

Adjustment and overhaul of the K301 and K302 Carburetors
Curt Peredina <http://www.russiancycles.com>

K302 Carburetor

Introduction

This manual was designed for the Dnepr enthusiast interested in tuning and overhauling their K301/2 carburetors. I will cover basic operation, tuning, and overhaul; all of which are relatively simple. The 301/2 series, though much maligned, are dependable, but slightly more complex to maintain than the later Pekar 63/65/68 series. As you will see, there are a series of filter screens and air chambers which must be thoroughly cleaned at the required intervals. If you are familiar with the latter, the 301/2 should not present any major issues. And most importantly, keep the carburetors clear of contaminants by installing inline filters of some sort. Your local auto parts store has plenty to choose from, so don't rely on the petcock screen.

Before disassembly, you should understand the basic concepts of carburetion, which, are as follows:

1. Air enters the carburetor throat through the air filter system;
2. Fuel from the tank, which is metered into the bowl by the float mechanism, is siphoned up through the jets (depending upon the amount of air entering), into the throttle body by the passing air and low pressure where it is atomized into an approximate mixture of 14.7:1 (weight). This air volume is changed by the height of the slides, drawing more or less fuel, directly controlled by the throttle. Since each unit has its own cable, it's important that each slide operates somewhat the same as the other.
3. The air/fuel mixture passes into the body of the carburetor, past the intake seals, and into the combustion chamber

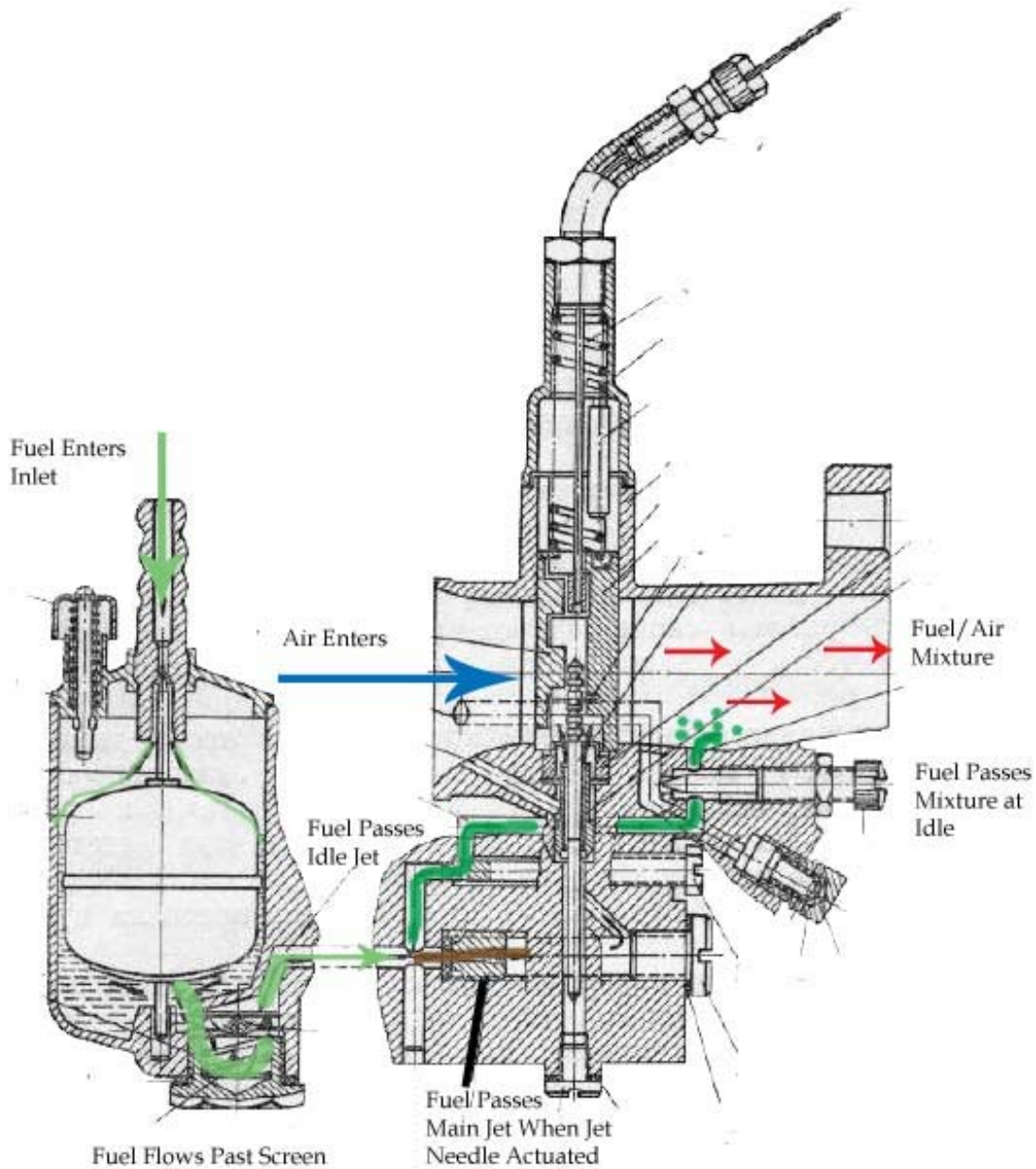
Depending upon the operating range, this is mostly dependent upon the idle jet and idle mixture screw (idle), radius of the jet needle (1/8 to 1/4 throttle), tapered section of jet needle and main jet (1/4 to open throttle). These are sometimes called the Idle system, intermediate system, and high speed system. If the engine runs well at idle and all is tuned, but you get pinging or knocking under load, if it's not a timing issue, it might be an overly lean mixture. Adjust the jet needle as necessary to compensate. It's easy....

