



***Ural (Урал) - Dnepr (Днепр)
Russian Motorcycle
Carburetors***

***Part 13: Keihin Carburetors
(see also Parts 13A, 13B, 13C and 13D)***

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04/2011***

K-68 to CVK32 Keihin Carburetor Transition

(<http://www.cossackmotorcycles.com/dnepr.html>)

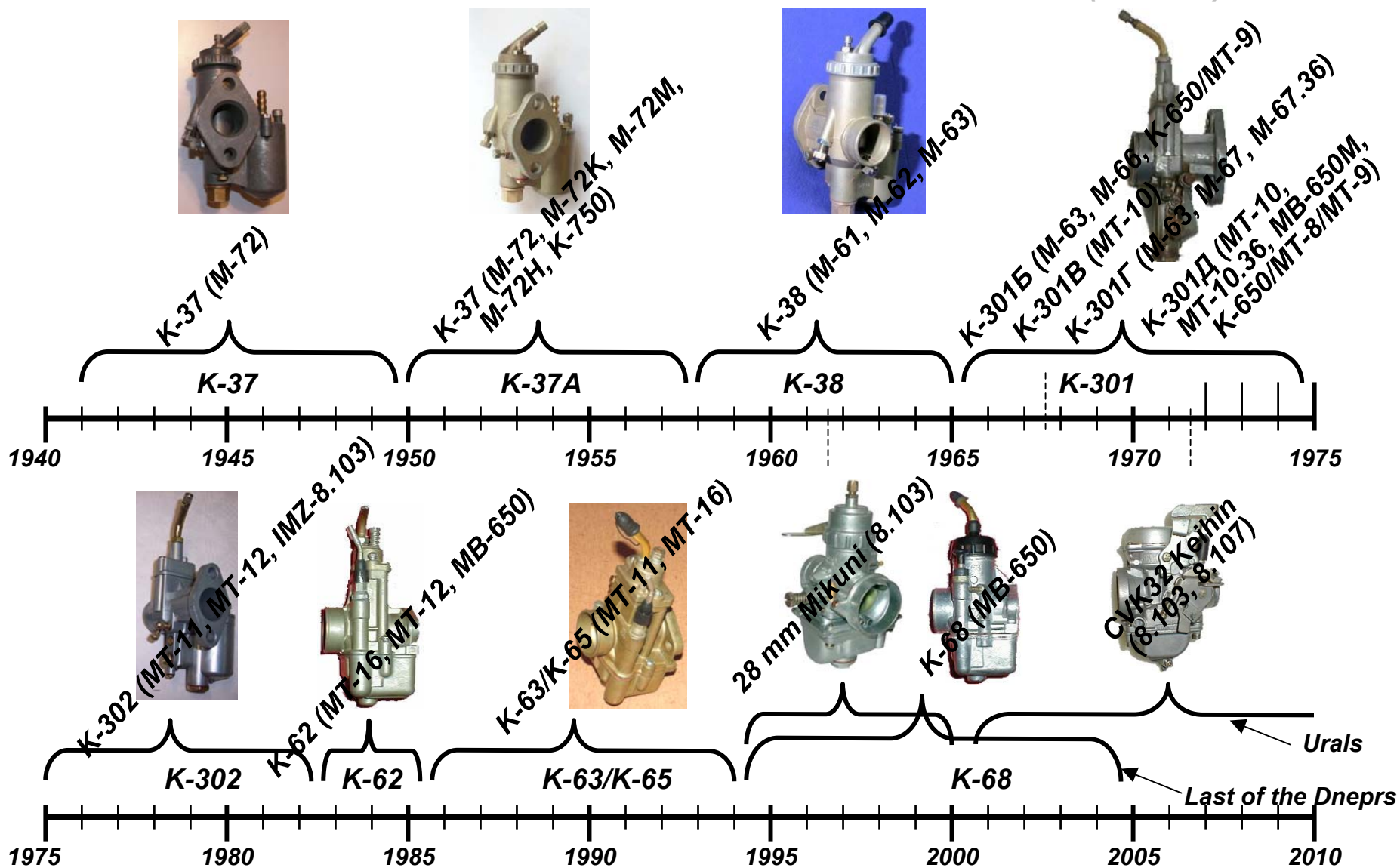
- **K-68 Runs a Little Rich Most of the Time**
- **Requires Frequent Adjustment to Stay Perfectly in Tune**
- **Looks Similar to the K-68 Fitted to Late 650cc Urals**
 - **They're Not the Same**
 - **Don't go Swapping Them from One to Another**



- **Ural Changed to Dual Keihin Seiki for US Import Models**
- **Fitted to Pass Stringent Emission Regulations (EPA)**
- **Current Carburetors for 650/750cc Motorcycles**
- **Generally a Good Carb, but Needs Re-Jetting to Avoid Overheating at High Engine Loads**
- **Must Be Kept Clean and Jets Need Regular Blowing Out, Especially the Ones that Can Be Seen in the Carb Throat when Air Filter Pipes Are Removed**

The common carburetors found on 750cc Ural motorbikes were the K-68's. Prompted by the need to meet the stringent EPA requirements for imports to the US, Ural chose the Mikuni, which was later replaced by the CVK32 Keihin, which appeared in 2000, and has remained steady today.

Russian Carburetor Time-Line (04/2011)



The 28 mm Mukuni was introduced in 1994 to meet EPA requirements on imported Urals, later replaced by the 32 mm Keihin.

CVK32 Keihin Carburetor

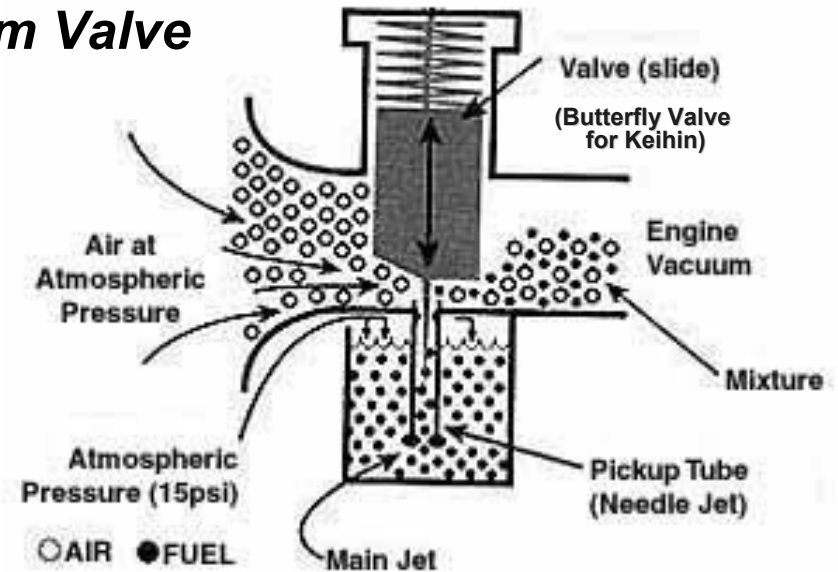
- **Bleed Type Carburetor**
- **Variable Venturi Controlled by Constant Velocity (CV)**
 - Also Known as Constant Depression or Constant Vacuum
- **CV is Next Best Thing to Electronic Fuel Injection**
 - Feeds Precise Amount of Mixture to Smooth-Out Throttle Response
 - Reduces Pollution and Stretch Fuel Budget and Gas-Tank Range
- **“32” Represents 32 mm Venturi Exit Diameter**
- **Butterfly Valve Instead of Round-Slide or Flat-Slide Throttle Valve**
 - Evidenced by the Rotary Movement on the Side
 - Throttle Cable Connected to Butterfly Valve
 - Varies Volume thru Venturi
- **Nominal Jets for 650 cc**
 - Main Jet: 118
 - Nozzle Idling: 38
 - Concentrator Nozzle (start): 65
- **Please See Part 13C for Re-Jetting of Carb**
 - 2002 CMSI 750 cc: 38 (some had 40) and 125
 - 2003 and early 2004 IMWA 750cc: 38 and 118
 - Late 2004 bikes: 38 and 125
 - 2005 thru 2007: 38 and 125 (Ducati Ignition starting with 2007 bikes)



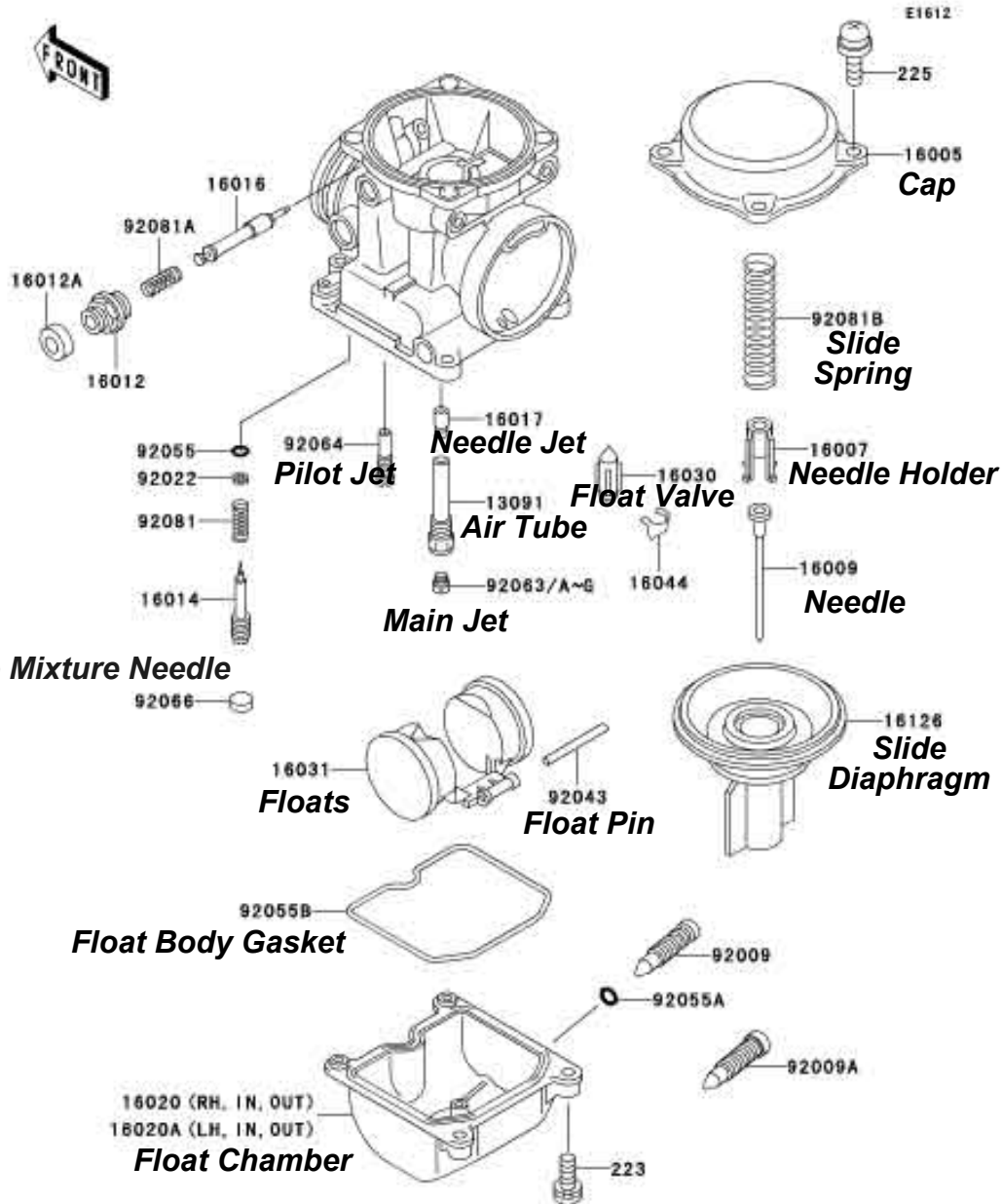
The Keihin has a butterfly valve, much like is commonly found in automobiles.

