



***Ural (Урал) - Dnepr (Днепр)
Carburetor Evolution
Part 4: K-301 Carburetor
(See Also Part 4A- K-301 Adjustment and Overhaul)***

***Ernie Franke
eaf Franke@tampabay.rr.com
12/2010***

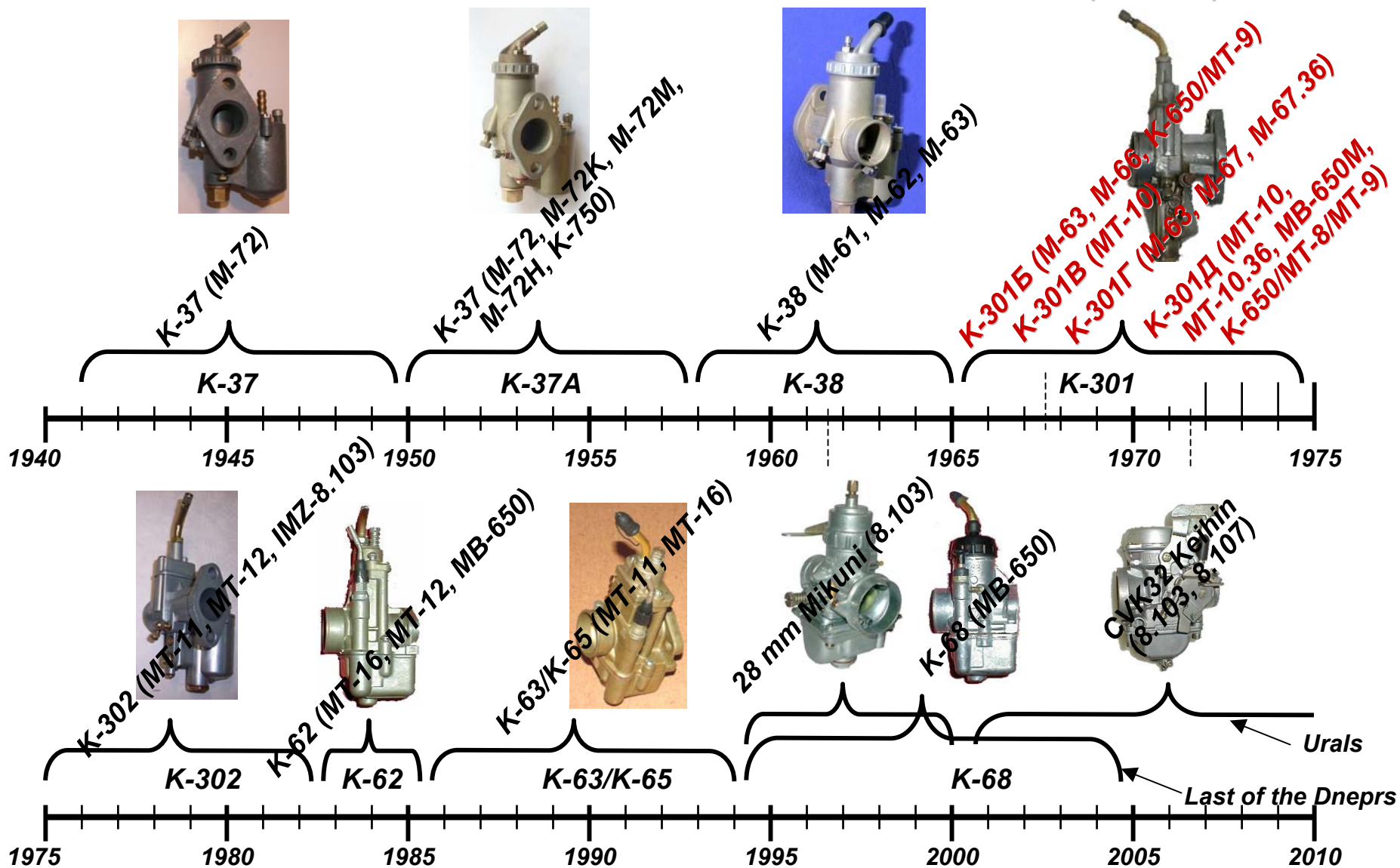
K-301 Carburetor (www.cossackmotorcycles.com)

- **Famously Awful K-301 Carburetor**
 - **Used Up to Late 1970's**
 - **Common Carburetor found on 650cc Urals**
 - **Used on the Ural's M-63 and M-66**
 - **Standard Fitment on MT-9 and MT-10.36 Dneprs**
 - **Main problem: Worn Out in Surprising Short Time**
 - **One solution: Replacement Pair of Re-Conditioned K-301's**
 - **Better Solution: Fit Just About Any Other Carburetor**
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- **Later Replaced by K-63 / K-65**
 - **Requires Setting and Adjusting Every Other Week**
 - **K-65 Will Not Fit Straight on Bike which Originally Had K-301's**
 - **Requires Vertical-to-Horizontal Adapter Plate**



The K-301 was absolutely awful; leaks, floods, spits, fuel almost anywhere except into the engine. What makes it to the engine is rarely the correct mixture.

