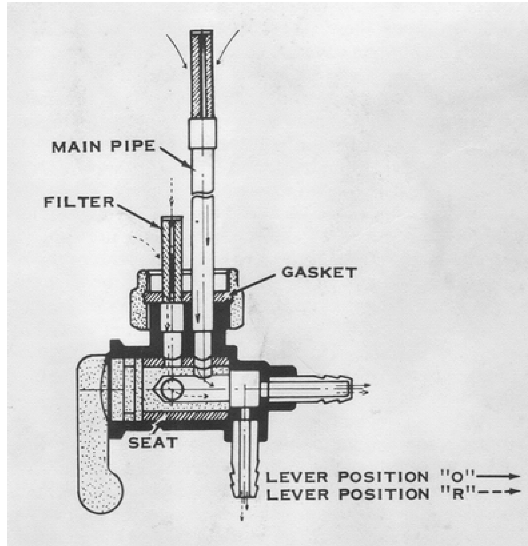
Drain the fuel tank into a container. Look for paint chips, rust, dirt, or water. Look inside the tank for signs of rust. To clean a rusty fuel tank, pour in kerosene or commercial rust-removing solution and add a number of large bolts and nuts. Shake the tank vigorously while changing its position to scour all the inside surfaces. Empty the tank and flush it with clean gasoline. Repeat the procedure until the tank is cleaned of all loose, scaly rust. If the fuel tank is badly corroded, replace it.

If there is any sign of leakage at the tank's welded seams, use a commercial epoxy sealant to stop the leak. If the leak is near one of the mounting brackets, it will be necessary to have it brazed. **CAUTION: Be careful of an open flame or excessive heat in the vicinity of the fuel tank, as it is potentially explosive because of the vapors.**

FUEL COCKS

The S-series Fuel Cock

The S-series machines all use the same manually operated fuel cock, which has three positions. When the lever points straight down, the fuel will flow through the valve if there is more than 1/2 gallon in the tank. When the lever points to the rear, an "S" (meaning STOP) shows on the top side of the lever. No fuel will flow in this position. When the lever points forward, an "R" (for RESERVE) shows on the top side of the lever. In this position, the fuel will flow until the tank is empty. The normal flow position of the lever (straight down) connects the three outlets to a tall, vertical, inlet pipe inside the tank. The fuel will flow through it until the level drops below the top end of the inlet pipe. The RESERVE position of the fuel cock lever connects the three outlets to a short. vertical, inlet pipe inside the tank. Obviously, fuel will still flow into the short pipe when the level is too low for the tall one.



This cross-section of the S-series fuel tap shows the fuel flow passages. In the O (On) position, fuel is admitted from the main pipe. In the R (Reserve) position, it is admitted from the short pipe. Both pipes carry fine screen filters to help prevent contamination of the carburetor jets.

The fuel cock lever turns a barrel valve inside the fuel cock that is sealed in a cylinder of cork. The outer wall of the fuel cock has two holes in its upper side; one to the tall inlet pipe and one to the short pipe. The cylindrical cork seal has two holes that match the two holes just mentioned. The barrel valve is hollow and has two holes through its sides. The holes are not side by side, but are 90° apart. They align with the holes in the cork cylinder one at a time, depending on the position of the lever. The fuel then flows down one of the inlet pipes, through the hole in the cork seal. through the hole in the barrel valve, through the hollow middle, and finally through the three outlets. Of course. each outlet has a tube leading to one of the three carburetors.

REMOVING THE FUEL COCK-S-SERIES

Turn the fuel valve lever to the #0 (OFF) position and use a wrench to take off the sediment bowl. Drain the fuel tank by turning the lever to the #2 (RESERVE) position and holding a container under the valve to catch the flow. **CAUTION: Don't allow the gasoline to spill on the hot engine parts, which could start a fire.**

After the tank has been drained. slip the fuel lines off their fittings. Use a wrench to loosen the nut joining the fuel valve to the threaded pipe on the fuel tank, and then remove the fuel valve, nut. and gasket from the tank.

CLEANING AND INSPECTING

Clean the filters around the two inlet tubes, and use compressed air to remove any sediment from the top of the fuel valve. Take off the sediment bowl gasket, retainer, and filter screen. Inspect the screen for obstructions by viewing it against a bright light. Replace the screen if it is torn or cannot be cleaned thoroughly.

Another problem is that the cork seal may have turned in the fuel valve body, restricting the fuel supply channel. To correct this, take out the small setscrew which holds the lever in the fuel valve body, and then pull out the lever. **CAUTION: Don't turn the lever while pulling it out, as this will change the position of the cork seal, if it is loose.** Inspect the positions of the holes in the cork seal with respect to the channels in the fuel valve body. If the holes don't line up, use compressed air to blow the seal out of the fuel valve body. Apply gasoline-proof gasket cement to its outer surface, keeping the glue away from the holes or inner surface. Reinstall the seal carefully, lining up the cork seal holes with the channels in the fuel valve body. Wipe off excess cement before inserting the lever. Let the cement dry, and then soak the fuel valve in gasoline to shrink the cork seal before operating the fuel valve. Install the setscrew into the fuel valve with the lever pointing toward the #1 position. *NOTE: Push the lever into the valve while tightening the setscrew, to make sure the screw fits into the lever's retaining groove.*

INSTALLATION

Position a new gasket inside the joint nut, and then thread it onto the fuel valve by 1/4 turn. *NOTE: The joint nut has both right- and left-hand threads.* **CAUTION: To prevent damaging the threads, install the joint nut on the fuel valve with the collar facing away from the valve.** Hold the fuel valve against the fuel tank, and then turn the nut onto the tank's threaded fitting, which is a right-hand thread. Keep the fuel valve from turning while tightening the joint nut, or else the gasket will be pushed out of its groove in the nut and leakage will result.

Push the fuel line onto the fuel valve fitting, and use a clip to secure it. Position the filter screen, retainer, and gasket up inside the valve, and then install the sediment bowl with a wrench. **CAUTION: Don't overtighten the sediment bowl, or you will tear the gasket.** Pour gasoline into the tank and open the fuel valve to prevent drying out of the seal and gaskets.

The H-series Fuel Cock

The H-series machines use a different fuel cock, of an automatic, vacuum-operated type. The lever has three positions. When the lever is straight down, it is in the ON position, and fuel flows from the tall inlet pipe to the three outlets, but only when the engine is running. When the engine stops, the fuel flow stops. When the lever is pointed to the rear, fuel flows from the short inlet, but only when the engine is running. This is the RESERVE position. When the lever is pointed straight up, the fuel cock is in the PRIME position, and fuel flows from the short inlet pipe to the three outlets whether the engine is running or not. The automatic, vacuum-operated fuel cock has a disc-type valve instead of a barrel valve, but the important feature of this fuel cock is the diaphragm-operated needle valve that controls the fuel flow after it has passed the disc valve.

Fuel enters the standpipe and is channeled to the diaphragm valve seat by the lever (in the ON or RESERVE position). When the engine is stopped, this is as far as the gasoline can travel, because the diaphragm and its 0-ring seal are forced against the valve seat by the shutoff spring. When the engine is running, intake port vacuum pulls the diaphragm to the left against the shutoff spring tension, and the 0-ring seal is lifted out of the valve seat. The fuel then passes through the diaphragm valve and fills the sediment bowl. The fuel rises through the filter screen and then flows through the outlet to the fuel line supplying the carburetor float chambers.

It is important to understand the vacuum circuit of the automatic fuel valve in order to service it properly. The right-hand carburetor has a vacuum fitting that is exposed to the vacuum and pressure pulses in the carburetor throat while the engine is running. The vacuum hose transmits these pulses to the fitting on the fuel valve's diaphragm cover. A check valve inside the cover cancels the pressure pulses, and the vacuum is admitted into the diaphragm chamber. The vent hole in the inner diaphragm cover admits atmospheric pressure to the right side of the diaphragm, and forces it to the left against shutoff spring tension. *NOTE: If the vent hole is blocked, the diaphragm will not open properly.* When the engine is stopped, the vacuum pulses in the carburetor throat are replaced by stable atmospheric pressure. A small pinhole in the check valve disc admits this pressure into the diaphragm chamber and bleeds off the vacuum acting on the diaphragm. *NOTE: If the pinhole becomes obstructed, the diaphragm will remain vacuum locked in the open position.* The shutoff spring pushes the diaphragm to the right, and the O-ring seal shuts off the fuel flow through the valve seat.

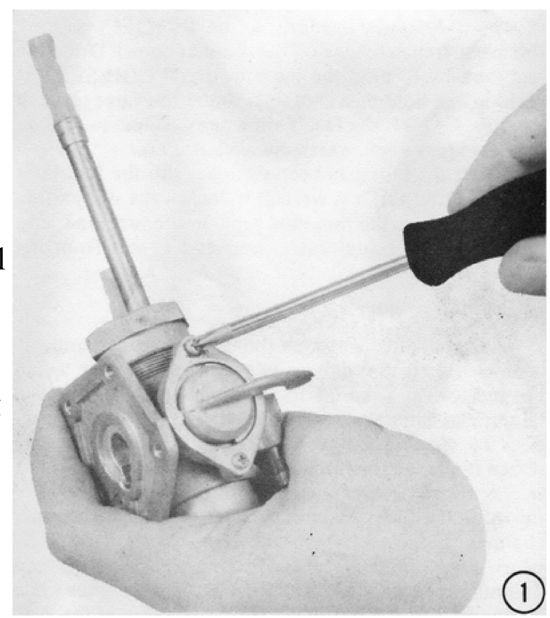
The automatic fuel valve has a priming mechanism that is used when the carburetor float chambers empty of gasoline, such as after overhauling the carburetors or running out of gas. By turning the lever to the PRIME position, the diaphragm is bypassed and the fuel flows directly through as in an ordinary fuel valve. After starting the engine, turn the lever to the ON or RESERVE position. **CAUTION: Don't park the motorcycle with the lever in the PRIME position, or crankcase flooding may occur.**

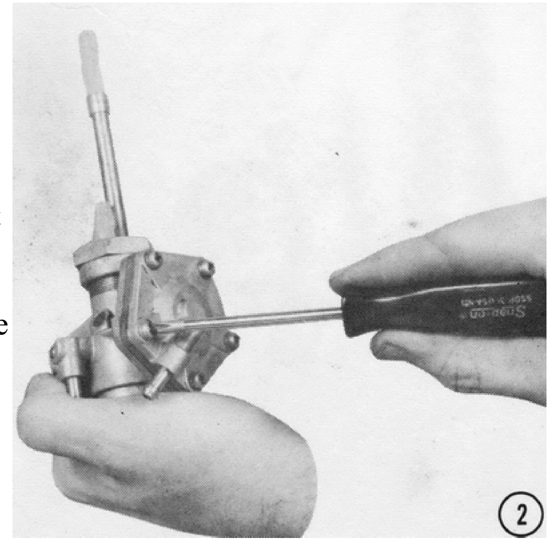
INSPECTING ON THE MOTORCYCLE

To check the fuel valve for internal air or fuel leaks, remove the sediment bowl and the vacuum line, then install a spare length of hose on the vacuum fitting. Hold a container under the fuel valve and suck on the hose with the lever in the ON and RESERVE positions. A steady flow of gasoline must come from the fuel valve. and fuel flow must stop as soon as the suction is released. There must not be any vacuum leakage in the diaphragm chamber nor any gasoline coming out of the vacuum hose; either of these problems indicates a defective diaphragm, which must be replaced. *NOTE: If gasoline leaks out of the small vent hole in the inner diaphragm cover, the spacer gasket, vent gasket, or diaphragm is damaged.*

REMOVING AND DISASSEMBLING-H-SERIES

1) Turn the lever to the ON or RESERVE position, and use a wrench to take off the sediment bowl. Drain the tank into a container by turning the lever to the PRIME position. Slide the fuel lines and vacuum line off the fuel valve fittings. Loosen the joint nut, and then remove the automatic fuel valve, gasket, and nut from the fuel tank threaded fitting. Take out the two screws holding the lever, and then lift off the lever, lever plate, and spring ring.





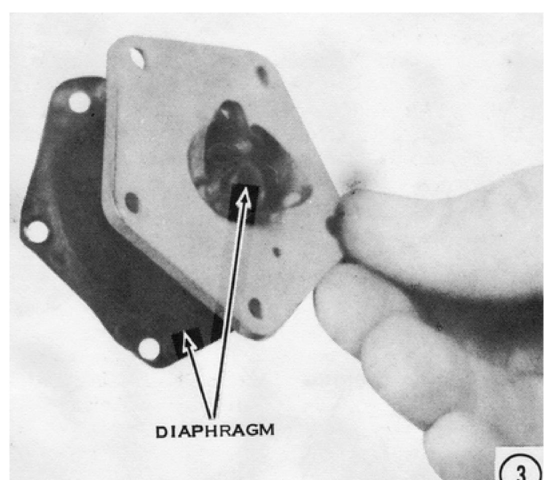
2) Loosen the five screws on the diaphragm cover a few turns at a time in a crisscross pattern to prevent pinching the diaphragm. Lift off the cover, then carefully separate the diaphragm and spacer from the fuel valve. **CAUTION: Don't pull on the diaphragm if it adheres to the inner cover, or you will tear it.** Instead, soak the fuel valve in gasoline to loosen the diaphragm.