Now, when everything is cold, fuel doesn't vaporize well, and this is where the enriching, or choke system is used. With the K301/2, the choke system is independent of the carburetor. This is usually found upstream of the intakes, just under the air filter on the engine case. It is a system of slide tubes, which constrict the air entering the intakes, thus enriching the mixture.

How to operate in the cold weather? Open the fuel shutoff valve, depress the ticklers (float depressors) a few times, activate the choke, and it should start immediately. Simple. Really...a tuned Dnepr carburetor of any model usually operates very well. Some methods even mention depressing the ticklers until fuel flows overboard. This might be a bit extreme. Usually 5, one second intervals of each tickler is plenty. With this series of carburetors, the float is suspended by an integral needle which rests in a guide on the bottom of the bowl. This can stick if there is any trace of contaminants in the bowl guide. When depressing the ticklers, listen carefully for a slight clunk as you release. This is the sound of the float rising and hitting the top of the bowl. This is the sound of a proper float. If fuel continues to spill, a stuck float is most likely the issue. Use the instructions to disassemble the float bowl and inspect/clean.

The next steps are to tune and possibly disassemble and overhaul the unit. This is relatively easy, requiring only a few tools and a clean work area (lots of little bits). Due to the scarcity of the 301/2, overhaul kits are not available.

Any questions or comments, let me know. Send an email to curt@russiancycles.com.



K301/302

I. Adjustment of K301 and 302 carburetors.

Prior to commencing carburetor adjustment (as with any carburetor), check the electrode gaps on the spark plugs, properly adjust timing, adjust breaker point gap, and adjust the valves.

1. Adjusting the slides of each unit and throttle free play.

This step sets the initial slide height of the units. By adjusting the top nut, you set the amount of air allowed through the chamber at idle. This is the initial static adjustment. Throttle slack is usually set to allow about 2 mm of play. This compensates for the turning of the handlebars. The slide adjustment (in conjunction with idle mixture) directly sets the idle speed.

a. There must be a height on the slides which allows for proper idle. Adjust this as necessary by loosening the locknut at the top of the unit (30) and adjusting the top nut as necessary to adjust the slide height. When adjusted, tighten locknut.

