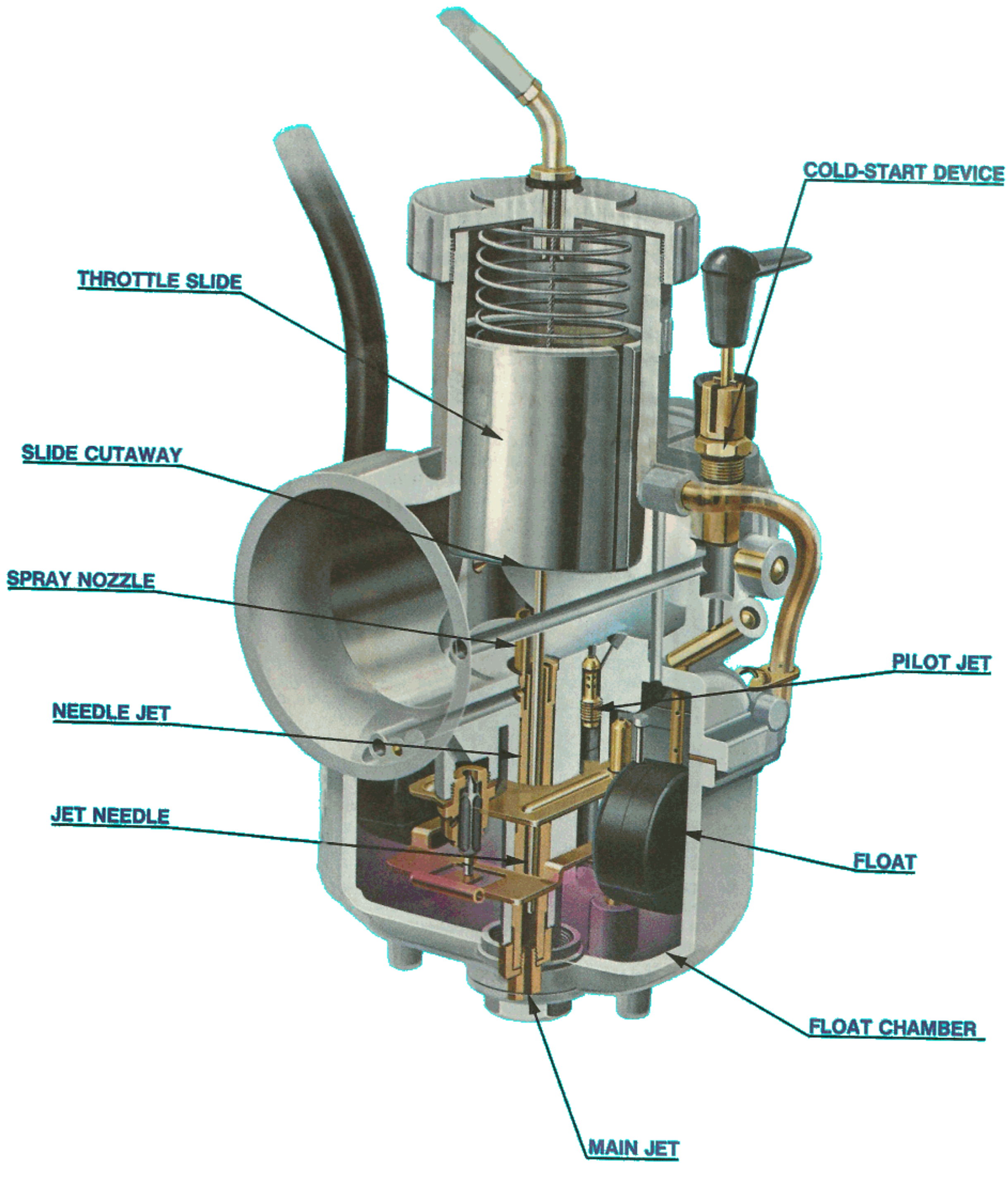
Bing Tuning Guide



WARNING

Federal, State and Local EPA Regulations may prohibit the altering of carburettors for your particular motorcycle - Any suggestions contained herein regarding such altering is therefore presented on the basis that such altering is performed on vehicles only for off-highway use.

INTRODUCTION: There are hundreds of possible jetting/air-valve/atomizer combinations that could be installed in your carburettor. Add to this, an infinite amount of variable mixture adjustments, and the possibilities become astronomical. Fortunately, the designers of your machine determined the proper combination that best fits your overall requirements in terms of power, economy, and reliability. They even left room for the individual rider to make certain changes to suit his particular requirements. When these changes are required, what changes we make, and results we achieve is what this manual is all about.

Paramount in the designer's mind is RELIABILITY. We never change anything in the carburettor that reduces reliability, and changing anything else is always a compromise between POWER and ECONOMY. Unless of course, both have been reduced in the first place - only then will we see an improvement in performance and mileage.

To make logical changes in our carburation, we first must have at least a passing knowledge of the underlying principles that govern our engine's carburation requirements; - the following discussions hopefully will fulfill this need. By itself, the carburettor does nothing -- but attach it to a reciprocating engine -- it comes to life, providing the very lifeblood that all engines exist on; air and fuel!

AIR: Air that our engine uses in the combustion process contains 21% Oxygen, 78% Nitrogen, and 1% other gasses.

FUEL: The gasoline that we use in our engine contains liquid hydrocarbons (Hydrogen and Carbon).

COMBUSTION: When each Carbon atom in our fuel is combined with two Oxygen atoms from our air supply, Carbon-Dioxide (CO2) is formed during the "burning" process. The Carbon-Dioxide thus formed, and the 78% Nitrogen from our air source absorb the heat from the combustion process and turn it into mechanical energy by expansion.

AIR/FUEL MIXTURE: A chemist will tell you that a perfect mixture, one that will be totally consumed in the combustion process, contains 1 pound of fuel for each 14.8 pounds of air. He is right BUT we cannot use this "perfect" mixture because it produces way too much heat that does nothing for efficient power or economy. Richer mixtures lower combustion temperatures and produce an increase of power until we reach a 13.8 air/fuel ratio. (Figure 1) From 13.8 to 12.5 we realize no increase in power but do see lower temperatures that greatly enhance the combustion process by allowing more time to convert heat to mechanical energy. Beyond 12.5 we experience a pronounced drop in power as excessive cooling by the enrichened mixture robs us of combustion efficiency. Lean mixtures are only tolerated at highway cruising speeds. Below 1/4 throttle, an excessively lean engine will not get you through the intersection -- above 3/4 throttle, you might see a hole where the top of your piston used to be (after an expensive tear-down). For cruising speed only, we can vary the mixture on the lean side between 16.4 and 18.2 to achieve desired economy levels.

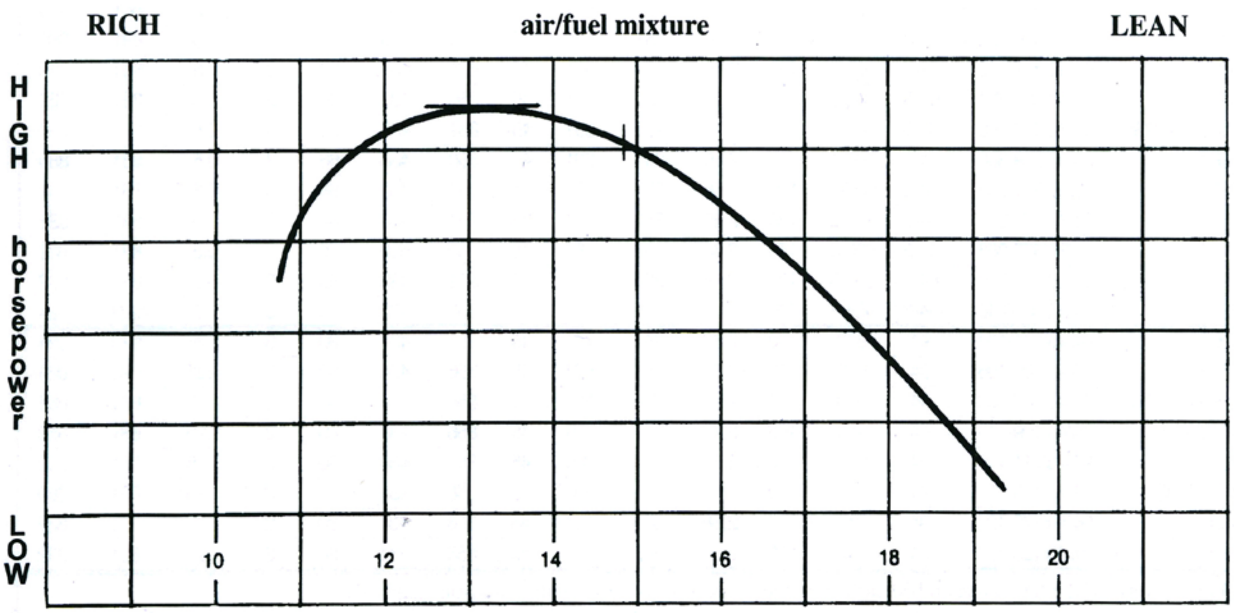
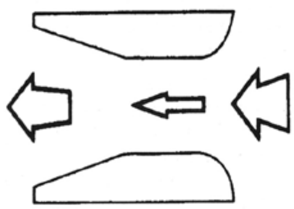


FIGURE 1

AIR PRESSURE is 14.69 pounds per square inch (psi) at sealevel and 59 degrees Fahrenheit. With the engine at rest, air pressure throughout the engine, carburettor, and exhaust is 14.69psi. As the piston begins downward travel (with intake valve open) a low pressure (partial vacuum) area is created in the cylinder. Outside air at the higher 14.69 psi rushes through the carburettor to refill the low pressure area behind the retreating piston. The amount of air that enters the cylinder during the intake stroke is dependent upon the throttle valve opening.

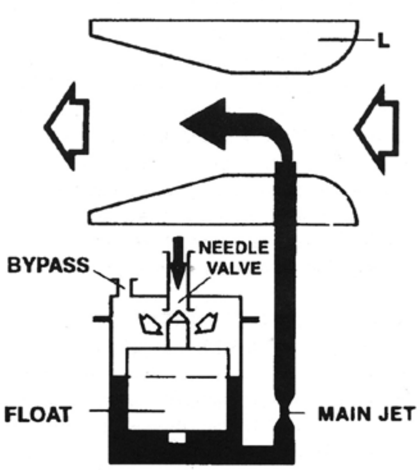
FIGURE 2a



THE VENTURI: (Figure 2a) A basic law of physics states: "as the velocity of air increases, the pressure of air decreases." In a given period of time, the amount of air exiting the carburettor must be equal to the amount entering the carburettor. On its way through the venturi, the air flow encounters a restriction and has to "speed up" to get past the restriction and exit at the same rate that it enters. How does it "speed up"? The only available source of energy to boost its speed through the restriction is PRESSURE. We don't get something for nothing, therefore we have a loss of pressure that is proportional to the increase of velocity through the restriction. At a point in the venturi where the lowest pressure exists, we place our fuel outlet. With a low pressure at the fuel outlet, the higher pressure (atmospheric) in the fuel chamber will force fuel up through our metering tube in an amount proportional to the air flowing through the venturi. In this manner, we now have the means with which to meter the correct amount of fuel for any given amount of air passing through the venturi. We will refer to the loss of pressure as LOW PRESSURE. (You may call it vacuum if you wish.)

