Ural (Урал) - Dnepr (Днепр)

Russian Motorcycle Evolution

Part V: Carburetor Evolution

(See Also Part I: Parade of Russian Sidecar Motorcycles, Part II: Engine Evolution, Part III: Alternator and Generator Evolution, and Part IV: Ignition System Evolution)

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Carburetor Evolution

- First We Trace the Evolution of the Ural & Dnepr Motorcycle Sidecar History
- We Then Establish a Time-Line for Carb Development
- Next We Display Enough Photos of Carburetors that the Operator Can Clearly Identify Their Carburetor

We have included ample photos, assembly drawings and line drawings to help identify the correct carburetor on each Ural / Dnepr. Identification of the carburetor, along with the electrical system and engine displacement, helps the operator pin-point the year of manufacture (assuming the motorcycle has not been modified).
Distinctive Components of Russian Carburetors

- Enrichener (a.k.a. Choke)
- Butterfly Valve Throttle
- Compliant Flange
- Carburetor
- Branch Pipe

An example of identifying distinctive parts of a carburetor is shown on a modern (Keihin CVK32) with a spigot mount and butterfly valve throttle.
Characteristics: Round-Slide vs. Flat-Slide vs. Butterfly Throttle Valves

• **Round-Slide Throttle Valve**
  – K-37 / K-38 / PZ-28D
  – 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.
Characteristics: Flange vs. Spigot Intake Manifold Mount

- **Flange-Mount**
  - Bolts Directly on Cylinder Head or Adapter
    - K-37 / K-38 / PZ-28D
    - 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.
Characteristics: Vertical vs. Horizontal Flange-Mount

- **Vertical Mounting Holes**

- **Horizontal Mounting Holes**

- **Transition from Vertical-to-Horizontal**
  – 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.
Characteristics: In-Line vs. Off-Axis Float Chamber Mount

- Float Chamber (Bowl) Offset from Carburetor Body
  - Vertical vs. Slanted Float Chamber (Bowl) Mount

- Float Chamber (Bowl) In-Line with Center of Carburetor Body

Older Russian carburetors had external float bowls, with some built on a slant, with greater foaming of the fuel under vibration.
The K-301, on the left, has an angled fuel bowl, compared to the later K-302 on the right.
Characteristics: Left-or Right-Hand vs. Similar Construction

• Left-Hand or Right-Hand Construction (mixture-adjust on opposite sides)

• Identical Construction (mixture-adjust on same side, top or bottom)

A few Russian carburetors were built so that the mixture-adjust screw was always on the outside.
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. 
Table I: IMZ (ИМЗ) - Ural (Урал) Sidecar Model/Year vs. Engine and Carburetor

<table>
<thead>
<tr>
<th>Model</th>
<th>Use</th>
<th>Year</th>
<th>Engine Size (cm³ / inch³)</th>
<th>Compression Ratio</th>
<th>Horse Power BHP (hp / kW)</th>
<th>Max Power (rpm)</th>
<th>Voltage</th>
<th>Carburetor</th>
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<tbody>
<tr>
<td>M-72</td>
<td>Military</td>
<td>1941-50</td>
<td>746 / 45.3 SV</td>
<td>5.5:1</td>
<td>22 / 16.2</td>
<td>4,500-4,800</td>
<td>6-Volt</td>
<td>K-37, K-37A after 1950</td>
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<tr>
<td>M-72K</td>
<td>Military</td>
<td>1951-58</td>
<td>746 / 45.3 SV</td>
<td>5.5:1</td>
<td>22 / 16.2</td>
<td>4,500-4,800</td>
<td>6-Volt</td>
<td>K-37A (1950)</td>
</tr>
<tr>
<td>M-72M</td>
<td>Military</td>
<td>1956-60</td>
<td>746 / 45.3 SV</td>
<td>5.5:1</td>
<td>22 / 16.2</td>
<td>4,500-4,800</td>
<td>6-Volt</td>
<td>K-37A (1950)</td>
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<tr>
<td>M-66</td>
<td>Civilian</td>
<td>1971-73</td>
<td>649 / 39.4 OHV</td>
<td>7.0:1</td>
<td>32 / 23.5</td>
<td>5,600-5,900</td>
<td>6-Volt</td>
<td>K-301B, K-301Г</td>
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<td>M-67</td>
<td>Civilian</td>
<td>1974-76</td>
<td>649 / 39.4 OHV</td>
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<td>32 / 23.5</td>
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<td>M-67.36</td>
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<td>1976-85</td>
<td>649 / 39.4 OHV</td>
<td>7.0:1</td>
<td>36 / 26.5</td>
<td>4,600-4,900</td>
<td>12-Volt</td>
<td>K-301Г</td>
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</tbody>
</table>

Prompted by the need to meet the stringent EPA requirements, Ural ended with the CVK32 Keihin in 2000 and has remained today.
<table>
<thead>
<tr>
<th>Model</th>
<th>Use</th>
<th>Year</th>
<th>Engine Size (cm³ / inch³)</th>
<th>Compression Ratio</th>
<th>Horse Power BHP (hp / kW)</th>
<th>Max Power (rpm)</th>
<th>Voltage</th>
<th>Carburetor</th>
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<tbody>
<tr>
<td>M-72</td>
<td>Military</td>
<td>1951-56</td>
<td>746 / 45.3 SV</td>
<td>5.5:1</td>
<td>22 / 16.2</td>
<td>4,500-4,800</td>
<td>6-Volt</td>
<td>K-37A (1950)</td>
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<tr>
<td>M-72N</td>
<td>Military</td>
<td>1956-60</td>
<td>746 / 45.3 SV</td>
<td>5.5:1</td>
<td>22 / 16.2</td>
<td>4,500-4,800</td>
<td>6-Volt</td>
<td>K-37A (1950)</td>
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<tr>
<td>MT-12</td>
<td>Civilian 2WD</td>
<td>1974-82</td>
<td>746 / 45.3 SV</td>
<td>6.0:1</td>
<td>26 / 19.1</td>
<td>5,000-5,800</td>
<td>6-Volt</td>
<td>K-302, K-63Ф</td>
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<tr>
<td>K-650/MT-8</td>
<td>Civilian</td>
<td>1967-71</td>
<td>649 / 39.4 OHV</td>
<td>7.0:1</td>
<td>32 / 23.5</td>
<td>5,000-5,200</td>
<td>6-Volt</td>
<td>K-301Б, K-301Д</td>
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<td>MT-10</td>
<td>Civilian</td>
<td>1973-76</td>
<td>649 / 39.4 OHV</td>
<td>7.0:1</td>
<td>32 / 23.5 (36 / 26.5)</td>
<td>5,600-5,800</td>
<td>12-Volt</td>
<td>K-301В, K-301Д, K-63T</td>
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<tr>
<td>MB-650M</td>
<td>Military 2WD</td>
<td>1985-91</td>
<td>649 / 39.4 OHV</td>
<td>7.5:1</td>
<td>36 / 26.5</td>
<td>5,000-5,200</td>
<td>12-Volt</td>
<td>K-301Д</td>
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<tr>
<td>MT-10.36</td>
<td>Civilian</td>
<td>1976-84</td>
<td>649 / 39.4 OHV</td>
<td>7.0:1</td>
<td>32 / 23.5 (36 / 26.5)</td>
<td>5,600-5,800</td>
<td>12-Volt</td>
<td>K-301Д</td>
</tr>
<tr>
<td>MB-650-M1</td>
<td>Military (MT-16)</td>
<td>1985-1995</td>
<td>649 / 39.4 OHV</td>
<td>7.0:1</td>
<td>32 / 23.5</td>
<td>5,000-5,200</td>
<td>12-Volt</td>
<td>K-301Б</td>
</tr>
</tbody>
</table>