Russian Carburetor Time-Line (03/2011)

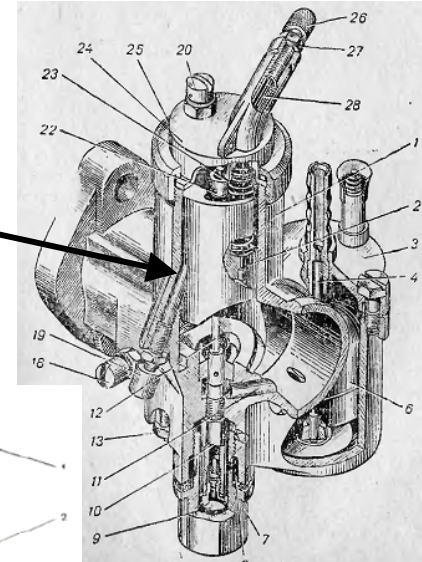


We have seen the gradual migration of the K-37 to the K-37A and then the K-38. The **K-301** went through several iterations before the K-302 came along, followed by the K-Series carburetors.

Round-Slide vs. **Flat-Slide** vs. Butterfly Throttle Valves

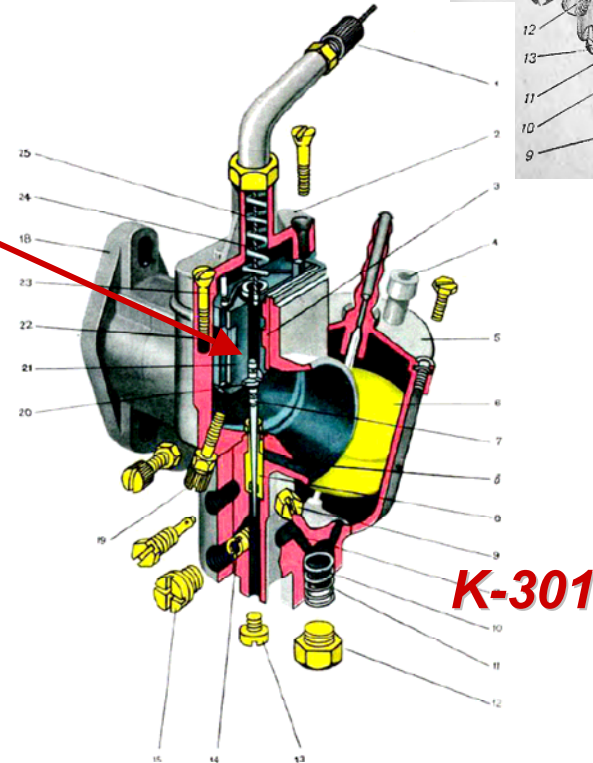
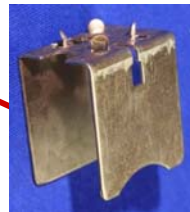
- **Round-Slide Throttle Valve**

- K-37, PZ-28, K-38
- Kaptex VDC-RAM
- K-68
- Mikuni VM-28
- Jikov 2928



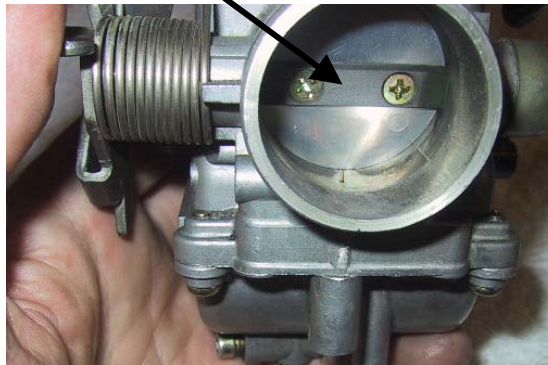
- **Flat-Slide Throttle Valve**

- K-301 / K-302
- K-62 / K-63 / K-65



- **Butterfly Throttle Valve**

- Keihin CVK32



One term describing carburetors is round-slide, **flat-slide** or butterfly throttle valves.

Flange-Mount vs. Spigot-Mount

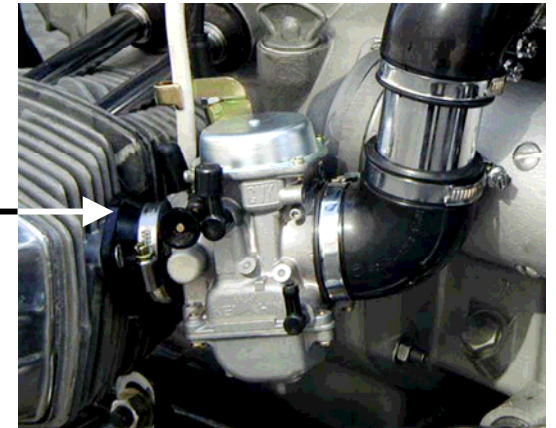
- **Flange-Mount**

- Bolts Directly on Cylinder Head or Adapter
- K-37, PZ-28, K-38,
- **K-301** / K-302
- K-62 / K-63 / K-65 / K-68
- Kaptex VDC-RAM