2. Intake inspection

This is to prevent an overly lean condition downstream of the fuel/air metering. If you have a leak here and continue to adjust the carburetors, more than likely this will degrade over time, causing a lean mixture and subsequent damage.

- a. Inspect the intake gasket of each unit for wear, replace if necessary. Tighten each nut, using care not to warp the flanges (they distort very easily). One method used here could be spring nuts.

Warm up engine

To start engine, first depress (2) on the side of each unit for a few seconds. These "ticklers" manually actuate the floats allowing fuel into the bowl. If the conditions warrant you may depress the tickler until fuel flows from the drain hole, though this is rarely necessary. The choke levers are usually located below the air filter on the engine case. With the ignition off, kick through 1 to 3 times, which will draw fuel into the cylinders, effectively "priming" the engine.

3. Minimum idle speed

- a. Adjust minimum idle speed, by raising or lowering the slides, using (9). As with all adjustments on the 301/2, loosen the locknuts before, tighten the locknuts after adjustment. Be sure to adjust in small increments, alternating cylinders.

4. Adjust idle mixture

- a. Gradually turn screw (18) counterclockwise until engine begins to miss (leaning mixture), steadily turning screw clockwise until engine no longer misses. It is better to have a slightly rich mixture over a slightly lean mixture.
- b. Again, adjust (9) for best idle if necessary. Repeat 4 and 5 on each cylinder.

6. Statically synchronize carburetors

- a. Remove the spark lead from one side. Note engine speed. Reconnect.
- b. Remove the spark lead from the other side. Note engine speed. Adjust (9) as necessary to equalize sides.

7. Mixture check

a. Verify proper operation by quickly opening and closing the throttle. If the engine sputters when the throttle is opened, the mixture is overly lean (18). Adjust (18) clockwise $\frac{1}{4}$ to $\frac{1}{2}$

turn, or until this no longer occurs. If the engine sputters when the throttle is closed, the mixture is too rich, adjust (18) counterclockwise.

8. Dynamically synchronize carburetors

a. This is tricky, and not really recommended, but it is a way to balance the carburetors when there is no other way. The point is to adjust the slides using engine load as the indicator. This will ensure that when the throttle is opened, the slides have uniform travel.

1. Place the motorcycle on the center stand and start. Shift into the highest gear and increase the speed to about 40-50 kmH.
2. Fix the throttle in position.
3. Short one spark plug to the cylinder, using a nail or something similar
4. Watch the speedometer and use this for reference
5. Re-connect the plug wire
6. Repeat on other side, noting the new indication of the speedometer, adjusting the slide (as in the beginning of this doc) as necessary to achieve the same speed as the other unit.

II. Detailed tuning of K301 and 302 carburetors.

1. Adjusting mixture for operating under load conditions

This step is for tuning the mixture for mid to upper range operations of the K301 and 302. For 1/8 to 3/4 throttle position, the mixture is dependent upon the jet needle taper and the needle jet (main jet). Altitude and seasonal changes can warrant this step. If you hear "popping" when increasing the throttle, this usually indicates a lean condition.

- a. Adjustment of the mixture is accomplished by moving needle (34) along the cleat (4) adjusting the locknut (3). Moving the needle up richens the mixture, moving the needle down leans the mixture under these ranges of operation. Each revolution of the needle raises it approximately .5 mm.

Notes:

1. These carburetors require the manufacturers air filter to be attached, without leaks, to function properly. At a minimum, make sure your intake system is free of leaks when tuning the carburetors.
2. Do not change the manufacturers recommended intake setup unless necessary. Make all adjustments with the intake system attached.
3. Do not clean the carburetors with anything other than gasoline or carb cleaner (no solvents). Do not clean any of the metering devices with wire or needles.