To reduce heat-stress on the MT-10.36 engine at low speeds on difficult roads and to use lower octane fuel, the compression ratio was reduced from 7.5:1 to 7.0:1. This was achieved by an increase of 0.9 mm cylinder height.
German R71 Vergaser (German for Carburetor): Father of Russian K-37

- BMW R71 Motorcycle
  - 746 cc Flathead (SV)
  - Production: 1938-1941
  - Father of Ural M-72, which begat the K-750, etc.
  - 2 X Graetzin G24 (24 mm) Carburetors

“Amal” carburetors were fitted to the German R51, R61 and R66 machines and the “Graetzin” carburetor to the BMW R71, the father of the Russian M-72.
Graetzin G28 (28 mm) Carburetor for BMW R12, R51 / 3, R61, R75, R71 (father of Russian M-72)

New Item #: 320968957585
List Price: €200 pair
(www.ebay.de)

Graetzin G28 carburetor was optimized for the later OHV engines.
K-37 and K-37A Carburetor

- Used in Dnepr M-72, MB-750 and K-750 750cc Engines
- Later Replaced by K-38 and K-301
- Motorcycle has Two Carburetors
  – Right and Left-Side Version
  – Similar, but Mirror-Images
- Specifications:
  – Diameter of Inlet Pipe: 24 mm
  – Diameter of Mixing Chamber: 24 mm
  – Distance from Fuel Level in Float Chamber to Plane of Connector: 21 mm
  – Weight of Float: 8.5 g
  – Carburetor Weight: 0.85 kg
  – Capacity of Main Jet: 160 cm³/min
  – Capacity of Main Jet: 21 cm³/min

K-38 carbs were used on the M-72, K-750 and MB-750, until replaced by the K-38 carburetor.
K-37 Carburetor

Round-Slide Throttle Valve
Off-Axis Float Chamber
Left-Hand and Right-Hand Versions
Vertical Float Chamber
K-37 Carburetor

K-37’s come in left- and right-side, mirror-images.
Carburetor K-37 Parts Breakdown

1 - Carburetor Body  
2 - Round-Slide Throttle Valve  
3 - Cover of Float Chamber  
4 - Float Needle Valve  
5 - Enrichener (Tickler)  
6 - Float  
7 - Connecting Piece  
8 - Filter Screen  
9 - Main Jet  
10 - Atomizer  
11 - Air Duct of Atomizer  
12 - Jet Needle  
13 - Low-Speed (Idle) Jet  
14 - Fuel Channel of Idle Jet  
15 - Atomizer (Spray Nozzle) Idle Jet  
16 - Air Duct of Idle Jet  
17 - Filter of Auxiliary Air Duct Idle Jet  
18 - Idle Mixture Adjustment Screw  
19 - Throttle Slide Stop Screw  
20 - Throttle Stroke Limiter  
21 - Lock Screw of Idle Jet  
22 - Attachment Split-Pin of Jet Needle  
23 - Spring  
24 - Housing Cover  
25 - Union Nut  
26 - End of Control Cable  
27 - Lock Nut  
28 - Control Cable

(5mv.ru/article.php & Manual for Motorcycle with Sidecar M-72, City of Irbit, 1954)
1 - Nut Cover
2 - Housing Cover
3 - Cable Sheath Screw Lock
4 - Carburetor Body
5 - Throttle Valve
6 - Throttle Valve Stop
7 - Throttle Valve Spring
8 - Needle Cone
9 - Fitting the float chamber
10 - Enrichener (Tickler)
11 - Float Needle
12 - Float
13 - Float Spring Latch
14 - Air Duct Idling Jet
15 - Air Duct Spray
16 - Spray
17 - Main Jet
18 - Strip Nozzle
19 - Screw-Cap idling Nozzles
20 - Idling Jet
21 - Filter of Auxiliary Air Duct Idle Jet
22 - Lower Tube Body
23 - Idle Screw
24 - Stop Screw (Limit for Throttle Valve)
Ticklers (5), used for starting at cold temp, are clearly seen in the parts diagram. Pressing on the tickler pushes against the float and allows extra fuel.
Operation of K-37 Carburetor

- Both Right and Left Carburetor Design and Adjustment Are Identical
  - Mirror Images of Each Other
- Air/Fuel Mixture Adjusted by Controlling Fuel thru Shaped Jet Needle and Vacuum of Main Jet
  - Round-Slide Throttle Valve (3) in Vertical Channel
  - Tapered Jet Needle (7) in Vertical Channel
- Throttle Valve (3) Pushed Down by Spring (2), between Lid (1) and Valve
- Maximum Travel of Throttle Valve Limited by Abutment (Slide-Stop) Screw
- Rise of Throttle Valve Controlled by Cable
- Main Dosing System Consists of Main Fuel Jet Nozzle (8), Air Chamber (10) with Conduit (11) and Jet Needle (7)
- Main Jet (9) Screwed into Body of Carburetor Bottom
- At Diffuser Are Two openings for Passage of Air Entering thru Channel (11)
- Nipple with Strainer at Bottom Filters Fuel Entering from Float Chamber
- Fuel Idle Injector (6) in Bottom Side of Carburetor Body
- Air Supply System Idle Carried Out Air Suction Pipe thru Channel (14), a Hole Near the Opening of Main System Channel, as Well as from Ambient thru Opening Protected by Mesh Filter (12), Located in Side of Carburetor Body
- Idle-Speed Adjusting Screw (5) Regulates Air Entering Carburetor Mixing Chamber
- Idle (Low-Speed) Operation
  - Fuel from Idling System Goes thru Channel (4)
  - Outlet Located in Mixing Chamber
  - At Low-Speed (Idle), Throttle Valve Closed
  - Fuel Enters Fuel Channel thru Nozzle (6) in Idling Channel (4)
  - Upon Leaving Nozzle (6) Atomizes Air, Going from Environment thru Strainer (12) and Suction of Air thru Carburetor Nozzle (14)
  - Adjust Carburetor at Idle Screw by Limiting Closing Throttle Valve, and Screw (5), Altering Composition of Combustible Mixture
  - With Rise of Throttle Valve, Carburetor Action Enters Main Dosing System
Fuel Flow and Tickler

• Float Chamber Cast In One Piece with Carburetor Body
  – Reservoir for Fuel
  – Fuel Enters Float Chamber thru Brass Fuel Inlet Nipple, Located in Cover (3)
  – Fuel Quantity Entering Float Chamber Automatically Regulated by Fuel Shut-Off Needle (4), Connected to Hollow Brass Float (6)
  – Bottom of Float Chamber and Lid Have Guide Holes for Float Needle
  – When Filling Float Chamber, Brass Fuel Float Rises with Float Needle
  – Needle’s Upper Conical End Fits Hole in Lid, Stopping Further Access of Fuel into Chamber
  – As Fuel Flow from Float Chamber of Float Falls, Needle Hole Opens and Fuel Starts Flowing Again into Fuel Cell

• Tickler (5) In Float Chamber Cover
  – Temporarily Pushes Down Float to Enrich Mixture when Starting Engine by Increasing Level of Fuel in the Float Chamber

• From Float Chamber, Fuel Enters Bottom of Carburetor
  – In Bottom of Carb Are Two Concentric Threaded Holes
  – In Smaller, Upper Hole Is Screwed Atomizer (10), which Is Screwed into Main Jet (9), Sealed with Fiber Washer
  – In Larger, Bottom Hole Is Screwed Fitting Hole (7) with Screen Filter (8), Also Sealed with Fiber Washers

• Fuel Passes from Float Chamber thru Filter Strainer (8) and Chamber of Main Jet
Medium and Full-Throttle Operation of K-37 Carb (cont.)