- **Spigot-Mount**

- Rubber Compliant Mount to Cylinder Head
- Mikuni VM-28
- Jikov 2928CE
- Keihin CVK32



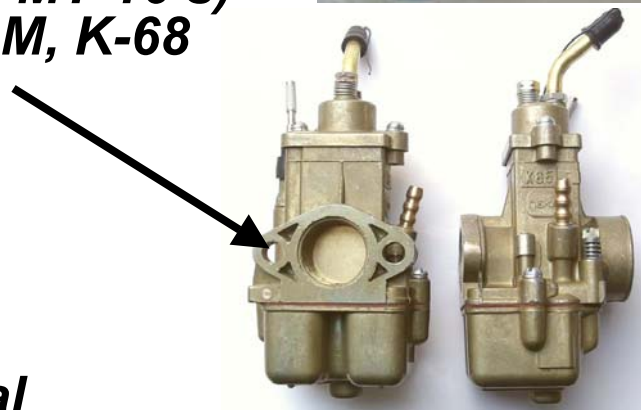
Another term describing carburetors is **flange-mount** or **spigot-mount**.

Flange-Mount: **Vertical** vs. **Horizontal**

- **Vertical Mounting Holes (MT-9's, MT-10's)**
 - K-37, PZ-28, K-38, **K-301**, K-302



- **Horizontal Mounting Holes (MT-11's, MT-16's)**
 - K-62, K-63, K-65, Kaptex VDC-RAM, K-68



- **Transition from Vertical-to-Horizontal**
 - Used to Transition from Older K-37/38 and **K-301/302** Carbs to Modern K-62 / K-65 / K-68 Carbs
 - Adapter Plates Readily Available



An adapter plate is needed to upgrade older motorcycles to the modern horizontal pattern for the K-63 / K-65 / K-68 type carbs.

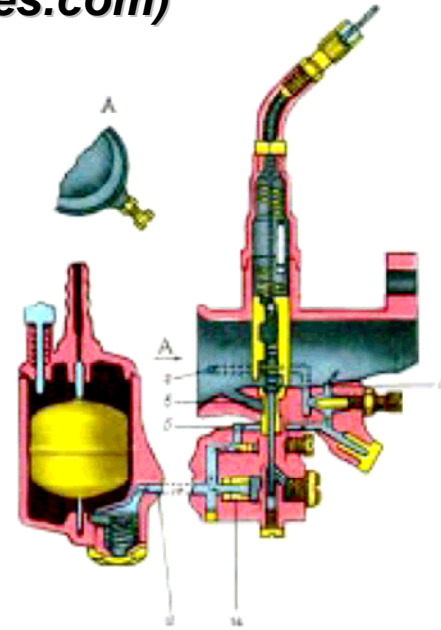
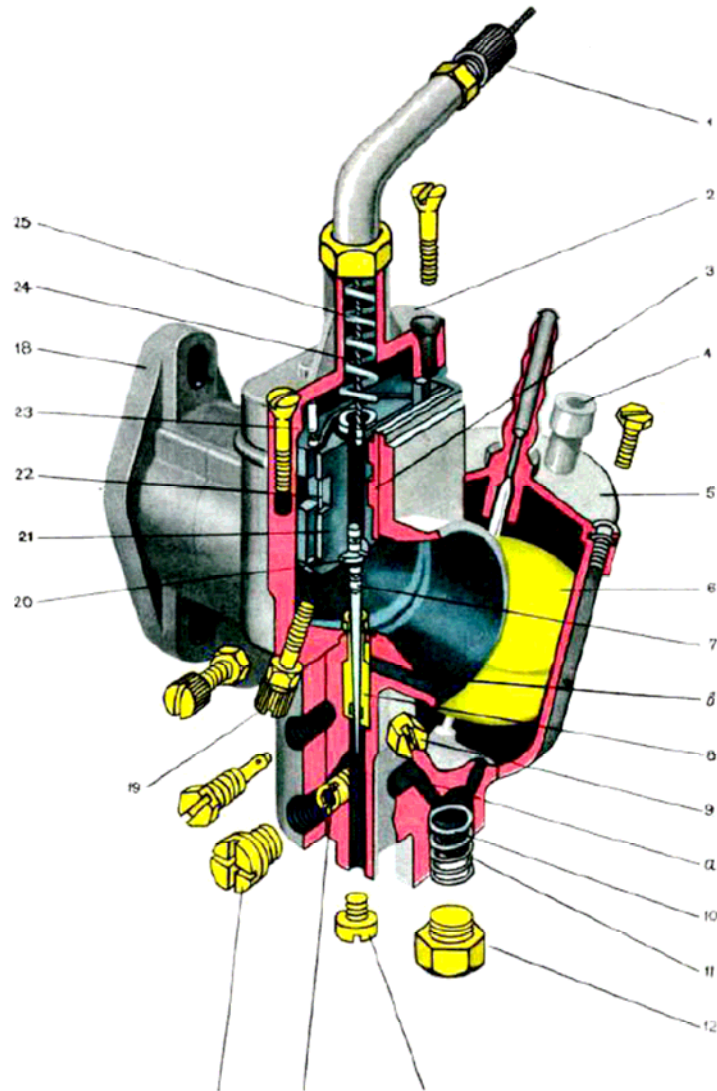
Carburetor Adapter from vertical (K-301/K-302) to a horizontal type of installation (K-63/K-65/K-68)



A simple conversion kit is needed to adapt from vertical (K-301/K-302) to a horizontal type of installation (K-63/K-65/K-68).