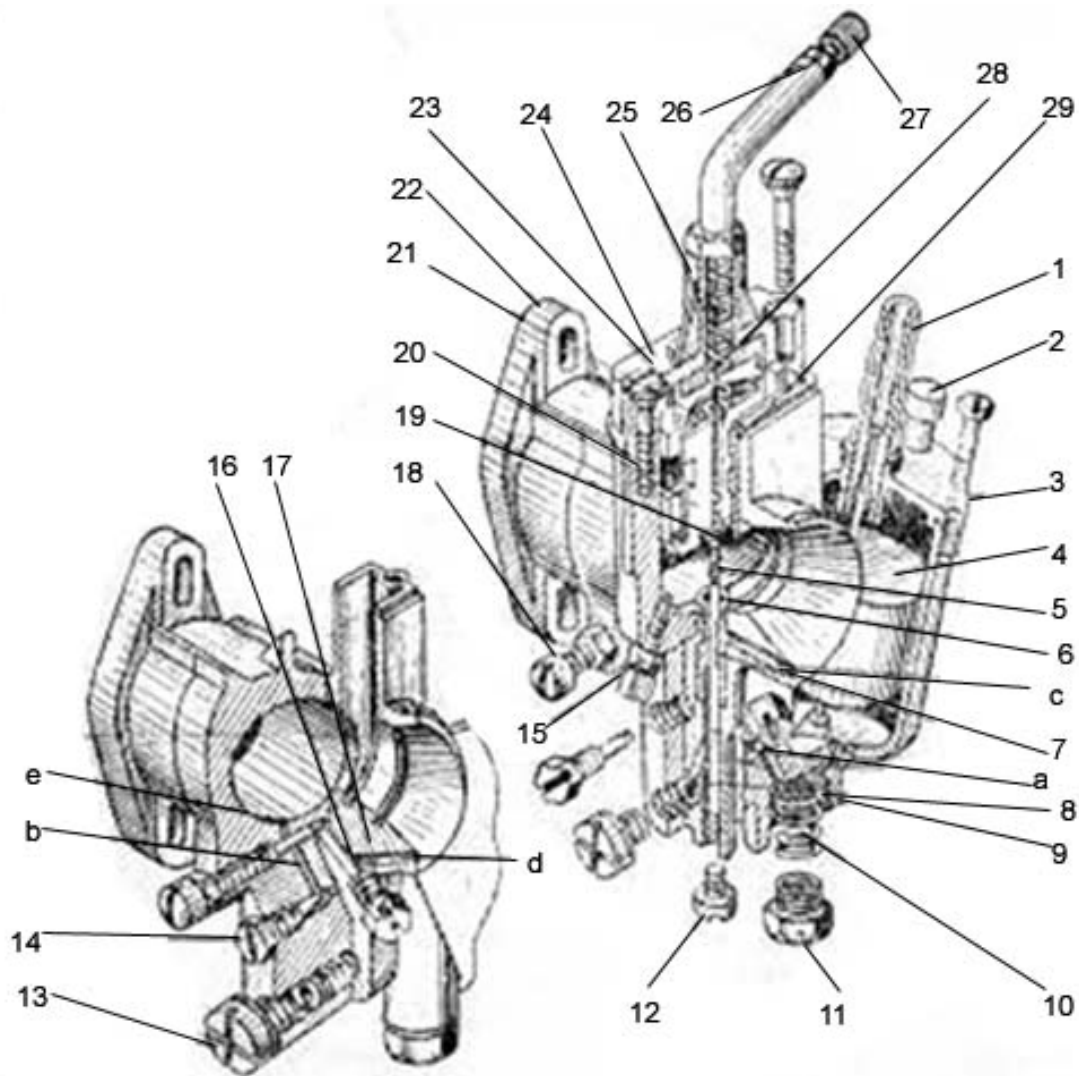


Fig. 1 - K301/302

1 – Fuel Inlet; 2 – Float Depressor; 3 – Float Cover; 4 –Float; 5 – jet needle; 6 – needle jet; 7 – inlet chamber; 8 – main jet; 9 – fuel screen; 10 –filter spring; 11 – filter plug; 12 – needle jet passage plug; 13 – main jet plug; 14 – idle jet; 15 – throttle valve screw; 16 – air filter body; 17 – chamber filter screw; 18 – idle adjustment screw; 19 – throttle needle lock; 20 – throttle body; 21 – throttle expansion spring; 22 – carburetor body; 23 – throttle stop; 24 – carburetor cover; 25 – throttle cable 26 – locknut; 27 – nipple; 28 – throttle spring; 29 – slide body; a – fuel passage; b- idle adjustment passage; c – main jet air passage; d – idle air passage; e – idle adjustment atomizer