FULL POWER MIXTURE: At the bottom of our metering tube, submerged deep in the fuel chamber, we place the MAIN JET. The Main Jet has a fixed bore diameter that restricts the amount of fuel that flows up through the tube at 3/4 to full throttle (Figure 2b). Fuel flowing through the main jet at full power settings is totally dependent on the amount of air passing through the venturi.

FIGURE 2b



PART THROTTLE MIXTURE: We place in the metering tube a needle jet , and inside this jet, a tapered needle, that when retracted increases the area through which the fuel must flow. (Figure 3) The needle is retracted at the same rate that our throttle (air) valve is opened, therefore we have a corresponding fuel flow for an increase of air flow. In this manner, our air/fuel mixture is precisely controlled from about 1/4 to 3/4 throttle.

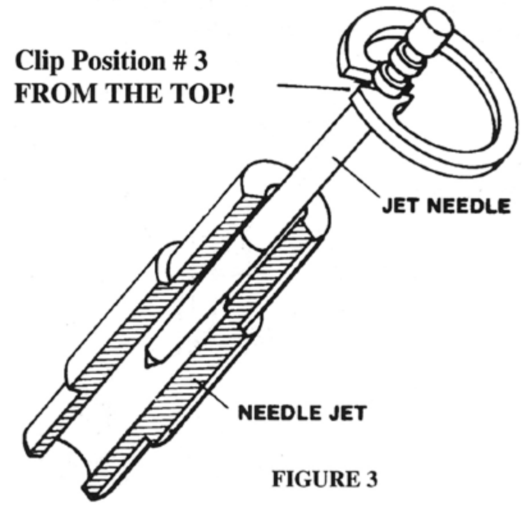


FIGURE 3

IDLE SPEED MIXTURE: At throttle settings in the idling speed range there is insufficient air flow through the venturi. The resulting higher pressure (less vacuum) will not allow fuel to flow from the main fuel outlet. The fuel outlet for idle metering therefore is placed between the throttle valve and the intake manifold where low pressure exists when the throttle valve is nearly closed. (Figure 4) The amount of fuel allowed to enter the airstream is controlled by (1) the bore diameter of the idle jet, and (2) the setting of our idle air screw. When the throttle valve starts to open, fuel begins to enter the air stream from the main fuel outlet while at the same time, it begins to cease flowing from the idle circuit. In this manner, we achieve a smooth, unhesitating transition from idle to part throttle range. How smoothly this transition occurs is dependent upon (1) size of jet, (2) idle air adjusting screw setting, (3) the underside profile of our slide, (4) the combination of needle jet and jet needle, and (5) mixture correction components.

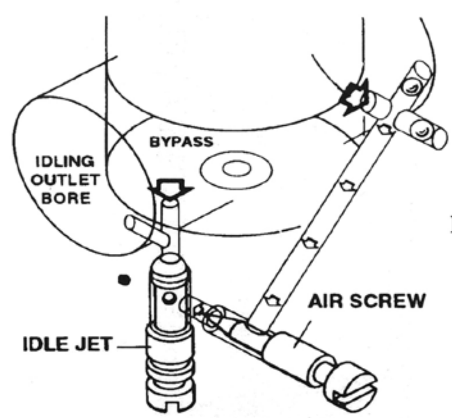
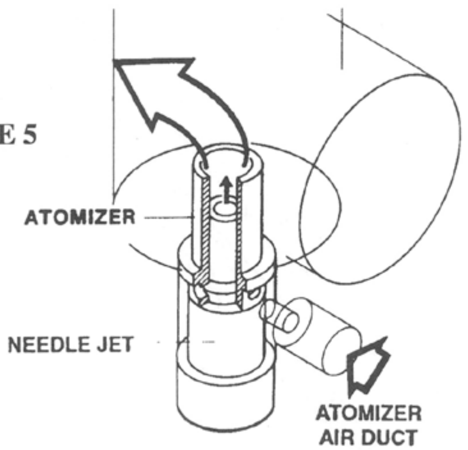


FIGURE 4

MIXTURE CORRECTION: At the lower end of our part-throttle range, atmospheric pressure in our fuel chamber is not great enough to force fuel out of the main discharge nozzle and into the air stream. We give the fuel flow a "boost" at this point by directing an air stream into the metering tube (Figure 5). In this manner, we not only help the fuel up and out of the nozzle, we also "break up" the fuel into smaller droplets that are more easily vaporized in the air stream. The component responsible for this pre-vaporization is our ATOMIZER.

FIGURE 5



FUEL LEVEL CONTROL: Much more important than maintaining a constant level in the fuel (or float) chamber, our floats determine the height that the fuel attains in our main fuel metering tube (Figure 6). At the proper height, the pre vaporized fuel is easily "picked off" by the (suction) that exists in our venturi. A "too high" level in the tube will allow more fuel into the air stream than is desired, resulting in an overly enriched air/fuel mixture. A "too low" level produces "lean" mixtures.

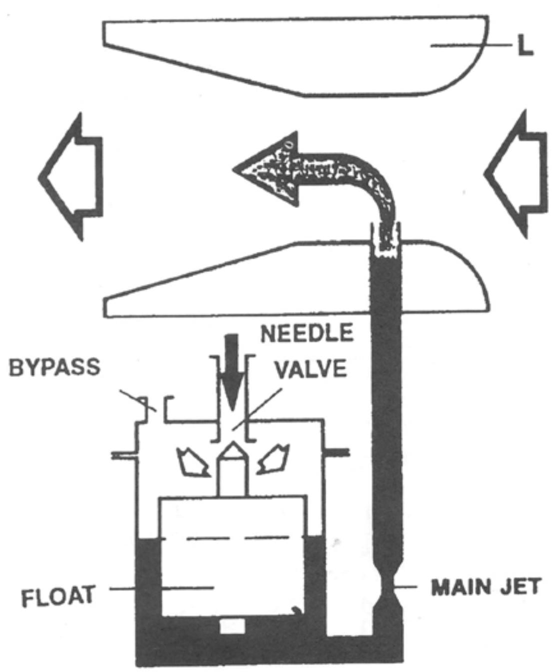


FIGURE 6

STARTING MIXTURE: Bing carburettors may be equipped with starting carburettor, choke or tickler. If you have a slide type carburettor and it is equipped with an independent "starting carburettor," it functions in the following manner: Pulling on the starting carburettor lever raises a plunger assembly that allows a pre-determined amount of fuel to enter the carburettor throat when suction is initiated by engine cranking speed. A predetermined amount of air is mixed with the fuel to achieve a combustionable mixture. Bing Constant Depression carburettors function similarly except that a rotary valve replaces the plunger design, and the fuel/air mixture is varied by the lever position. Initially an overly rich mixture is provided to the cold engine and then reduced after the engine is running. This reduction is accomplished automatically by nature of the starting jet design. The throttle MUST remain closed during starting carburettor operation. Bing choke assemblies consist of an air slide located within the main throttle slide. Releasing the choke lever causes the air slide to drop down under spring pressure -- into the venturi where it reduces the cross sectional area. At cranking speed, this reduced area means a greater suction at the fuel outlet, providing an enrichened mixture to the engine. Pressing the tickler forces the float and attached float needle downward, allowing the fuel level to rise above its predetermined level to flood the carburettor throat with raw fuel. The tickler should not be used in conjunction with a choke or starting carburettor operation.

TEAMWORK : The best tuned carburettor in the world will not contribute anything to power or economy unless all influencing system components are in harmony! The following paragraphs are presented as an aid to understanding how the carburettor fits into the overall scheme of engine operation. Our fuel system, or rather our total fuel system, is not limited to the gas tank, gas line, and carburettor. It begins with the outside surface of our air filter and ends at the tip of our exhaust system. Our carburettor has to compensate for an infinite amount of subtle, as well as pronounced changes that can and do occur anywhere in between these points. Your BMW was designed to provide an optimum level of performance, economy and reliability under a full range of operating conditions. All components must function as a team to ensure that these levels are properly maintained. Gasoline is vaporized, mixed with air, forced into the cylinder, compressed by the piston, then ignited by a spark with resulting heat being converted to mechanical energy. Since it is heat that produces the energy needed for our engine to work, we need to know about Thermal Efficiency.

THERMAL EFFICIENCY: Of the total heat produced by combustion in the cylinder -- only 25-30% is available for conversion to working energy, 15-20% is dissipated through our cooling fins, 5-10% is absorbed by our lubricating oil to reduce friction, and a whopping 40-45% disappears out the tail pipe. With only 25-30% available to do the work we must therefore exercise extremely close control over our air/fuel mixture to produce maximum allowable output with each power stroke. We say "allowable" because if we exceed the limits imposed by engine design, we overheat or overstress our engine, eventually losing what we thought we had gained.

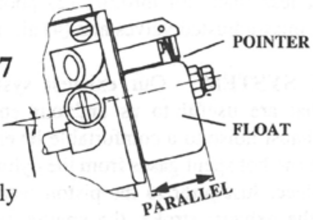
VOLUMETRIC EFFICIENCY RATIO: Simply stated is the amount, or VOLUME of air/fuel mixture (corrected for temperature and pressure) that is drawn into a given cylinder displacement -- as compared to the volume that could be drawn in. At SEA-LEVEL elevation with a standard temperature of 59 degrees F, air pressure is 14.69 pounds-per-square-inch (psi), Adjusting Screws turned LIGHTLY in against their seat—then backed out (CCW) the specified amount of rotation. We recommend that you first remove both L and R screws and inspect the tips for concentricity with respect to wear. A tip with noticeable indentation will prevent fine regulation of your idle air/fuel mixture, and make carburettor "balancing," next to impossible. (3) Idle Speed Adjusting Screws backed completely off the throttle valve lever—CAREFULLY counting the required number of turns. If the number differs between carburettors, you can be sure that your idle system was improperly set. It is quite possible to have one carburettor throttle valve open farther than the other carburettors', yet have normally appearing idle from both cylinders. This is because of the overlapping influence of idle air and idle speed settings. Mis-adjusted cables have a similar over-lapping effect. (4) New Rubber O'rings on Idle Air Screw, Idle Jet, Main Jet Stock, Throttle Shaft and Start Valve.

MIXTURE TRANSITION SYSTEM: We will explain this system first, as it is the easiest of all to tune—reason being, you cannot tune it. It has no tunable components, yet it is the one that determines how our carburettor reacts as it makes many transitions through its various stages: Starting-to-Idle-to-Part-Load (or Needle Control) and Part-Load-to-Full Power and then all the way back in reverse sequence. All of these transition stages are totally dependent upon how close we have tuned the areas just below and above where transition occurs. In other words, we cannot tune "just the idle" and "just the part-load" —we have to make certain that we select components that overlap one another—but not too much! Anyone can make an engine idle, accelerate, and pull G's at full step—it's the "artist" who can bring about smooth unhesitating performance zero-to-flat-out.