CLEANING AND INSPECTING

Wash the parts in gasoline and then blow them off with low-pressure compressed air. **CAUTION: Don't soak the parts in carburetor-cleaning solvent, which can ruin the diaphragm.** Inspect the valve seat surface in the inner cover for nicks or gouging, which can cause fuel flow when the engine is stopped. Suck on the vacuum fitting in the diaphragm cover to make sure the check valve is not stuck; there must be no restriction. Blow into the vacuum fitting to inspect the check-valve disc pinhole; there must be more restriction than when sucking on the fitting, but there must also be a slow air leak into the diaphragm chamber. *NOTE: If there is no difference in restriction when blowing or sucking on the fitting, the check valve is stuck.* This can cause an erratic fuel supply to the carburetors and poor performance. Use a straightened paper clip to loosen the check valve disc. If the disc pinhole is blocked, use a needle to clear it. Replace the complete fuel valve if the check valve or shutoff valve seat is damaged.

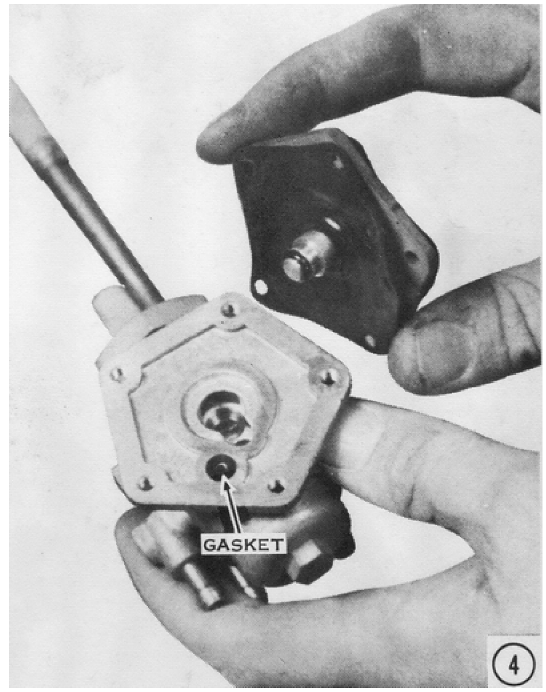
Visually inspect the diaphragm for signs of tearing or puncture. Check the O-ring seal for cuts or gouging, which can cause fuel flow when the engine is stopped. Any damage to the diaphragm or O-ring seal requires replacement of the diaphragm and spacer together. Check the inner diaphragm cover to make certain the vent hole is clear. Inspect the lever gasket for cuts or tears which would cause leakage around the fuel valve lever. *NOTE: Damage to the lever gasket, O-ring seal, and diaphragm is most often caused by leaving the fuel tank empty for a long period of disuse, which results in drying out and deterioration of these rubber parts.*

ASSEMBLING AND INSTALLING

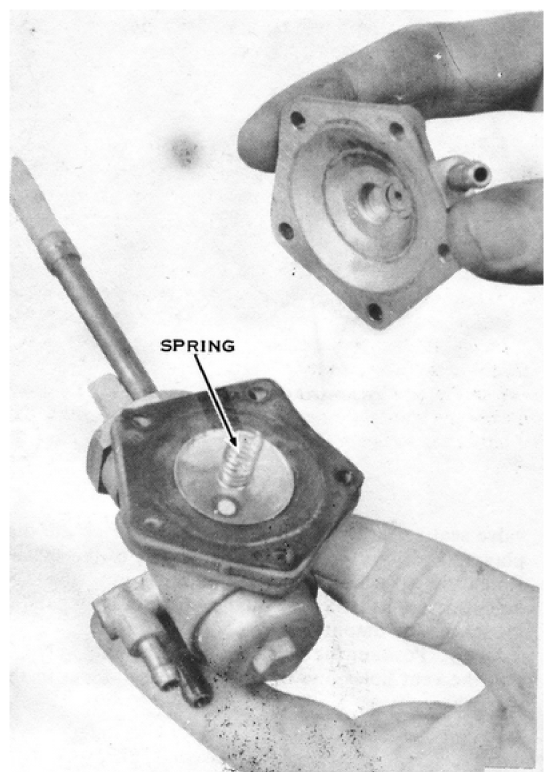


3) Wipe off any gasoline from the diaphragm covers and the diaphragm. Position the vent gasket inside the inner diaphragm cover and smear oil around the valve seat surface. Fold up the gasket side of the diaphragm and insert it into the dished side of the spacer. Rotate the spacer inside the diaphragm until the vent holes line up, as indicated by the two matching ears on the spacer and diaphragm.

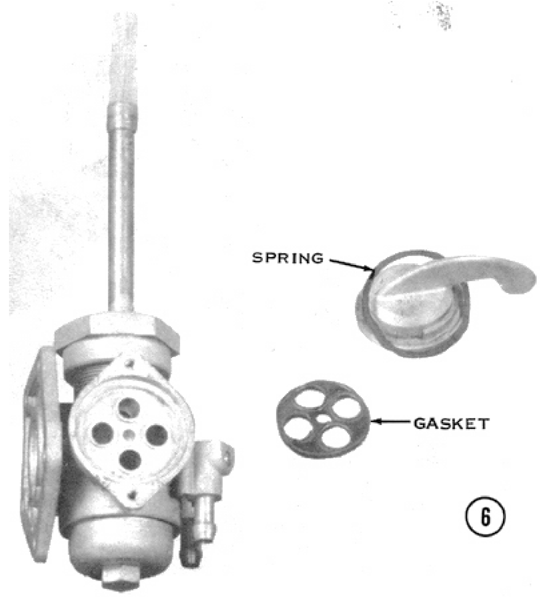
4) Position the diaphragm on the fuel valve so that the vent holes line up with the vent gasket in the diaphragm cover.



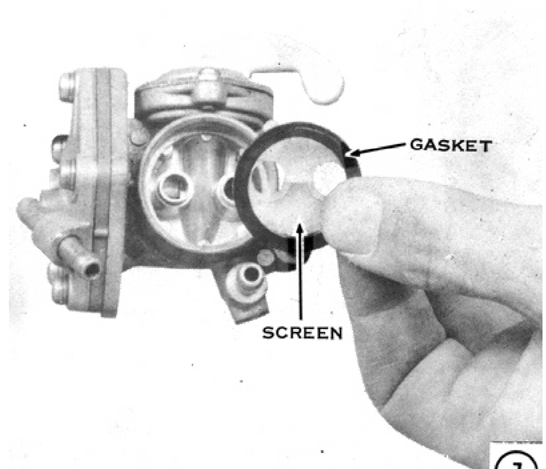
5) Install the shutoff spring over the diaphragm, and then position the diaphragm cover so that the vacuum fitting is in line with the spacer ear. Install the cover screws, with lockwashers, and tighten them in a crisscross pattern a few turns at a time to prevent damaging the diaphragm.



6) If the lever gasket was damaged, install a new one and oil it to prevent damage. Insert the lever, with spring ring, into the lever clamp plate. Install the lever plate with the PRI mark toward the sediment bowl, and turn the lever to the RESERVE position before tightening the two screws. **CAUTION: If the lever is installed without the spring ring, gasoline will leak past the lever.**



7) Hold the nylon filter by its tab, and then position it inside the fuel valve with the filter holes lined up with the outlets. Install the gasket next to the filter and use a wrench to install the sediment bowl. Roll a new gasket inside the joint nut groove, and thread the nut on the fuel valve by 1/4 turn. **CAUTION: To prevent damaging the threads, install the joint nut with the collar toward the fuel valve.** Hold the fuel valve against the fuel tank, and turn the nut onto the threaded fitting, which is a right-hand thread. Keep the fuel valve from turning while tightening the joint nut, or else the gasket will be pushed out of its groove, resulting in leakage.



Install the vacuum line, with a clip, on the diaphragm cover fitting. Slide the fuel line onto the fuel valve fittings, and then secure them with a clip. **CAUTION: Don't reverse one of the fuel lines and the vacuum line by mistake, or else the engine will die soon after starting, from fuel starvation.** If the lever is turned to the PRIME position, the engine will be flooded through the vacuum fitting on the carburetor. Fill the fuel tank and start the engine to get gasoline into the O-ring and gasket side of the diaphragm and prevent their drying out.

AIR CLEANER

There are three types of air cleaners used on Kawasaki triples. The S-series machines all have a cylindrical paper element, which fits in a can behind the carburetors and under the seat. The carburetors are connected to the air cleaner by three short rubber tubes. The air cleaner has built-in baffling to silence intake noise.

A dirty air cleaner element causes decreased power and increased fuel consumption. Use compressed air to blow the dirt off from the inside. Brush the felt cup on top of the element and then lightly oil it. CAUTION: This is a dry-type paper element. Do not oil the paper part.

The H1's all have a conical paper element in the same general location as on the S-series. The air cleaner can is connected to the carburetors by a one-piece rubber molding that incorporates the three tubes to the carburetor mouths and an air plenum chamber below the filter element. Early H1's had no provision for silencing intake noise, but 1972 models started using a plastic air horn on the H1B. This was not used on the H1C, but appears on the H1D, H1E, and H1F models.

The H2's all have a conical, oil-wetted foam filter. The location and air ducting are very similar to the H1's parts. All H2's have a rubber air horn on top of the air cleaner.

The paper-type air filters on H1's and the S-series models can be cleaned by blowing dirt off with low pressure compressed air. If they are very dirty, however, they must be replaced.

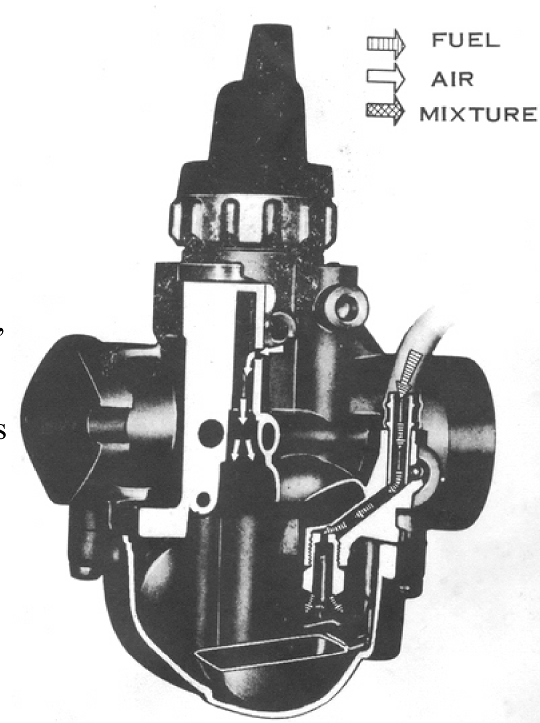
The H2 air filter is washable in kerosene or a parts cleaner type of solvent. After removing the filter from its wire frame, wash it carefully and dry it completely. Prepare a one-to-one solution of gasoline and SAE 30-weight motor oil. Soak the filter in this solution until it is thoroughly impregnated. Let it dry overnight and the gasoline will evaporate. leaving just the right amount of oil distributed evenly over the foam filter element.

If the upper air filter cap is dirty, it should be brushed lightly. Rub a little SAE 30-weight motor oil into the felt pad to restore its effectiveness.

CARBURETORS

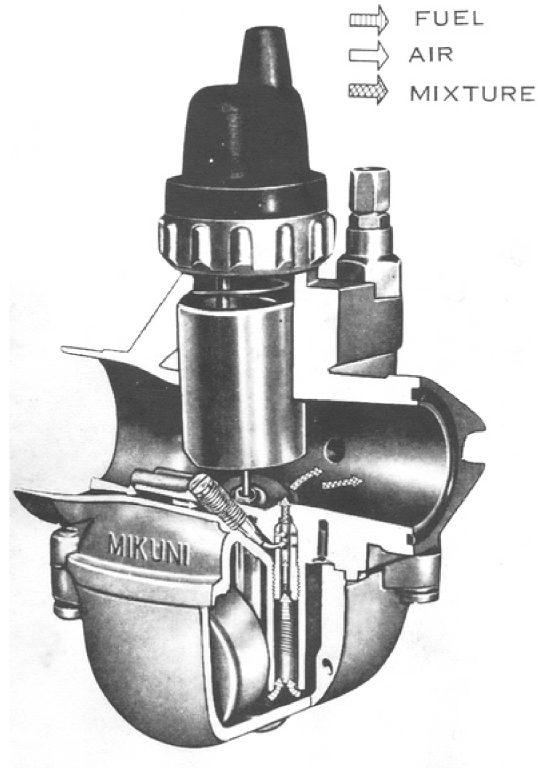
All Kawasaki triples use Mikuni VM-type carburetors. They are simple in construction but cleverly designed to give a fuel/air ratio well matched to the requirements of the engine under a wide variety of load and speed conditions.

This carburetor has four basic systems: a float system, pilot system, main system, and cold-start system. The float system consists of the fuel bowl, with a float operated fuel inlet needle valve. The fuel flows down from the tank by gravity and into the fuel bowl. As the fuel in the bowl rises to a predetermined level, the float pushes the inlet needle valve closed. The level of the fuel is important to the motorcycle's performance, as we shall see.