K-301 Carburetors www.russiancycles.com

- 1 control cable armour thrust needle
- 2 carburettor cover
- 3 throttle cheek
- 4 depressor
- 5 float chamber cover
- 6 float with shut-off needle
- 7 throttle valve needle
- 8 atomizer
- 9 air filter
- 10 fuel filter
- 11 filter spring
- 12 filter plug
- 13 atomizer duct plug
- 14 main jet
- 15 main jet plug
- 16 low speed jet
- 17 idle speed screw
- 18 carburettor body
- 19 throttle valve screw
- 20 throttle needle lock
- 21 throttle body
- 22 throttle distance spring
- 23 throttle stop screw
- 24 throttle lift cable
- 25 throttle spring

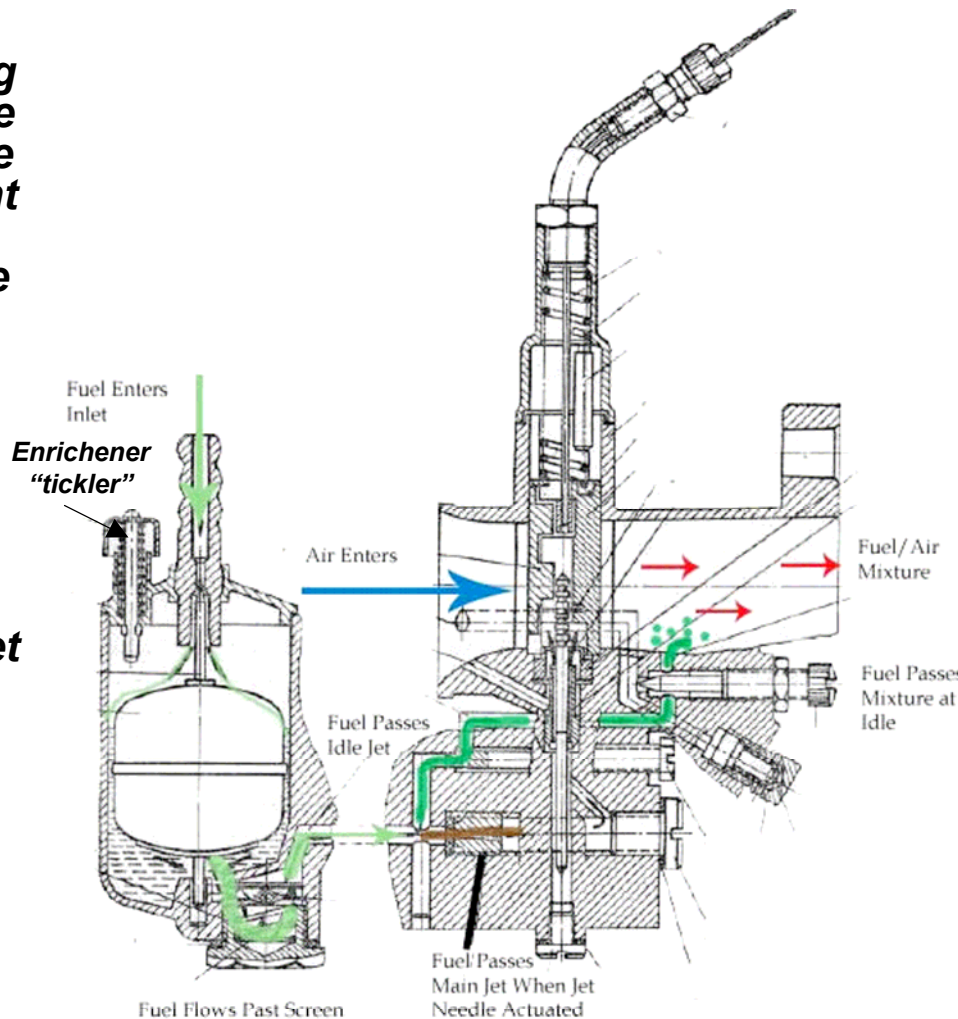


- a fuel passage
- b idle speed system fuel passage
- c main metering system air passage
- e idle speed system atomizer hole

K-301 carbs introduced with Ural M-63, M-66 and Dnepr K-650 and were used on the Dnepr MT-9 as well.