FUEL LEVEL: In figure 6, you can see that the fuel stands higher in the metering tube than in the float chamber. The higher level in the metering tube is the result of pressure differential between the higher atmospheric pressure in the float chamber pushing against lower pressure in the metering tube when the engine is running and partial vacuum exists in the venturi. For a given constant RPM, metering tube fuel level is totally dependent upon float chamber fuel level—as determined by our float adjustment setting. If the level in the metering tube is too high, fuel will exit into the venturi at a much lower air velocity, resulting in the air/fuel mixture becoming enriched before it is supposed to—as in the low middle-to-higher RPM range. A too-low fuel level results in just the opposite. As fuel metering jets and jet needles also effect the above discharge rates, it is imperative that an exact pre-determined fuel level is maintained. If you find that a different fuel level improves performance or economy, rest assured that your jetting is improperly set. Two types of floats are used in Bing Carburettors (1) the single element brass float in the early side-bowl carburettor and (2) the double element plastic float found in the centered-bowl carburettor. The brass float is not adjustable, its height is fixed by a notch in the float needle. Resetting single element float height is carried out by replacing the worn float needle, and in the case of extremely high wear, the float chamber cover that contains the needle seat. Double element floats may be adjusted to compensate for float needle/seat wear by resetting the float pointer after replacing the worn needle. This needle seat may also be replaced. Correct float adjustment is achieved in the following manner (See Figure 7).

There is an update to the double element float system. The Alcohol Resistant Independent Float and Bowl Kit—the kit gives you alcohol resistance, 5 to 7 mpg improvement on mileage and a little better performance due to a more constant level of fuel in the bowl.

FIGURE 7



NOTE: A WORN FLOAT NEEDLE WILL NOT REGULATE FUEL HEIGHT—NO MATTER WHERE YOU SET FLOATS.

1. Tilt carburettor past horizontal approximately 15 degrees or an amount causing float pointer to "lightly touch" float needle spring-plunger (or ball) without depressing plunger into needle.
2. Increase or decrease pointer-to-hinge angle with a thin blade screwdriver until top surface of float element is parallel with base of carburettor. Both plastic elements must also be parallel with each other; if not, carefully twist elements to obtain correct parallelism (excessive twisting force can separate plastic from metal hinge).
3. Repeat above steps 1 and 2 until desired results are obtained.

FOR INDEPENDENT FLOAT SYSTEM—Check and adjust float arm in the following manner:

1. If the carburetor is off the engine, turn it upside down, resting on its own weight, the float arm must be perfectly parallel with the carburettor base. If carburettor is mounted on the engine, the same parallelism must be maintained, but this must be ascertained WHILE NOT DEPRESSING THE FLOAT NEEDLE'S SPRING-LOADED PLUNGER INTO THE NEEDLE BODY.
2. Adjust for parallelism by bending the float-arm pointer with a small, flat-tipped screwdriver. Exercise care during adjustment -- NOT TO BEND THE PARALLEL FLOAT ARM LEVERS. Not only must the arm be parallel with the carburettor, the arm levers must be parallel with each other, in order not to cause binding with the float elements. (See Figure 7B)

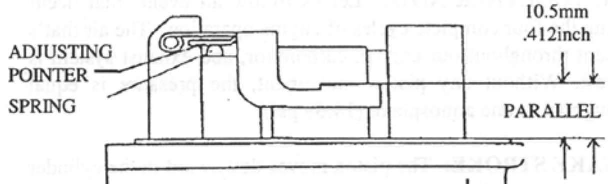


FIGURE 7B

IDLE SYSTEM: Slide Carburettor— With the air slide nearly closed, vacuum at the main fuel outlet is insufficient to draw fuel up from the main metering tube. Fuel and air to supplement the small volume of air getting under the slide for idling is then supplied through the auxiliary idle system (Figure 8) which consists of IDLE JET (LD), IDLE AIR SCREW (LRS), OUTLET BORE (LA) and BYPASS(BP).

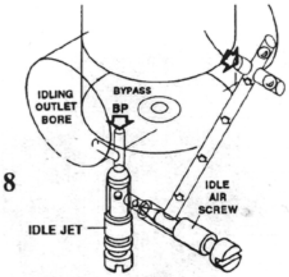


FIGURE 8

SLIDE CARBURETTOR IDLE SYSTEM

The fuel passes through the idle jet whose bore will determine the amount of fuel allowed through. Behind the jet bore the fuel mixes with air that is supplied via cross ducts, the amount of air admitted is determined by the setting of the idle air screw. This initial mixture then flows through the idling outlet bore (LA) and the bypass or transition passages (BP) into the venturi where it is mixed further with pure air.

Idling should always be adjusted with the engine at operating temperature. First the mixture control screw is turned in fully clock-wise and then backed off by the number of turns specified for the particular engine (See Pages 1&2). Turning in clockwise direction results in a richer mixture and turning counter-clockwise produces a leaner mixture. The idle setting quoted serves as a guide only. The optimum will generally differ slightly. First select the desired idle speed by using the air slide adjusting screw. The idle air screw is then opened (turned counter-clockwise) until the speed rises. Then turn the screw back by a quarter of a turn.

If your idle jet is partially blocked by dirt or evaporated fuel residue, the air screw will have to be excessively rotated in a clockwise (CW) direction to obtain proper idle mixture. A "too lean" selected jet will also require the same excessive screw setting. If a "too rich" jet is selected, or if the carburettor air passages are partially blocked, these conditions will be indicated by the requirement of an excessive screw setting in the opposite (CCW) direction.

If the air slide is closed down to the idle position while the engine is running, then only the idle outlet bore (LA) is available between slide and engine intake and it is thus exposed to the suction effect. When the slide is in this position, air will enter through the bypass bore (BP) which will make the pre-mixture leaner until idle speed is reached. If the slide is then opened, the bypass bore will also be subject to the vacuum and supply additional fuel to enrich the mixture in the transition range. Idling may be adjusted only by turning the idle speed and the idle air screw or by using idle jets of various sizes. Idle outlet bore (LA) and bypass bore (BP) are matched to the fuel requirements of any given engine and must not be changed.

To faciliate adjusting the idle setting on two cylinder engines having two carburettors, where it is important that they are evenly adjusted, it is possible to connect a vacuum gauge to a nipple (Vacuum Take Off a/k/a VTO) which is normally closed off by a screw. To select the speed, the idle stop screws are in this case adjusted until the same vacuum is indicated for both carburettors. By slightly opening the throttle valve via a turning handle or the accelerator it is also possible to adjust cables or linkages evenly by making this vacuum comparison. (Vacuum Guage shown on page 35)

IDLE SYSTEM: Constant Depression Carburettor— During idle and low-load running the throttle valve is closed to such an extent that the air flow underneath the plunger no longer forms a sufficient vacuum. The fuel is then supplied via an auxiliary system (the idle system See Figure 9) which consists of IDLE JET (LD), MIXTURE SCREW (GRS), OUTLET BORE (LA), BYPASS (BP), and in the case of later model carburettors, TRANSITION PASSAGES (TPS). The fuel passes through the idle jet whose bore will determine the amount of fuel. Behind the jet bore the fuel mixes with air that is supplied via cross ducts in the jet throat from the idling air channel, the amount of air admitted being determined by the size of the idling air jet at the inlet of this duct. This initial mixture then flows through the idle outlet bore (LA), the cross-sectional area of which can be adjusted by the mixture control screw. It then reaches the venturi via bypass or transition passages where it is mixed further with pure air. Idling should always be adjusted with the engine at operating temperature. First the mixture control screw is turned fully clockwise and then backed off by the number of turns specified for the particular engine. Turning in a clockwise direction results in a leaner mixture and turning in counter-clockwise direction in a richer mixture. (Note: this is just the opposite of the direction required in Bing slide carburettor mixture settings.) The idling setting quoted serves as a guide only. The optimum will generally differ slightly. First, select the desired idling speed by using the idling stop screw. When subsequently adjusting the mixture control screw—starting from the basic setting—a speed drop will be noticed in both directions. The optimum setting will generally be found half-way between the two settings at which this speed drop was noticed.

If your idle jet is partially blocked by dirt or evaporated fuel residue the air screw will have to be excessively rotated in a counter clockwise (CCW) direction to obtain proper idling mixture. A "too lean" selected jet will also require excessive screw setting. If a "too rich" jet is selected, or if carburettor air passages are partially blocked, these conditions will be indicated by the requirement of excessive screw setting in the opposite (CW) direction.

To faciliate adjusting the idle setting on two cylinder engines having two carburettors, where it is important that they are evenly adjusted, it is possible to connect a vacuum gauge to a nipple (Vacuum Take Off a/k/a VTO) which is normally closed off by a screw. To select the speed, the idle stop screws are in this case adjusted until the same vacuum is indicated for both carburettors. By slightly opening the throttle valve via a turning handle or the accelerator it is also possible to adjust cables or linkages evenly by making this vacuum comparison. (Vacuum Guage shown on page 35)

FIGURE 9

CD IDLE SYSTEM

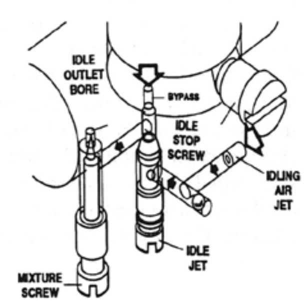


FIGURE 10

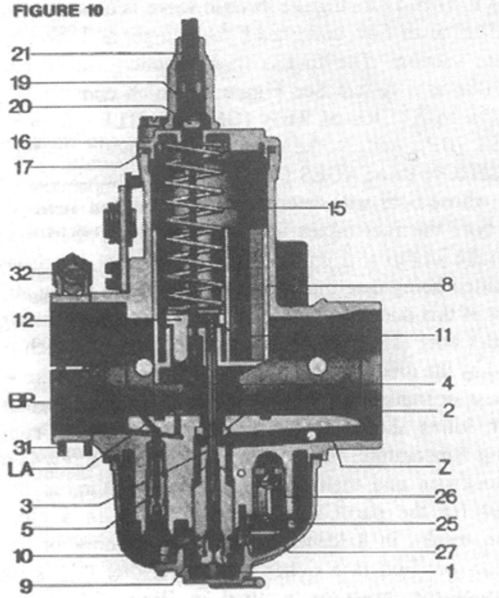
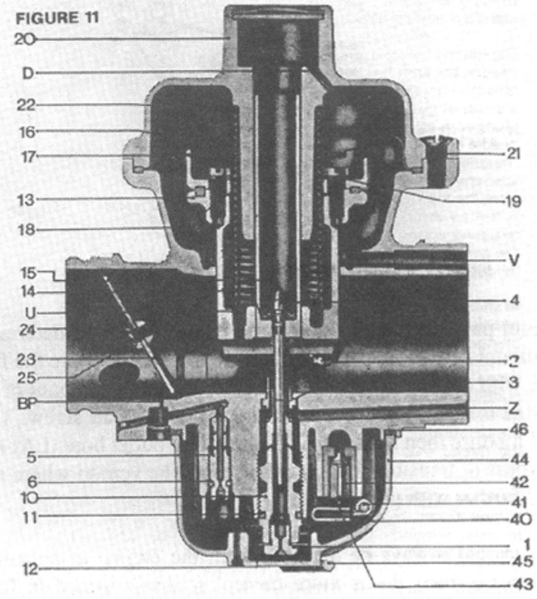


FIGURE 11



MAIN REGULATING SYSTEM: (Slide Carburettor) The amount of mixture drawn in by the engine and thus its performance is determined by the cross-sectional area in the venturi which is opened up by the AIR SLIDE. The air flow produces a low pressure or (vacuum) which draws fuel from the float chamber through the jet system (Figure 10). On its way from the float chamber the fuel passes through the MAIN JET, the JET STOCK, and the NEEDLE JET; as it leaves the needle jet it is pre-mixed with air which is brought in from the filter connection via an AIR DUCT (Z) and the ATOMIZER in an annular flow around the needle jet. This air flow assists the atomizing process to form minute fuel droplets and thus favorably affects the fuel distribution in the intake manifold and combustion in the engine.