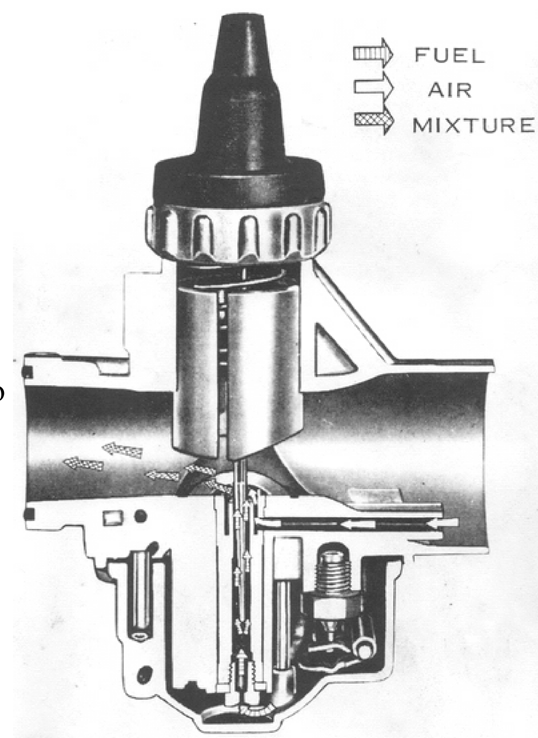
The float circuit. When the float chamber is empty, fuel flows from the fuel tank to the float valve. When the float drops, the fuel passes the needle and fills the chamber. When the fuel level rises to the designed level, the floats are lifted enough to push the float valve needle against the seat and shut off the flow from the tank. The float chamber vent has two functions: it keeps a balanced atmospheric pressure in the chamber to force the fuel into the carburetor jets as venturi vacuum increases, and also admits air into the chamber for use in the cold-start pickup tube.

The pilot system is analogous to the idle system on an automobile. Under low-load conditions, it supplies the fuel/air mixture the engine needs. The pilot jet is in a tube leading from the carburetor body or mixing chamber down into the fuel in the bowl. In the front of the carburetor throat is an air inlet leading to a small premixing chamber above the pilot jet. Incoming air is controlled by the air screw. Turning the air screw clockwise cuts down the amount of air admitted, making the pilot mixture richer. Turning it counterclockwise has the opposite effect. In the premixing chamber above the pilot jet is an "emulsion tube," which is a small-diameter tube with holes. The low pressure produced by the engine sucks the fuel up through the pilot jet and into the emulsion tube. It also sucks air past the air screw and into the premixing chamber around the emulsion tube. The air passes through the holes in the emulsion tube and joins the fuel to make a bubbly froth or emulsion. This mixture is drawn through a short passage and joined by more air from the carburetor throat that comes in through the bypass hole. This final mixture flows into the carburetor throat through the pilot outlet hole and goes into the engine. If the throttle is lifted a little bit, the flow in the bypass reverses and the fuel/air emulsion flows out through both the pilot outlet and the bypass.



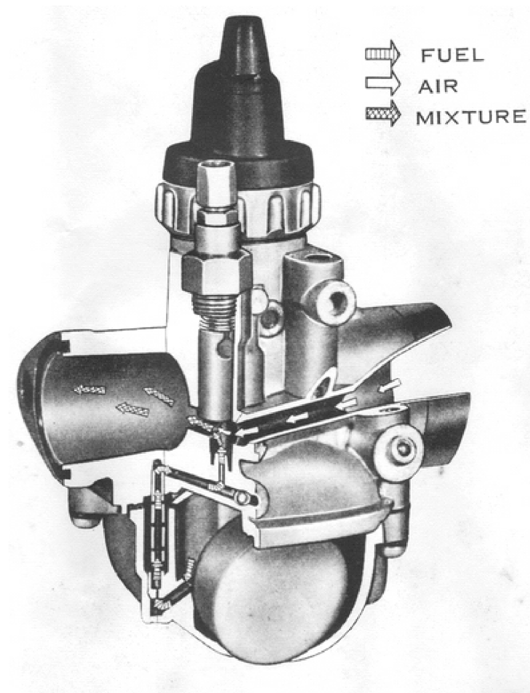
The low-speed circuit. The low-speed air supply enters the carburetor body through the pilot air inlet at the carburetor throat. Air flow through this channel is controlled by the position of the tapered idle-mixture adjusting screw. The low-speed fuel is forced through the pilot or low-speed jet by atmospheric pressure in the float chamber. Emulsifying bleed holes in the jet permit the low-speed air to mix with the fuel, and this mixture is supplied to the carburetor venturi through the low-speed and bypass outlets.

The main system comes into play from idle speed to full throttle. All the fuel for the main system comes through the main jet. Like the pilot jet, this one is located in a tube extending from the body of the carburetor down into the fuel bowl. Of course it is much larger than the pilot jet. and protrudes from the end of the tube into the very bottom of the bowl. The main jet feeds fuel to the needle jet. Down the middle of the needle jet and partially blocking it is a tapered rod called the jet needle. This is carried by the throttle slide, a pistonlike valve that rides up and down in a bore in the carburetor body to control the amount of air going into the engine. As the slide is raised and lowered. the taper of the jet needle changes the amount of blockage of the needle jet. This varies the amount of fuel which can get through the needle jet and to the engine. At low speeds, the slide closes the venturi, restricting the amount of air available to the engine. At the same time, the larger diameter upper end of the jet needle blocks the outlet of the needle jet, allowing less fuel to flow. At large throttle openings, the slide opens the venturi and a lot of air can come through. Because the slide is so high, only the sharp tip of the jet needle hangs down into the needle jet. resulting in a greater fuel flow. When the jet needle is pulled so far out of the needle jet that the needle jet's flow capacity exceeds that of the main jet, the total fuel flow is determined by the main jet alone. This happens over about 3/4 throttle.



High-speed circuit of a primary-type carburetor. The high-speed fuel flow enters the jet block or needle jet through the main jet, from where it is controlled by the position of the jet needle in the needle jet orifice. Emulsifying air enters at the carburetor throat, passes through the air jet, and into the primary chamber of the needle jet to mix with the outflowing fuel. As the throttle is opened, more air passes under the throttle valve slide and more fuel flows past the widening gap between the jet needle and needle jet orifice. At about ¾ throttle opening, the gap is so large that the main jet orifice becomes the controlling factor in determining fuel flow and carburetor high-speed mixtures.

Another feature of the main system is the primary choke of the needle jet. The primary choke is a little wall from 2 to 8mm high on the front of the needle jet opening, extending tip into the carburetors venturi. The primary choke acts in conjunction with a tiny fuel reservoir around the top of the needle jet and an air passage to the reservoir from the mouth of the carburetor. Together they act to keep the fuel mixture lean at low power outputs to help the engine run more smoothly. At high throttle openings, they enrich the mixture to protect the engine from overheating and possible seizure. The higher the primary choke is. the greater the combined effect.



The cold-start circuit. When the cold-start plunger is lifted, two inlet and one outlet channels are opened into the cold-start mixing chamber. The air enters through a channel from the carburetor throat. Raw fuel is sucked through the cold-start jet, which meters the cold-start mixture. Emulsion bleed holes in the cold-start pickup tube mix float chamber air with the fuel. This "wet" mixture enters the cold-start chamber through the plunger seat hole, where it is further mixed with the inlet channel air. This rich starting mixture is drawn into the carburetor venturi through the outlet port located just in back of the closed throttle valve.

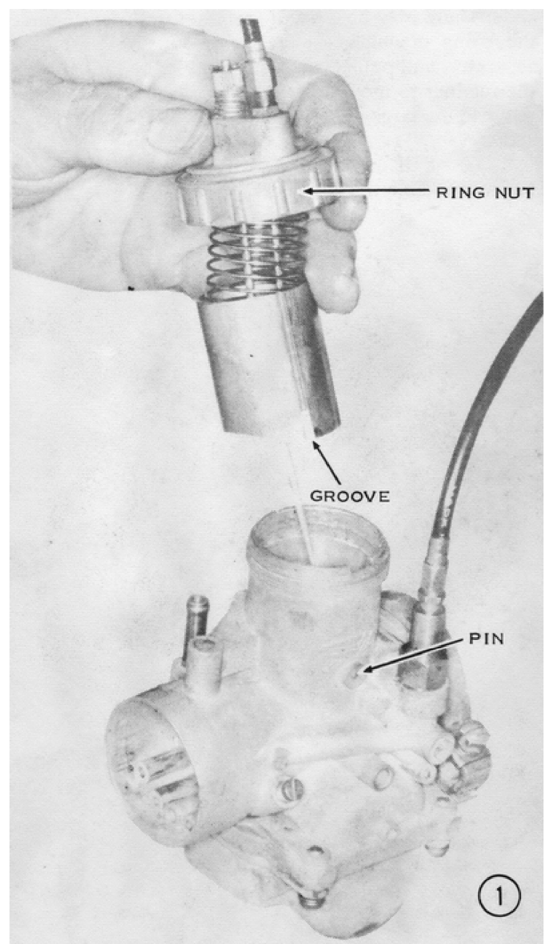
The fourth system of the Mikuni VM carburetor is the cold-start mechanism. This is a special system that takes the place of the choke on an automobile carburetor. When activated, it supplies an extrarich mixture to the cold engine for starting. An emulsion tube extends into a well in the fuel bowl. At the bottom of the well is a small, fixed, brass cold-start let. A large air passage leads from the mouth of the carburetor to a mixing chamber on the side of the carburetor body at the rear. A large, flat-fronted valve in the chamber closes a fuel passage that conies up from the emulsion tube. To start a cold engine, the cold-start valve is lifted with the throttle closed. The engine sucks fuel through the cold-start jet, up the emulsion tube (air is supplied by the air space above the fuel in the bowl), and into the mixing chamber. There it is joined by more air, and the mixture is drawn down a passage which empties into the carburetor throat downstream from the throttle slide. The throttle slide must be closed for the cold-start system to be effective.

OVERHAULING THE CARBURETOR

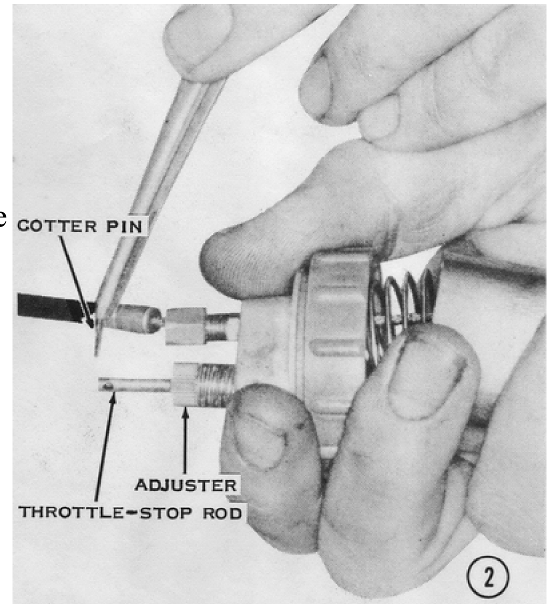
See the engine disassembly section of Chapter 4, Engine Service, for carburetor removal. Because of the possibility that gasoline will spill out of the carburetors while you are disassembling them, work on a surface that will not be harmed by it. **CAUTION: Fire danger is extreme. Do not smoke while working on the carburetors or work near an open flame until the carburetors have been completely disassembled and dried.**

DISASSEMBLING

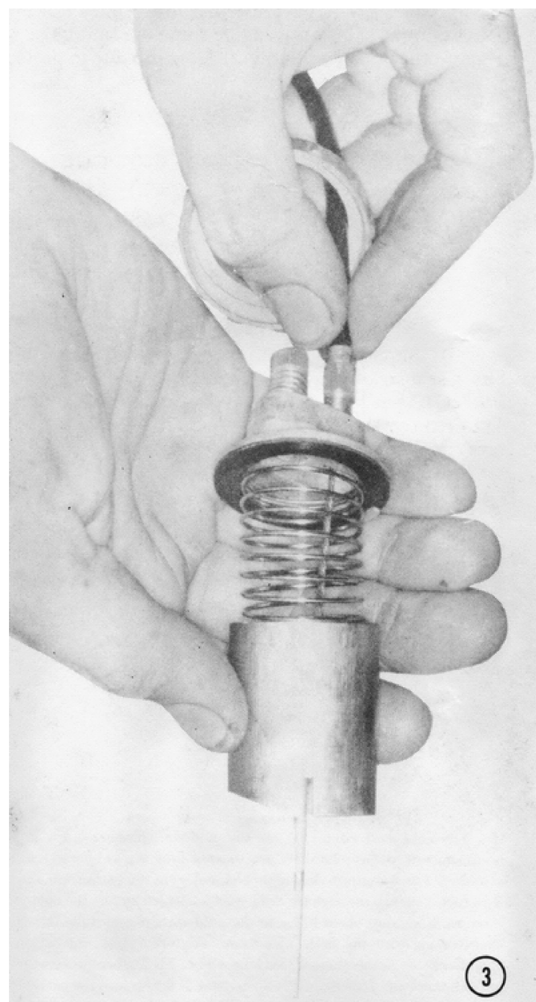
1) Unscrew the ring nut, then lift the throttle slide assembly out of the carburetor body.



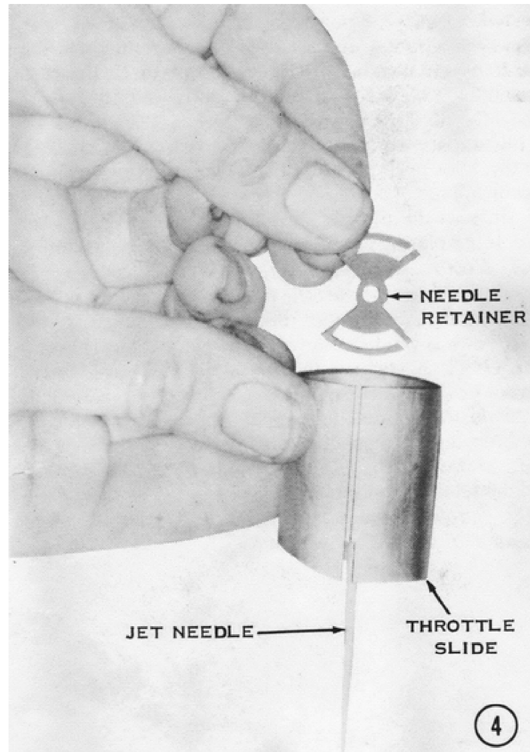
2) Push together the ring nut (with the carburetor cap in it) and the throttle slide assembly to compress the slide spring. This will cause the throttle stop rod to protrude from the idle speed adjuster. Remove the cotter pin from the end of the throttle stop rod. The throttle stop rod will fall out of the bottom of the slide.