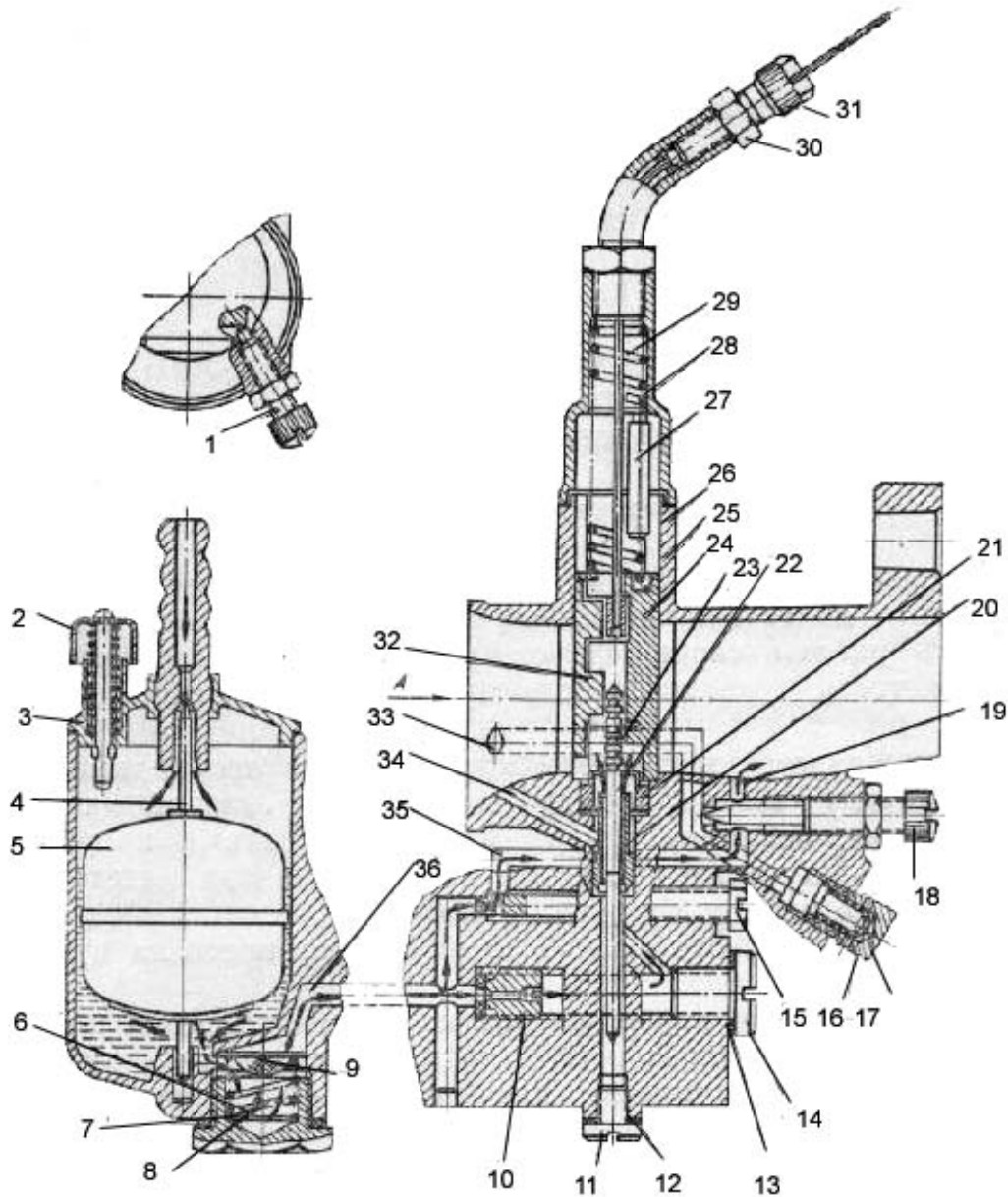


Fig. 2 - K301/302

1 – Slide adjustment; 2 – Float Depressor; 3 – Float Cover; 4 –Float Needle; 5 – Float; 6 – Fuel screen spring; 7 – Fuel screen plug; 8 – Fuel screen; 9 – fuel assage; 10 –main jet; 11 – needle jet plug; 12 – main jet passage ; 13 – carburetor body; 14 – main jet plug; 15 –idle jet; 16 – locknut; 17 – slide adjustment; 18 – idle adjustment screw; 19 – idle jet atomizer; 20 –jet needle; 21 – needle jet; 22 – needle locknut; 23 – needle adjustment; 24 – carburetor body; 25 – slide spring; 26 – carburetor body; 27 – throttle rise stop; 28 – throttle spring; 29 – throttle cable;

III. Disassembly/Overhaul