K-301 Basics www.russiancycles.com

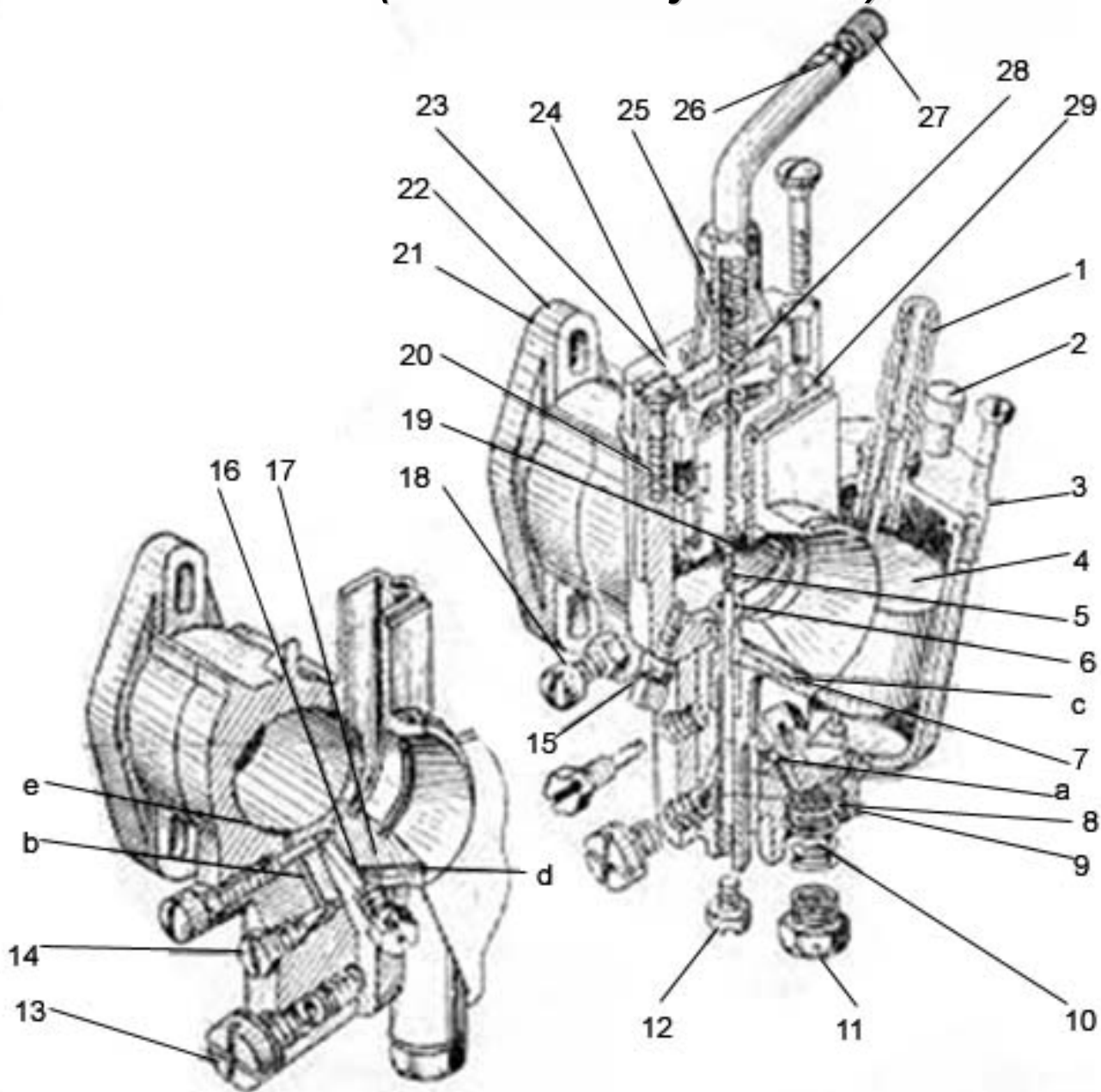
- Air Enters Carb Throat via Air Filter
- Fuel from Tank, Metered into Bowl by Float Mechanism, Is Siphoned thru Jets (depending upon the amount of air entering), into Throttle Body by Passing Air and Low Pressure where It Is Atomized into Mixture of 14.7:1 by Weight
- Air Volume Changed by Height of Flat-Slide Throttle, Directly Controlled by Throttle Cable
- Since Each Carb Has It's Own Cable, It's Important that Each Slide (throttle valve) Operates Similarly
- Air/Fuel Mixture Passes into Body of Carb, Past Intake Seals, into Combustion Chamber
- Role Played Depends Upon Operating Range
 - Idle: Idle Jet and Idle Mixture Screw
 - 1/8 to 1/4 throttle: Radius of Jet Needle
 - 1/4 to Open Throttle: Tapered Section of Jet Needle and Main Jet
- If Engine Runs Well at Idle, but Pinging or Knocking Under Load, If It's Not a Timing Issue, It Might Be an Overly-Lean Mixture
 - Adjust Jet Needle as Necessary
- When Everything Is Cold, Fuel Doesn't Vaporize Well, and Enrichening (tickler) Is Used



K-301/302 carburetors had a "tickler," to increase (enrichen) the fuel/air mixture to achieve a lean starting mixture.