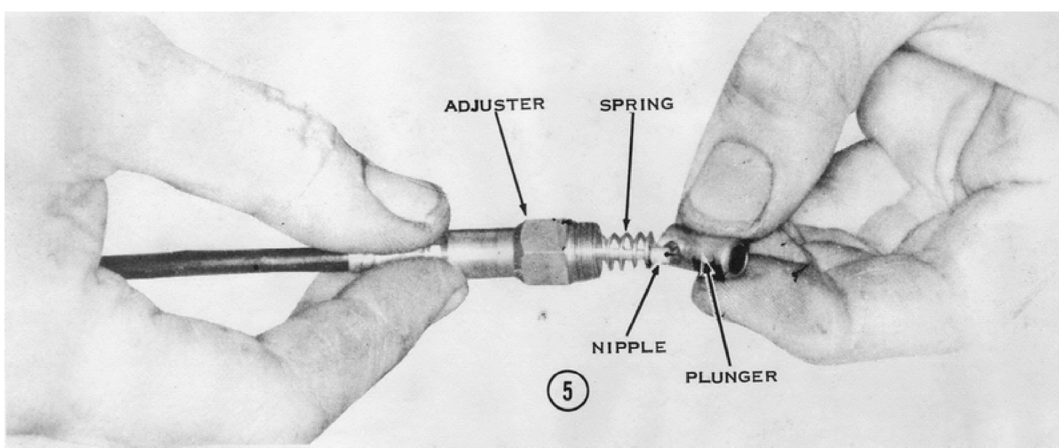


3) Push the throttle cable sheath down into the adjuster while holding the throttle slide and the carburetor cap aligned as shown. Disengage the cable nipple from the keyhole-shaped hole in the center of the throttle slide. There may be a needle retainer in the slide under the spring, in which case the spring must be compressed separately and pulled completely out of the slide to allow the retainer to move far enough to let the cable nipple move to the large end of the keyhole-shaped hole in the slide.



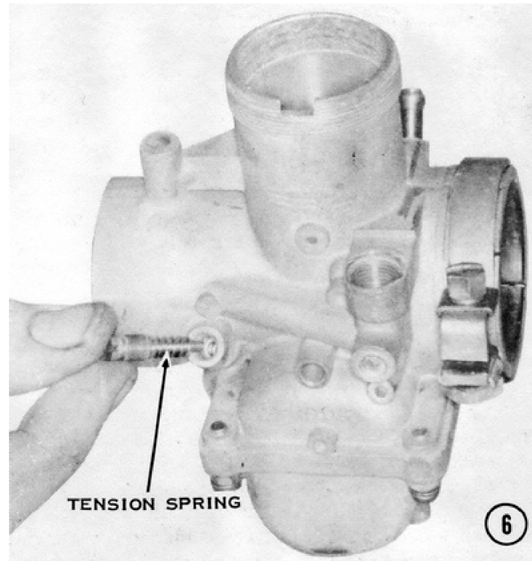
4) Pull out the needle retainer, then push the needle out from the bottom. **CAUTION: Do not remove the small E clip on the top end of the needle. If the E-clip were accidentally moved to a higher notch, the carburetor would supply a leaner mixture, which would cause overheating, detonation, and engine seizure.**



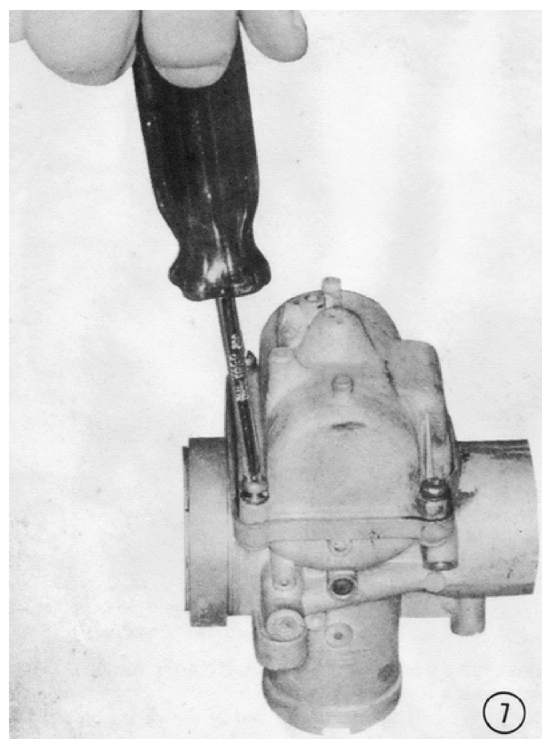


5) Use a 12mm wrench to remove the cold-start cable adjuster from the carburetor body. Compress the spring enough to disengage the cable nipple from the plunger. The spring and adjuster will now slip off the end of the cable.

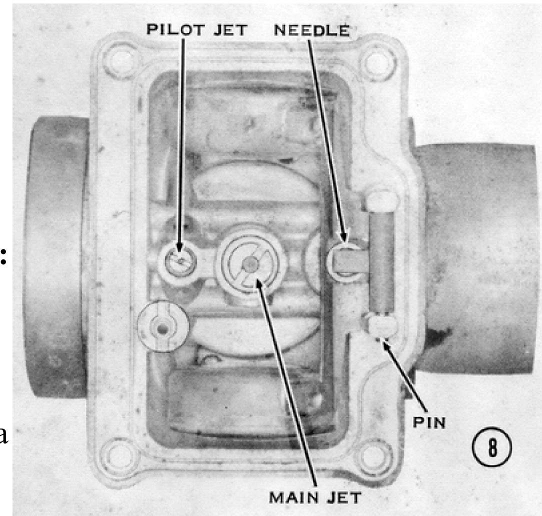
6) Unscrew the air screw, and remove it and the spring from the carburetor body.



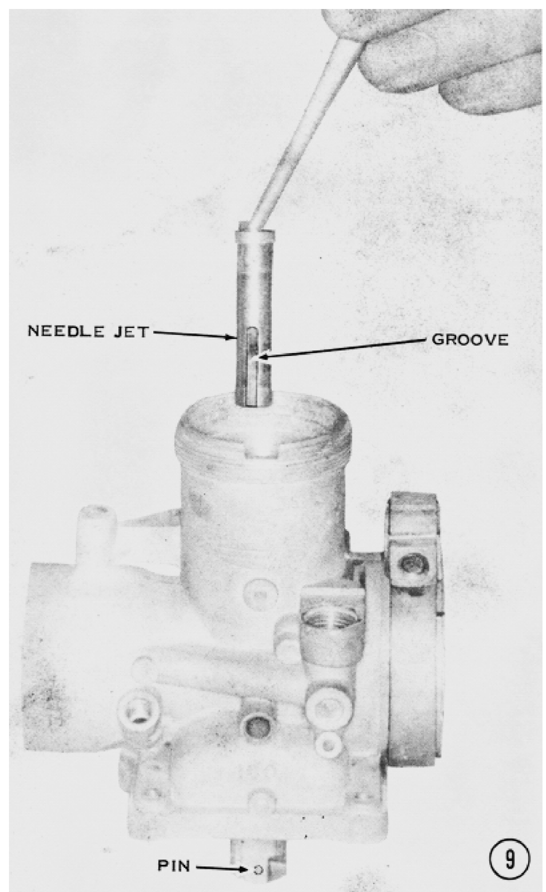
7) Remove the four float bowl screws. If there is an overflow tube bracket held on by one of the screws, note on which corner of the bowl it goes to speed assembly. Lift off the bowl and remove the gasket between it and the carburetor body.

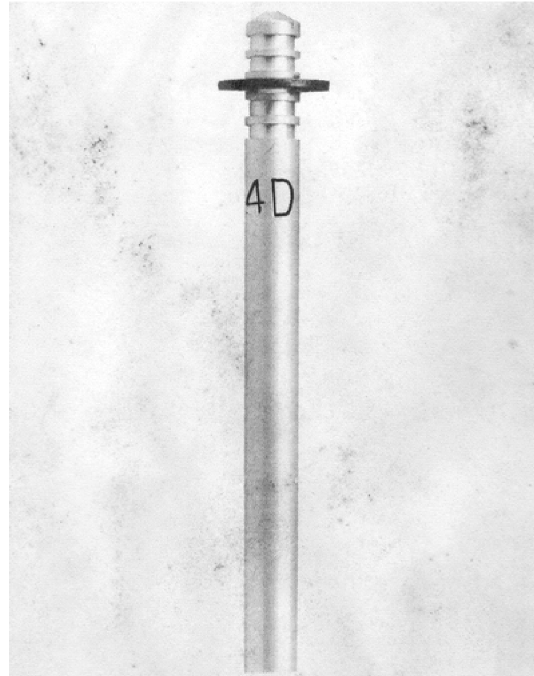


8) Slip out the float pivot pin, then remove the float. Use a small flat-bladed screwdriver to remove the pilot jet. Use as large a flat-bladed screwdriver as possible to remove the main jet. **CAUTION: These jets are brass and rather soft. Be careful not to let the screwdriver ruin the slot. Do not push wires or small drills through the jets.** Turn the carburetor body right side up and catch the
float valve needle as it falls out. Remove the float valve seat with a 10mm socket wrench.



9) Lift the needle jet out of the carburetor body from the top.





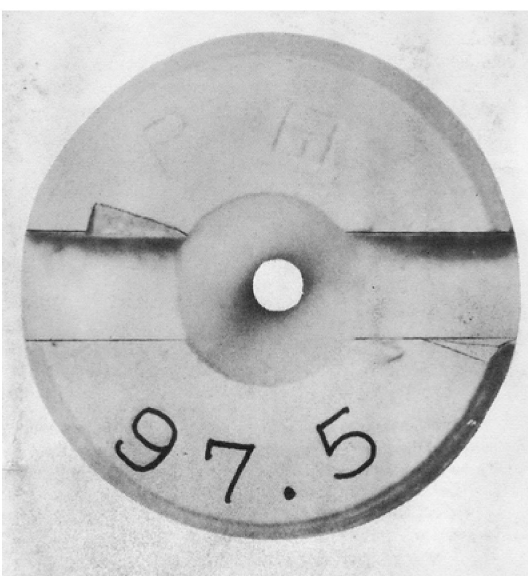
This is how the jet needle is marked. The numbers in the specifications section at the end of this chapter include an extra digit denoting the groove at the top end of the needle in which the clip is positioned (for proper needle height).

CLEANING AND INSPECTING

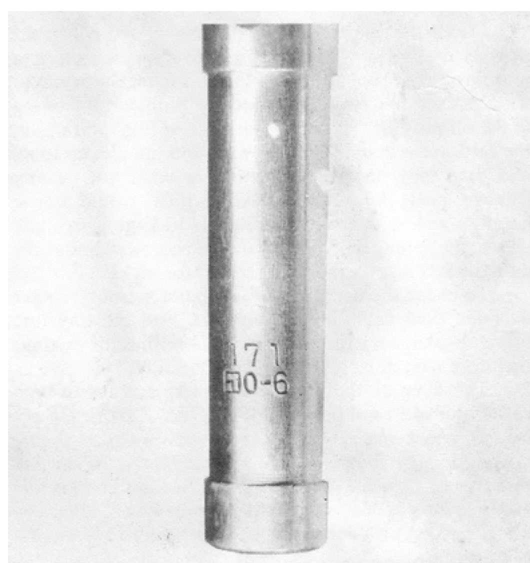
Soak all carburetor parts, except those made of rubber, in solvent or a commercial carburetor-cleaning solvent. Rinse the parts thoroughly in hot water to remove the solvent. Use compressed air to blow out all jets and passageways. Inspect all jets and passageways for deposits caused by stagnant gasoline.

Check the float valve needle and seat for pits or grooves. Submerge the float assembly, and then shake it to listen for gasoline, which would indicate a leak. *NOTE: A leaking f oat causes high fuel levels, with consequent rich fuel-air mixtures and flooding.* Dark scratches on the brass floats indicate contact with the carburetor body caused by an incorrect float level adjustment. Check the floats for a convex shape, which is normal. Concave floats have been collapsed by using compressed air on an assembled carburetor, and they will result in excessively rich fuel-air mixtures. Insert the float hinge pin in the carburetor body and check for a snug fit.

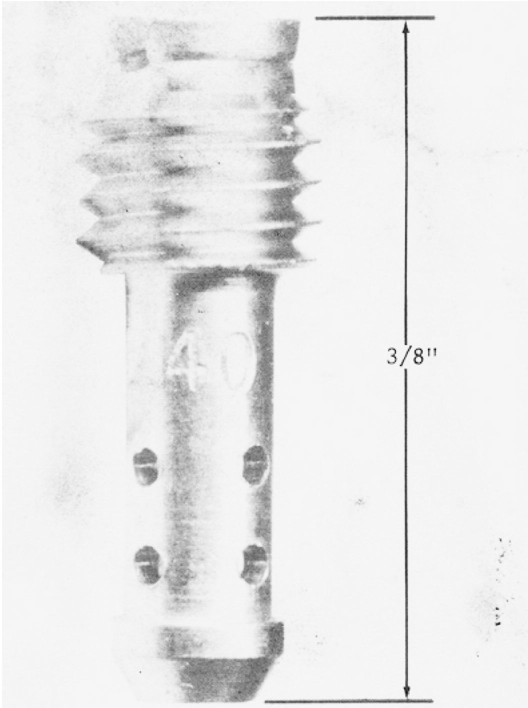
Compare the markings on the main jet, jet block, jet needle, low-speed jet, and throttle valve cutaway against specifications.