In the part-load range, in other words when the air slide is between one and three-quarters of its full stroke, less fuel is required than at full throttle. The fuel supply to the venturi is therefore reduced by the JET NEEDLE which is connected to the air slide and engages the needle jet. Depending on dimension of the flat cone of the jet needle, the annular gap between the jet needle and needle jet is enlarged or decreased. For fine adjustment the jet needle may be located in the air slide in various positions (needle positions) which, similarly to the jet needle cone, affect the amount of fuel drawn in. For example, a higher needle position results in a larger annular cross-section in the needle jet which allows more fuel to pass through and vice versa. When the throttle slide opening is reduced, the amount of fuel supplied is affected also by the shape of the throttle slide at the lower end. With increasing height the cylindrical recess called air cushion results in the mixture becoming leaner. The recess on the filter side,called cut-away, has a similar effect but this extends up to a greater slide stroke. The air/fuel mixture is adjusted using main jets and needle jets of various sizes and also atomizers, air slides and jet needles of various types. The main jet may be surrounded by a strainer; in particularly severe operating conditions this ensures that the fuel is not spun away from the main jet. The strainer does not act as a filter!

MAIN REGULATING SYSTEM: (Constant Depression Carburettor) The amount of mixture drawn in by the engine and thus its performance is determined by the cross-sectional area in the venturi which is opened up by the THROTTLE VALVE (Figure 11). If the throttle valve is opened while the engine is running, the increased air flow results in a vacuum building up at the outlet of the needle jet, drawing fuel from the float chamber through the jet system. At low speeds this vacuum is not sufficient for an adequate fuel supply, it must therefore be increased artificially by using a pressure regulator. For this purpose Bing Constant Depression carburettors are provided with a DIAPHRAGM regulated PLUNGER that reduces the cross-sectional area of the venturi by virtue of its own weight, or in some applications with the additional pressure from a spring and thus increases air velocity and vacuum.

The vacuum in the venturi acts on the top of the diaphram and the plunger via a bore (U) in the plunger and attempts to lift the plunger against its own weight and spring. The considerably lower vacuum between air filter and carburettor is applied to the underside of the diaphragm via duct (V) as reference pressure.

If the throttle valve is opened when the plunger is closed, then a vacuum will build up in the small cross-section at the bottom of the plunger which is sufficient to provide a supply of fuel. The weight of the plunger and the force of the spring are matched in such a way that the vacuum will be maintained with increasing speed until the plunger has fully opened the venturi cross-section. From this point onwards the carburettor acts as a throttle valve carburettor with fixed venturi. The vacuum increases with increasing speed.

On its way from the float chamber, the fuel passes through the MAIN JET, the JET STOCK and the NEEDLE JET; as it leaves the needle jet it is pre-mixed with air which is brought in from the air filter via an air duct (Z) and the ATOMIZER in an annular flow around the needle jet. This air flow assists the atomizing process to form minute droplets of fuel, thereby favorably affecting fuel distribution in the intake manifold and combustion chamber.

Depending on the dimension of the flat cone of the jet needle, the annular gap between the needle and needle jet is enlarged or decreased and thus the fuel supply is throttled to a lesser or greater extent. The jet needle can be located in the plunger in four different positions which, similarly to the jet needle cone, affect the amount of fuel drawn in. For example "needle position 3" means that the jet needle has been suspended from the retaining spring in the third notch from the top. To achieve the height adjustment the jet needle is turned through 90 degrees and pushed up or down, the retaining spring engaging the next notch in the jet needle. If the needle is suspended higher up, this will result in a richer mixture and vice versa.

In short the main regulating system is set using main jets and needle jets of various diameters and also jet needles and plungers of various types. Between the main jet and jet stock, a washer is provided which, together with the float chamber, forms a annular gap. In particularly severe operating conditions this ensures that the fuel is not spun away from the main jet. A rubber ring seals the jet stock off from the carburettor housing to avoid any fuel being drawn in via the thread thus by-passing the main jet.

SPECIAL TUNING REQUIREMENTS: Modifications to your engine dictate the necessity for matching the air/fuel mixture to new demands placed upon the engine by whatever changes you have made.

LARGER DIAMETER EXHAUST: Bolting on the larger exhaust system will reduce backpressure thereby allowing the engine to "breathe" easier! Your engine now will have an excess amount of AIR and will necessitate strengthening the mixture. Later model machines that have been "leaned out" at the factory for emission control (Smog devices, etc.) will generally show a DECREASE of power when large exhausts are bolted on unless enrichened.

DUAL PLUG IGNITION: Dual plug ignition systems greatly reduce detonation at high load and high power operation— so does a slightly rich air/fuel mixture. Use of dual plug ignitions therefore will allow you to "slightly" lean your mixture to achieve better economy at reasonable cruising speeds.

DECREASED VALVE CLEARANCE: Decreasing valve clearance from the factory specification lengthens the valve overlap time period, allowing a greater amount of air to enter through the intake port AND an abnormal amount of exhaust gasses to return through the exhaust port—resulting in fresh charge dilution at lower engine speeds. If you choose to reduce valve clearance—ENRICHEN your air/fuel mixture.

AIR/FUEL MIXTURE AT ALTITUDE: From sea-level to about 3,000 feet elevation, atmospheric pressure decreases about one-inch-per-thousand feet of altitude—therefore our 29.92 barometer reading at sea-level now becomes about 27, at 5,000 feet—about 25 and 20.6 at 10,000 feet. Our engine (and carburettor) only react to air velocity—not weight of air. Not knowing this, the carburettor continues flowing the same amount (by weight) of fuel, and all of the sudden our "ideal mixture" at sea-level becomes extremely rich at higher elevations. The Bing carburettor is less susceptible to changes in elevation than other carburettors in use, and in general does not require jetting changes for the idle and lower part-throttle settings. These settings can be compensated for by mixture screw adjustment. However, the upper part-throttle range will require the lowering of the jet needle to lean out mixture. Continuous operation at higher elevation certainly necessitates the changing of the main jet. Table 1 provides all information necessary to determine jetting changes in relation to altitude changes.

HOW TO USE THE BING MAIN JET CORRECTION CHART

STEP #1: Assume Nothing!!! Disassemble and check your carburettor(s) to verify the jetting in your carb(s).

STEP #2: Because air density varies with temperature and altitude changes, a main jet correction may be necessary. This chart was calculated at sea level with an air temperature of 60°F or 15°C.

STEP #3: Apply the multiplication factor shown to the main jet size recommended in the chart at the front of this manual.

STEP #4: Your operating conditions will vary by the change of seasons.

STEP #5: Humidity is also a variable in determining air density. A high humidity means a lower air density of air to be consumed by combustion. Because we are generally not equipped with a way of easily reading the % of humidity present, this can be read into this chart by adding altitude for high humidity and subtracting altitude for very dry climates.

EXAMPLE: You are going to do a lot of touring in Colorado (elevation about 5,000 feet). Your machine is performing just fine in Galveston, Texas (elevation 7 feet). Your main jet size is 150. Temperature in Galveston (86°F) - Denver (50° F). The new jet required to obtain the same mixture ratio as was provided by the size 150 is determined by the formula: 150 x 0.96 = 144.

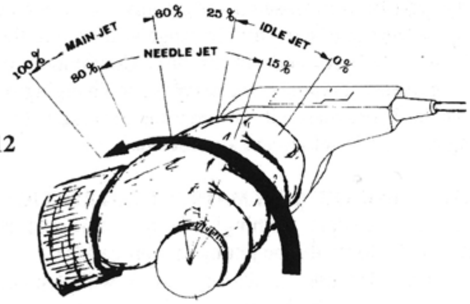
MAIN JET CORRECTION CHART

Temperature		Altitude - Feet								
F	C	0	1600	3300	5000	6500	8200	10000	11500	13000
-22	-30	1.04	1.03	1.01	1.00	0.98	0.97	0.95	0.94	0.93
-4	-20	1.03	1.02	1.00	0.99	0.97	0.96	0.95	0.93	0.92
14	-10	1.02	1.01	0.99	0.98	0.96	0.95	0.94	0.92	0.91
32	0	1.01	1.00	0.98	0.97	0.95	0.94	0.93	0.91	0.90
50	10	1.00	0.99	0.97	0.96	0.95	1.09	0.92	0.91	0.89
59	15	1.00	0.99	0.97	0.96	0.94	0.93	0.92	0.90	0.89
68	20	1.00	0.98	0.97	0.95	0.94	0.93	0.91	0.90	0.88
86	30	0.99	0.97	0.96	0.94	0.93	0.92	0.90	0.88	0.87
104	40	0.98	0.96	0.95	0.94	0.92	0.91	0.90	0.88	0.87
123	50	0.97	0.96	0.94	0.93	0.92	0.90	0.89	0.88	0.86

When changing jets for altitude, always make correction for temperature as well.

CARBURETTOR TROUBLE SHOOTING: Only two types of trouble occur with any carburettor (1) those that creep up gradually and (2) those that show up instantly. The ones that occur instantly are easy to locate through a logical process of elimination. Even the troubles that come upon us gradually can be pinpointed if we pay close attention to what the symptoms are telling us. Locating the exact area of malfunction becomes a relatively easy task if we always think in terms of AIR and FUEL. All possible carburettor faults have to be one or the other, or both. (Figure 12) provides a general idea of component control relating to throttle position. One last word of advice before we tear into the carburettor. Take a little time to make sure the problem does not lie elsewhere—(1) do we have good spark and at the correct time? (2) do we have proper compression that tells us our valves and rings are in order? The condition of your spark plug tells all!

FIGURE 12



READING YOUR SPARK PLUG: The spark plug from a normally functioning cylinder (with ideal air/fuel mixture) will appear as shown in Figure 13A. The ceramic insulator tip will exhibit an extremely light deposit in various shades of white/gray. The bottom edge of the threaded shell will be lightly coated with dry black soot. If the ceramic appears normal, but light reddish/brown soot appears on the shell, a slightly lean condition is indicated. A TOO LEAN plug under the scrutiny of the magnifying glass will have tell-tale signs warning of the degree of leanness. Slightly lean-to-excessively lean signs would include (in order of leanness) (1) almost-white ceramic with sand-blasted surface, (2) shiny-white ceramic with tiny black specks, (3) tiny beads of copper deposited between center electrode and surrounding ceramic insulator, (4) engine in shop for new pistons and valves. (Figure 13B) illustrates the appearance of the spark plug from a rich running cylinder. The entire plug area exposed to combustion has a velvet-black carbon appearance. The above descriptions only relate to air/fuel mixture problems. Other plug conditions, such as burned, pitted and eroded electrodes, oil, sludge, or rust deposits indicate engine or operational faults other than carburation.