- Fuel from Float Chamber Enters Mixing Chamber thru Main Jet Atomizer (9) and (8)
- When Fuel Flows into Nozzle, Mixed with Air Coming from Air chamber (10) thru Two Holes Made in Diffuser
- Air/Fuel Mixture Regulates the Negative Pressure behind Main Jet (9)
- Composition of Mixture at Medium Loads Mainly Determined by Annular Section between Inner Walls of Atomizer and Tapered Dosing Needle (Jet Needle)
- When Engine at Constant Position of Throttle Valve, but with Change in Load, Air/Fuel Ratio Adjusted by Air Supplied to the Spray from Air Chamber (10)
- At Full-Throttle, Round-Slide Valve at Highest Position
  - Provides Rich Fuel Mixture Needed for Maximum Power
  - Adjustment of Mixture Also Set by Size of Main Jets
M-72 Top-View Showing K-37 Carburetors
PZ-24 and PZ-28 Carburetor (Карбюратор)

• PZ-24 and PZ-28 Are Chinese Knockoffs of Russian K-37's, but Better Made
  – K-37 Carb Was a Russian Knockoff of the German Graetzin G24 for the BMW 71
  – Used in Chang Jiang 750 (CJ750) Motorcycle
    • CJ750 Was Chinese Knockoff of Russian M-72
    • Russian M-72 Was Knockoff of German R-71 Motorcycle
• Later Replaced by K-38 and K-301 / K-302
• PZ-24 and PZ-28 Characteristics:
  – Motorcycle has Two Carburetors
    • Right and Left-Side Version
    • Similar, but Mirror-Images
  – Round-Slide Throttle Valve
  – Float Chamber (bowl) Offset from Carburetor Axis

The PZ-24 and PZ-28 were good substitutes for the K-37 carbs used on the M-72, K-750 and MB-750 motorcycles.
Chinese Carburetors and Motorcycles

• Three Models of Chang Jiang (CJ) Motorcycles
  – Chang Jiang M1
    • Sidevalve (flathead) Engine and 6-Volt Electrical System
    • Clone of the Russian M-72 and Closely Resembles the German 1938 BMW R71
  – Chang Jiang M1M
    • Sidevalve (flathead) Engine and 12-Volt Electrical system
  – Chang Jiang M1S (or "Super CJ")
    • Overhead-Valve (OHV) Engine and 12-Volt Electrical System
    • Chinese Design

• Three Types of PZ-XX Carburetors for CJ Motorcycles
  – Dash Number Indicates Carburetor Size (PZ-24 Is 24 mm)
    – PZ-24 (24 mm) Original Flatheads (SV’s): M1 and Early (1972-1980) M1M
      • Designed for 6:1 Compression, 24 H.P. Engine
    – PZ-26 (26 mm) Early OHV’s; Later (1980-1986) M1M and the M1S
      • Works Great for Flatheads
      • Hard to Find
    – PZ-28 (28 mm) Later OHV
      • Seems to Be Too Much to Get a Good Idle on Flatheads, but Works Good at Highway Speeds!
      • Designed for 8:1 Compression, 32 H.P. Engine

Chang Jiang has been making a clone of the Russian M-72 in China since the late 1950’s. Chang Jiang bikes are still made, but often in more or less artisan ways. Sometimes of very good quality, sometimes not. Bike parts are still mostly unaltered since the original M-72 construction. Engines are either old side-valve (SV) 24 hp, or overhead-valve (OHV), 32 hp.
## Comparison Data

<table>
<thead>
<tr>
<th>CJ Model</th>
<th>Engine Type</th>
<th>Engine Designation</th>
<th>Engine Size</th>
<th>Produced</th>
<th>Horse-Power</th>
<th>Carb</th>
<th>Electrical</th>
<th>Compress Ratio</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>M1</td>
<td>SV</td>
<td>Type I</td>
<td>746 cc</td>
<td>1957-1966</td>
<td>22 HP / 4500-4800 rpm</td>
<td>QHQ15 (72)</td>
<td>6-Volt</td>
<td>5.7:1</td>
<td>Almost exact copy of Russian M-72 engine</td>
</tr>
<tr>
<td>M1</td>
<td>SV</td>
<td>Type II</td>
<td>746 cc</td>
<td>1966-1972</td>
<td>22 HP / 4500-4800 rpm</td>
<td>QHQ-15</td>
<td>6-Volt</td>
<td>6:1</td>
<td>Minor improvements/changes made to Type I engine</td>
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<tr>
<td>M1M</td>
<td>SV</td>
<td>Type II</td>
<td>746 cc</td>
<td>1972-1980</td>
<td>24 HP / 4500-4800 rpm</td>
<td>PZ-24</td>
<td>12-Volt</td>
<td>6:1</td>
<td></td>
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<tr>
<td>M1M</td>
<td>OHV</td>
<td>Model 750E</td>
<td>746 cc</td>
<td>1980-1986</td>
<td>32 HP / 4700-5500 rpm</td>
<td>PZ-28</td>
<td>6-Volt</td>
<td>7:1</td>
<td></td>
</tr>
<tr>
<td>M1S</td>
<td>OHV</td>
<td>Model 750E</td>
<td>746 cc</td>
<td>1986-?</td>
<td>32 HP / 4700-5500 rpm</td>
<td>PZ-28 D</td>
<td>12-Volt</td>
<td>7:1</td>
<td>Difference between “D” and “F” in size of jets</td>
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<tr>
<td>M1S</td>
<td>OHV</td>
<td>Model 750F</td>
<td>746 cc</td>
<td>1986-?</td>
<td>32 HP / 4700-5500 rpm</td>
<td>PZ-28 F</td>
<td>12-Volt</td>
<td>7:1</td>
<td>Difference between “D” and “F” in size of jets</td>
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### Carb Used On:

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<tr>
<th>Carb</th>
<th>Used On:</th>
<th>Size</th>
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<tbody>
<tr>
<td>Graetzin G24</td>
<td>German R71 (father of M-72)</td>
<td>24 mm</td>
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<tr>
<td>Graetzin G28</td>
<td>BMW R12, R51/3, R61, R71</td>
<td>28 mm</td>
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<tr>
<td>K-37/-37A</td>
<td>M-72, K-750, K-750M, MB-750</td>
<td>24 mm</td>
</tr>
<tr>
<td>CJ QHQ15</td>
<td>CJ M1 (SV)</td>
<td>24 mm</td>
</tr>
<tr>
<td>PZ-24</td>
<td>CJ M1 (SV)</td>
<td>24 mm</td>
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<tr>
<td>PZ-26</td>
<td>SV or OHV</td>
<td>26 mm</td>
</tr>
<tr>
<td>PZ-28D</td>
<td>SV or OHV, Ural 650, M-67</td>
<td>28 mm</td>
</tr>
<tr>
<td>PZ-28F</td>
<td>OHV</td>
<td>28 mm</td>
</tr>
<tr>
<td>K-38</td>
<td>Ural M-61, M-62, M-63 (all OHV’s), Dnepr K-750 (SV)</td>
<td>24 mm</td>
</tr>
</tbody>
</table>

Notes:

The PZ-24 or K-37 (both 24 mm) carbs give good performance for flat head (SV) engines. The PZ-26 gives better performances for the OHV engines, and the optimum carb for the flathead. PZ-28, G28 were optimized for the OHV.
QHQ-15 carburetors appeared on Chang Jiang’s M1 (SV) and M1M (SV) engines, a copy of the Russian K-37.
PZ-24 on a Chang Jiang 750 Motorcycle (SV)

Item #: 120820187818  
List Price: $90.00 pair  
(www.ebay.com)

Item #: 04-0001  
List Price: $70 pair  
(www.changjiang750sidecar.com)

Replica of G24 (24 mm)  
List Price: €239 pair  
(classicdepartment.com)
**Carburetor PZ-28**

Air Intake on a M-72 and CJ750

Left-Side
Item #: 7215-2
List Price: €60
(www.henriksson.ee)

Right-Side
Item #: 7215-1
List Price: €55
(www.henriksson.ee)

Pair (left + Right)
Item #: 72152-1 + 7215-2
List Price: €110
(www.henriksson.ee)

Carburetor PZ-28 is a good quality replica of the K-37 and the Graetzin carburetors, as seen on the M-72, K-750M, MB-750 and MT-12.
The PZ-28D is a replica of the Graetzin carburetor, which was fitted to the BMW R71 of 1938. Since 1941, this carb was produced as K-37 for the Russian M72.
Modern Copies of PZ-28D Carburetor (made in China)
Carburetor Deni PZ-28D (replica Graetzin) Carburetor

Deni PZ-28D (left side)
Product #: S245-Li
List Price: €49.50
(www.ural-zentrale.de)

Deni PZ-28D (right side)
Product #: S245-Re
List Price: €49.50
(www.ural-zentrale.de)
PZ-28D Installation (ural.hu)
# Chang Jiang CJ750 M1 PZ-28 Carburetor

<table>
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<tr>
<th>Part #</th>
<th>CJ 750 Part Name</th>
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<td>39</td>
<td>Rubber Hood or Sleeve</td>
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Chinese maintenance manuals use M-72 part numbers; 7211902 (QHQ15) right carburetor and 7211901 (QHQ15) left carburetor.
PZ-24 / PZ-28 Carburetor Parts Breakdown

1 - Carburetor Body
2 - Round-Slide Throttle Valve
3 - Cover of Float Chamber
4 - Float Needle Valve
5 - Enrichener (Tickler)
6 - Float
7 - Lower Filter Plug
8 - Filter Screen
9 - Main Jet
10 - Atomizer
11 - Air Duct of Atomizer
12 - Conical Throttle Jet Needle
13 - Low-Speed (Idle) Jet
14 - Fuel Channel of Idle Jet
15 - Atomizer (Spray Nozzle) Idle Jet
16 - Air Duct of Idle Jet
17 - Filter of Auxiliary Air Duct Idle Jet
18 - Idle Mixture Adjustment Screw
19 - Throttle Slide Stop-Screw
20 - Throttle Stroke Limiter (Discard after Engine Run-In)
21 - Lock Screw of Idle Jet
22 - Attachment Split-Pin of Jet Needle
23 - Throttle Valve Spring
24 - Housing Cover
25 - Union Nut
26 - Control Cable Union
27 - Lock Nut
28 - Control Cable

The PZ-24 / PZ-28 is a Chinese copy of the Russian K-37 carburetor.
PZ-24 / PZ-28 Parts Illustration

- Control Cable Guide
- Throttle Stroke Limiter (20) (delete after engine break-in)
- Housing Cover (24)
- Fuel Float (6)
- Round-Slide Throttle Valve (2)
- Fuel Shut-Off (Float) Needle (4)
- Throttle Valve Spring (3)
- Float Chamber Cover (3)
- Tapered Jet Needle with Cotter Clip (12)
- Fuel Inlet
- Idle Air Circuit Atmospheric Vent
- Fuel Shut-Off (Float) Needle (4)
- Throttle Slide Stop Screw (19)
- Fuel Float (6)
- Idle Mixture Adjustment Screw (18)
- Control Cable Guide Flange to Engine Cylinder
- Idle Jet (13)
- Fuel Filter Plug
- Main Jet (9)
K-38 Carburetor
• Used in Later Dnepr K-750 (750 cc) Boxer Engines
• Used in Ural M-61 and M-62 (650 cc) Boxer Engines
• Left and Right Carburetors Are Completely Similar
• Later Replaced by K-301
• Specifications:
  – Diameter of Inlet Pipe: 24 mm
  – Diameter of Mixing Chamber: 24 mm
  – Distance from Fuel Level in Float Chamber to Plane of Connector: 19 mm
  – Weight of Float: 8.8 g
  – Diameter of Fuel Holes Idle Nozzle Chamber: 0.5 mm
  – Carburetor Weight: 0.85 kg
  – Capacity of Main Jet: 150 cm³/min
K-38 Carburetor (M-63 Maintenance Manual)

1. Carburetor Body
2. Throttle Valve Cover
3. Control Cable Armor Thrust Nipple
4. Throttle Valve Stop Screw
5. Cover Nut
6. Throttle Float Valve Spring
7. Jet Needle (Tapered Metering Needle)
8. Throttle Valve
9. Enrichener (Tickler)
10. Float with Shut-Off Needle
11. Float Chamber
12. Idle Speed Air Suction Passage
13. Air Passage
14. Fuel Passage
15. Main Jet
16. Atomizer
17. Jet Chamber
18. Jet Chamber
19. Idle-Speed Adjustment Screw
20. Idle-Speed Valve Stop-Screw
21. Idle-Speed Fuel Passage
22. Drain-Hole Gauze
23. Enrichener (Tickler)
Карбюратор K-38 (kotjar.spb.ru)

1 - Cover Carburetor Body
2 - Throttle valve Spring
3 - Nut Cover
4 - Throttle Valve
5 - Tapered Jet Needle with Spring Lock

Idle Adjustment Screw
Throttle Valve Stop-Screw

Enrichener (Tickler)
• Adjusting Air/Fuel Mixture Carried Out by Dosing Needle Shaped and Management Vacuum in Dispenser Main Dosing System
• In Addition, Carburetor Has Independent System Idling
• Carburetor Consists of Mixing Chamber (18), with Connecting Flange, Nozzle Chamber (5), Float Chamber (11), Throttle Valve (4) and Lid of Mixing Chamber (1)
• Housing of Carb K-38 and Air Path to Horizontal Plane Makes an Angle of 15°
• All Major Carburetor Parts Made of Zinc Alloy Injection Molding
• Mixing Chamber (18) for Right and Left Carburetor Are the Same Casting thru Appropriate Mechanical Refinements Specially Provided for This Purpose and Channels
• Nozzle Chamber Inserted into Bottom of Mixing Chamber and Pressed against Contoured Threaded Sleeve (7)
• Between the clutch and the casing is installed Fibre Sealing Strip.
• In Nozzle Chamber Is Channel to Install a Spray of Main System, a Channel for Supplying Air to Main System, a Fuel Channel Idle and Outlet Idling (19)
• Body Spray Made of Zinc Alloy with Brass Calibrated Tube in the Middle

1. Mixing Chamber Lid and Throttle Valve Stop-Screw
2. Throttle Valve Spring
3. Tapered Metering Needle
4. Throttle Valve
5. Nozzle Chamber
6. Atomizer
7. Contoured Threaded Sleeve
8. Main Jet
9. Idle-Speed Adjustment Screw
10. Drainage Hole
11. Float Chamber and Fuel Float Shut-Off
12. Float in Float Chamber
13. Float Chamber Cover
14. Brass Fuel Nipple
15. Depressor (Tickler)
16. Idle Passage
17. Jet Chamber
18. Mixing Chamber
19. Outlet Idling Channel
20. Throttle Valve Control Wire Conduit
K-38 on a Ural M-62 (www.ural-m62.com)
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