K-301 Carburetors www.russiancycles.com

- 1 – Fuel Inlet
- 2 – Float Depressor “tickler”
- 3 – Float Chamber Cover
- 4 – Float with Shut-Off Needle
- 5 – Throttle Valve Jet Needle
- 6 – Needle Jet
- 7 – Inlet Atomizer Chamber
- 8 – Main Jet
- 9 – Fuel Filter Screen
- 10 – Filter Spring
- 11 – Filter Plug
- 12 – Needle Jet Passage Plug
- 13 – Main Jet Plug
- 14 – Idling 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 Rise Stop
- 24 – Carburetor Cover
- 25 – throttle Control Cable
- 26 – Locknut
- 27 – Control Cable Thrust Nipple
- 28 – Throttle Spring
- 29 – Slide Body
- a – Fuel Passage
- b – Idle Adjustment Fuel Passage
- c – Main Jet Air Passage
- d – idle Adjustment Air Passage
- e – idle Adjustment Atomizer



Setting K-301 Carbs (www.russianiron.com, Scott Pell)

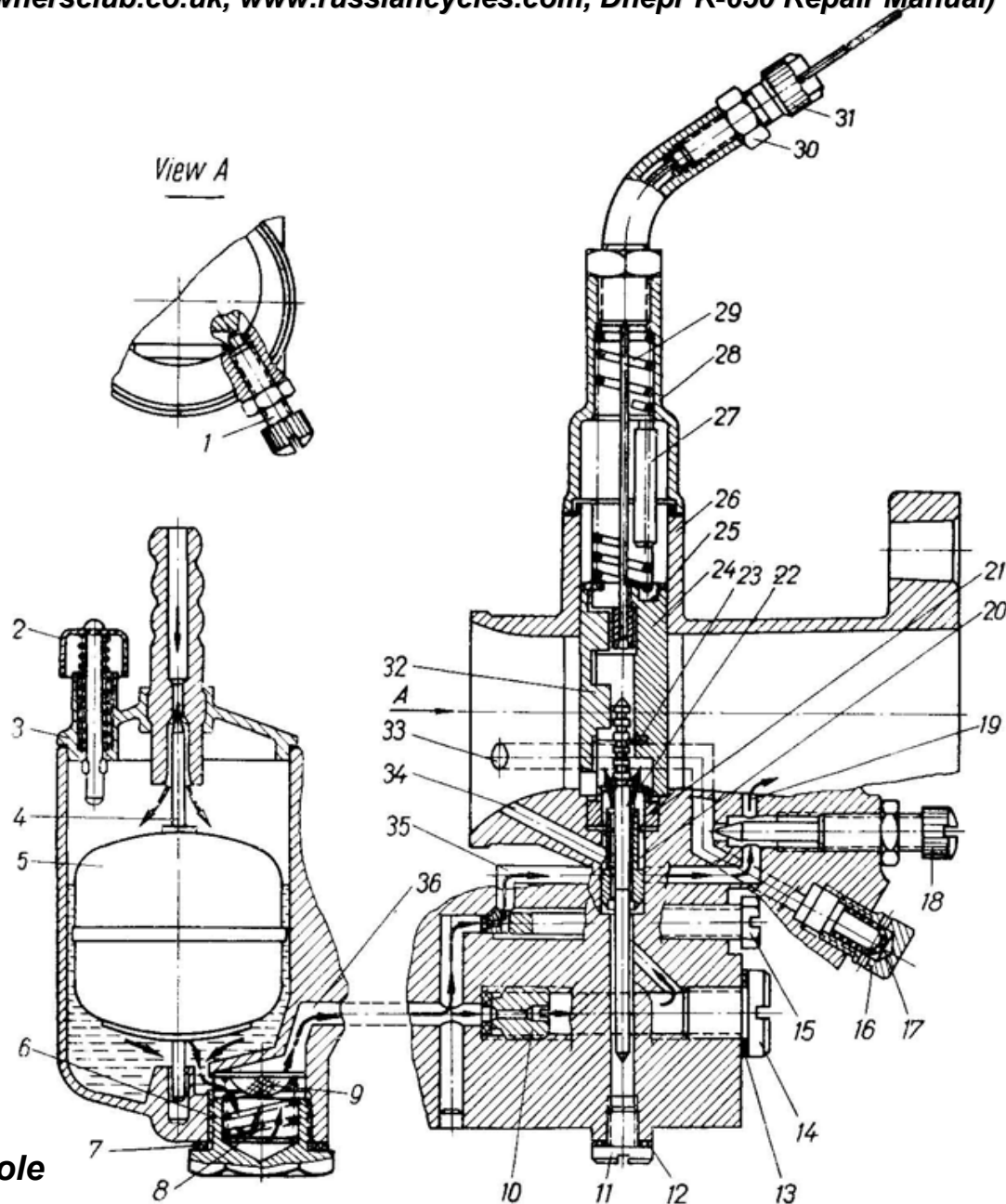
- 1. Warm up engine (make sure both sides get hot because many times bikes are only running off one cylinder). If installed, disconnect supercharger hose and plug up the carb holes or pinch off the tube with vise-grips so that absolutely ZERO air passes from one side to the other. Then kill or ground out one cylinder; we'll set the carb on the other cylinder.**
- 2. Loosen Carb Neck screws (#30, 31) so that there is slack between the end of the cable casing and the carb neck.**
- 3. Loosen the jam-nuts on HORIZONTAL (mixture) and DIAGONAL (slide lift) adjustments.**
- 4. Screw the HORIZONTAL (#18) screw all the way in.**
- 5. Set the DIAGONAL (#17) screw for minimum steady operation.**
- 6. Adjust the HORIZONTAL screw for maximum engine speed.**
- 7. Set the DIAGONAL screw for minimum steady operation again by backing it out.**
- 8. Tighten jam-nuts**
- 9. Repeat for the other side**
- 10. Note differences in engine speeds when operating on single cylinders. Plug up both cylinders. Adjust the DIAGONAL screws (#17) equally for final low speed idle operation.**
- 11. Tighten Jam-Nuts**
- 12. Put Bike on Center Stand (or jack up the drive wheels on an MT-16)**
- 13. Fire it up, and put it in 4th gear (might wanna chock it)**
- 15. Rev It Up to 30-40 km/hr**
- 16. Clamp/hold the throttle in place, AND DO NOT CHANGE UNTIL PROCEDURE IS OVER**
- 17. Disconnect (or ground) one cylinder wire,**
- 18. Note exactly what the speedometer settles down to after 10 seconds**
- 19. Now quickly re-connect that side disconnect the other (don't move the throttle even though it'll rev up some)**
- 20. Adjust the Carb Cable ferrule on the running side to match the exact speed you noted while the first side was running**
- 21. Now let off the throttle and reconnect supercharger**