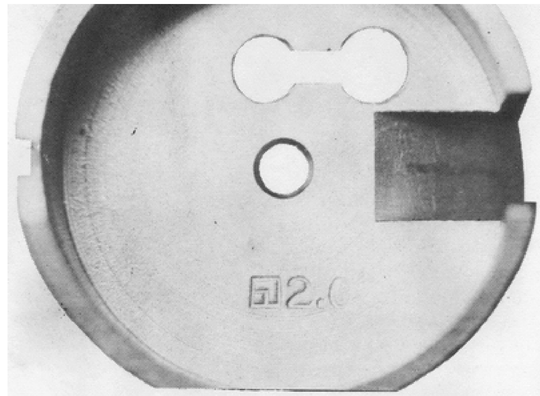
This is how main jet sizes are marked. All main jets used in these machines have a round head with a screwdriver slot as shown.



This is how the needle jet (NJ) is marked. The numbers in the specifications section at the end of this chapter may include an extra digit denoting the height of the primary choke in millimeters.



This is how the pilot jet sizes are marked. The pilot jet is very important to general usage because it controls the fuel mixture strength during idling and almost all around-town riding.



The slide or throttle valve cutaway is indicated by this number on the bottom of the slide. The cutaway controls the fuel mixture strength during the transition from the pilot system to the main system.

Inspect the throttle slide for wear on its outer surface. If the plating has worn through, replace the throttle slide. *NOTE: A worn throttle slide is evidenced by a clicking sound at low throttle openings.* Insert the throttle slide in the carburetor body and check for free movement. If binding is evident, replace the carburetor. **CAUTION: A sticking throttle slide can cause loss of control from a runaway engine.**

Roll the jet needle on a flat surface to check for bending, and inspect the tapered section for nicks or wear. Make sure the clip is tight in the jet needle groove and the retainer is not bent or broken. *NOTE: A loose jet needle flutters in the jet block and causes erratic engine operation at part-throttle openings.*

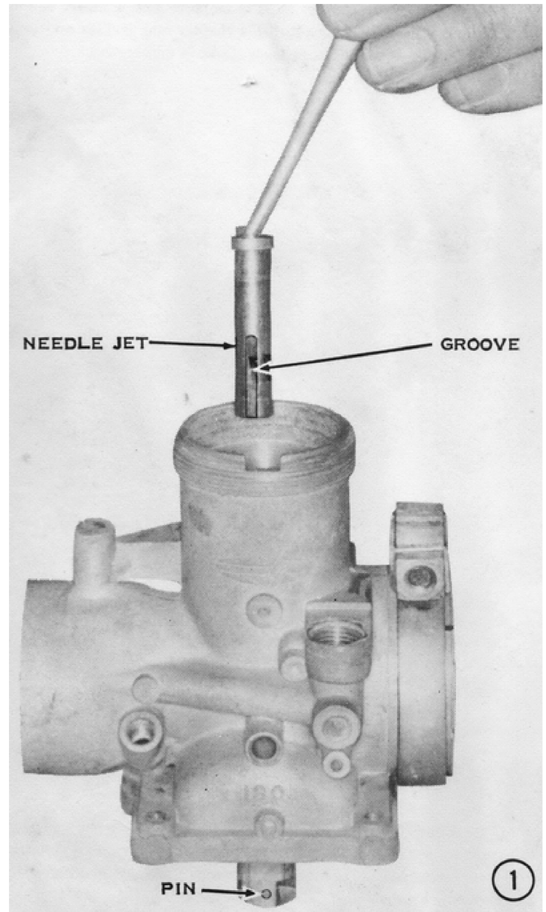
Check the rubber seal in the end of the cold-start plunger for cracking or deterioration. Insert the plunger into the carburetor body and check for free movement without excessive play. To inspect the plunger for leaking in the off position, install the plunger, spring, and nut in the carburetor body. Wrap tape around the pickup tube, and then blow into the tube. There must not be any leakage past the plunger seal, which would cause flooding at low throttle openings. If leakage is evident, check the plunger bore in the carburetor body for damage and inspect the plunger seat for nicks.

To check the carburetor fuel channel, hold a finger over the float valve hole, then blow into the fuel line fitting. Leakage is caused by a porous carburetor casting; therefore, you must replace the carburetor.

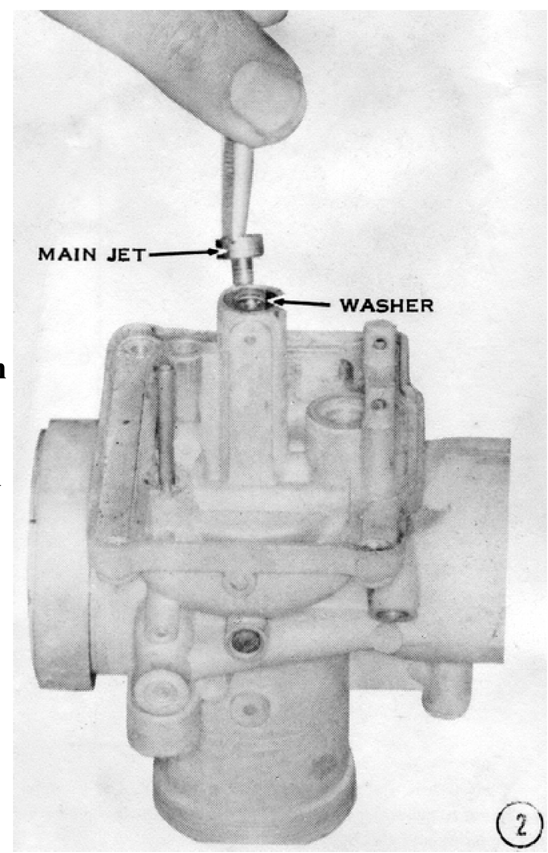
The fiber insulating sleeve of a spigot clamp-type carburetor must not be worn or cracked. *NOTE: On H2 models, check the rubber socket on the cylinder intake flange for poor bonding to the metal flange, which can result in an air leak.* **CAUTION: A leaking carburetor-to-manifold connection results in excessively lean air-fuel mixtures, with consequent piston seizure and engine overheating.**

Inspect the throttle and cold-start cables for fraying or corrosion. Make sure the cable action is free of binding. Make sure the throttle stop rods are straight by rolling them on a flat surface. **CAUTION: A bent or nicked throttle stop rod can cause the carburetor to stick at wide-open throttle.**

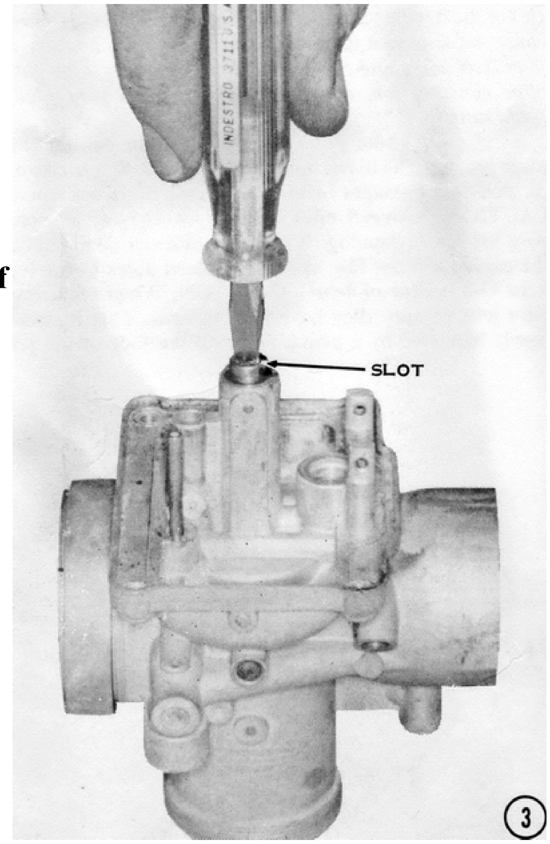
ASSEMBLING



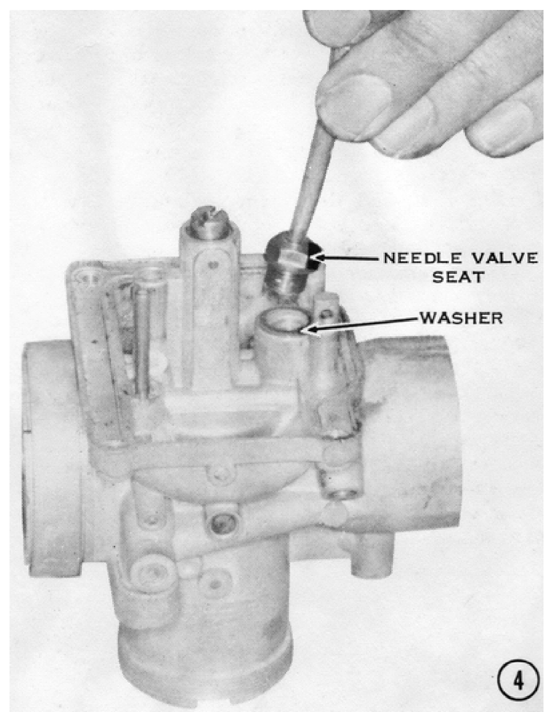
1) Drop the needle jet into the carburetor body from the top. The notch in the side of the jet fits onto a pin in the body near the bottom, as shown. *NOTE: The pin must be tight in the carburetor body.*



2) Turn the body over. Put the washer on the bottom end of the needle jet, and then thread the main jet into the bottom of the needle jet. **CAUTION: Be sure the main jet is a reverse-type, round-headed jet. A hex-head main jet has different-sized threads and can strip the threads in the needle jet. Check the size in the specification table in the Appendix. Too small a main jet can cause major engine damage from overheating. Too large a main jet will cause excessive exhaust smoking, high gasoline consumption, excessive emissions, and poor high-speed running.**

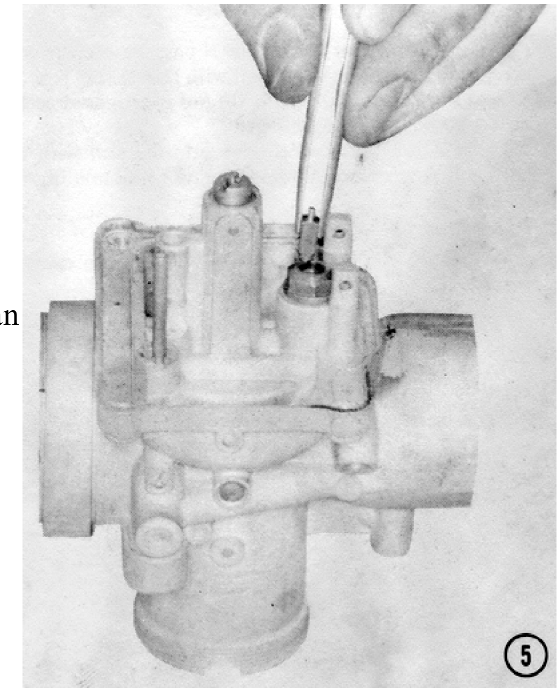


3) Tighten the main jet to 17 lb-ins. **CAUTION: Be sure the tip of the screwdriver fits the slot in the jet. The main jet is soft brass and can be damaged easily by using too narrow a blade or by overtightening.** After tightening the main jet, look into the air jet passage in the mouth of the carburetor to check the alignment of the needle jet air hole. **CAUTION: If the air hole is blocked or masked, midrange and high-speed operation will suffer unless the needle jet is replaced.**



4) Check that the fuel inlet passage is clear, and then install the needle valve seat with its washer. Tighten the seat securely. **CAUTION: Do not overtighten or the carburetor body will be damaged.**

5) Drop the needle valve into the seat with the sharp end down. Suck on the fuel line while holding the valve against the seat, to check for leaks that will cause flooding or fuel overflow. Leaks can occur at the needle and seat and through casting flaws in the carburetor body.



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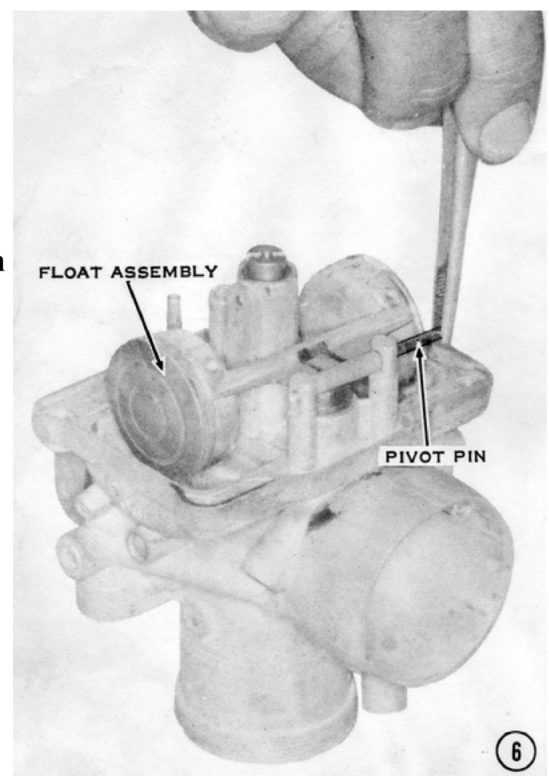
6) Position the float assembly as shown, and then slide the pivot pin into place. Note that the soldered tangs on the floats point toward the main jet. **CAUTION: Be sure the floats have not been crushed or bent so as to interfere with the carburetor body or float bowl. The pivot pin must be a fairly snug fit in the carburetor body posts or the float valve's performance will be erratic.** Hold the carburetor right side up and check that the float does not drop far enough for the needle valve to fall out of its seat. **CAUTION: If the needle valve falls out in operation, the carburetor will immediately overflow, flooding the engine inside and out, which is a dangerous fire hazard. The float on early models cannot be adjusted and must be changed for one with less drop.** Later models have an adjusting tab. which can be bent to obtain a maximum float drop of 20mm.