13a

13b

ENGINE FAILS TO START (WET SPARK PLUG): A wet plug indicates excessive rich mixture—excessive to the point of plug fouling by gasoline. One source of this much gasoline would be from a too high fuel level but would usually be accompanied by fuel overflowing onto the ground (unless the overflow tube was plugged). Unless the floats have been mishandled, the chance of them being out of adjustment is slim indeed. A more likely cause of "too high fuel level" is a worn out float needle. If wet fouling occurs after machine has been sitting overnight with tank valve left open, a small amount of dirt may have prevented the float needle from holding back tank fuel (also accompanied by overflowing onto the ground). Repeated cranking with mixture control screw set "too rich" or a too rich idle jet can also cause wet fouling, especially when throttle valve is completely blocking air flow through carburettor.

ENGINE FAILS TO START (DRY PLUG): A dry spark plug indicates a blocked fuel line, starting jet (CD Carburettor) or idle jet (Slide Carburettor) or in the case of normal jets, an excess of air being inducted into the cylinder. If your carburettor is equipped with a "starting carburettor", the starting jet is located in the float bowl starting chamber where it is vulnerable to any foreign matter contaminating the gasoline. Excessive throttle opening during cranking will prevent the proper amount of fuel from being drawn through the starting system.

ENGINE STARTS BUT DOES NOT IDLE: If the idle speed adjusting screws are backed out too far, the throttle valve (CD Carburettor) and air slide (Slide Carburettor) will close off all air flow through the carburettor venturi. An ideally idling engine needs more air than is supplied by just the idle system. Excessive valve or slide opening allows too much air into the cylinder, therefore necessitating an extremely rich setting of the idle mixture screw. If this situation exists, the slightest idle jet blockage will result in an extremely lean idle condition.

ENGINE SPEED VARIES AT IDLE: The "hunting" of RPM, trying to stabilize itself, accompanied by fast idle (or rather a slow return to idle) pretty much indicates an air leak between the carburettor and cylinder. Most leaks appear at the carburettor connection to the cylinder head intake manifold. Some air leaks have been traced to a worn out, or hardened rubber "O" ring on the throttle valve shaft. If your CD Carburettor has a vacuum take-off port just to the front of the idle mixture screw, make sure the screw is snug (a little silicone seal is a lot of insurance here—and it's easily removed for carb balancing.) On slide carburettors with a clamp-on connection, a worn out or damaged fiber bushing may leak air.

ENGINE MISFIRE (0 to 1/8 throttle): The mixture in this throttle range is controlled by the IDLE JET and MIXTURE CONTROL adjusting screw. Misfiring in this range is a result of a "too lean" air/fuel mixture that is corrected by resetting the mixture screw or changing the idle jet to the next larger size, and matching the screw setting to the larger jet.

ENGINE MISFIRE (1/8 to 1/2 throttle): A lean mixture in this range is made richer by changing the needle jet to the next larger size—the mixture control screw has some influence over this area.

ENGINE MISFIRE (1/2 to 3/4 throttle): Mixture strength in this range is mainly controlled by the taper of the jet needle—increasing the size of the needle jet would certainly enrichen this range however, the 1/8 to 1/2 throttle range will also be enrichened.

ENGINE MISFIRE (3/4 to full throttle): As the jet needle is almost totally retracted in this throttle range—mixture is controlled by the MAIN JET.

LOW POWER UPON ACCELERATION: This condition, if a fault of the carburettor, would be an excessively rich air/fuel mixture. The various stages of throttle opening are similar to those above (for misfire) except the components would be selected to obtain a leaner mixture.

ENGINE BACKFIRES THROUGH CARBURETTOR: An extremely lean mixture burns so slow that it may still contain flame when the intake valve opens to allow the next charge into the cylinder. The incoming charge will ignite in the intake tract.

ENGINE AFTERFIRES THROUGH EXHAUST: An extremely rich mixture burns slow and incomplete. The unburned mixture enters the exhaust system, where it is ignited by the hot exhaust gases.

MISCELLANEOUS RECOMMENDATIONS AND TIPS ON CARBURETTORS

ALL MODELS:

You should replace your fuel line every two years as the factory fuel line starts to deteriorate into little particles that go down into your carb. This will contaminate the carb and block passage ways. We of course recommend that you use our black or blue B.A.I. Alcohol Resistant Fuel Line which does not deteriorate as the factory fuel line does. Replacement should still be made every two years.

Storage Tip: If you store your bike for 30 days or more at a time, shut the fuel off, run the bike until it quits and then drop the fuel bowls and dump all remaining fuel and residue. This will help keep your carbs from varnishing because of fuel deterioration.

Every 25,000 miles you should replace your needles and needle jets **on all models**. Both of these items wear out of round and give you sluggish response because of improper fuel flow regulation.

ON ALL BIKES: It is extremely important to turn the Petcocks off EVERY TIME you park it. Failure to do this may result in a **FIRE HAZARD!!!**

CV a/k/a CD CARBURETORS

CARB NUMBERS ON CV CARBS: On the earlier 32mm carbs the number was stamped on the aluminum BING plate on the outside of each carb. On the later 32 and 40mm carbs the number is stamped on a small web cast directly below the carb top, in line with either the intake side of the carb or the head side.

You should replace your diaphragm in the **CV carb** every two years regardless of mileage.

When replacing the throttle shaft "O" Ring, you must file down the threaded portion of the throttle plate retaining screws that protrude through the back of the throttle shaft before you attempt to unscrew them. If you do not, you will strip the threads out of the throttle shaft because the screws are peened on the threaded ends so that if they work loose they cannot fall out and be ingested through the engine intake valve — which would obviously cause great damage and expense. Be sure to peen the new screws after they are in place.

When you remove your butterfly valve in the CV carbs they absolutely must go back in the same carb exactly the same way they came out. To identify this position **before disassembling note the following:** There is normally a small dot stamped on the upper half facing the outside of the butterfly plate, some models have a number on the upper half on the inside of the plate. I have heard that some advise not to mess with this "O" Ring as it is a lot of trouble to replace. If you are going to rebuild, then rebuild correctly. This "O" Ring is just like the other "O" Rings, they get hard & brittle. Failure to change the Throttle Shaft "O" Ring can cause problems off idle.

WARNING: The start valve or choke on **CV carbs** has a tendency to come loose on a regular basis. Check the four screws for tightness every 4000 or 5000 miles so the carb does not suck in the gasket and create a vacuum leak which kills your performance.

When disassembling the start valve or choke, note that there is a dot on the outer end of the brass threaded shaft that goes toward the cable connection. If you reverse this when you reassemble it, the choke will not work. Also note that there is a left and right choke, and they are so marked on the center of the brass shaft inside. Do not mix them up!

CV Carbs: When overhauling your carbs be sure that the steel insert crimped in the top of the carb has not come loose. If they are loose, this creates a vacuum leak which hurts the performance almost as if you had a hole in the diaphragm. If they are loose, we can re-crimp them for $15.00 per carb plus return shipping.

On CV Carbs 1990 & Newer: The new style slide needle plug retainer may need to be heated with a small torch before you try to remove it. Some of these bikes may experience fuel spattering on the right side while bike is at highway speeds, if this is the case, it is a defective Air Tube and your dealer should replace it with BMW part #13721254654.

On CV Carbs 64/32/ 1 through 20: The early model 64 CV carbs have a steel tip float needle, this needle has a tendency to wear the needle seat, replacement part is 51-540-2.5 and comes with instructions. **Test:** raise floats just till it starts to depress ball, turn on petcock and wait a minute to see if it starts to drip, if so replace seat.

On the older CV carbs the idle speed adjustment screw screws into a boss cast in the side of the carb. Be very careful not to strip the threads when replacing the screw as the threads are extremely fine. Put some Never-seez on it so the threads do not bind.

Old Style Side Float Carbs

CARB NUMBERS ON /2 CARBS: The numbers are usually found on each carb on the side facing away from the bike just ahead of the flange that bolts to the cylinder head. Some /2s and earlier had the number stamped on the edge of the flange that bolts to the cylinder head.

/2 Carbs: When you store your bike for the winter or if you leave it out in the rain, you need to take the carbs completely off the bike, remove the fuel bowl cover and dump out any water or contamination that might have settled into the bottom of the bowl so that it does not eventually corrode out the bottom of the fuel bowl.

/2 Carbs: Our lever top replacements for your old fuel bowl shuts the fuel off much more positively than the original float and needle shut off. This lever top kit is highly recommended to stop the "/2 Dribbles".

/2 Carbs: If your slides are sticking when the engine warms up or you are not getting a good vacuum seal at the flange you should have your carb flanges re-trued as they have become warped.

TROUBLE SHOOTING IDLE CIRCUIT PROBLEMS

One of the most common problems that can occur is the shut down of the idle circuit due to a blockage. The first indication of a blockage of the idle circuit is the engine becomes hard to start. Most of the time when this problem occurs you will just engage the choke for a longer period of time. On a Bing carburettor there is a separate starting carburettor circuit which is actually an enriching circuit, not a choke. This will warm up the engine more. You will also tend to open the throttle repeatedly to keep the engine running, because once you get off of idle the engine will run. The engine will often stumble when you try to accelerate until you are above half throttle because the idle circuit is not contributing any fuel and the engine will run lean below half throttle. When the engine is lean it will cough back through the carburettors when you try to accelerate off idle. Normally you don't operate the engine below half throttle very much so you tend to ignore the problem. Finally, when you decide that you need to adjust the carb to cure the stumbling problem that is occurring below half throttle, you will turn up the idle speed screw until the engine idles. What you have actually done is to open the slide until the engine is running on the needle jet instead of the idle circuit because you have opened the slide far enough to flow enough air to pull fuel from the needle jet. This is your mid range circuit. What will happen then is the idle is very rich and the engine will tend to load up at idle and run rough. When you try to accelerate, the engine may stumble due to the rich mixture instead of a lean mixture as before and this may be signaled by the engine backfiring through the mufflers which indicates a rich mixture.

The easiest way to determine if you have a plugged idle circuit is to try to adjust the idle mixture screw. If the idle circuit is plugged the idle mixture screw will have no effect on the idle. Remember you will probably have opened the idle speed screw far enough to get the engine to run on the needle jet. Normally if you close the idle mixture screw the engine will stop running on that cylinder or in the case of one carb only, the engine will die.

The idle circuit contributes fuel until approximately half throttle. It then shuts down due to the flow dynamics built into the circuit. If the idle circuit is plugged the engine will run lean up to approximately half throttle. As stated earlier, the engine will stumble when you try to advance the throttle below half throttle due to the lean condition. The give away is the coughing through the carb. This always signals a lean condition. Most of the engines that we are dealing with now have one carb per cylinder. So, if one carb's idle circuit becomes plugged the other carb and cylinder will carry the engine even though it will run rough because it is missing at idle on one cylinder.

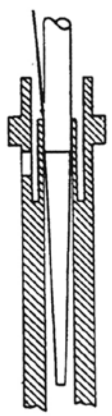
The first thing to check if you think the idle circuit is shut down is the idle jet. Remove it and see if you can see light through the orifice. If it is clear, the blockage is usually in the very tiny holes behind the slide that pass the idle mixture into the venturi of the carb. These holes are just pin holes located in the floor of the carb directly behind the slide. Behind the slide means on the engine side of the slide.