Variable Venturi - Getting Sucked In (Redondo Ron, 1998, www.gadgetjq.com)

- **Venturi Is a Tube with Convex Taper (one end wider than the other)**
- **As Air Enters Wider End, It's Squeezed into Narrower Section of Tube, Lowering Air's Pressure**
- **Area of Lowest Pressure Is Just Past the Narrowest Point**
 - **Lowest Pressure Point Called the Depression**
- **Bernoulli's Principle States That This Lowered Pressure, or Comparative Vacuum Is Separate from Engine Vacuum**
- **Variable Venturi Varies the Venturi Diameter at the Depression by Raising or Lowering an Obstruction**
- **This obstruction is Called a Slide**
- **On a CV the Slide is Called a Diaphragm Valve**



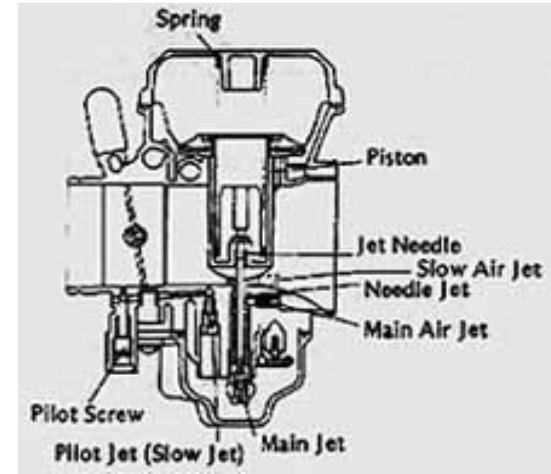
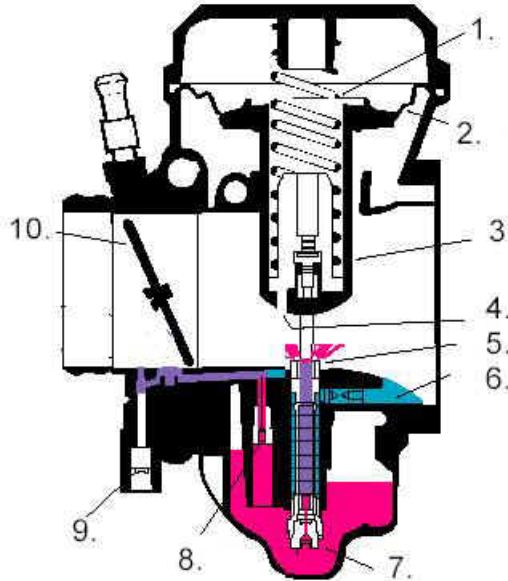
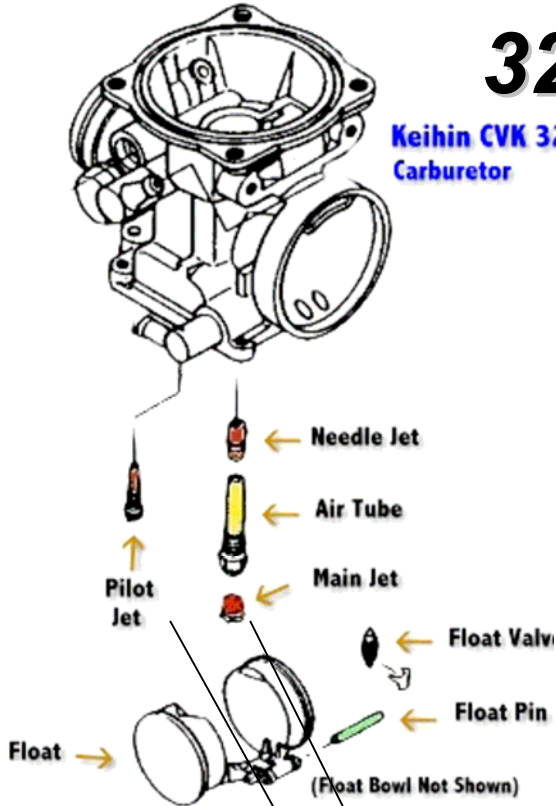
CVK32 Keihin Carburetor



'IMZ-8.128-15001	Carburetor Keihin
'93500040081H	Pan Screw
'12908802000	Coil spring
'14028462200	Vacuum Piston Comp.
'12298007000	Spring Seat
'N425-6NE00	Jet Needle
'N41303C00	Needle Jet Holder
'991013931220	Main Jet 122
'991013931250	Main Jet 125
'N42425B38	Slow Jet 38
'N42425B40	Slow Jet 40
'16155ZG8L100	Float Valve Comp.
'N42431065	Starter Jet 65
'10528292100	Float Valve
'09018146000	Float Body Gasket
'11988102002	Drain Screw
'93500040141H	Pan Screw
'N44602C00	CO2 Adjust Screw
'IMZ-8.1037-15157	Cap for Carburetor Breather

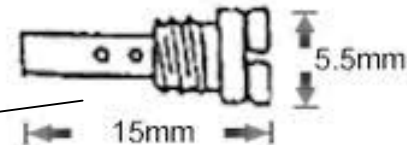
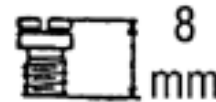
32CVK Components

Keihin CVK 32
Carburetor

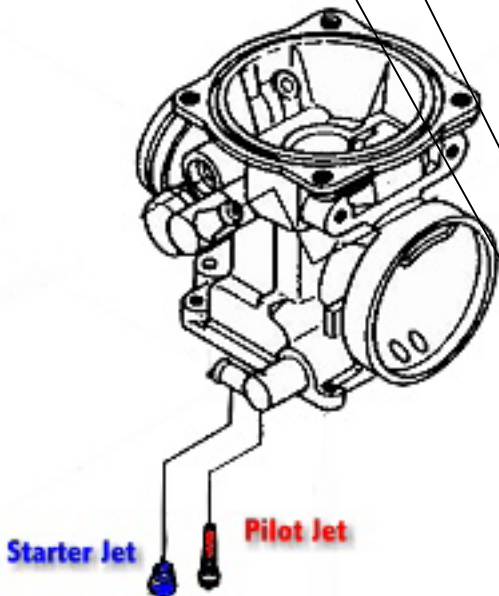


*38 jet = 0.38mm or 0.0149 in.
45 jet = 0.45mm or 0.0177 in.
125 jet = 1.25mm or 0.0492 in.*

1. Slide Spring
2. Slide Diaphragm
3. Vacuum Slide
4. Vacuum Port
5. Needle Jet
6. Main Air Jet
7. Main Jet
8. Pilot (Slow) Jet
9. Idle Mixture Adjustment Screw
10. Throttle Plate