If the tuning steps above don't increase performance, or if they have no effect, it's time to remove the carburetors from the motorcycle, and go through a disassembly and possibly overhaul of your 301/2. It's a simple procedure, mainly consisting of removing plugs and cleaning filter screens and air passages. Remember, do not use wires or solvents to clean jet passages. Compressed air and fresh petrol or carburetor cleaner will work just fine.

1. Remove the carburetor from the engine

Loosen the intake sleeves on each side. Remove the rubber gasket and swing the intake elbow free.



2. Remove the top of the slide housing

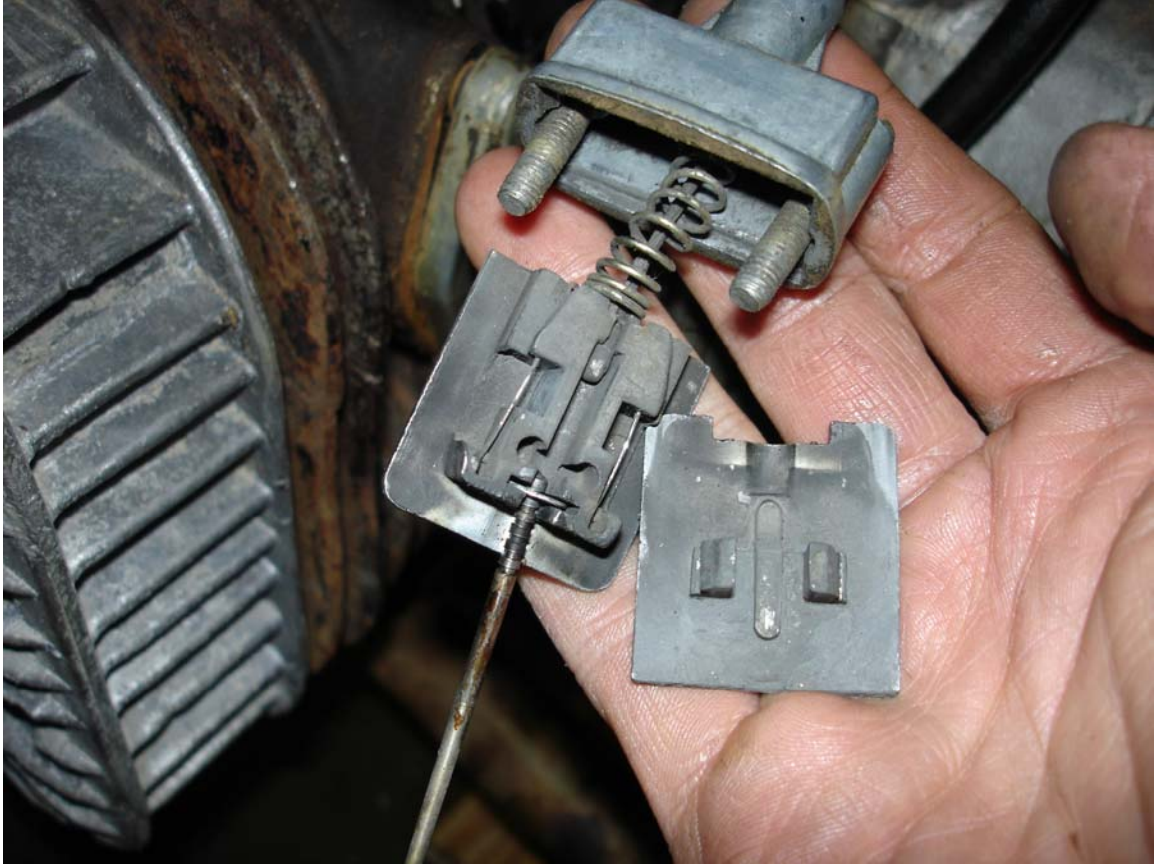
Remove the 2 screws securing the slide housing to the top of the carburetor. The slide top will contain the cables, slides, and jet needle. Remove the 2 intake screws fixing the carburetor to the engine.