Remember, the screws listed above in Steps 1-11 only affect idle. It's the ferrule where the cable goes in that affects most of the rest of your operating range. That's Step 12 onward.

K-301 Carburetors

(<http://opposit.ru/article1057.html>, info@cossackownersclub.co.uk, www.russiancycles.com, *Dnepr K-650 Repair Manual*)

- 1 - Throttle Stop Screw
- 2 - Float Depressor (Tickler)
- 3 - Float Chamber Cover
- 4 - Float Shut-Off Needle
- 5 - Float
- 6 - Fuel Screen (Filter) Spring
- 7 - Fuel Screen Plug and Gasket
- 8 - Filter Spring
- 9 - Fuel Filter Screen (Filter)
- 10 - Main Needle Jet
- 11 - Atomizer Passage (Needle Jet) Plug
- 12 - Main Jet Gasket
- 13 - Gasket
- 14 - Main Jet Plug
- 15 - Idling Jet
- 16 - Locknut
- 17 - Throttle Valve Screw
- 18 - Idle Adjustment Screw (Air/Fuel Ratio)
- 19 - Idling Jet Atomizer Hole
- 20 - Jet Needle (Atomizer)
- 21 - Needle Jet
- 22 - Adjusting Needle
- 23 - Throttle Needle Retainer
- 24 - Throttle Body
- 25 - Throttle Slide Spring
- 26 - Carburetor Body
- 27 - Throttle Rise Stop (Travel Limit)
- 28 - Carburetor Cover
- 29 - Spring
- 30 - Stop Lock Nut
- 31 - Union
- 32 - Throttle Side Piece
- 33 - Idling Jet Air Channel
- 34 - Atomizer Air Channel
- 35 - Channel Supply of Fuel to Atomizing Hole
- 36 - Main Fuel Supply Channel



K-301Г (Dnepr K-650 Repair Manual)

- ***In Disassembling the Carburetor***
 - ***Unscrew Plug (14)***
 - ***Unscrew Main Fuel Jet (10) and Blow It Out with Compressed Air***
 - ***Unscrew Plug (6) and Take Out Fuel Filter (9) and Wash***
 - ***Steel Wire Must Not Be Used for Cleaning the Fuel Jets***
 - ***Jet Bore Will Be Changed and Normal Operation Disturbed***
- ***If Idle Speed Jet Is Clogged, It Should Be Unscrewed and Blown Out with Compressed Air***
- ***Screw (18) Is Used to Change the Section of the Air Channel which Adjusts the Fuel-to-Air Ratio at Idle Speed***
 - ***Combustible Mixture Enriches When Screw Is Turned In and Becomes Lean When Screw Is Screwed Out***
- ***Needle Valve (22) Entering Inner Channel of Main Jet Atomizer Is Connected with Body (24) of the Throttle***
 - ***Thus Fuel Is Supplied to the Atomizer Along the Circular Clearance between the Atomizer Channel Wall and the Needle***
 - ***The Needle Is Tapered at Its Lower End, Due to Which the Circular Clearance Widens When Needle Is Lifted, Increasing the Amount of Fuel Applied to the Atomizer and Enriching the Combustible Mixture***
 - ***The Needle Valve Is Connected with the Throttle thru Lock (23) Engaging One of the Six Slots on the Needle***
 - ***Due to This Arrangement, the Carburetor May Be Set in Six Positions Engaging One of the Six Slots with a Circular Clip***
 - ***The Combustible Mixture Is the Leaner the Lower the Needle and vice versa***

K-301Г (Dnepr K-650 Repair Manual)