Pilot (Slow) Jet



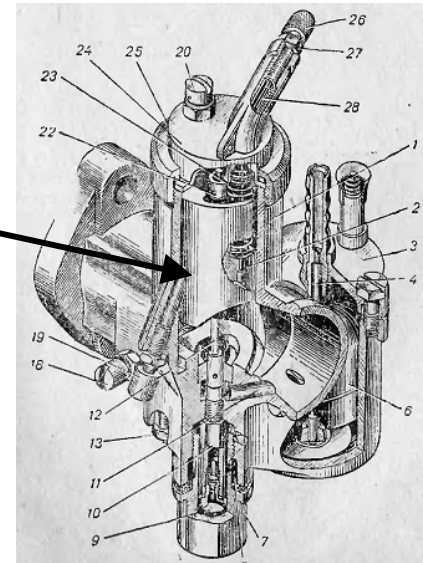
Starter Jet

Pilot Jet

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

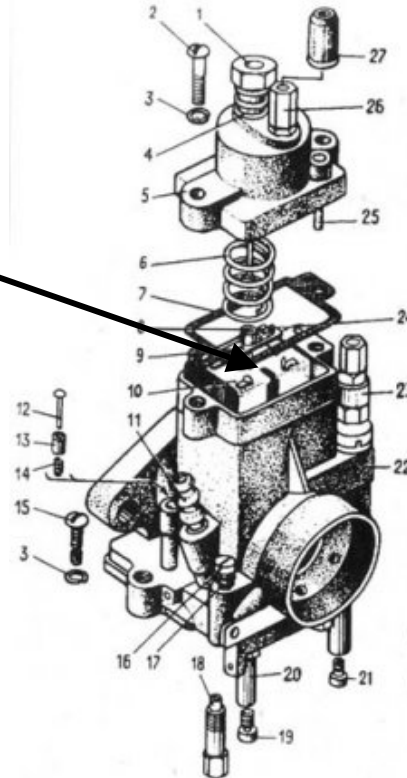
- **Round-Slide Throttle Valve**

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



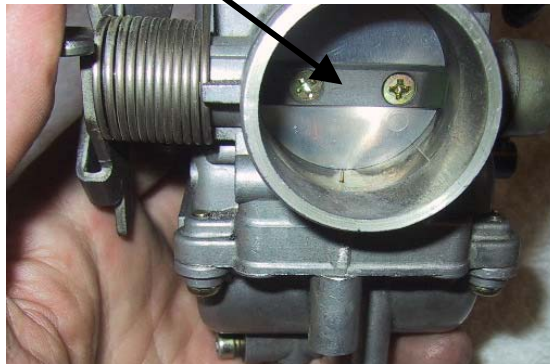
- **Flat-Slide Throttle Valve**

- 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

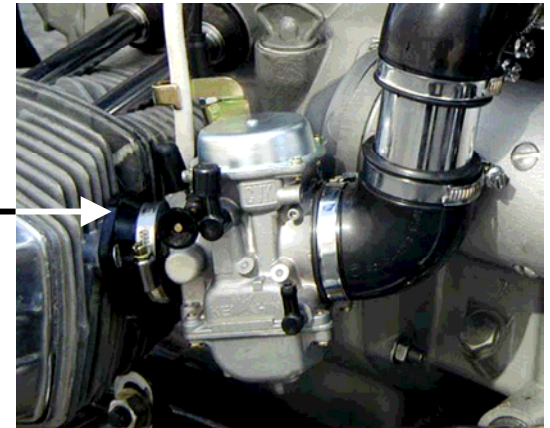
- **Flange-Mount**

- 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



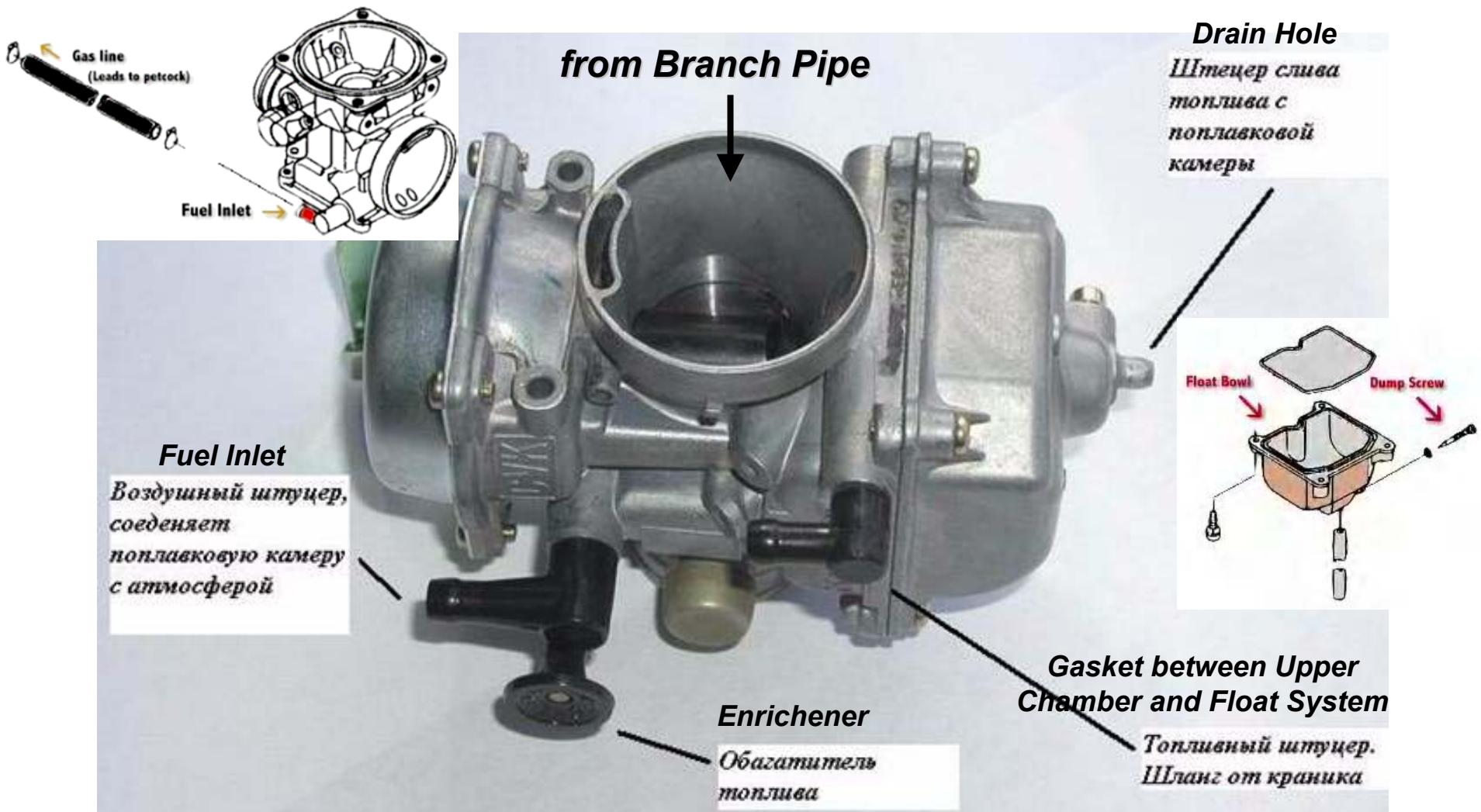
- **Spigot-Mount**

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



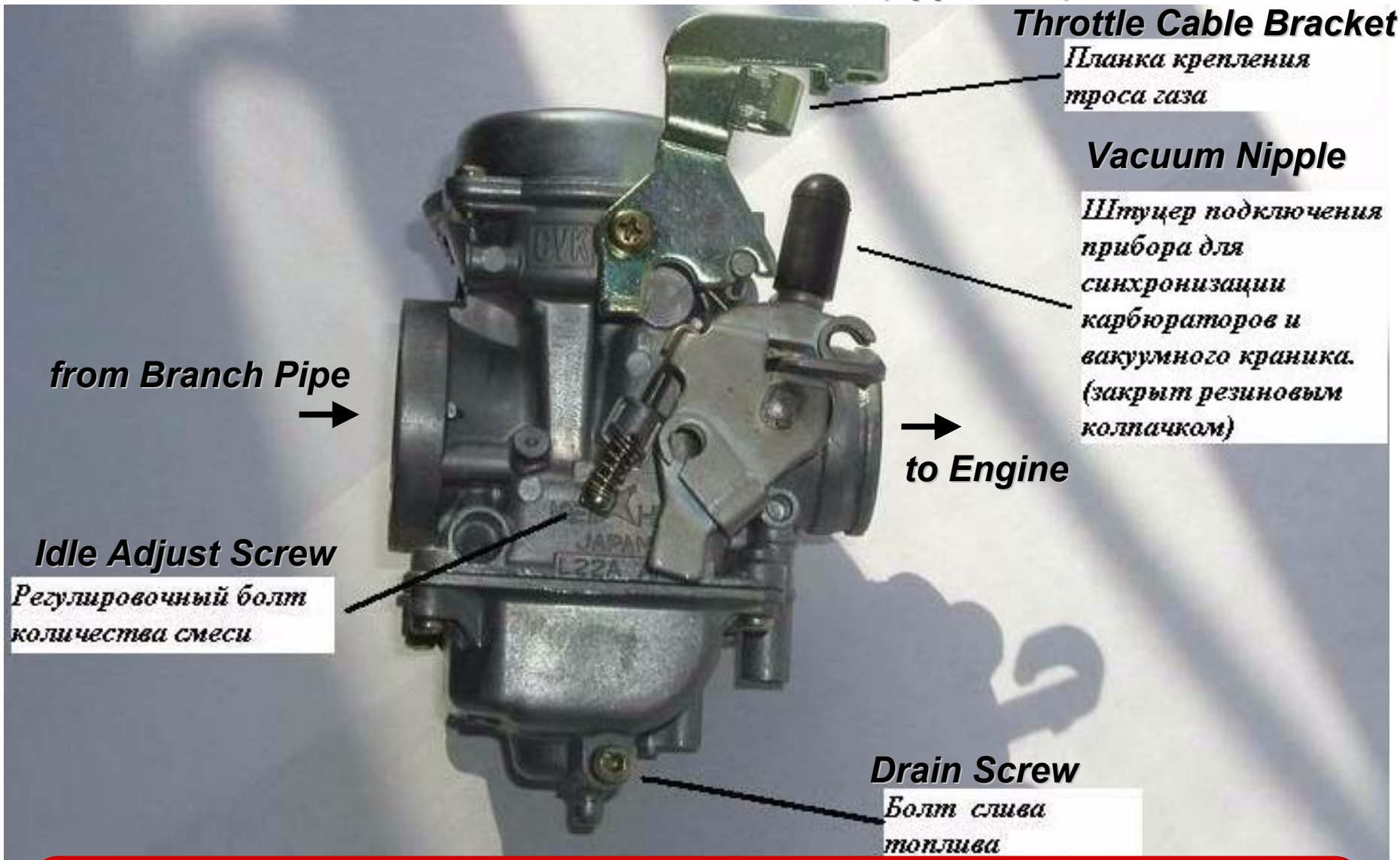
Another term describing carburetors is flange-mount or **spigot-mount**.

Keihin Carburetor (opposit.ru)



The 32CVK is a common type for the Japanese, the differences in models are usually in the diameter of the diffuser and nozzles, although there are also minor structural differences depending on volume, design and model year.

Keihin Carburetor (opposit.ru)



Throttle Cable Bracket

Планка крепления
троса газа

Vacuum Nipple

Штуцер подключения
прибора для
синхронизации
карбюраторов и
вакуумного краника.
(закрит резиновым
колпачком)