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
K-301 Carburetors
(http://oppozit.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-301 Carburetors

Slanted Float Chambers

- Throttle Control Cable
- Tickler
- Throttle Slide-Stop Screw
- Flange to Engine Cylinder
- Idle Mixture Adjustment Screw
- Fuel Inlet
- Slanted Float Chambers

K-301’s are right and left-handed, which allows the mixture control to be on the outside in each case.
K-301 on a Ural
K-302 Carburetor

- Replacement for K-301Г(G) Russian Carburetor
  - Same Flange Size and Orientation (Vertical)
- Better than K-301, but Not Good Enough
- Replaced by K-Series (K-62, -63, -65, and -68) of Carburetors
- K-301 Fitted to Dnepr K-650, MT-9, & MT-10 and Ural M-63, M-66 & M-67 (All 650 cc OHV Models)
- Later Dnepr MT-11 & MT-12 and Later K-750 & MB-750s Used K-302
  - Main Difference Would Be the Jets for Larger Engine
- K-301 vs. K-302 Carburetors
  - K-301 and K-302 Carburetors Are Similar
  - Typically Treated Together in Repair Manuals
  - K-301 Has an Angled Fuel Bowl, Compared to Vertical K-302

The K-302 captured all the changes during the development of the K-301 series, but was quickly over-taken by the K-63/K-65 carburetors.
K-301 / K-302 Basics

• 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 for starting.
K-301 / K-302 Carburetors (www.russiancycles.com)

K-302 carhs were introduced with Dnepr’s K-750M, MB-750, MT-11 and MT-12.
K-301 / K-302 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

Note: K-302 shown.
K-302 has vertical float chamber.
K-301 / K-302 Carburetors

- 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 - Air Cleaner Strainer
- 18 - Idle Adjustment Screw
- 19 - Idling Jet Atomizer
- 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 - Nylon Spacer
- 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 Body
Simple Identification of the K-302

The K-302 appeared around 1976 as a direct replacement for the K-301. Much of the information from the K-301 applies to the K-302.
The bodies of K-302’s are right and left-handed, which allows the Idle Adjusting Screw to be on the outside in each case.
K-302 Carburetors

- Throttle Control Cable
- Idle Mixture Adjustment Screw
- Throttle Slide-Stop Screw
- Fuel Inlet
- Tickler
- Float Chamber
- Idle Mixture Adjustment Screw
- Flange to Engine Cylinder
K-302 Carburetors

- Throttle Control Cable
- Fuel Inlet
- Tickler
- Flange to Engine Cylinder
- Idle Mixture Adjustment Screw
- Throttle Slide-Stop Screw
- Float Chamber
K-302 Carburetors (replicas)

- Throttle Control Cable
- Fuel Inlet
- Idle Mixture Adjustment Screw
- Throttle Slide-Stop Screw
- Float Chamber
- Flange to Engine Cylinder
- Tickler
K-62 Carburetor

- **Used on Dnepr 650cc Engines**
  - Older Models of MB-650
  - Early Models of MT-16 / MT-11
- **Used on Ural 650 cc Engines**
  - Later Models of M-63
- **Appeared in 1987-to-1989 Time Frame**
- **Not Recommended**
- **Recommendation: Replace with K-65 (modernized K-62) or K-68**
- **Flange Bolts Directly on Cylinder Head**
- **26 mm Diameter Diffuser Chamber**
- **Enrichener Added for Cold-Start Primer**

The K-62 carburetor appeared in the mid 1980’s, on Dnepr’s MB-650’s and early MT-16/MT-11’s and Ural’s M-63.
1. Steady-State Adjustment Screw (Idle Adjust)

26. Throttle Cable Guide

25. Lower Throttle Valve Travel Limit

10. Throttle Valve

24. Throttle Needle Lock

23. Enrichener (Cold-Start)

11. Fuel Feed Fitting

28. Floats

12-14. Tickler

29. Float Axle

16. Idle Mixture Adjustment Screw

30. Float Valve

32. Float Chamber

Flange to Cylinder

Spigot Air Intake
K-62 Carburetor Construction

- K-62 carburetor consists of three main (zinc alloy) parts; housing (10), float chamber (3) and cover (17).
- Float lever-type mechanism consists of two floats (25), which are held by the float axle (5), passed through a brass sleeve (6).
- Fuel valve is designed as a needle (24) which rests on the bottom of the plate of the float, and the top closes the channel for supplying the fuel. The level of the floats in the float chamber is controlled by bending the supporting plate.
- The throttle valve (11) is a vertical flat U-shaped cross-section of brass sheet. In its wall facing the air cleaner, the bottom of the throttle valve is cut on a radius, which provides a given dilution of the spray.
- The upper wall of the idle-adjust throttle rod (16) is fixed with a screw, screwed into the lid. Rotate it to limit the lowest value of the throttle.
- Throttle needle (9) can hold the throttle is one of three positions - depending on the desired composition of the mixture. It is held in a groove (12) with a circlip.
- The enrichener (cold-start primer) consists of a plunger (29) with dispensing tip (27), which moves in the well casing, the spring (30) and cable (31). The mixture enrichener (28) float facilitates the start-up in the winter (below 15°C).
- A tickler (28) bypasses the float valve to give an extra shot of fuel during cold-start. To avoid excess fuel falling into the cylinder, which can lead to water hammering with devastating consequences, a drain hole (22) is provided in the float chamber.
- During run-in of a new engine it is not recommended to speed to the maximum. Inside the lid is molded a rod (14), which limits raising the throttle valve to the max. This limiter is made removable, following the engine break-in period.
**K-63 Carburetor**

- Common Carburetors Found on Urals and Dneprs
- K-63Ф (K-63F in English) Introduced to Dnepr K-750M and Later to MT-12
- K-63T (most popular) Introduced in 1985 on Dnepr MT-11 and MT-12
- K-63У (K-63U in English) Introduced to Modern (8.101) Urals in 1998
- Significant Improvement Over Predecessor K-301 / K-302
- Similar to K-62 Carburetor
  - Enrichener Added for Cold-Start Prime (twist up ¼ turn to lock)
- Very Reliable, but Needs Setting Often to Remain in Peak Condition
- Left and Right-Hand Versions Identical
- Flange Bolts Directly on Cylinder Head
- Later Replaced with K-65
- Re-Build and Repair Kits Readily Available

The **K-63** carburetor predominantly appeared in the late 1980’s, on Dnepr MT-16 and MT-11 and modern Ural 8.103 (650cc).
As evidenced from the part numbers, the K-63 carburetor used parts from its predecessor, the K-62.
1. Steady-State Adjustment Screw (Idle Adjust)

5. Throttle Cap

6. Throttle Spring

Horizontal Flange Manifold Mount

12-14. Tickler

11. Fuel Feed Fitting

16. Idle Mixture Adjustment Screw

17. Idle Mixture Adjustment Spring

18. Idle Jet

19. Needle Jet Assembly

20. Starter Jet

21. Starter Jet

22. Float Bowl

23. Enrichener (Cold-Start)

24. Throttle Jet Needle Bar (Cleat)

25. Lower-Limit Throttle Valve Travel (discard after engine break-in)

26. Throttle Cable Guide

28. Floats

29. Float Axle

30. Float Valve

31. Gasket

32. Float Chamber

K-63 Parts Diagram
K-63 Carburetors

- **Steady-State Adjustment Screw (Idle Adjust)**
- **Enrichener (Cold-Start)**
- **Fuel Feed Fitting**
- **Tickler**
- **Spigot Air Intake**
- **Idle Mixture Adjustment Screw**
- **Enrichener (a.k.a. Choke)**
  - Pull Up and Rotate 90° to Enable.
  - Disable (Un-twist and Release) Soon after Warm-Up!