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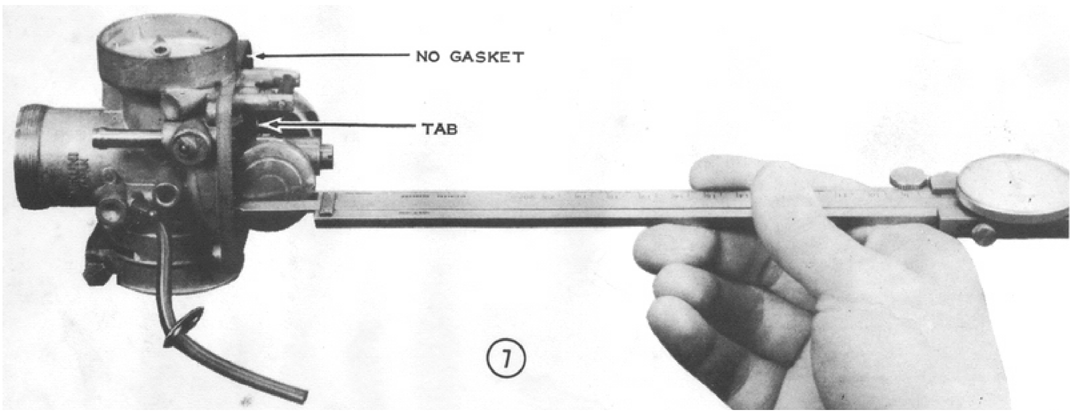
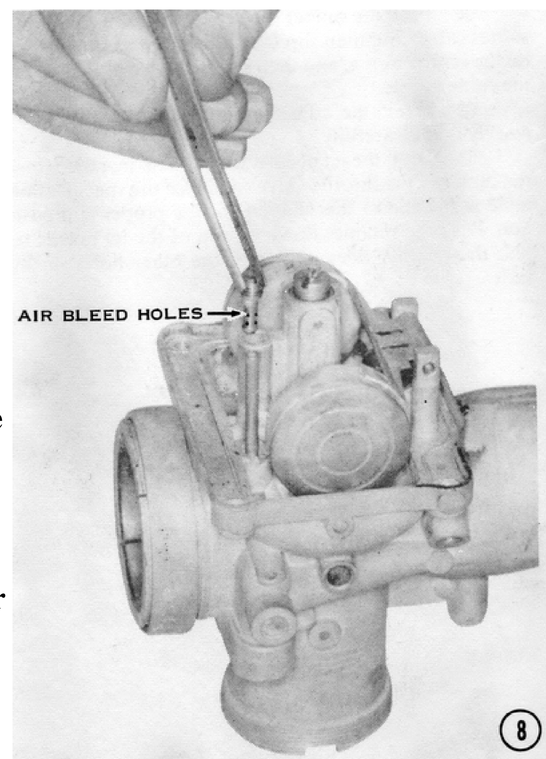
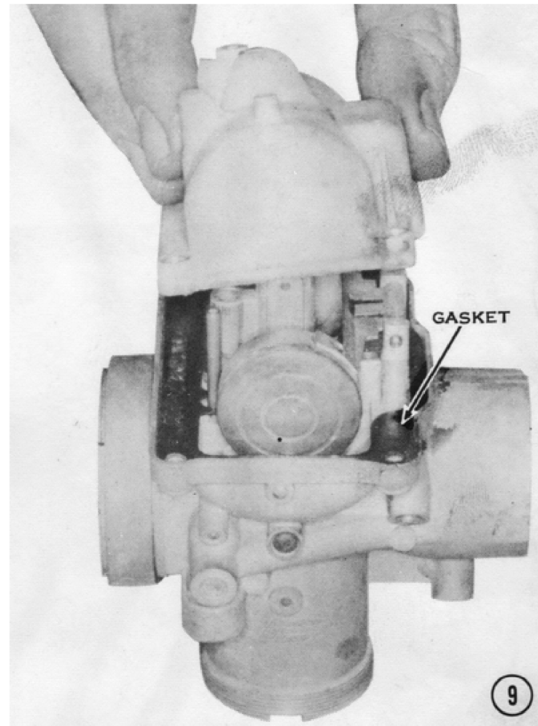
7) To measure the float level, rest the carburetor body on a horizontal flat surface, with its air intake pointing straight up. Tip it back until the float arm just touches the valve tip. Measure the distance from the float bowl gasket surface (without a gasket) to the outermost edge of the float. which must be as specified in the Appendix. If it is incorrect, bend the tab that bears on the end of the needle valve. *NOTE: Too high a float level will cause major engine damage from overheating. Too low a float level will cause excessive exhaust smoking, high gasoline consumption, excessive emissions, and poor highspeed running.*



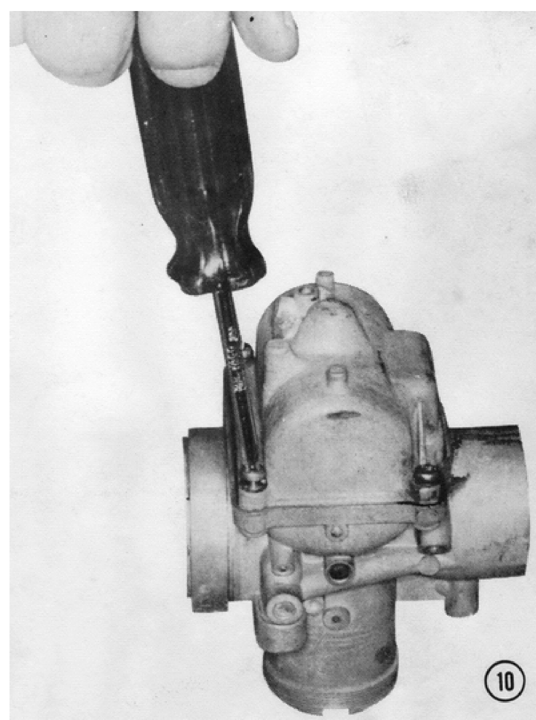
8) Drop the pilot jet into the tube behind the main jet, with the bleed holes down. Check that the pilot air and fuel passages in the carburetor body are open. **CAUTION: Clogged pilot system passages can cause poor low-speed running. If they are blocked completely, the engine will not idle at all. The bleed holes in the jet must also he free of debris. CAUTION: When replacing pilot jets, be sure they have ISO threads. This is commonly indicated by a punch mark on the face of the jet near the screwdriver slot. If a jet with incorrect threads is used, the carburetor body will be damaged. See the beginning of Chapter 4, Engine Service, for a complete explanation of ISO threads.** Carefully tighten the pilot jet with a small screwdriver.



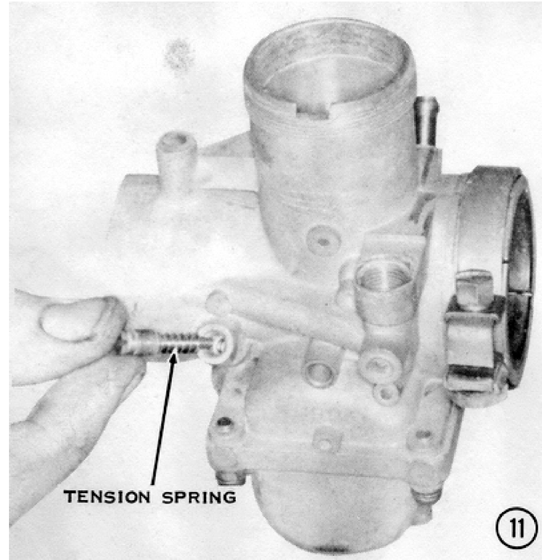
9) Install a new gasket so that the eyelet on the gasket fits over the tube for the cold-start jet. Check the inside of the float bowl to be sure the brass cold-start jet is in the bottom near the starter reservoir tube. The brass overflow tube must be tight in the bowl. **CAUTION: If the overflow tube loosens or falls out during operation, gasoline will run out of the bowl, causing a fire hazard.** Check that the air vent in the carburetor body is clear. H1 carburetors have an extra vent that opens into the mouth of the carburetor, which must also be open. **CAUTION: If all the air vents are stopped, the float chamber will be under pressure when the fuel cock on the tank is opened. This will force the gasoline through the needle jet and into the venturi of the carburetor, creating a fire hazard or a severely flooded engine.** Position the float bowl on the gasket.



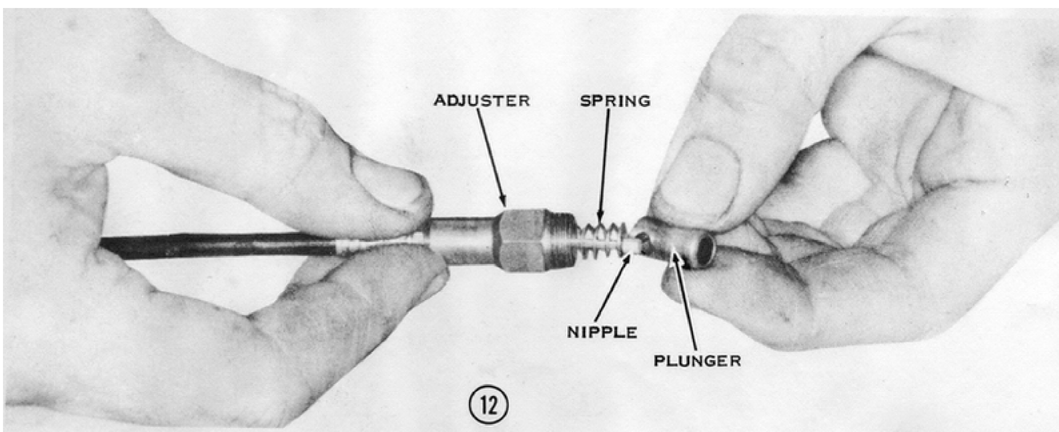
10) Fasten the float bowl in place with four screws, each with a lockwasher. Don't forget the overflow tube holder on H2 and S-series carburetors, which goes on one of the screws closest to the engine. Tighten the screws evenly to prevent distorting the fuel bowl.



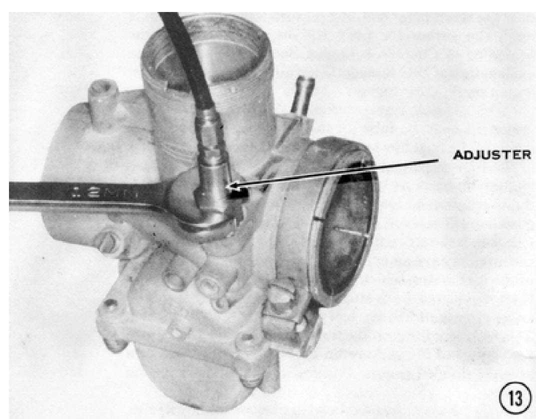
11) Screw in the air screw with its tension spring. **CAUTION: Do not tighten this screw excessively; bottom it lightly to prevent damaging the seat in the carburetor body, which would make an idle mixture adjustment difficult. This can only be cured by replacing the carburetor assembly, or the body, if one is available.**



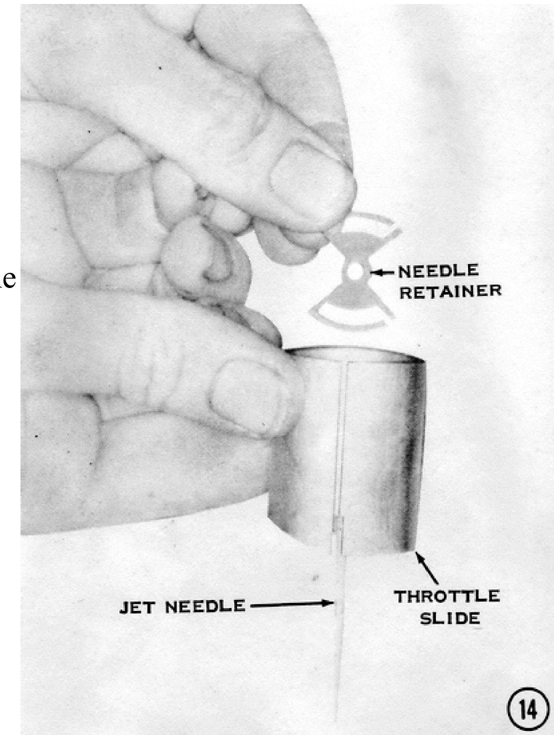
12) Push the rubber dust cover over the end of the starter cable, and then slip the adjuster on as shown. Put on the return spring, and then slip the valve plunger over the cable nipple.