from Branch Pipe



Idle Adjust Screw

Регулировочный болт
количества смеси



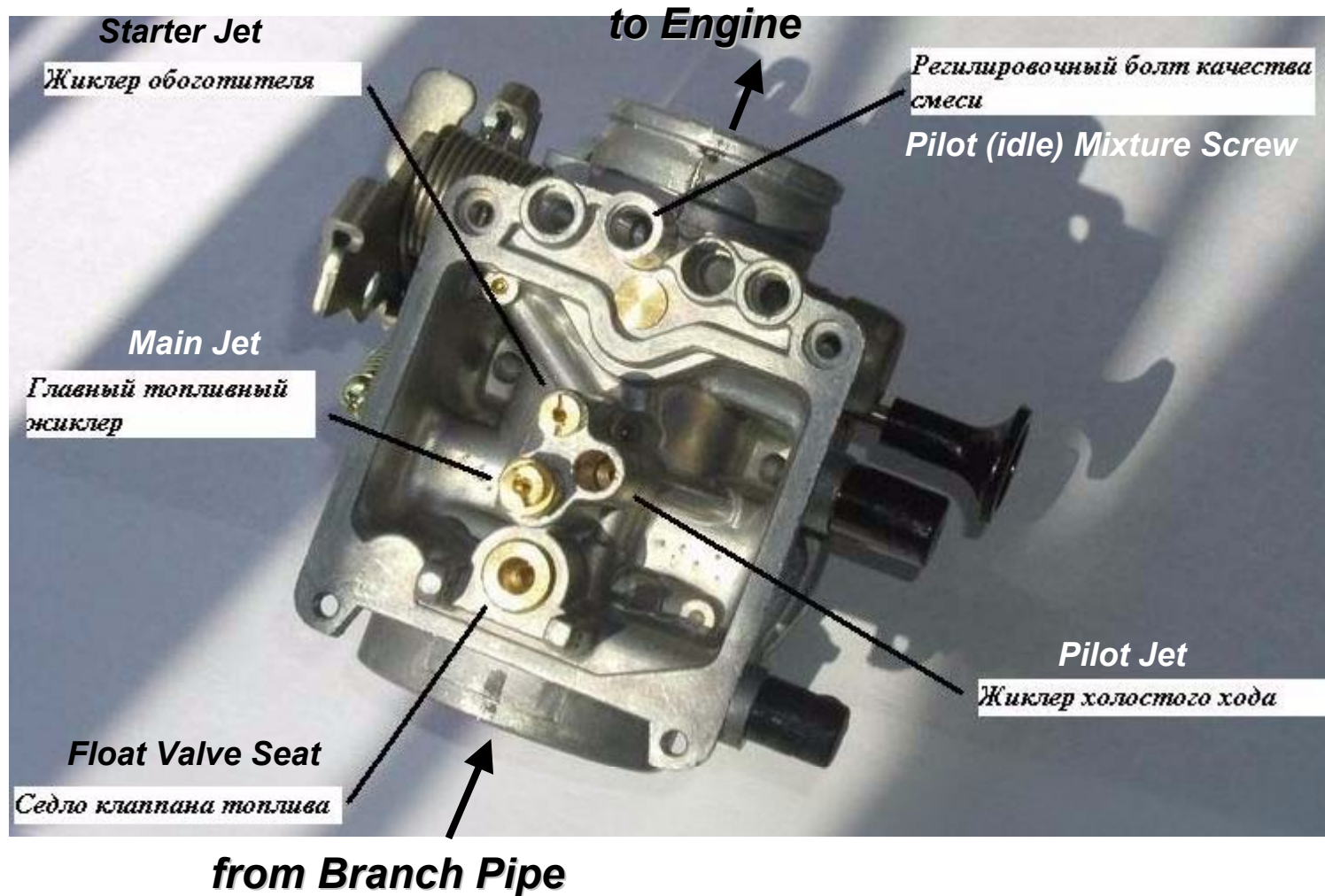
to Engine

Drain Screw

Болт слива
топлива

**The idle adjust screw sets the speed for each carburetor at rest.
The drain screw is periodically backed out to rid water and
other contaminants.**

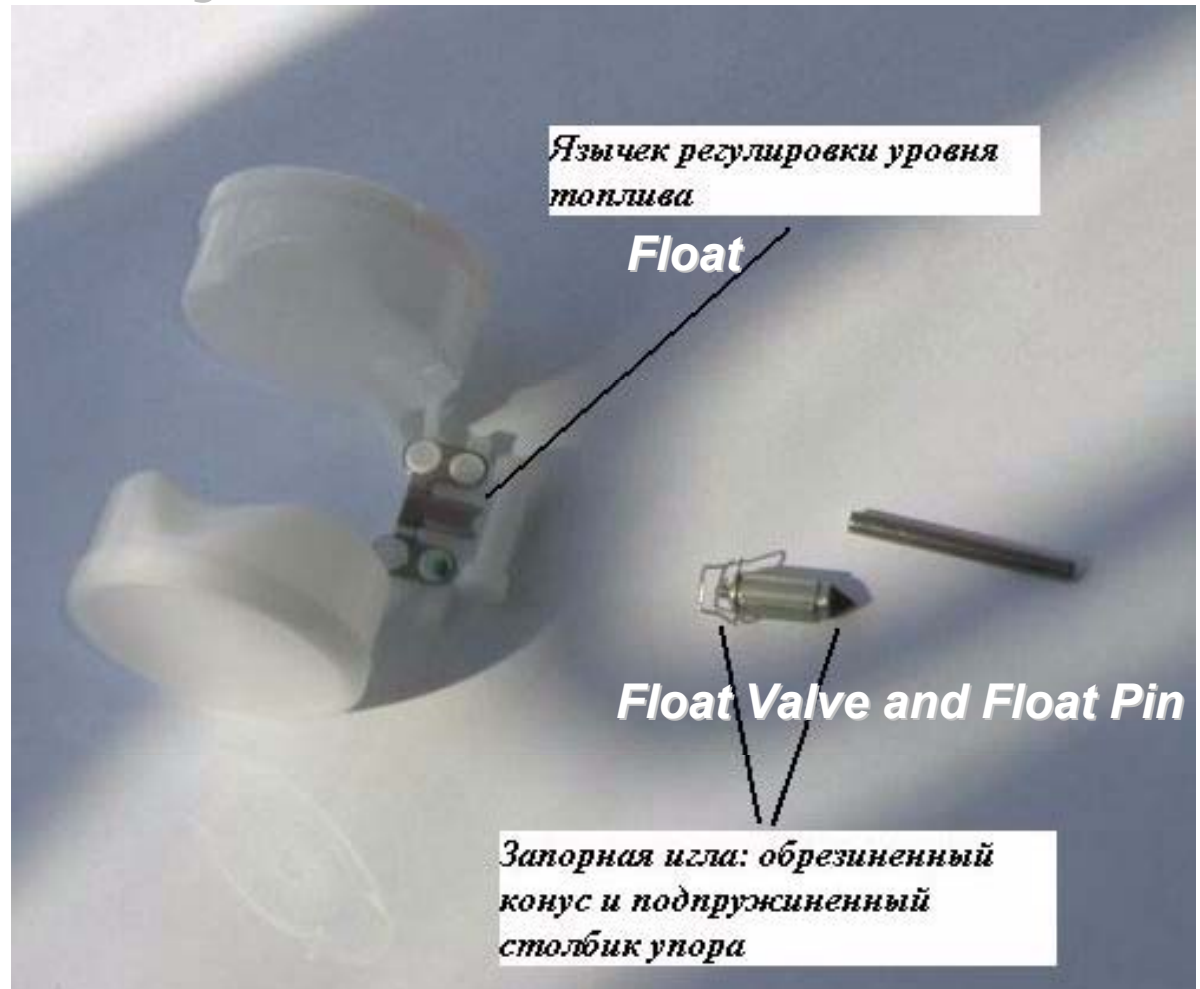
Bottom View with Float System Removed (opposit.ru)



Removing the 4 float bowl screws and the float assembly reveals the starter jet, main jet and pilot jet.

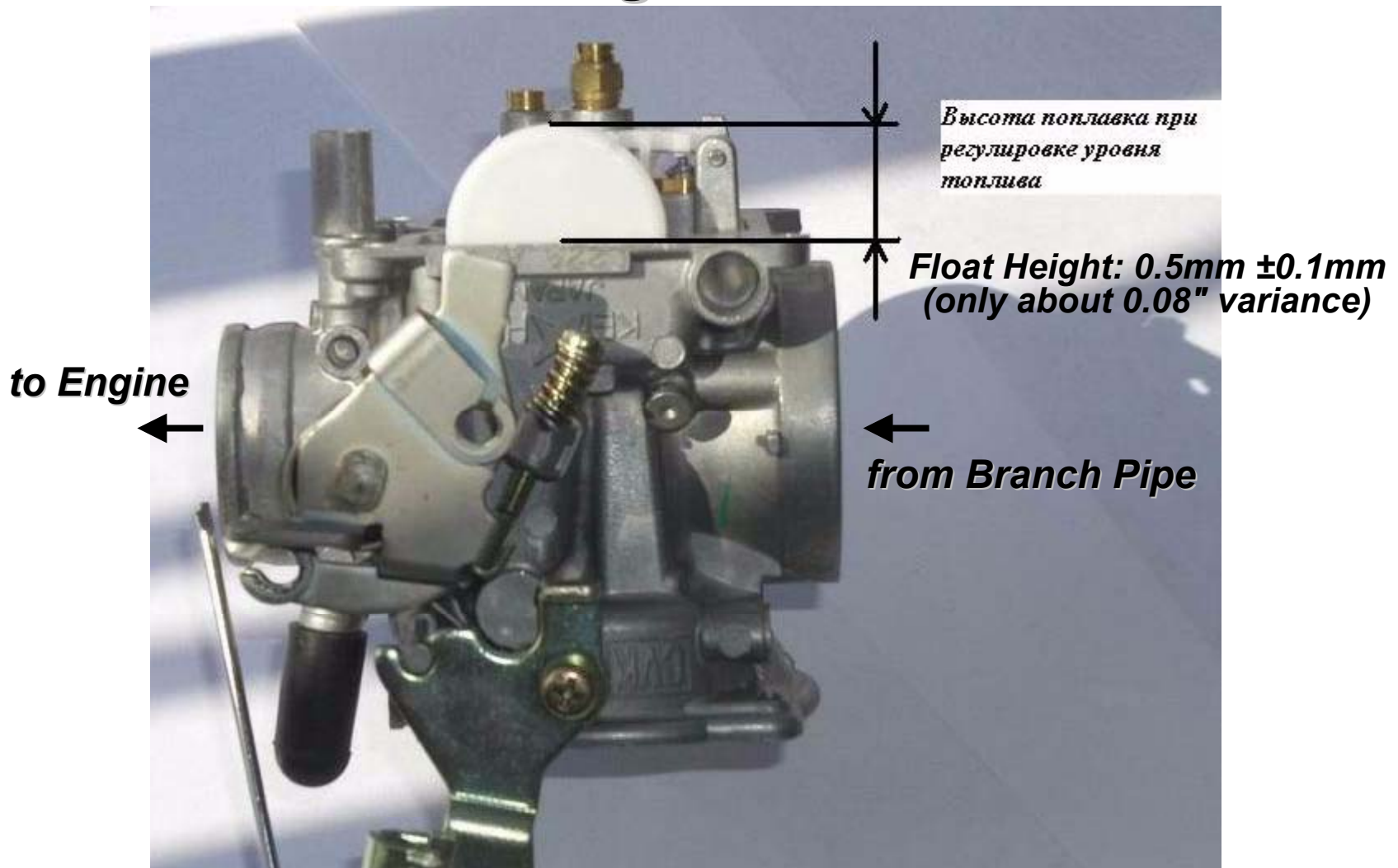
Float System (opposit.ru)

Before bending anything, visually inspect the rubber tip on the float valve and spray some carb cleaner and compressed air in the valve seat, to make sure nothing is blocking it open.