**Float Chamber**

**Flange to Cylinder**
The MT-11 and MT-16 maintenance manuals show the adapter plates needed to transform the vertical mounting pattern used by the K-37/K-301 carbs to the K-63 horizontal mounting pattern.

The K-63T, unlike some carburetors, is identical “left” or “right”.

Note: Extra heat-insulating gaskets next to the flange adapters.

Vertical-to-Horizontal Adapter

K-63T: 1107010

The MT-11 and MT-16 maintenance manuals show the adapter plates needed to transform the vertical mounting pattern used by the K-37/K-301 carbs to the K-63 horizontal mounting pattern.
K-63 Fₜ, Y (Ф, Т, У) Carburetor Construction

1. Fitting with Lock-Nut
2. Throttle Spring
3. Max Throttle Travel Limiter (remove after engine break-in)
4. Throttle Housing Cover
5. Jet Needle Lock-Nut
6. Metering Needle Bar (Cleat)
7. Throttle Valve
8. Main Housing (block)
9. Air Channel Dispenser
10. Float Arm Axle
11. Body
12. Main Nozzle (Air Tube)
13. Float Chamber Cover
14. Main Jet
15. Idle (pilot) Jet
16. Lock Washer
17. Channel for Supplying Fuel Mixture from Enrichener
18. Float
19. Fuel Valve Stop (Reference to Adjust Fuel Level)
20. Fuel Valve
21. Drain Hole
22. Emulsion Hole
23. Transition Hole
24. Air Channel Idle Jet
25. Conical Throttle Jet (Metering) Needle
26. Float Chamber Vent
27. Fuel Input Fitting
28. Idle Speed Adjust Screw
29. Fuel/Air Idle Mixture Adjust Screw
30. Air Channel
31. Enrichener (starter) Lever
32. Enrichener Rod
33. Spring
34. Enrichener (starter) Piston
35. Tickler Float
36. Needle Plunger
37. Starter Jet
38. Float Chamber (bowl)
K-63 Carburetor Construction

- K-63 Construction Similar to K-62
- Carburetor Consists of Three Main (cast zinc alloy) Parts;
  - Body (8), Float Chamber (bowl) (38) and Throttle Cover (4)
- Float Chamber (38)
  - Breathing Hole Connected to External Environment via Opening (26)
  - Float Mechanism Consists of Two, Rectangular, Lever-Type Floats (18), Connected by a Common Shaft (axle) (10)
  - Float and Lever Made of One-Piece Plastic
  - Level of Fuel in Float Chamber Approximately the Same as in the K-62
    - When Carburetor Upside Down, Molding Line on Side of the Float Should be Parallel and 13 ± 1 mm to the Plane
  - Drain Hole (21) In Lid of the Float Chamber
- Fuel Valve (20)
  - Designed as Brass Needle which Rests on the Bottom of the Float Plate
  - Top Closes the Fuel Supply Channel
  - Disc of Elastic Material In Upper Cone of Fuel Valve (20)
  - Level of Floats in the Chamber (bowl) Controlled by Bending the Supporting Plate Tab
- Mixture Enrichener System (starter)
  - Before Starting a Cold Engine, Lever (31) or Bent Stick Raises Piston (34)
  - Fuel mixture from the Enrichener (starter) to Mixing Chamber Enters thru Channel (17)
  - Under the Influence of Vacuum, Formed when Turning Kick-Starter, Fuel Flows thru Starter Jet (37)
  - Spring (33) Prevents Conical Needle (36) from Sticking
- Throttle Valve (11)
  - Vertical, Flat, U-shaped Cross-Section of Sheet Brass
  - In Wall, Facing the Air Cleaner, the Bottom Is Cut on a Semi-Circular Radius to Provide Air/Fuel Mixture when Idling
- Throttle Jet (metering) Needle (25)
  - Made of Brass or Stainless Steel
  - Upper Part Has a Thread to Move to Change the Amount of Spray
  - Metering Needle Can Be Raised or Lowered by Loosening the Lock-Nut (5) and Screwing or Twisting the Throttle Needle (25) in the Needle Bar (6)
  - Need for Such Adjustments May Occur Under Seasonal Operation, Break-In Period, or In Conditions of High Temperature or Altitude (mountains)
  - Each Full-Turn Moves the Needle by 0.5 mm
K-63 Carburetor Construction (cont.)

• At Low-Speed
  • Cylinders Need a Rich Mixture, When Idle Throttle Screw (28) Is Slightly Screwed In
  • Mixing Occurs in the Mixing Chamber thru the Emulsion Hole (22), from Fuel Leaving
    the Idle (pilot) Jet (15) and Air Coming thru Air Channel (30)
  • In the First Quarter of the Throttle (when the throttle is lifted)
    – When Lifting the Throttle Up to a Quarter, the Mixture Composition Is Determined by
      System Idling
    – Idle Jet (15) Fuel Fed Directly from the Float Chamber thru Emulsion (22) and Transition
      (23) Holes
    – Vacuum in the Air Tube (12) Increases
    – Fuel Is Discharged from the Float Chamber thru the Main Jet (14) to the Annular Cavity
      between the Jet Needle (25) and the Walls of the Air Tube into the Air-Flow of the Main
      Air Duct
    – Here, Fuel is Sprayed, Partially Evaporating and Entering the Cylinder
    – Composition of the Mixture Is Controlled by Idle Mixture Screw (29) and Idle Speed
      Adjust Screw (28)
      • With Mixture Screw Turned Out (CCW) (29) Mixture Is Depleted (leaner)
      • Turned In (CW) Mixture Is Enriched (richer)
    – Best Composition of Fuel/Air Mixture Depends on Position of Conical Jet Needle (25), the
      Capacity of the Main Jet (14) and the System Idling System
    – Jet Needle (25) Provides Necessary Fuel Supply Over Most of Throttle Range,
      Corresponding to about ¼ to 3/4 of Range
    – Since Moving Jet Needle Up Increases the Area of Annular Cross-Section between the
      Jet Needle and the Air Tube, and Consequently the Fuel
  • In the Last Quarter of the Throttle
    – Flow Area of Air Channel in Spray Zone Varies Relatively Little, so Air Flow Remains
      Almost Unchanged
    – Amount of Fuel Supplied Determined Mainly by Diameter of Main Jet (14)
    – Air Entering thru Channel (9) of Main Nozzle (12) in the Annular Gap between the Nozzle
      and Body, Substantially Improves Mixing
**K-63 Carburetor Construction** (cont.)