- **Adjusting the Carburetor**
 - Before starting Carburetor Adjustment, Clean the Carburetor
 - Warm Up the Engine
 - Set the Timing Lever to the Late Ignition Position
 - Back Off the Lock-Nut which Secures Screw (1) and Screw in the Latter so as to Slightly Lift the Throttle thus Running the Engine at Increased Speed
 - Turn In Mixture Control Screw (18) and, as Possible, Reduce Engine Speed, Turning Off Screw (1)
 - Listening to Engine Operation, Gently Turn Off Screw (18), Leaving It In a Position in which the Engine Runs Uniformly Developing Maximum Speed
 - Then, Turning Off Screw (1), Reduce Engine Speed until the Minimum Stable Speed Is Achieved (on Completion of Adjustment Lock Screws (18) and (1) in Position with the Aid of the Lock-Nut)
 - By Means of the Control Cable, Raise Up the Throttle of the Carburetor Being Adjusted
 - If This Increases Engine Speed, the Adjustment Is Considered Over
- **Synchronizing the Carburetors**
 - Put Motorcycle on a Support (lift the rear wheel)
 - Start Engine and Put in Fourth Gear
 - Switch Off One of the Cylinders (disconnect the Hi-Voltage Wire from Spark Plug)
 - Increase Engine Speed Until Speedometer Reads 45 km/hr
 - Wait Several seconds (to make sure speed is stabilized)
 - Switch On Other Cylinder and Switch Off First One
 - Lifting or Lowering the Throttle by Way of Turning the Union on the Carburetor Covers, Obtain Equal Readings of the Speedometer for Both Cylinders
 - Adjustment Takes Time, Take Care that Engine Doesn't Overheat

K-301



Living with K-301 Carburetors: (Phil Hardcastle info@cossackownersclub.co.uk)

• **Main Jet**

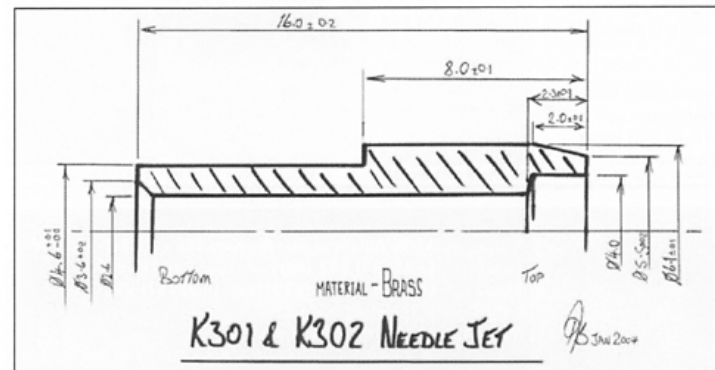
- **Affects mixture from around 2/3rds Throttle to Wide-Open Throttle**
- **If Main Jet Is Wrong Size or Blocked You Will Not Notice the Effect below Half Throttle**
- **Can Be Screwed from Side of Carb, Cleaned or Replaced with Carburetor in situ**
- **If Too Small a Size or Partially Blocked: Poor or Zero Throttle Response at High Load, Full Throttle, Particularly at mid-rpm.**
- **If Too Large a Size: Black Smoke at Wide Throttle Openings**
 - **May Be Down on Power, but Unlikely to Foul Plugs Due to High Engine Temperatures Associated with High Power Demand**

• **Available Main Jet Sizes:**

- **150 is approx 0.83 mm diameter**
- **185 is approx 1.04 mm diameter**
- **200 is approx 1.11 mm diameter**
- **210 is approx 1.14 mm diameter**

• **First Check Petrol Levels in Float Chamber by Removing the Top and the Float**

- **Check Brass Floats for Leaks**
- **Using a Set of Weight Watchers Kitchen Scales, Weigh the Floats**
- **If One Float Has Been Repaired, It Will Be Heavier**
- **Check Needles for Correct Values**



Carburetor Throttle Cable Covers



Rubber boots protect the control cables from dust and dirt.

Air Intake Rubber Collars (www.oldtimergarage.eu)

- ***Air Intake Rubber Collars***
- ***Diameter: 38 mm***
- ***Fits K-301, K-63, K-65, K-68 Carbs***
- ***Product #: *001.655****
- ***List Price: €7.00 (2011) per pair***



K-301 Upgrade from F2 Motorcycles Ltd

(<http://www.f2motorcycles.ltd.uk/uralcarburetorspares.html>)

- ***New Pattern Carburetors Have Advantage of Replacing Original K-301's***
 - ***Bolting Straight On and Looking Almost Identical to Originals***
 - ***Work Much Better than Original K-301's***
- ***F2 Motorcycles Ltd Supplies them as a pair with gaskets***
- ***May Need to Make Up New Cables Depending on Which Throttle You Have***
- ***F2 Motorcycles Ltd***
- ***Part #: F23803/301 pair***
- ***Price per Pair: £130.00 (2011)***



F2 Motorcycles Ltd upgraded K-301's replacing original K-301's, bolting straight on and looking almost identical to the originals, with the advantage of working much better.