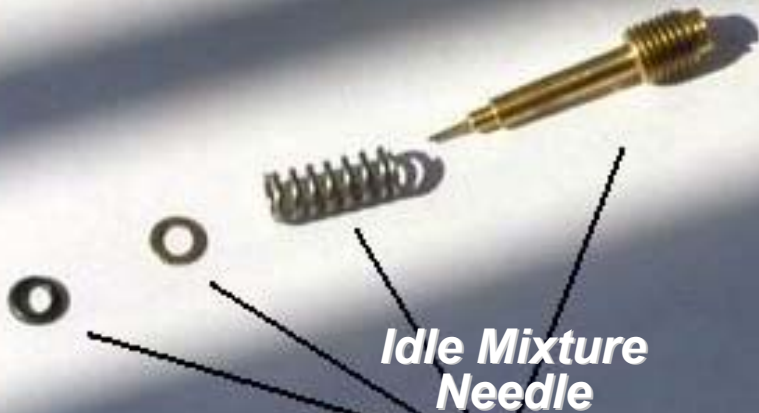
The float is hinged on a pin in the float boss, rising and falling with fuel level in the float bowl. The small metal tang integrated in the plastic float supports the float valve (float needle). As fuel in the float bowl rises, the float valve is pushed into the valve seat, until it's high enough to shut off the fuel to the bowl. As the level in the bowl drops, lowering the float, float valve pulls from it's seat, and fills again.

Float Height *(opposit.ru)*



The float level is the first thing that needs to be checked when tuning your carb. If the level is too high, it can cause a rich condition, too low and it can cause a lean condition. If it's not set correctly, any other adjustments you make may have to be redone.

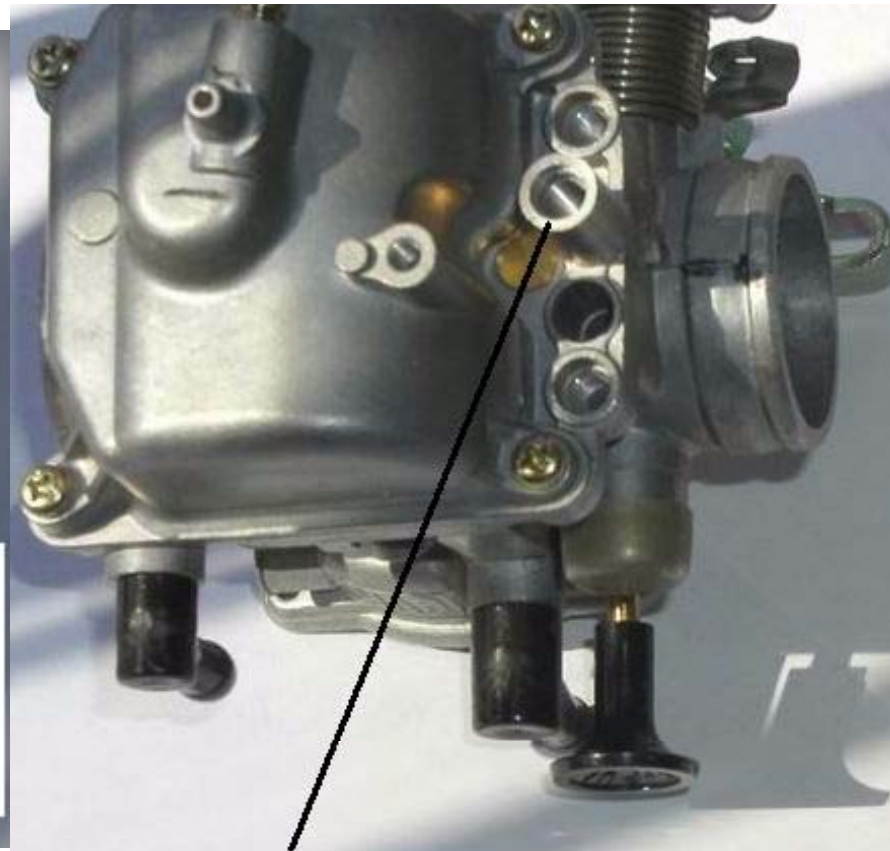
Idle Mixture Needle of Keihin Carburetor (opozit.ru)



Idle Mixture Needle

*Регулировочный болт качества смеси:
Обязательно собирается в следующей
последовательности: на болт
одевается->пружинка->шайба->резиновый
уплотнитель.*

**Mixture Needle and Seat Should Be Clean.
Pay Close Attention to the Two Washers.**

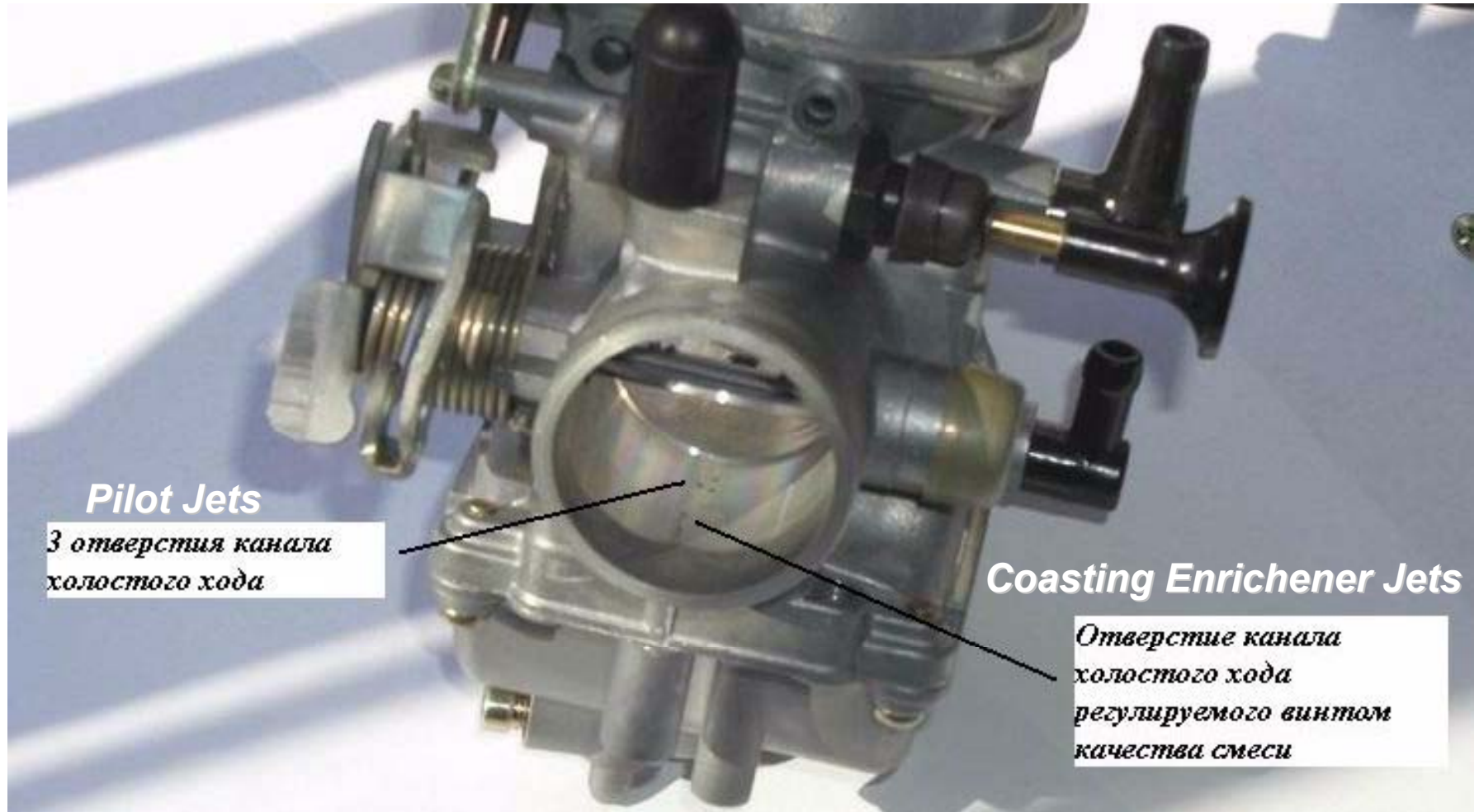


*Иглу в сборе окуратно вкручиваем в
шашту чтобы не выпало
уплотнительное колечко*

**Idle Mixture Screw Adjustment
Is Underneath the Carb**

The idle mixture-adjustment screw is turned very gently CW until you just meet resistance, any further and you will damage the needle. Factory setting is 1-1/2 turns CCW from seated.

Keihin Carburetor (opposit.ru)



Pilot Jets

*3 отверстия канала
холостого хода*

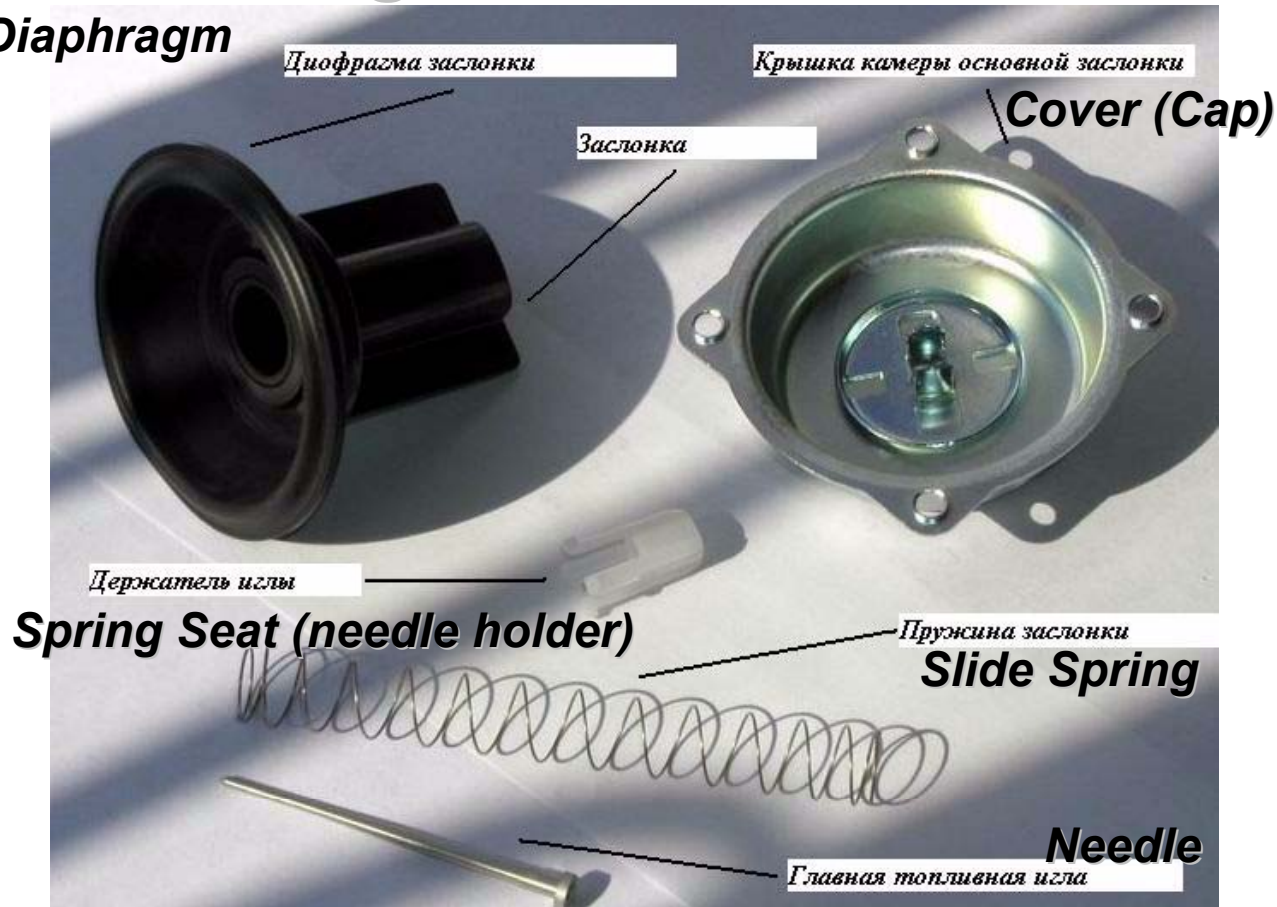
Coasting Enrichener Jets

*Отверстие канала
холостого хода
регулируемого винтом
качества смеси*

Pay attention to the opening of the idle channel, when operating a motorcycle with a faulty engine. Part of the holes could be clogged with soot, emissions from the cylinder.