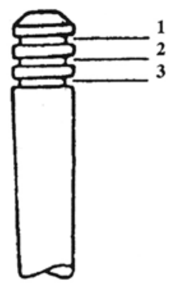
Cleaning the carb in carb cleaner and blowing it out with high pressure air is no guarantee that the circuit will be opened. The only way to be sure the idle circuit is open is to blow through the circuit with your mouth and check the passage of air through each orifice. If you need to open up one of the circuit holes use a copper wire smaller than the orifice. Copper wire is softer than the carb body and will not tend to open the hole size of the orifice. **CAUTION:** If you open the hole size of the orifice when attempting to clean it you will mess up the regulation and cause the carb to run rich at idle all of the time. Be careful if you attempt to do this, carbs are expensive!

JET NEEDLE CLEARANCE AREA INFORMATION
TYPE 54 ° TYPE 84 ° TYPE 55

Changing the holding plate or "E" clip to position #1(top of pin) will draw the pin out later, causing a leaner condition. Moving the holding plate to the #3 position (bottom of pin) will draw the pin out earlier, producing a richer condition. If you feel your mid-range needs a change, try this first. It only takes a quick minute and doesn't cost anything. If this doesn't cure the problem, consider a change of components in this circuit.

Clearance





Changing the holding plate position will change your midrange fuel mixture.

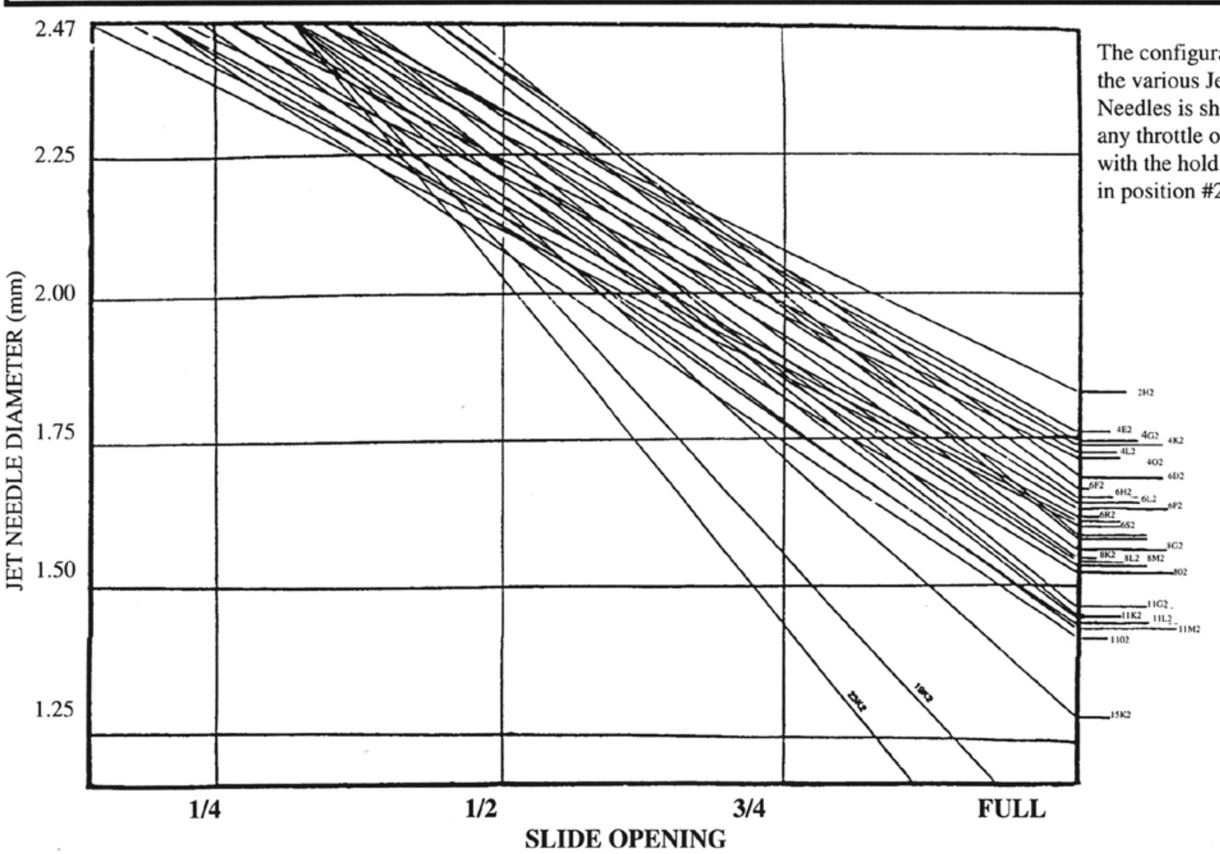
Figure #2: Illustrates the relationship of these two components forming the ¼ to ¾ fuel supply.

According to the chart, an 8G2 at 1/2 throttle opening measures around 2.3mm. If you are using a 2.72mm needle jet (the number stamped on this part is the inside diameter), you can figure the clearance area by applying a simple-to-use formula:

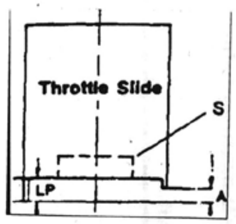
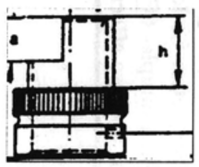
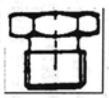
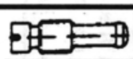
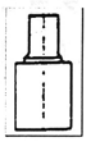
Clearance Area=(.25 x 3.14 x D1 squared)-(.25 x 3.14 xD2 squared)
Where:
⇒ D1 = Diameter of the Needle Jet (the number stamped on it).
⇒ D2 = Diameter of Jet Needle at a certain throttle opening (from chart)

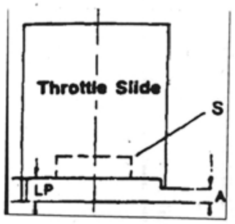
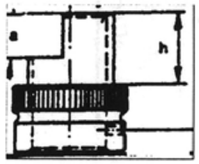
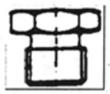
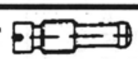
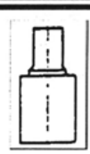
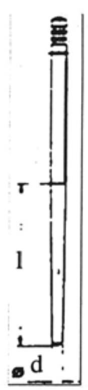
For Example:
8G2 Jet Needle used with 2.72 Needle Jet
@ 1/2 throttle opening:
Clearance = (3.14 x .25 x (2.72 squared))-(3.14 x .25 x (2.30 squared))=1.66mmsq
@3/4 throttle opening:
Clearance =(3.14 x .25 x (2.72squared))-(3.14.x25x(1.9squared))=2.975mmsq
8L2 Jet Needle used with 2.74 Needle Jet
@ 1/2 throttle opening
Clearance=(3.14 x .25 x (2.74squared))-(3.14 x .25 x (2.2squared))=3.12mmsq

You can apply the clearance formula to figure out at which point these parts are no longer smaller than the main jet passage. The diameter of the main jet passage is also the number stamped on it. (150 Main Jet = 1.50mm diameter; 180 Main Jet = 1.80mm diameter.)
Thus the area of the Main Jet is:
Area = 3.14 x .25 (diameter of Main Jet (squared)).



The configuration of the various Jet Needles is shown at any throttle opening with the holding plate in position #2.

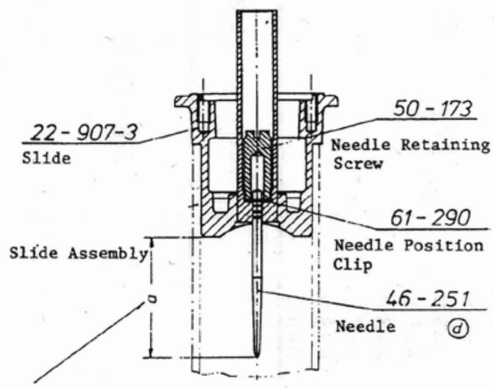
	53	84-2	54-2	55	94 64
		22-635-1 LP=5 A=8		22-655-135 LP=10 A=3.5	
		22-635-591 LP=7 A=1		22-655-140 LP=10 A=4.0	
		22-635-592 LP=7 A-2	See Page 15 for listing	22-655-145 LP=10 A=4.5	
	22-570	22-635-593 LP=7 A-3		22-655-150 LP=10 A=5.0	SEE PAGE 2
		22-635-594 LP=7 A-4		22-655-155 LP=10 A=5.5	
		22-635-595 LP=7 A-5		22-655-160 LP=10 A=6.0	
		22-635-596 LP=7 A-6		22-655-170 LP=10 A=7.0	
		22-635-597 LP=7 A-7		22-655-180 LP=10 A=8.0	
				22-655-190 LP=10 A=9.0	
		60-369 normal	60-432 normal		
	60-430	60-370 strong	60-433 strong	60-470	SEE PARTS LIST
		60-372 weak	60-434 weak		
ATOMIZER		51-590-1 a= 0 h=5 d= O 2.5	51-550-1 (51-551) h = 6.5 a = 4 d = 2 groves		
		51-590-2 a= 8 h=12.5 d= O 2.5	51-550-2 (51-552) h = 8.5 a = 6 d = 2 groves		
	51-590	51-590-5 a= 5 h=6.5 d= O 2.5	51-550-3 (51-553) h = 6.5 a = 4 d = 1.2 O		SEE PAGE 2
		51-590-6 a= 4 h=5.5 d= 1.2	51-550-4 (51-554) h = 8.5 a = 4 d = 1.2 O		
		51-590-7 a=4 h=8 d= O 2.5	51-550-5 (51-555) h = 10.5 a = 5.5 d = 2 groves		
		51-590-8 a= 4 h=8 d= 1.2	51-550-6 (51-556) h = 10.5 a = 5.5 d = 1.2 O		
		51-590-9 a=8 h=11 d= 1.2	51-550-7 (51-557) h = 12.5 a = 7.5 d = 2 groves		
		51-590-10 a=0 h=6.5 d= O 2.5	51-550-8 (51-558) h = 12.5 a = 7.5 d = 1.2 O		
MAIN JET 	44-051-X	X = 70 75 80 85 90 95 100 105 110 115 120 125 130 132 134 135 136 138 140 142 144 145 146 148 150 152			
		154 155 156 158 160 162 164 165 166 168 170 172 174 175 176 178 180 182 184 185 186 188 190 192 194 195			
		196 198 200 202 205 210 215 220 225 230 235 240 245 250 255 260 270 275 280 285 290 295 300			
IDLE JET 	44-353-X	X = 30 35 40 45 48 50 55 60 65 70 72 75 80 85			
NEEDLE JET 	45-191-X	45-196-X	45-120-X		
		X = 2.60 2.62 2.64 2.66 2.68 2.70 2.72 2.74 2.76 2.78 2.80 2.82 2.84 2.86 2.88 2.90 2.92 2.94 2.96 2.98			
		46-290-0B1 l = 19 d = 1.8	46-360-2H2 l=33.5 d=1.7	46-380-2H6 l=33.5 d=1.69	
		46-290-3S1 l = 33 d = 1.5	46-360-4E2 l=30.5 d=1.6	46-380-4E6 l=30.6 d=1.58	
		46-290-4E1 l = 23 d = 1.4	46-360-4K2 l=34 d=1.6	46-380-4K6 l=34 d=1.58	
JET NEEDLE 	46-234	46-290-4K1 l = 26 d = 1.4	46-360-4O2 l=38 d=1.6	46-380-4O6 l=38.2 d=1.58	
		46-290-4O1 l = 30.5 d = 1.4	46-360-6D2 l=29 d=1.45	46-380-6D6 l=29.2 d=1.45	46-XXX
		46-290-6G1 l = 24 d = 1.2	46-360-6F2 l=32 d=1.45	46-380-6F6 l=31.9 d=1.45	SEE PAGE 2
		46-290-6L1 l = 27 d = 1.2	46-360-6L2 l=35 d=1.45	46-380-6L6 l=35.1 d=1.45	
		46-290-6O1 l = 31 d = 1.2	46-360-6P2 l=39 d=1.45	46-380-6P6 l=39 d=1.45	
		46-290-8E1 l = 23 d = 1.0	46-360-8G2 l=32.5 d=1.35	46-380-8D6 l=29.9 d=1.34	
		46-290-8H1 l = 25 d = 1.0	46-360-8L2 l = 35 d = 1.35	46-380-8G6 l=32.4 d=1.34	
		46-290-8M1 l = 28 d = 1.0	46-360-8O2 l = 39 d = 1.34	46-380-8L6 l=35.3 d=1.34	
			46-360-9M1OJ	46-380-8O6 l=38.8 d=1.34	
			46-360-11G2		
			46-360-11K2		
			46-360-15E5U		
			46-360-15K2		
			46-360-19K2		