- **Tickler** (cold-start) (35)
  - Ensures Desired Mixture when Starting a Cold Engine (<-15° C)
  - Momentarily Bypasses Float Valve (20) to Give Extra Shot of Fuel during Cold-Start
  - To Avoid Excess Fuel Ending Up in the Cylinder, Which Can Lead to Compression with Devastating Consequences, a Drain Hole (21) Is Provided in the Float Chamber
- **Max Throttle Limiter** (3)
  - Rod (3) Molded Inside Carburetor Lid
  - Limits Travel Height of Throttle Valve, Thus Limiting the Max Speed During New Engine Break-In
  - Made To Be Removed following Engine Break-In Period
- **Idle Speed Adjust Screw** (28)
  - Upper End of Idle-Adjust Throttle Rod (28) Is Fixed with a Screw, Screwed into the Lid
  - Rotate to Limit the Lowest Value of the Throttle
  - Engine Idle Speed Regulated by Screw (28)
  - If Unscrewed: Speed Is Increased; if If Screwed In: Speed Is Reduced
- **Idle Mixture Adjust Screw** (29)
  - Screw (29) Regulates Composition of the combustible mixture when the engine at Idle
  - If Unscrewed (counter-clockwise): Mixture Is Leaned; If Screwed In (clockwise): Enriched
The breakdown of the K-63 carb shows the flat-side throttle valve, and flange-mount. The part numbers clearly show a heritage to the K-62.
K-65 Carburetor

• Common Carburetor Found on Urals and Dneprs
  – K-63T (most popular) Introduced on Dnepr MT-10.36, MB-650, MT-11 and MT-16
  – K-63У (K-63U in English) Introduced to Dnepr MT-10.36 and to Ural "Соло Классик" (Solo Classic, IMZ-8.123 (650 cc)) in Late 1980’s
• Modernized Version of K-62 Carburetor
• Fit 650cc Urals from M-67 Onwards
• Manufactured by Pekar (St Petersburg, Russia)
• Most Ural and Dnepr 650 cc Motorcycles from 1985, Right thru to Late 1990's Were Fitted with These
• Left and Right-Hand Versions Identical
• Flat-Slide Throttle Valve
• Standard Jets: 50 and 165
• Flange Bolts Directly onto Cylinder Head
  – Horizontal Mounting Bolt Holes
• Later Replaced with K-68 and 28 mm Mikuni
• Re-Build and Repair Kits Readily Available

The K-65 carburetor appeared on Dnepr MT-10.36MB-650, MT-11, MT-16 and on the modern Ural IMZ-8.123 (650 cc) Solo Classic.
K-65 Carburetors (after market)

- Throttle Control Cable
- Steady-State Adjustment Screw (Idle Adjust)
- Fuel Feed Fitting
- Tickler
- Spigot Air Intake
- Flange to Cylinder
- Idle Mixture Adjustment Screw
- Float Chamber
K-65 Part Identification

1. Steady-State Adjustment Screw (Idle Adjust)

5. Throttle Cap

6. Throttle Spring

Horizontal Flange Manifold Mount

12-14. Tickler

11. Fuel Feed Fitting

16. Idle Mixture Adjustment Screw

17. Idle Mixture Adjustment Spring

18. Idle Jet

19. Needle Jet Assembly

20. Starter Jet

21. Starter Jet

22. Throttle Jet Needle Bar (Cleat)

23. Enrichener (Cold-Start)

24. Throttle Jet Needle Bar (Cleat)

25. Lower-Limit Throttle Valve Travel (discard after engine break-in)

26. Throttle Cable Guide

10. Flat-Slide Throttle Valve

27. Float Axle

28. Plastic Floats

29. Float Axle

30. Float Valve

31. Gasket

32. Float Chamber
Major K-65T Carburetor Characteristics

- Throttle Control Cable
- Steady-State Adjustment Screw (Idle Adjust)
- Enrichener (a.k.a. Choke) Lever
  Pull Up and Rotate 90° to Enable. Disable (Un-twist and Release) Soon after Warm-Up!
- Fuel Feed Fitting
- Float Chamber
- Tickler
- Spigot Air Intake
- Idle Mixture Adjustment Screw (Tightening Enriches)
- Flange to Cylinder

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The breakdown of the K-65 carb shows the flat-side throttle valve, and flange-mount. The part numbers clearly show a heritage to the K-62 and K-63.
Карбюратор K-65И (І) and K-65Ж (ZH) Carburetors

Control for the enrichener (corrector) of the "І" (І) and ZH (Ж) uses a cable that goes to a remote control.
Both the K-65B and the K-65C use a twist handle to locally control the enrichener (corrector).
The control for the enrichener (corrector) of the gamma (Г) and delta (Д) versions of the K-65 carburetor is a cable that goes to a remote control.
The control for the enrichener (corrector) of the “T” version of the K-65 carburetor is a twist handle.
**K-65 Carburetors** *(Made in China)*

- **Tickler**
- **Enrichener (Cold-Start)**
- **Throttle Control Cable**
Kaptex VDC-RAM Carburetor

- Kaptex VDC-RAM Carburetor Is Ukrainian Copy of Pekar K-68
  - Kaptex VDC-RAM Carburetor Not Made Anymore
  - When Kaptex Carbs Die, Replacements and Refurb Kits Will Not Be Sourced by the Factory
- Kaptex Is Just as Good as Original Russian Pekar K68 Carburetor
- Kaptex Has Metal Top/Cover, while Pekar K-68 Has Plastic Top/Cover
- Not To Be Confused with Chinese K-68 Copies
  - Chinese-Copies Look Like the Pekar K-68, but Poorly Fabricated
- Fully Interchangeable with K-301D, K-65T and K-68U Carburetors

Parameters:
- Diameter of Mixing Chamber: 31.5 mm
- Diameter of Diffuser: 28 mm
- Main Jet: 190 mL/min
- Idling Jet: 50 mL/min
- Jet Launcher: 55 mL/min

Because the Kaptex is a copy of the Pekar K-68, many of the slides make a comparison and tune-up is the same.
The Kaptex consists of four systems: (a) supplying and maintaining a constant level of fuel (14,17,18,19,20,22), (b) regulatory system of the combustible mixture; main (1,3,4) and idling (5,7,8,15,16), (c) unbalance and drain float chamber (6,9,10) and (d) starter enrichener float for cold starts (11,21,23,24,25,26,27).
Kaptex has the metal top/cover, while the Pekar K-68 has a plastic top/cover.
Kaptex VDC-RAM Carburetor Close-Up
(www.oppozit.ru)
Close-Up of Kaptex VDC-RAM
(Russian Iron Board Forum, Antoni Font, picasaweb.google.es)
We will see that the components of the Kaptex VDC-RAM are very similar to those of the Pekar K-68.
K-68 Carburetors (www.cossackmotorcycles.com/ural750.html)

- Common Carburetors Found on 750cc and Late 650cc Urals
  - 1994 to 2000’s
- K-68 Fits Any 650 cc Head
  - Except M-61 and M-62, where Two Bolts are Mounted Vertically
  - Need Simple Vertical-to-Horizontal Adapter Plate
- K-68U (K-68Y in Russian) for 650cc, K-68T for 750cc
- K-68’s Are Side-Specific (Left or Right)
  - Puts Adjustments on the Outside
  - Can Bolt Them Backwards and Won't Affect Performance
- Operation
  - Gives Better Results than Standard K-63 / K-65 / K-301 / K-302 Carbs
  - Similar to K-63 / K-65, with More-Robust Round-Slide Replacing Earlier Flat-Slide Throttle
  - Runs a Little Rich Most of the Time, So Economy Is Not Best
  - Requires Frequent Adjustment to Stay Perfectly Tuned
- Still in Production in Russia, so Repair Kits Are Available
K-68 Carburetors

• Basic Systems and Devices:
  – System for Supplying and Maintaining Constant Level of Fuel in Float Chamber
  – Idle System with Adjustable Composition and Quantity of Combustible Mixture
  – Main Dosing System with Adjustable Air-Fuel Mixture
  – Start-up and Warming System
  – Devices for Correcting Position of Throttle Needle in Axial and Radial Directions
  – Device for Fastening the Throttle Cable Coaxially with the Throttle
  – Fitting and Channels of Ventilation System of Float Chamber