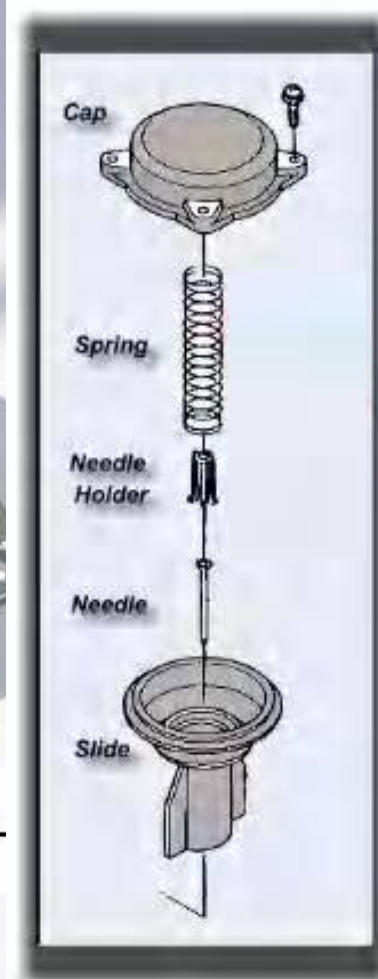
Coasting Enrichener (opposit.ru)

Slide Diaphragm



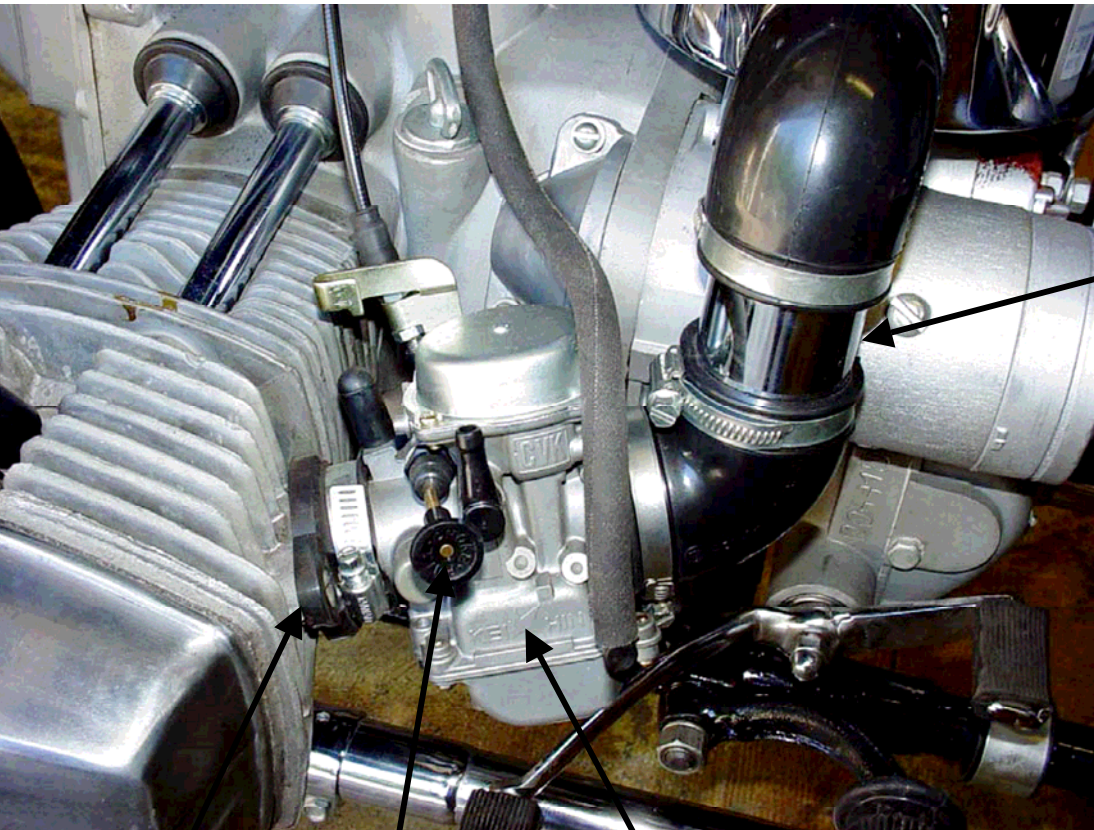
You're blasting down the trail and you see a hairpin coming up, so you let off the throttle, which closes the butterfly valve. Your 700 lb Ural is still rolling with inertia, keeping the engine rev's high. The engine can't get the mixture it's trying to suck in because the butterfly valve is closed, blocking air flow. To compensate for this there's an air jet in the lower diaphragm chamber that transfers ambient pressure to one side of the coasting enrichener's spring-loaded cut-off valve. The excess vacuum in front of the butterfly valve is transferred to a drilling that leads to the other side of the cut-off valve. This sucks it open, allowing the pilot jet to feed more fuel to the engine preventing an overly lean condition.

Keihin Carburetor (opposit.ru)



When re-building the carb, check that the needle holder is mounted evenly on the needle. Spread the diaphragm, and gently cover with a lid, do not over tighten the screws to avoid damaging the sealing skirting of the diaphragm.

2003 Patrol (32mm CVK Keihin Seike Carburetors)

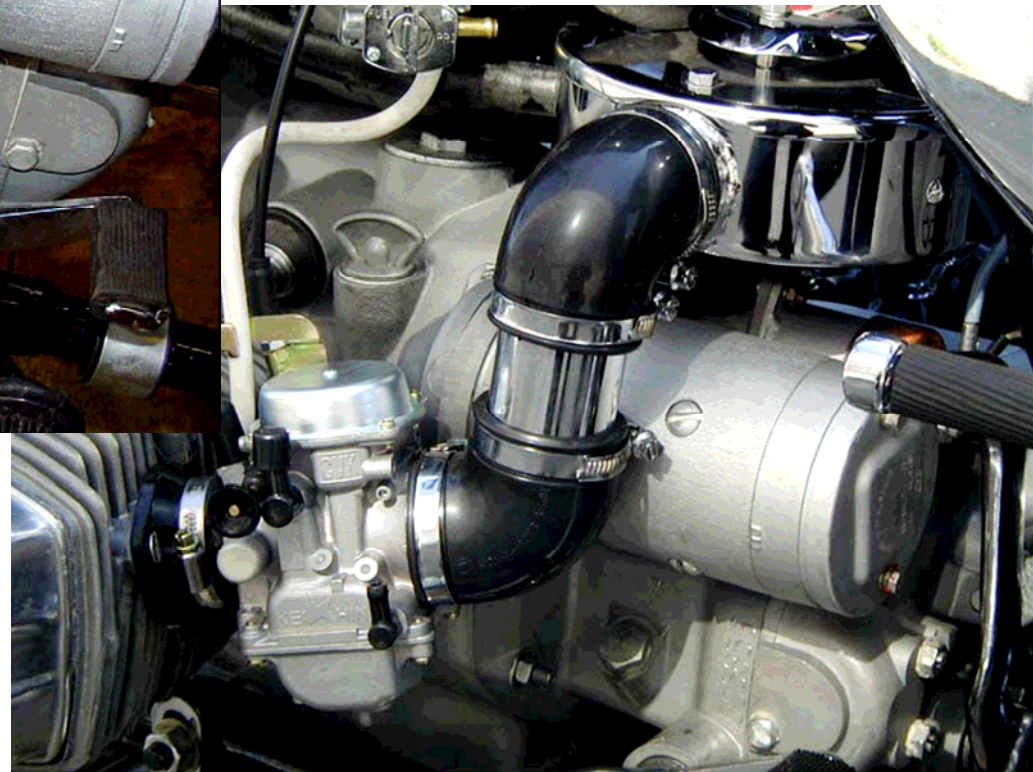


Branch Pipe

**Compliant
Gasket**

Carburetor

**Enrichener
(a.k.a. Choke)**



Never use a metal adapter between the carburetor and cylinder head.