	53	84-2	54-2	55	94 64
		22-635-1 LP=5 A=8		22-655-135 LP=10 A=3.5	
		22-635-591 LP=7 A=1		22-655-140 LP=10 A=4.0	
		22-635-592 LP=7 A-2	See Page 15 for listing	22-655-145 LP=10 A=4.5	
	22-570	22-635-593 LP=7 A-3		22-655-150 LP=10 A=5.0	SEE PAGE 2
		22-635-594 LP=7 A-4		22-655-155 LP=10 A=5.5	
		22-635-595 LP=7 A-5		22-655-160 LP=10 A=6.0	
		22-635-596 LP=7 A-6		22-655-170 LP=10 A=7.0	
		22-635-597 LP=7 A-7		22-655-180 LP=10 A=8.0	
				22-655-190 LP=10 A=9.0	
		60-369 normal	60-432 normal		
	60-430	60-370 strong	60-433 strong	60-470	SEE PARTS LIST
		60-372 weak	60-434 weak		
		51-590-1 a= 0 h=5 d= O 2.5	51-550-1 (51-551) h = 6.5 a = 4 d = 2 groves		
ATOMIZER		51-590-2 a= 8 h=12.5 d= O 2.5	51-550-2 (51-552) h = 8.5 a = 6 d = 2 groves		
	51-590	51-590-5 a= 5 h=6.5 d= O 2.5	51-550-3 (51-553) h = 6.5 a = 4 d = 1.2 O		SEE PAGE 2
		51-590-6 a= 4 h=5.5 d= 1.2	51-550-4 (51-554) h = 8.5 a = 4 d = 1.2 O		
		51-590-7 a=4 h=8 d= O 2.5	51-550-5 (51-555) h = 10.5 a = 5.5 d = 2 groves		
		51-590-8 a= 4 h=8 d= 1.2	51-550-6 (51-556) h = 10.5 a = 5.5 d = 1.2 O		
		51-590-9 a=8 h=11 d= 1.2	51-550-7 (51-557) h = 12.5 a = 7.5 d = 2 groves		
		51-590-10 a=0 h=6.5 d= O 2.5	51-550-8 (51-558) h = 12.5 a = 7.5 d = 1.2 O		
MAIN JET 	44-051-X	X = 70 75 80 85 90 95 100 105 110 115 120 125 130 132 134 135 136 138 140 142 144 145 146 148 150 152			
		154 155 156 158 160 162 164 165 166 168 170 172 174 175 176 178 180 182 184 185 186 188 190 192 194 195			
		196 198 200 202 205 210 215 220 225 230 235 240 245 250 255 260 270 275 280 285 290 295 300			
IDLE JET 	44-353-X	X = 30 35 40 45 48 50 55 60 65 70 72 75 80 85			
NEEDLE JET 	45-191-X	45-196-X	45-120-X		
		X = 2.60 2.62 2.64 2.66 2.68 2.70 2.72 2.74 2.76 2.78 2.80 2.82 2.84 2.86 2.88 2.90 2.92 2.94 2.96 2.98			
		46-290-0B1 l = 19 d = 1.8	46-360-2H2 l=33.5 d=1.7	46-380-2H6 l=33.5 d=1.69	
		46-290-3S1 l = 33 d = 1.5	46-360-4E2 l=30.5 d=1.6	46-380-4E6 l=30.6 d=1.58	
		46-290-4E1 l = 23 d = 1.4	46-360-4K2 l=34 d=1.6	46-380-4K6 l=34 d=1.58	
JET NEEDLE 	46-234	46-290-4K1 l = 26 d = 1.4	46-360-4O2 l=38 d=1.6	46-380-4O6 l=38.2 d=1.58	
		46-290-4O1 l = 30.5 d = 1.4	46-360-6D2 l=29 d=1.45	46-380-6D6 l=29.2 d=1.45	46-XXX
		46-290-6G1 l = 24 d = 1.2	46-360-6F2 l=32 d=1.45	46-380-6F6 l=31.9 d=1.45	SEE PAGE 2
		46-290-6L1 l = 27 d = 1.2	46-360-6L2 l=35 d=1.45	46-380-6L6 l=35.1 d=1.45	
		46-290-6O1 l = 31 d = 1.2	46-360-6P2 l=39 d=1.45	46-380-6P6 l=39 d=1.45	
		46-290-8E1 l = 23 d = 1.0	46-360-8G2 l=32.5 d=1.35	46-380-8D6 l=29.9 d=1.34	
		46-290-8H1 l = 25 d = 1.0	46-360-8L2 l = 35 d = 1.35	46-380-8G6 l=32.4 d=1.34	
		46-290-8M1 l = 28 d = 1.0	46-360-8O2 l = 39 d = 1.34	46-380-8L6 l=35.3 d=1.34	
			46-360-9M1OJ	46-380-8O6 l=38.8 d=1.34	
			46-360-11G2		
			46-360-11K2		
			46-360-15E5U		
			46-360-15K2		
			46-360-19K2		

CV SLIDES

There are two styles of slides for the Bing CV Carburettors. We will call them Old Style (32mm 46-241, 40mm 46-341) and New Style (46-251 32mm, 46-371 40mm). See page two of this manual for your part number.

The Old Style Slide uses a push/pull and turn principle. To achieve proper height adjustment the jet needle is turned through 90° and pushed up or down, the retaining spring engaging the next notch in the jet needle. If the needle is suspended higher up, this will result in a richer mixture and vice versa.
The New Style Slide has a position clip and needle retaining screw. You use a screwdriver to remove the retaining screw before positioning your needle. See photo below.



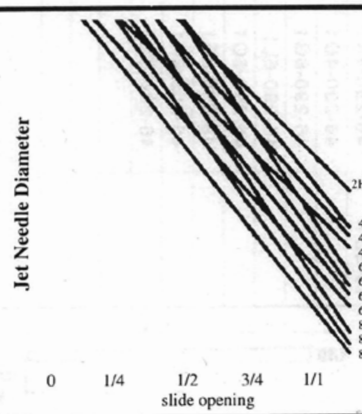
SEE PAGE 2 FOR YOUR SPECIFIC JET NEEDLE

54-2 Slide No.'s and Dimensions

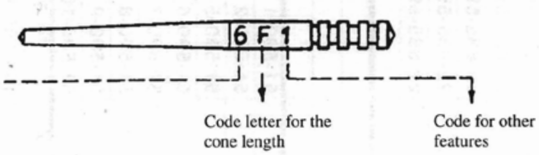
Part #	LP	Rear Notch Width	Bevel
22-642-210	6.5mm	______	
22-642-215	6.5mm	______	
22-642-220	6.75mm	______	
22-642-230	6.5mm	______	
22-642-2003	6.5mm	______	
22-642-2103	6.7mm	______	
22-642-2203	6.5mm	______	
22-642-2204	6.7mm	10.0mm	
22-642-2303	No dimensions available		
22-642-2305	6.7mm	3.0mm	
22-632-2306	6.7mm	4.5mm	
22-642-2603	6.7mm	______	

MAIN JET AREAS

MAIN JET	AREA
1.25	1.23
1.30	1.33
1.35	1.43
1.40	1.54
1.45	1.65
1.50	1.77
1.55	1.89
1.60	2.01
1.65	2.14
1.70	2.27
1.75	2.40
1.80	2.54
1.85	2.69
1.90	2.83
1.95	2.98



JET NEEDLE DIAMETER & SELECTION



The Jet Needle is selected as follows:

⇒ **Needles with a "Higher Number Code" produce RICHER mixtures above HALF THROTTLE…example- 8L2 instead of 6L2**

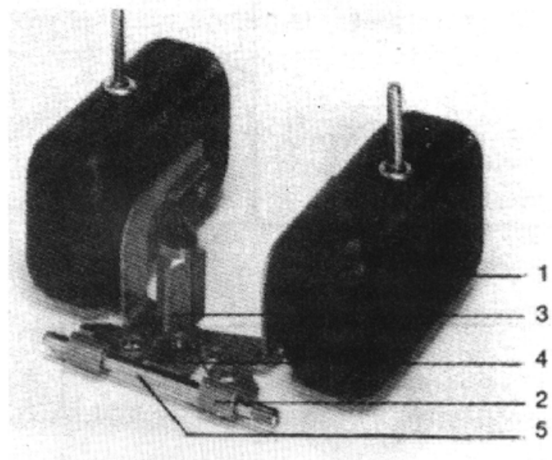
⇒ **Needles with a "higher Letter Code" produce RICHER mixtures below HALF THROTTLE…example- 6P2 instead of 6D2**

⇒ **The adjacent regions are also effected to a lesser extent.**

TECHNICAL BULLETIN
No. 1 / 1984
New Float System For BING Carburettors Type: 53 - 54 - 55 - 64 - 84 - 94

For incorporation in BING Slide Carburettors 53 (24 - 27 mm dia.), 84 (28 - 32 mm dia.), 54 (34 - 40 mm dia.), and 55 (40 - 44 mm dia.) as well as in BING Equal Pressure Carburettors 64 and 94, a new float system (Fig. 1), is now available, appreciably extending the application range of these carburettors.

Two floats (1) guided on vertical pins in the float cap act separately from each other by their own buoyancy on a common hinge (2)Float Needle (3), Retaining Spring (4), and Bearing Pin (5) have been adopted from the previously series produced float system.