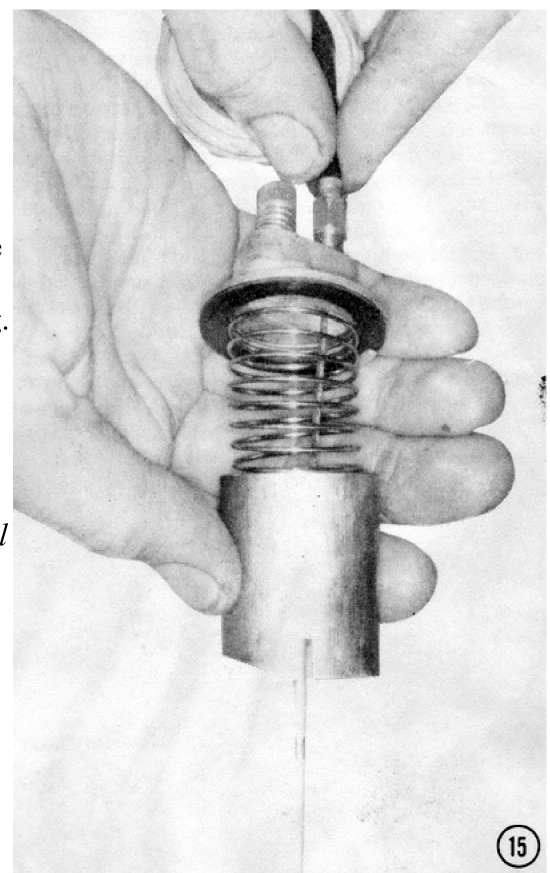
13) Screw the adjuster into the carburetor body and tighten it carefully.



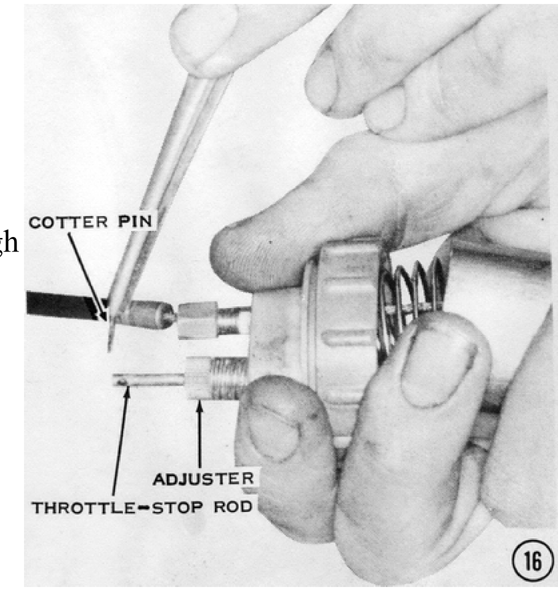
14) Drop the jet needle. with its clip installed, into the center of the throttle valve slide. See the specification table at the end of this chapter for the proper clip position. Push the retainer down on top of the jet needle so that the retainer does not cover the other holes in the slide.



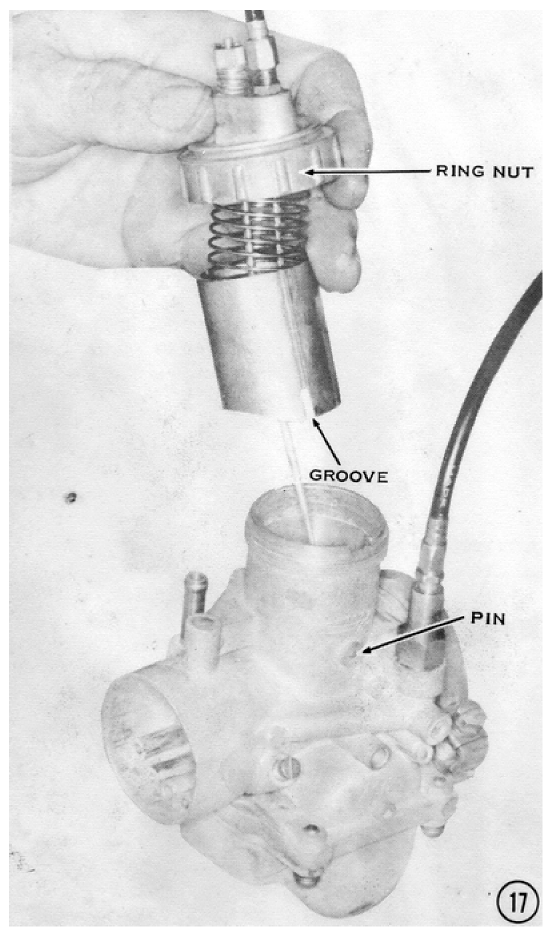
15) Insert the slide-return spring into the slide and push the throttle cable through the ring nut and through the adjuster in the carburetor top. Position the carburetor top against the return spring. Now push the cable nipple through the double hole in the slide. *NOTE: Be sure the gasket is in place.* The cable nipple will hook into the other side of the double hole when released. Now use a pointed instrument to rotate the needle retainer until it is in a position to prevent the cable from slipping back into the large side of the double hole. *NOTE: Some models use a retainer with a small tab that fits into the double hole to prevent the cable from slipping out.*



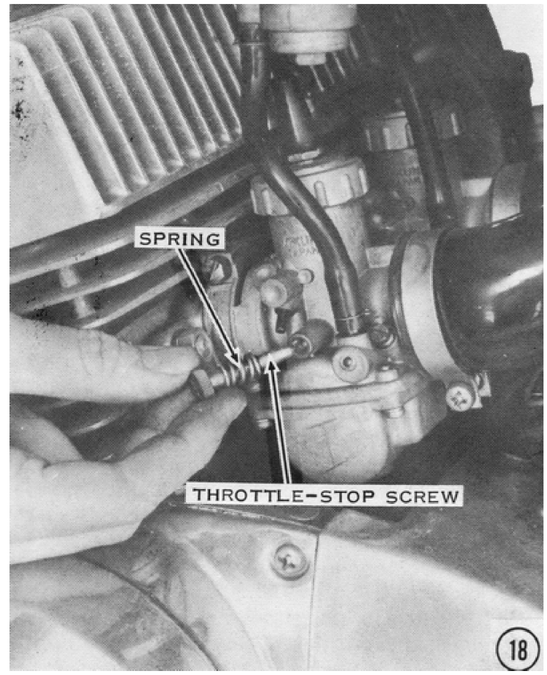
16) On H1 and S1 models only, slip the throttle stop rod up through the last hole in the throttle valve slide. The rod should extend through the slide, inside the spring, and through the idle adjuster screw on the carburetor top as shown. Insert a small cotter pin in the hole in the end of the rod to secure it.



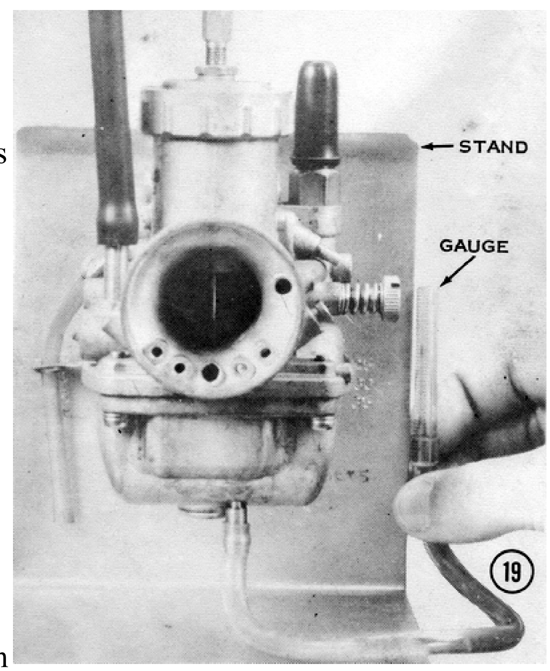
17) Install the completed slide assembly into the throttle bore of the carburetor body. The groove in the slide fits on the pin in the side of the bore to prevent the slide from rotating. The needle goes into the needle jet. The key in the carburetor top fits the notch in the body, as shown in Step 15). Screw the ring nut on finger tight. **CAUTION: Be sure the gasket stays in position. If the gasket slips out of position, it could prevent the throttle slide from moving freely.** If it loosens during engine operation, it can be tightened by tapping lightly on the ridges with a screwdriver and a mallet.



18) Install the side throttle-stop screw, with its tension spring, on H2's, S2's, and S3's. Screw it in until it just lifts the slide.
CAUTION: If it is screwed in all the way, the engine will race when started.



19) Even though the float level has been set on the bench. this does not guarantee that the fuel level will be correct. It is the fuel level that actually determines how rich the mixture will be. To measure the fuel level, drill a small hole in the bottom of an old float bowl and thread it to accept a small brass fitting, onto which a neoprene tube should be fitted as shown. Though the illustration shows the carburetor mounted on a test stand. the level can be similarly checked on a motorcycle. Find the fuel level for your machine in the specification table at the end of the chapter. That level is the distance in millimeters from the center of the carburetor bore to the level of the fuel in the bowl when the float valve shuts off the fuel flow from the tank. Measure the distance on your carburetor, and then make a scratch on the side of the float bowl at the proper fuel level. Turn the fuel cock ON and hold the neoprene tube up beside the float bowl. The fuel in the tube should rise to the scratch mark. If it is too high, the float level must be raised. If it is too low. the float level must be reduced.



TUNING THE CARBURETORS

The procedure for adjusting the idle speed is covered in Chapter 2, Tuning for Performance. The carburetor settings listed in the specification table at the end of this chapter are the manufacturer's recommendations for general usage. Because conditions of operation may differ, it may be necessary to experiment with the carburetor adjustments and tuning to obtain peak engine performance and/or best fuel economy. This section explains how to tune the carburetors for each mode of operation. Before changing the jetting of the carburetors, be sure the ignition system is in good condition and the engine is properly timed. The carburetors must also be properly synchronized.

SYNCHRONIZING THE CARBURETORS

In order for the engine to run smoothly and deliver the best performance and fuel mileage, all three carburetors must act together. They must be synchronized so that all three throttles lift the same amount at the same time, so that all three pilot systems and main systems are working in unison.

To synchronize the carburetors, first warm the engine to operating temperature, and then switch it off.

Loosen the throttle cable adjuster at the twistgrip to get as much cable slack as possible. This moves the sliding block that carries the four lower cables (one to each carburetor and one to the oil pump) all the way to the bottom of the cable junction box. Shorten the cable adjusters on the carburetor caps all the way. Remove any cable clips from the adjusters.

Now remove the air pipes from the mouths of the carburetors. Set all three air screws to the setting recommended in the specification section at the end of this chapter. Lower all three throttle slides as far as they will go, by turning the throttle stop screw or adjuster. On H2's, S2's, and S3's, turn the throttle stop screw counterclockwise; on H1's and S1's, clockwise. Feel with your fingers or use a mirror to see that all three throttle slides are at the bottom of their travel. Turn each throttle stop in the **opposite** direction until each slide just begins to lift, and then make one additional turn. This will synchronize all three carburetors at a slow idle.

Start the engine. If it will not run, turn each throttle stop exactly one more turn to speed up the idle slightly. To increase engine idling speed to specifications, turn all three throttle stops 1/4 turn at a time in the same direction, until the idle is constant at 1,100 to 1.300 rpm.

If you have access to a Uni-Syn or similar air-speed sensing tool, hold it against the mouth of each carburetor in turn and adjust the throttle stops until the ball is lifted the same height on each carburetor. Then turn all three throttle stops 1/4 turn at a time in the same direction until the idle is constant at 1,100 to 1,300 rpm. Switch off the engine.

Lengthen each cable adjuster on the carburetor cap until the cable sheath has 1/16" free play. Now turn the cable adjuster at the twistgrip until the grip also has 1/16" free play. While turning the twistgrip back and forth. check with your fingers or a small mirror to be sure that
all three throttle slides start to lift at exactly the same time. Replace the air pipes and any dust covers and cable clips that were removed.

There are a couple of alternative carburetor synchronization methods offered below that may offer greater precision:

ALTERNATIVE SYNCHRONIZATION METHOD 1:

1) First back off the idle screws until they don't touch the slides.

2) Carefully screw each one in until the screw just barely touches the slide.

3) Turn in each screw the exact same amount, until you get your target idle number. If you don't do this first, the little variance you get when setting the idle screws will affect slide height and the sync will not be "spot on".

4) Make sure you have slack in the cables.

5) Put your middle finger of your left hand on the center slide, and your thumb (left hand) on the right slide. Turn the throttle very slowly and feel if the slides lift at the same time. If not, adjust one or the other cable so they do.

6) Snap the throttle a couple of times to make sure the slides are setting in well, and tighten the cable lock nut and recheck.

7) Move your thumb to the center slide and your middle finger to the left carb. Adjust the LEFT carb till it lifts exactly with the center.

8) Snap the throttle again and make sure the lock nut is tight (tightening the lock nut will change the slide height).

9) Open throttle until slide is even with top of carb throat. Feel that all slides are at the same position.

10) Take out any extra slack in the cable, AND check the oil pump for correct setting.

The finger method can tell movement in thousands of an inch (just say very accurate). Set the sync from idle, because that is where it is most important.

ALTERNATIVE SYNCHRONIZATION METHOD 2:

1) Find a smooth round pin about 3/8" or 10mm dia. (the shank of drill bit works well).

2) Remove air box/filters.

3) Back out slide stop (idle adjustment) screws.

4) Set throttle lock or set throttle adjuster at the grip so the pin will just lightly drag as it is inserted in the carb throat under the slide cutaway of one carb.

5) Set the other carbs so they offer the same resistance when the pin is inserted by setting the cable adjuster at top of each carb.

6) Release throttle lock or reset throttle adjuster at grip insuring that slides on all carbs will fully bottom out and throttle grip has 2-3mm play.

7) Set air and idle adjustment screws for best idle.

As a final check to insure all idle adjustment screws are set the same, insert a nail, spoon, or long toothpick under each slide without altering slide position. As the grip is turned the ends of all three should tip at the same time. Readjust idle screws as required.