2000 Ural Carburetor Troubleshooting Chart

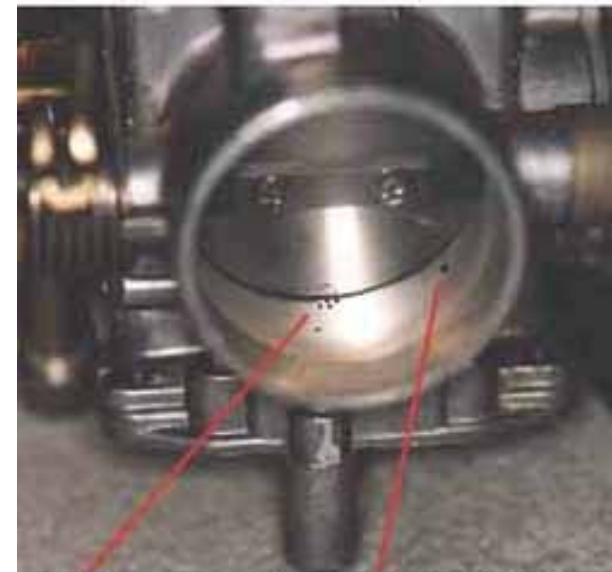
PROBLEM	POSSIBLE CAUSE	CORRECTIONS
Hard starting	<i>Incorrect use of enrichener</i>	<i>Correct use of enrichener</i>
	<i>Clogged fuel filter</i>	<i>Clean filter</i>
	<i>Clogged low speed fuel jets</i>	<i>Disassemble carburetor and chemically clean</i>
	<i>Float stuck</i>	<i>Remove float bowl, check float operation and correct or replace</i>
	<i>Float damaged or leaking</i>	<i>Replace float</i>
	<i>Intake air leak</i>	<i>Check carburetor mounting flanges for air leaks</i>
	<i>Ignition problem</i>	<i>Repair, replace or adjust as necessary</i>
	<i>Low cylinder compression</i>	<i>Repair, replace or adjust as necessary</i>
Poor idle or stalling	<i>Idle speed adjustments are unequal (twin carburetor models and multi-carburetor models using individual throttle stop adjustments)</i>	<i>Equalize throttle stop settings</i>
	<i>Clogged idle and low speed air bleed</i>	<i>Disassemble carburetor and chemically clean</i>

Pilot System (Redondo Ron, 1998, www.gadgetjq.com)

- **Pilot System Supply the Air/Fuel Mixture at Idle**
 - **Continues to Supply Fuel throughout Entire Throttle Range**
 - **After about 1/8 Throttle, MAIN SYSTEM Cuts-In to Supply an Increasing Percentage of Total Mixture Up to Full Throttle**
- **When You Set the Idle with Big Screw on Right Side of the Carb, What You're Doing Is Covering or Uncovering One or More of the Four Small Holes that Are Drilled into the Venturi (leading to the pilot jet), Just under the Butterfly Valve, and Letting More or Less Air Pass the Butterfly**
- **When You Adjust the Pilot Screw (under the carb), You Are Varying the Amount of Air Pre-Mixing with the Fuel before It Enters the Venturi**



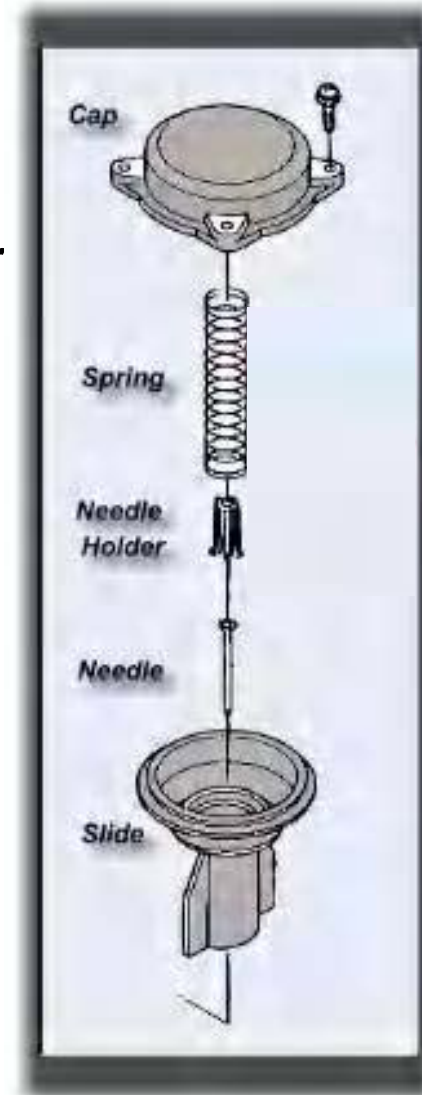
*At 6 o'clock in the mouth of the carb you can see the end of the idle mixture needle poking up.
Engine Side, Butterfly Closed*



Pilot and Coasting Enricher Drillings

Main System (Redondo Ron, 1998, www.gadgetjq.com)

- **Top Chamber Separated from Bottom Chamber by Rubber Diaphragm**
- **Bottom Chamber Is Open to Atmospheric Pressure**
- **When Vacuum in the Top Chamber Rises Sufficiently, the Constant Ambient Pressure of the Lower Chamber Helps the Diaphragm Valve Overcome the Downward Force of the Diaphragm Spring, and It Rises from the Venturi**
- **As the Diaphragm Valve Is Raised from the Venturi Depression (lowest pressure area), the Needle is Pulled Further Out of the Needle Jet, Exposing a Thinner Portion of the Needle Taper, Which Allows Even More Fuel to Rise into the Venturi to Meet the Increased Engine Demand**



32 CVK Carburetor (*"The Unofficial Ural 750cc Service Manual," www.myural.com/*)



Front-View, Compliance Fitting Side



Left-Side View



Branch Tubing or Intake Side



Right-Side, Idle Setting Screw

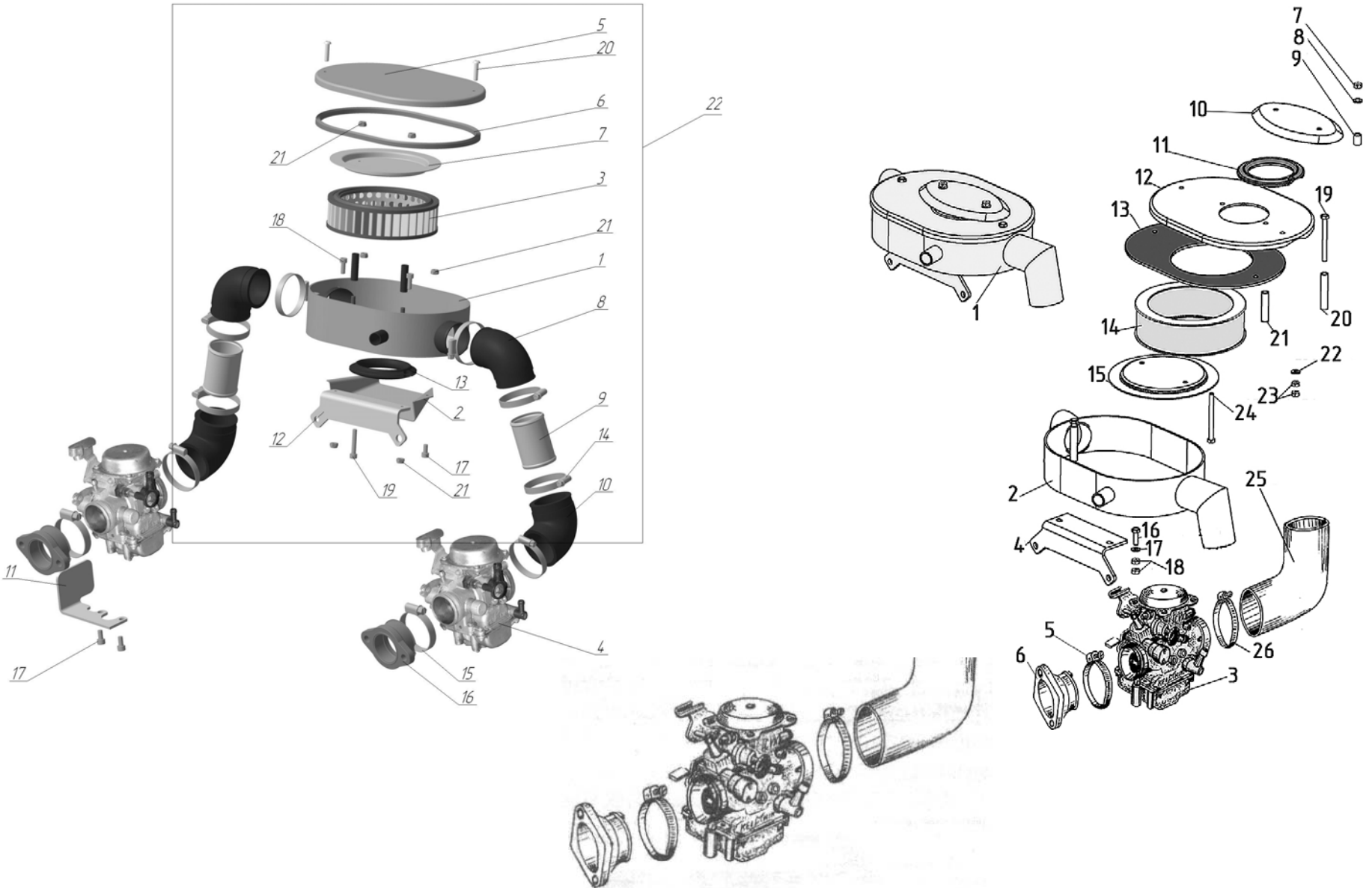


Top-View Diaphragm Cap



Bottom-View, Bowl Drain

Keihin L22 AA Keihin Carburetor for 750 cc



Diagnosing Issues on my Ural: Air/Fuel Mixture and Carburetor Synchronization

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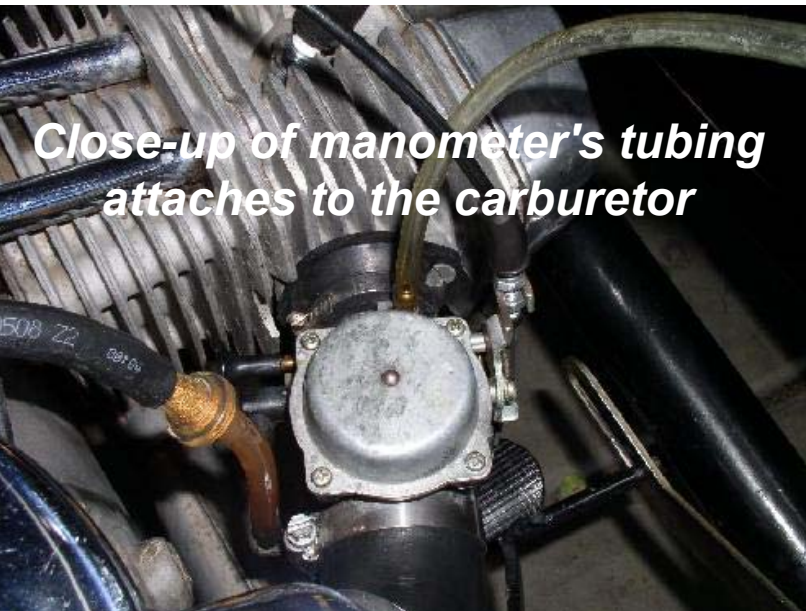
- **Set Fuel Mixture Screw Located at Bottom of Each Carburetor's Float Bowl**
- **Turn 2.5 turns from Seat (starting point)**
 - **Screw Fuel Mixture Screw Clockwise till It Stops**
 - **Don't Force It, Be Gentle and Smoothly "seat it"**
 - **Correct Number of Turns is 1-1/2 turns from Seated**
- **Adjust Idle Speed Using Idle Set Screws to Control Amount of Air Drawn at idle into Carburetor's Venturi Chamber**
 - **Loosen Throttle Set Screws (red circled item below) and Take Throttle Cables Out of the Equation**
 - **Don't Want Tension on Butterfly Lever when Turning Throttle Grip!**
 - **Take Cable Out of Channel and Let Hang Loose but Still Connected to Butterfly Levers**