Under heavy lateral inclination of the carburettor, only the float located below lifts the hinge. The opposite float falls off, thus not loading the hinge with its own weight, which, in the previous float system, had to be carried by the float located below. Even in a heavy carburettor lateral position, the new float system therefore still reliably regulates the fuel level in the float chamber.

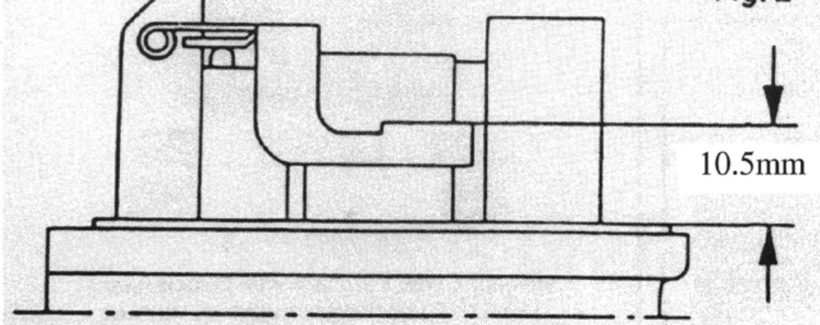
The new system is especially recommended for motorcycles with carburettors installed transversely to the direction of motion, for industrial engines with special inclination performance requirements, for ultra-light aircraft, and the like.

During installation of the new float system in a carburettor, the hinge must be brought to dimension H (Fig. 2) by bending of the bearing flap for the float needle, in contrast to the previous arrangement whereby alignment was according to the float surfaces. H comes to 10.5 mm for BING Carburettors 53, 54, 84, 64 and 94 and to 8.5 mm for BING Carburettor 55.

Special hints:

Due to lack of space, float bowls for the new float system contain no over flow tube. At actuation of any available tickler, only the left-hand float is depressed, whereas the right-hand float lifts the hinge, and the valve closes. The tickler is therefore ineffective as a starting aid!

Fig. 2



Part # 35-F& B Kit

EXPLANATION OF OPERATION
"BING" FLOAT & BOWL KIT FOR BMW MOTORCYCLES

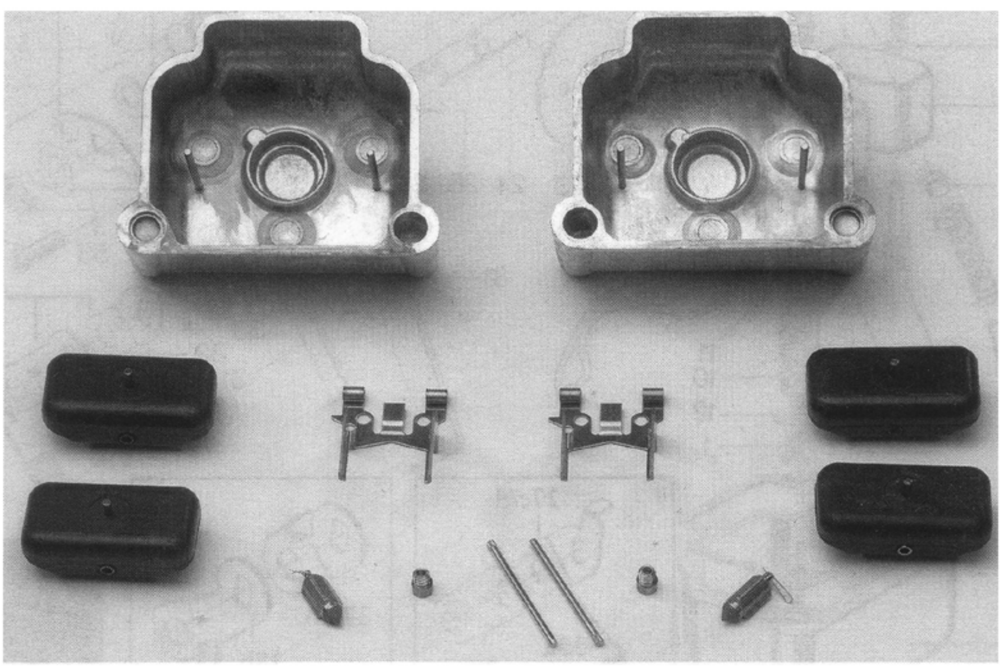
The bowl kit consists of a completely different configuration zinc bowl, two rectangular plastic floats, a separate float arm, a new float needle, with clip where applicable, a new hinge pin, and a start jet for the cold start circuit, plus instructions.

The benefits to be gained with this are (1) - an increase in horsepower at acceleration, (2) - increased fuel mileage (average 5 - 7 mpg) and (3) - it is 100% Alcohol Proof.

The basis for these gains is the completely different operation of the float system. Picture a glass of water fastened to your handlebars. Upon hard acceleration from a stop sign, the water would go to the back side of the glass, up and out; the same thing occurs in your fuel bowl! Your present float system is hinged at the back and supported by fuel at the front. During acceleration, the fuel is at the rear of the bowl, not supporting the pair of floats, which in turn fall to wide open position, calling to the fuel system for lots more fuel, and it gets all the fuel it asks for. After 200 ft. and decreasing rate of deceleration, the now overabundant supply of fuel begins to level out. The result is an over rich condition of the fuel mixture which results in loss of power, which you subconsciously add more throttle for in compensation. The above condition also wastes the excess fuel that was burned during this period, and possibly ran out on your foot.

The new float system greatly minimizes the above condition by much greater control of the fuel level. This keeps the mixture out of an over rich condition and in the usable power range, and effectively prevents waste of fuel. The floats are entirely independent of each other and the float arm. This is the difference between the new and the old system. The Kit is manufactured only by BING for Bing carburettors.

The Kit will fit all Beemers from 1970 on excluding K models. Use your carb numbers when ordering.



TYPE 54-1 SLIDE CARBURETTOR
-XXX DENOTES VARIABLE COMPONENTS SEE PAGE 16

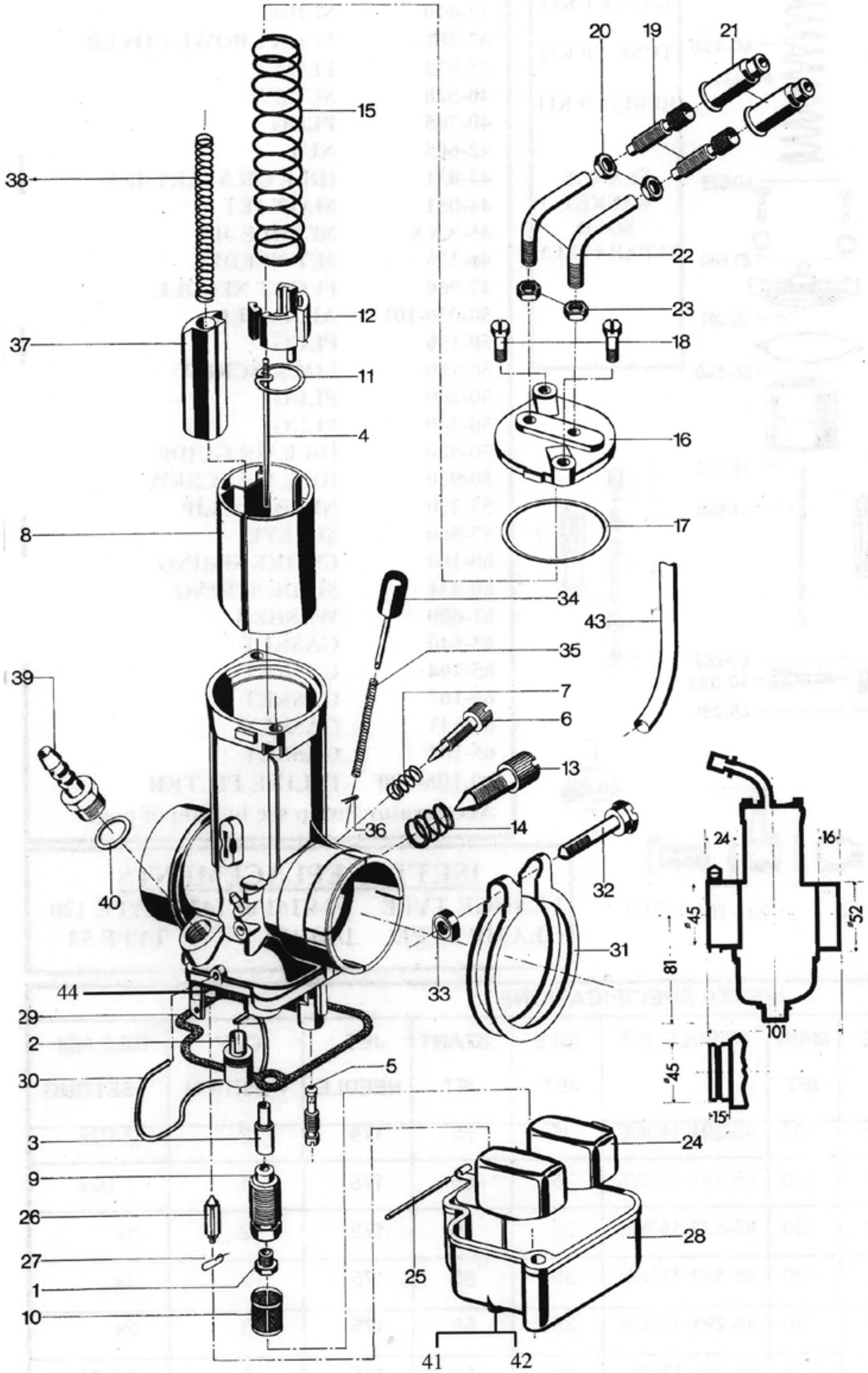


FIG #	DESCRIPTION	BING #
1	MAIN JET	44-051-XXX
2	ATOMIZER	51-XXX
3	NEEDLE JET	45-118-XXX
4	JET NEEDLE	46-XXX
5	IDLE JET	44-353-XXX
6	AIR SCREW	50-023
7	SPRING	60-160
8	AIR SLIDE	22-745-1
9	JET STOCK	45-425
10	SCREEN	57-706
11	CLIP	57-251
12	RETAINER	26-512
13	IDLE SPEED	50-072
14	SPRING	60-322
15	SLIDE SPRING	60-XXX
16	COVER	20-XXX
17	"O" RING	65-745
18	TOP SCREW	40-518
19	ADJUSTER	50-050
20	NUT	42-655
21	BOOT	65-851
24	FLOAT(black hinged)	35-310
24	FLOAT(white hinged)	35-300
24	FLOAT(Independent)	35-IND
25	PIVOT PIN	52-058
26	FLOAT NEEDLE	47-916 (HARD)
26	FLOAT NEEDLE	47-968 (SOFT)
27	LOCK SPRING	61-420
28	FLOAT BOWL	30-XXX
29	BOWL GASKET	65-584
30	BOWL CLIP	61-479
31	CLAMP	59-115
32	BOLT	40-646
33	NUT	42-611
34	TICKLER	48-855
35	SPRING	60-055
36	PIN	49-030
37	CHOKE	24-050
38	SPRING	60-195
39	FUEL INLET	51-323
40	GASKET	65-171
41	BOWL PLUG	50-286
42	PLUG GASKET	65-221
44	FLOAT NEEDLE SEAT	51-540-XXX