3. Remove the throttle cable

The slide is two pieces held together with a fine wire. Spread the wire beyond the tabs on the slides, and separate the two slide pieces to expose the throttle cable. Pull the end of the throttle cable past the indentation in the slide and remove the cable.









4. Examine the jet needle

At your workbench, examine the jet needle, which should have a proper taper. This one doesn't.



This one is slightly better.



5. Remove the float cover and examine the floats

Remove the float covers and examine the floats for leaks, which can occur around the float guides. If there are any leaks, reseal the floats with fuel resistant epoxy (conservatively applied). Also inspect the float body guides for contaminants which can hinder the operation of the floats. Varnish and other debris which get past the filter can accumulate here. Make sure the top gasket is in proper order.







Float sealed with light application of JB Weld.



This is the float guide which can contain buildup, hindering the actuation of the float.

6. Remove the filter screw

Remove the filter screw and clean the filter screen..





Note the tiny screen in the screw.



7. Remove the fuel filter screen plug.

This is where the fuel enters the jet system. Remove the plug, and clean the passage, screen, and spring unit.





8. Remove the jet needle plug





Idle Jet.

9. Remove the main jet

Remove and clean. This one is slightly used.....



10. Remove the slide adjustment screw



11. Remove the idle adjustment screw

Remove and inspect taper. If the taper is worn, replace. When replacing, adjust locknut flush with adjustment head. Visually inspect that needle bottoms out before locknut. Back off 2 and ½ turns and tighten locknut.



12. .Inspect the carburetor body





13. Clean/Replace all parts

Now you can see how easy it is to disassemble this carburetor. Reverse the steps to replace/re-install components after cleaning. You can soak the carburetor in gasoline, clean all the jets with compressed air, and reassemble the carburetor for tuning. Make sure all passages are free of contaminants, including the float chamber pressure equalization port.

IV. OTHER INFORMATION

Interesting observations on the K301/302 from BCozz:

8/20/2003 7:48 AM *Posted by MT-9*

K301 carbs. well I'm still runnin em. They're good most of the time, throttle cable stretch the main reason for the occassional adjustment, but weather and altitude are also factors, and the fuel quality. For years I ran it on low octane (regular) when that was phased out I had to use Super, and she loves it. But this new LRP (Lead replacement petrol) I wouldnt fang it if I were you! yes a little bit of 2-stroke oil (50ml to 20 litres) helps.