Diagnosing Issues on my Ural: Air/Fuel Mixture and Carburetor Synchronization

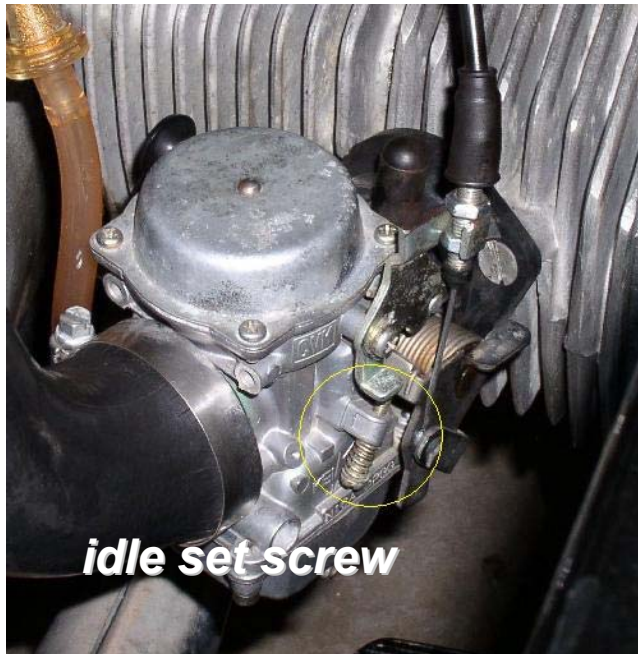
October 10th, 2009, Domingo Chang, Colorado Motorcycle Travel Examiner

- **Remove Black Rubber Caps on Carburetors which Seal the Vacuum Nipples (red rectangled item below)**
- **Use Home-Brew Manometer**
- **Hook Up to Vacuum Nipples on Each Carburetor (see below)**
 - **Left Vacuum Hose Goes on Left Side of Engine, Right Hose to Right Side**
- **Start the Engine and Note the Levels which Reveal How Much Vacuum Each Carburetor Is Pulling or Generating**
- **The Side with the Higher Fluid Level Is Pulling the Most Vacuum**



Diagnosing Issues on my Ural: Air/Fuel Mixture and Carburetor Synchronization
October 10th, 2009, Domingo Chang, Colorado Motorcycle Travel Examiner

- **Slowly (in small increments) Adjust Each Idle Set Screw until Fluid Levels on Manometer for Each Carburetor Hold Even**
- **Be Patient, Allowing a Couple of Seconds for Changes to Take Effect (See yellow circled area below)**
- **Once Set Steady at Idle, Rev Engine to 2000-3000 rpm**
 - **Levels Should Remain Steady**
 - **If So, Successfully Synchronized Carburetors!**
 - **Turn Off Engine**
- **Place Throttle Cables Back into Play, Securing Set Screws So That When You Twist the Throttle, It Turns Butterfly Levers on Both Carburetors at Same Time and Angle (see red rectangled area below)**



Diagnosing Issues on my Ural: Air/Fuel Mixture and Carburetor Synchronization
October 10th, 2009, Domingo Chang, Colorado Motorcycle Travel Examiner

- **Ideal Condition: Light Brown or "Caramel" Color**
- **Black Soot Means Air / Fuel Mixture Running Too Rich or Too Much Fuel**

Ideal Condition: Light Brown or "Caramel"



Too Rich Condition: Black Soot



Diagnosing Issues on my Ural: Air/Fuel Mixture and Fuel Delivery

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- **Determine Good Steady Fuel Delivery to Carburetors**
 - **Check for Good Steady Flow on Both Lines from Y-Junction under Petcock**
 - **Check In-Line Fuel Filters for Debris or Obstructions**
 - **Drain Some Fuel from Each Carb by Loosening Screw on Bottom of Float Bowl Chamber using 3mm Allen Wrench**
 - **Check Fuel for Water (it'll settle to the bottom) and Contamination/Debris**
- **Remove Float Bowls by Removing the 4 Screws Used by Ural and Examine Contents of Bowl for Contamination and Water**
 - **Replace Easily-Stripped Screws, with Allen-Headed Stainless-Steel Screws**
- **Blow-Out Any "Gunk" in the Jets within Carburetor's Fuel Paths**
 - **Best Way Is to Take Carburetors Apart and Do a Thorough Cleaning of the Jets and Liberal Use of Carburetor Cleaning Spray while Examining the Components.**
- **Following Procedure is "Quick and Dirty" Way of Clearing Fuel Path, but Not a Long-Term Solution**
 - **Do This with Little or No Fuel in Float Bowls**
 - **Some Fuel Works Better as It Acts as a Hydraulic Force thru the Carburetor Jets**
 - **Plastic Elbow Piece (vent mechanism) on Side of a Keihin (see light blue circle)**
 - **When You Blow Air Through, It Will Exit This Vent!**



Stainless-Steel Allen-Head Screw Upgrade Kit for Top Cover and Bowl Chamber of Keihin Carbs



8 Screws for Top Cover



8 Screws for Bowl Chamber

Helpful upgrade kits to allen-head, stainless-steel screws are readily available from Heindl Engineering and Holopaw Gene.

Diagnosing Issues on my Ural: Fuel Delivery / Fuel Path

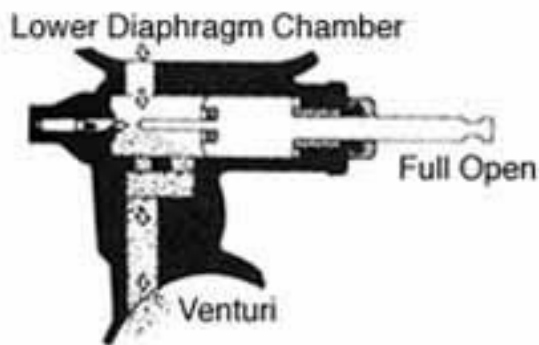
October 10th, 2009, Domingo Chang, Colorado Motorcycle Travel Examiner

- **Blowing Out the Fuel Path**
 - **Use Manual Air Pump or Air Compressor Set for 20 PSI max, with Cone Adapter to Snugly Fit into Fuel Line's Opening**
 - **Ensure Fuel Petcock Is Closed**
 - **If Petcock Isn't Closed, Fuel Will Come Out the Lines**
 - **Disconnect Fuel Filter (red circle) from Each Carburetor**
 - **Leave Short-Length Fuel Line (blue arrow) which Connects to Carburetor Itself**
 - **Connect (using a plastic cone-shaped adapter) Air Hose to Short Fuel Line, Holding It Tight to Get a Snug Fit**
 - **Place Wad of Shop Towel Paper against Opening of Carburetor's Vent and Blow Two Quick Sub-Second Blasts of Air into Fuel Line**
 - **Most Fuel Caught by Shop Towel Wad of Paper**
 - **Do Both Carburetors in Same Manner**
 - **After Loosening the Gas Cap, Blow Air thru Length of Fuel Line which Was Connected to Fuel Petcock**
 - **Ensure End of Fuel Line with Compressor Is HIGHER than the Fuel Petcock When Open the Petcock to Open the Fuel Path into the Gas Tank!**
 - **Hearing Air within the Tank Gives Confidence of No Debris in That Portion of Fuel Path**
- **Button Things Up and Go for a Test Ride**

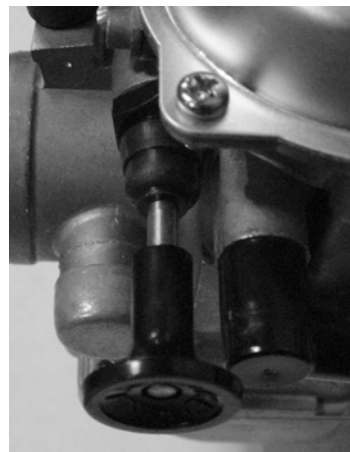


Carburetor Enricheners (www.gadgetjq.com)

- **Carburetor Enricheners Provide Extra Fuel to the Fuel-Air Mixture, Allowing a Cold Engine to Start and Run until Warmed-Up Sufficiently to Allow Normal Operation**
- **Pulling the Enrichener Retracts a Plunger that Opens a Tube Connected to the Starter Jet, Allowing Additional Fuel to Enter Venturi just below Vacuum Hose Nipple**
- **It Supplements the Pilot System at Start-Up**
- **Use Caution When Using Enricheners, as They Can Easily Cause Engine to Flood or to Foul Spark Plugs**



Enrichener On
(Starting)



Enrichener Off

The enrichener is referred to as the choke. But that's a misnomer. When you apply the choke lever, what you're doing is retracting a plunger that opens a tube connected to the starter jet, allowing additional fuel to enter the venturi just below the vacuum hose nipple, supplementing the pilot system at start up.

2000-2003 Patrol (Keihin) and Gear-Up Enricheners

- **Keihin Carbs Do Not Have a Choke, but Use a Mixture Enrichment Circuit, or Enrichener**
- **Enricheners Work by Opening a Secondary Fuel Circuit below the Throttle Valve**
 - **Circuit Works Like Idle Circuit, Supplying Extra Fuel when Throttle Is Closed**
- **First Enricheners Used on Urals Imported to U.S. to Satisfy EPA**
 - **32mm CVK Keihin (2000-present)**
- **When Engine Is Cool or Cold and Ambient Temp between 40°F-60°F (5°C-15°C), Pull-Out Both Enricheners to Start**
- **As Soon as Engine Starts, Immediately Push-In Enricheners**
- **Run Engine at Moderate Speed for 30-60 seconds**
- **If Engine Starts to Die, Blip the Twist Grip Throttle (rapidly twist part way towards full throttle and then back off) to Keep Engine Running**
- **After 1 to 3 minutes, Depending on Ambient Temp, Engine should Run Smoothly without “blipping” the Throttle**
- **If Engine Is Cold and Ambient Temperature Is below 40°F (5°C)**
 - **Give Engine 5-10 (depending on how cold it is) Priming Kicks with Ignition Off**
 - **Gets Some Oil Circulated to Key Internal Parts**
 - **Engage Enricheners on Both Carburetors**
 - **Engine Should Fire, Depending on Temp (for example, when the ambient temperature is 0°F, it typically takes about 5-10 rotations to start Engine)**
 - **When Engine Starts, Disengage Both Enricheners (after a few seconds)**
- **Back-Off on Enricheners as soon as Engine Sustains Itself without Stalling**
- **Since the Ural is Carbureted Air-Cooled Engine, Plugs Will Foul Quickly (as soon as one minute) If Engine Mixture Too Rich**
- **If One Plug Fouls and Other Doesn't, Engine Will Run Unevenly and May Cause Internal Damage**
- **When Engine Is Hot, Do Not Enrichen Carburetors (Risks Flooding Engine)**

If the ambient temp is high (60°F (15°C) or above), try starting the engine without pulling the carburetor enricheners.