TUNING THE IDLE AND LOW-SPEED MIXTURE (IDLE TO THROTTLE)

To tune the carburetor properly for idling and low-speed running, you will have to adjust the pilot system. The principal adjuster of the pilot system is the air screw. First, set all three air screws to the specification given at the end of this chapter. Now synchronize all three carburetors and set the idle speed, as described above and in Chapter 2, Tuning for Performance. With the engine idling, turn all three air screws in or out 1/4 turn. Listen to the exhaust and note any change in the firing pulses. Place your hand one inch from the ends of the mufflers to feel the exhaust pulses. Turning the air screws clockwise makes the mixture richer, turning them counterclockwise makes it leaner. If the engine begins "four-stroking," that is, firing on every other stroke instead of on each stroke, the mixture is too rich. If the exhaust note is very uneven or irregular, the mixture is too lean.

Some other signs of an excessively lean idle mixture are hesitation and poor throttle response when accelerating from idle, overheating when the bike is ridden at slow speeds, heavy detonation when the bike is ridden at highway speeds, a marked idle speed increase (more than 300 rpm) when the engine is hot, and having the engine take a long time to idle down after a high-speed run.

Some signs of an excessively rich idle mixture are four-stroking and sputtering at an idle, fouling the spark plugs when riding at slow speeds. and excessive fuel consumption.

Generally speaking, for better gas mileage and smoother running around town, turn the air screws out 1/4 turn from the specified setting. unless detonation is evident at highway speeds. For better throttle response, better low-end torque, and easier starting on cold mornings, turn the air screw in 1/4 turn, from the specification. Of course the standard setting is given in the specification table.

The final idle mixture adjustment should be no more than 1/2 turn from the specified setting. If it is, check for a clogged pilot jet, a restricted pilot air channel, an obstructed low-speed outlet in the carburetor throat, or an air leak at the carburetor mounting spigot or flange. *NOTE: Turning the air screw has an effect similar to changing the size of the pilot jet.* If the best air screw adjustment is more than 1/2 turn from the specified setting, the pilot jet should be changed instead. If the air screw is 1/2 turn (or more) clockwise from the recommended setting, change the pilot jet for one with a number that is five higher. For example, if the carburetor has a #25 pilot jet standard, replace it with a #30. If the air screw is 1/2 turn (or more) counterclockwise from the recommended setting, change the pilot jet for one with a number that is five lower, i.e., #25 to #20. There is a listing of available pilot jets and their Kawasaki part numbers at the end of this chapter in the specification section. **CAUTION: Don't lean the pilot mixture enough to cause detonation at highway speeds. Detonation will cause extensive damage to the pistons, rings, crankshaft bearings, and spark plugs.**

NOTE: Each carb must be ADJUSTED for optimum idle via AIR SCREW adjustment.... seeking the point where idle rpm for that cylinder is highest. That is the point where the fuel/air mixture is optimum at idle rpm. Starting from scratch, unless you're extremely lucky, there is no "balance" between cylinders or carbs.... one cylinder will be pulling the other two. When this condition exists ONLY the carb on the pulling cylinder will respond to adjustment. Setting the idle stop to insure that the "pulling" cylinder carb is in control of idle rpm will then allow adjustment of that carb to be seen in rpm changes. An alternative is to pull the plugs of the cylinders not being adjusted so it would be apparent which cylinder is "pulling". If, using this method, an air screw has no effect on idle speed, something is wrong.

TUNING THE MIDRANGE MIXTURE (1/4 TO 3/4 THROTTLE)

The fuel mixture in the midrange mode is changed by moving the clip on the top end of the jet needle. For most usage the standard clip position is best. The grooves in the top end of the needle are numbered from top to bottom, #1 to #5. For high-altitude riding, the needle may be lowered to lean the mixture by moving the clip to a lower-numbered groove; for instance, from groove #3 to #2. For riding in cold, damp weather at sea level, the mixture may need to be enriched for best running by raising the needle; for example, moving the clip from groove #3 to #4.

If the engine hesitates and/or backfires when accelerating from 1/2 throttle, the midrange mixture is too lean and the jet needle should be raised (move the clip to the next-higher-numbered groove). This will allow more fuel to flow between the jet needle's tapered section and the orifice of the needle jet.

If the engine is sluggish and stutters when accelerating at 1/2 throttle in high gear, the midrange mixture is too rich. The jet needle should be lowered to restrict the orifice of the needle jet. This reduces fuel flow (leaner mixture) for an equivalent throttle opening. Take the clip out of its present groove and move it to a lower-numbered groove. **CAUTION: Do not lean the midrange too much or detonation will result.**

If the midrange mixture is not satisfactory after adjusting the jet needle, check to be sure that the needle jet is tight in the carburetor body, that the float level is correct, that the primary air passage is open, and that the jet needle clip is in place. If the engine has over 10,000 miles on it, check the center section of the needle for wear. If it is shiny, it has worn against the needle jet because of engine vibration. Both the needle and the jet must be replaced to guarantee like-new performance.

TUNING THE HIGH-SPEED MIXTURE (3/4 TO FULL THROTTLE)

The fuel mixture at high speeds and large throttle openings is controlled by the main jet. *NOTE: The main jet is not effective until the area between the end of the jet needle and the inside of the needle jet is greater than the area of the main jet opening.* The size of the main jet is marked on it. The number is a code for the diameter of the opening in the jet; the larger the opening, the higher the number and the richer the mixture at full throttle. All Kawasaki triples use reverse-type main jets. They have round heads with a screw slot. **CAUTION: Do not use hex-headed main jets in these carburetors because the threads are different, which will strip the threads in the needle jet.**

To test the main jet, accelerate momentarily at full throttle in high gear at about 50 mph. If the main jet is too small (lean) or too large (rich), the engine will not respond well at full throttle and will regain power only when the throttle is closed to the 3/4 position (which reactivates the midrange system).

If the main jet is too large, full-throttle performance will be sluggish and the exhaust note will be stuttering. Inspection of the spark plugs will show a dark brown or sooty black color on the insulators. *NOTE. These indications can also be caused by too cold spark plugs or retarded ignition timing.* Install a main jet with the next size smaller number for a leaner mixture. Check the list of main jet sizes and part numbers at the end of this chapter in the specifications section. If there is still no improvement. check for a dirty air cleaner, an obstructed air cleaner inlet, or clogged muffler baffle tubes.

If the main jet is too small. the engine may backfire or hesitate and accelerate in lurches when the throttle is opened fully. The spark plug insulators will be white or grayish white. Too lean a mixture will cause overheating, and if the condition is excessive, small flecks of aluminum will be evident on the spark plug insulators. *NOTE: These indications can also be caused by too hot a spark plug or overadvanced ignition timing.* A main jet that is too small will cause detonation at full throttle which sounds like static electricity. It is not the same as the "pinging" sound made by an automobile engine running on too low an octane rated gasoline. **CAUTION: If detonation is heard at full throttle, back off the throttle immediately or major engine damage will result.**

CARBURETOR SPECIFICATIONS

H1, H1A (I.D. MARK KA1 OR KAE-1)

Manufacture and Type	Mikuni VM28SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#100 Reverse
Needle Jet	#0-2
Jet Needle and Clip Position	#5GL3-3rd
Pilot Jet	#30
Throttle Valve Cutaway	#3.0
Air Screw (Turns Out)	$1\frac{1}{4}$*

*$\frac{3}{4}$ turns for best idle, $1\frac{1}{4}$ turns for best gas mileage.

H1B (I.D. MARK KA4)

Manufacture and Type	Mikuni VM28SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#100 Reverse
Needle Jet/Primary Choke Height	#0-4/2mm
Jet Needle and Clip Position	#5DJ19-3rd
Pilot Jet	#30
Throttle Valve Cutaway	#2.5
Air Screw (Turns Out)	$1\frac{1}{4}$

H1C (I.D. MARK KA5)

Manufacture and Type	Mikuni VM28SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#95 Reverse
Needle Jet/Primary Choke Height	#0-4/8mm
Jet Needle and Clip Position	#5DJ19-4th
Pilot Jet	#30
Throttle Valve Cutaway	#2.5
Air Screw (Turns Out)	$1\frac{1}{2}$

H1D (I.D. MARK KA6)

Manufacture and Type	Mikuni VM28SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#92.5 Reverse
Needle Jet/Primary Choke Height	#0-4/8mm
Jet Needle and Clip Position	#5DJ19-4th
Pilot Jet	#30
Throttle Valve Cutaway	#2.0
Air Screw (Turns Out)	$1\frac{1}{4}$

H1E, H1F (I.D. MARK KA6)

Manufacture and Type	Mikuni VM28SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#92.5 Reverse
Needle Jet/Primary Choke Height	#0-4/8mm
Jet Needle and Clip Position	#5DJ19-4th
Pilot Jet	#30
Throttle Valve Cutaway	#2.0
Air Screw (Turns Out)	$1\frac{1}{4}$

H2 (I.D. MARK H2)

Manufacture and Type	Mikuni VM30SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#105 Reverse
Needle Jet/Primary Choke Height	#0-6/2mm
Jet Needle and Clip Position	#5FL14-2nd
Pilot Jet	#35
Throttle Valve Cutaway	#2.5
Air Screw (Turns Out)	$1\frac{1}{2}$

H2, H2A (I.D. MARKS H2-1, H2-2, H2-4)

Manufacture and Type	Mikuni VM30SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#97.5 Reverse
Needle Jet/Primary Choke Height	#0-6/8mm
Jet Needle and Clip Position	#5EJ15-3rd
Pilot Jet	#35
Throttle Valve Cutaway	#2.5
Air Screw (Turns Out)	$1\frac{1}{2}$

H2B, H2C (I.D. MARK H2-5)

Manufacture and Type	Mikuni VM30SC, Primary
Float Level	23.0-25.0mm
Fuel Level	29.0-31.0mm
Main Jet Size and Type	#102.5 Reverse
Needle Jet/Primary Choke Height	#0-6/8mm
Jet Needle and Clip Position	#5EJ15-4th
Pilot Jet	#40
Throttle Valve Cutaway	#2.5
Air Screw (Turns Out)	$1\frac{3}{4}$

S2 (I.D. MARK S2J1)

Manufacture and Type	Mikuni VM24SC, Primary
Float Level	25.5-27.5mm
Fuel Level	27.0-29.0mm
Main Jet Size and Type	#85 Reverse
Needle Jet/Primary Choke Height	#0-2/4mm
Jet Needle and Clip Position	#4EJ3-3rd
Pilot Jet	#25
Throttle Valve Cutaway	#2.0
Air Screw (Turns Out)	$1\frac{1}{2}$

S1A, S1B (I.D. MARK S1U)

Manufacture and Type	Mikuni VM22SC, Primary
Float Level	24.0-26.0mm
Fuel Level	27.0-29.0mm
Main Jet Size and Type	#75 Reverse
Needle Jet	#0-2
Jet Needle and Clip Position	#4EJ9-3rd
Pilot Jet	#17.5
Throttle Valve Cutaway	#2.5
Air Screw (Turns Out)	$1\frac{1}{4}$

S1C (I.D. MARK S1U-1)

Manufacture and Type	Mikuni VM22SC, Primary
Float Level	24.0-26.0mm
Fuel Level	27.0-29.0mm
Main Jet Size and Type	#75 Reverse
Needle Jet/Primary Choke Height	#0-2/4mm
Jet Needle and Clip Position	#4EJ9-3rd
Pilot Jet	#20
Throttle Valve Cutaway	#2.5
Air Screw (Turns Out)	$1\frac{1}{2}$

S2A (I.D. MARK S2U-0)

Manufacture and Type	Mikuni VM24SC, Primary
Float Level	24.5-26.5mm
Fuel Level	26.0-28.0mm
Main Jet Size and Type	#85 Reverse
Needle Jet/Primary Choke Height	#0-2/4mm
Jet Needle and Clip Position	#4EJ4-3rd
Pilot Jet	#25
Throttle Valve Cutaway	#2.0
Air Screw (Turns Out)	$1\frac{1}{2}$

S3, S3A (I.D. MARK S3)

Manufacture and Type	Mikuni VM26SC, Primary
Float Level	24.5-26.5mm
Fuel Level	26.0-28.0mm
Main Jet Size and Type	#85 Reverse
Needle Jet/Primary Choke Height	#0-2/4mm
Jet Needle and Clip Position	#4EJ4-3rd
Pilot Jet	#22.5
Throttle Valve Cutaway	#2.0
Air Screw (Turns Out)	$1\frac{3}{4}$

PILOT JET SIZES AND PART NUMBERS

Jet Number	Part Number
20	92064-021
22.5	92064-040
25	92064-032
30	92064-022
35	92064-023
40	92064-024

MAIN JET SIZES AND PART NUMBERS FOR ALL KAWASAKI CARBURETORS

Jet #	Part Number	Jet #	Part Number	Jet #	Part Number
70	92063-107	97.5	92063-063	127.5	92063-056
72.5	92063-108	100	92063-070	130	92063-057
75	92063-109	102.5	92063-071	132.5	92063-103
77.5	92063-122	105	92063-072	135	92063-104
80	92063-123	107.5	92063-073	137.5	92063-105
82.5	92063-124	110	92063-074	142.5	92063-117
85	92063-093	112.5	92063-075	145	92063-118
87.5	92063-094	115	92063-076	147.5	92063-119
90	92063-095	117.5	92063-077	150	92063-120
92.5	92063-068	120	92063-078	152.5	92063-121
95	92063-069	122.5	92063-100	2.4	92063-102
		125	92063-055		