6/9/2003 9:21 PM *Posted by bcozzAdmin1*

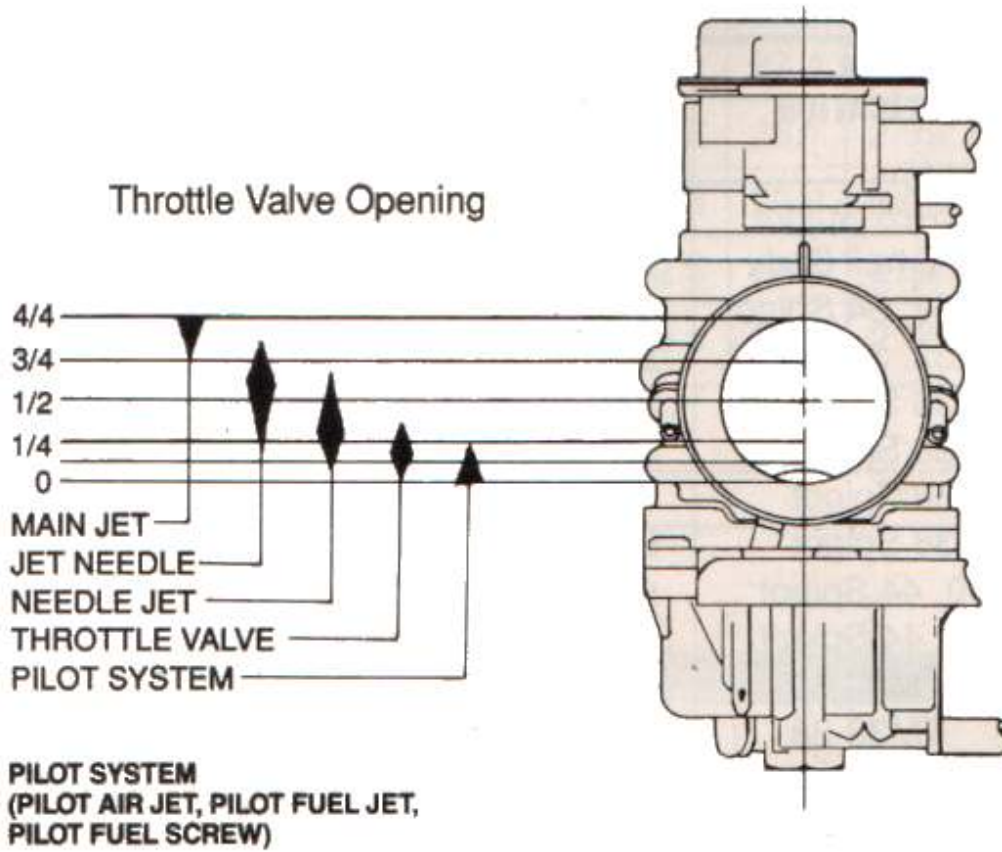
of course for the purist enthusiast wanting to keep and run a completely original say M63 Ural or K650 or MT-9 Dnepr machine, he/she must put upwith getting their K-301 carbs right eh! Ha ha I love it when their running sweet, set and forget for a couple of years. Use Locktite on your lock nuts comrades!!!

5/3/2003 7:46 PM *Posted by J.D.*

Yeah K-301 carburetors - I've still got em but many a good man has lost it trying to get their bike to run with em. Mine warped really bad - the more you tighten em the more they warp. VW inlet manifold gaskets are the go, about 20cents each, and the holes just need to be elongated a bit to fit. But tuning them can vary from day to day... whatever prefer them to run richer rather than leaner, or the end is near. But running just a bit on the rich side and with good synchronization they're ok. Yr spark plugs should be a bit black (not filthy sooty black tho) and they'll power on indefinitely

4/23/2003 12:42 AM *Posted by BadPig_M-63*

What can I say about the K 301, nothing much. I **had** K 302s on my bike. Much the same though. Dropping screws, pissing fuel, and frying a nice set of pistons. I like the new set of K 65s just fine.



Carburetor Operating Range