• Specifications:
  – Diameter of Mixing Chamber: 31.5 mm
  – Diameter of Diffuser (Bore at Flange): 28 mm
  – Fuel Jet Capacity: 190 ml/min (K-68U) for 650cc, 220 ml/min (K-68T) for 750cc
  – Dimension: 77.5 X 81 X 189 mm
  – Weight: 0.55 kg
The common carburetors found on 650cc Russian motorbikes were the K-301’s and K-302’s. The K-301 went through several iterations before the K-302 came along. Then MT-11/MT-16’s were fitted with K-63T’s.
K-68 Assembly Diagram

1. Throttle Cable
2. Protective Cap
3. Cable Guide
4. Throttle Cover
5. Throttle Spring
6. O-Ring Seal
7. Housing
8. Slide Throttle
9. Cable Catch
10. Cable Stop
11. Throttle Needle
12. Needle Lock
13. Spring Pre-load Needle
14. Slide Ball
15. Air Channel Main System
16. Chamber Cover Gasket
17. Cover of Float Chamber
18. Sprayer
19. Main Fuel Jet
20. Idle Atomizing (Dosing) Tube
21. Lock Washer
22. Drain Hole
23. Float Activator (Tickler)
24. Idle Adjusting Screw
25. Screw Spring
26. Fuel Inlet Fitting
27. Balancing Port
28. Balance Channel of Float Chamber
29. Idle Mixture Adjustment screw
30. Screw Spring
31. Mixing Chamber
32. Transient Opening of Idle System
33. Air channel of Idle System
34. Idling Hole
35. Removable Brass Fuel Valve Seat
36. Fuel Valve Assembly
37. Float Element Adjust
38. Float
39. Channel of Starter
40. Float Axle
41. Air Channel (Duct)
42. Starter Plunger Assembly
43. O-Ring Seal
44. Jet (Nozzle)
45. Needle of Corrector-Enrichener
46. Dosing Hole
47. Fuel Well (Pit)
48. Fuel Channel (Duct) of Starter
49. Starter Needle
50. Plunger Spring
51. Spring Guide
52. Enrichener (a.k.a. choke or tickler)
Features of K-68 Compared to Previous Versions (K-63 / K-65)
(oppozit.ru and afto.chat.ru/k68/k68.htm)

• Basic Components (Housing, Throttle, Cover, Bowl) Made of Cast Aluminum Alloy
  – Carburetor Weighs Only 0.55 kg (Half the Weight of Previous Carbs)
• Surface Contacts and Throttle Shaft Carefully Processed and Wear-Resistant Coating Applied
• Throttle Spring (5): Rests on Lower Wall of Throttle with Increased Length and Number of Turns
• Increased Air Velocity and Smoother Speed Control in Diffuser
  – Adopted Oval Shape, Elongated in Direction of Movement of Throttle
• Dispensing (Throttle) Needle (11): Half Shorter and Attached to Lower Wall of Throttle Valve and Further Tightened in Direction of the Engine
• Special Spring (13) with Slide Ball (14): Provides for Correction of Its Position in Increments of 0.8 mm.
• Upgraded Fuel Valve Assembly (36) and Removable Brass Seat (35): Increased Reliability and Improved Maintainability
• Idle Adjusting Screw (24): Positioned Horizontally and Rests on Inclined Plane (8) at Bottom of Throttle
  – Allows More Precise and Smooth Adjustment of Idling Speed
• Carburetor Equipped with Balancing System: Consisting of Set of Channels (ducts) Connecting Float Chamber with the Atmosphere
  – Ensures the Chamber (at the entrance to the metering system) Constant, which Is Close to Atmospheric Pressure
• Balancer System: Equipped with Fitting that Allows Drainage Hose of Surplus Fuel (for example when using quencher) to a Backup Capacity, and Not on the Ground
• Float Chamber with All the “filling”, Except for Fuel Valve, Remained Unchanged
• Unchanged dresser (start) device, which comes in four versions - with cable or self-propelled, with a separate fuel pit 47 or without it. In the second case the fuel nozzle is limited to 44. There is also a version of the carburetor Without any additional trigger device.
• Adjusting Carburetor on an engine similar to the regulation of K-65, except, perhaps? Another location screw lift the throttle
• Tests Showed K-68 Is More Economical by 15-20% and Durable than Predecessors

The model K-68 has an advanced design and give better result than the K-65 or K301-302. It has a ellipse-shape throat, cylindrical throttle, central float chamber, and protective electro-plating of parts. All the main parts of the carburetor (body, throttle, float chamber) are aluminum alloy.
### K-68(Х)-1107010 Characteristics

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Motorcycle</td>
<td>IZH-6.113-03</td>
<td>IZH-Jupiter</td>
<td>IZH-Planeta</td>
<td>IZH 6.902</td>
<td>Snowmobile “Lynx”</td>
<td>“Ural”</td>
<td>“Ural”</td>
<td>“IL-Chopper”</td>
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<tr>
<td>Air Intake Cone Diameter</td>
<td>28 mm</td>
<td>28 mm</td>
<td>32 mm</td>
<td>32 mm</td>
<td>28 mm</td>
<td>28 mm</td>
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<tr>
<td>Mixing Chamber Diameter</td>
<td>31.5 mm</td>
<td>31.5 mm</td>
<td>35 mm</td>
<td>35 mm</td>
<td>31.5 mm</td>
<td>31.5 mm</td>
<td>31.5 mm</td>
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<tr>
<td>Capacity of Fuel Nozzle</td>
<td>250 ml/min</td>
<td>250 ml/min</td>
<td>280 ml/min</td>
<td>320 ml/min</td>
<td>370 ml/min</td>
<td>220 ml/min</td>
<td>190 ml/min</td>
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<tr>
<td>Weight</td>
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<td>0.55 kg</td>
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<td>Size (mm)</td>
<td>77.5X81X155</td>
<td>77.5X81X155</td>
<td>77.5X81X157</td>
<td>77.5X81X157</td>
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<td>77.5X81X189</td>
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<tr>
<td>Enrichener (Corrector) Control</td>
<td>Remote</td>
<td>Remote</td>
<td>Remote</td>
<td>Remote</td>
<td>Remote</td>
<td>Auto</td>
<td>Auto</td>
<td>Remote</td>
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</tbody>
</table>

**Notes:** 1. Kaptex VDC-RAM Carburetor is a Ukrainian copy of the Pekar K-68.

<table>
<thead>
<tr>
<th>Engine</th>
<th>IMZ Part #</th>
<th>Carburetor</th>
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<tbody>
<tr>
<td>650cc</td>
<td>IMZ-8.103-15001</td>
<td>K-68Y RH</td>
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<tr>
<td>650cc</td>
<td>IMZ-8.103-15002</td>
<td>K-68Y LH</td>
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<tr>
<td>750cc</td>
<td>IMZ-8.108-15001</td>
<td>K-68T, RH</td>
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<tr>
<td>750cc</td>
<td>IMZ-8.108-15002</td>
<td>K-68T, LH</td>
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</tbody>
</table>

Of all the versions of the K-68 carburetor, The K-68У (U) was designed for the 650cc engine, whereas the K-68Т (T) was installed on the 750cc engines. They are the only two versions with the “local” control of the “starter” enrichener (corrector) lever.
**K-68Y vs. K-68T Carburetors**

<table>
<thead>
<tr>
<th>Engine</th>
<th>IMZ Part #</th>
<th>Carburetor</th>
</tr>
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<tbody>
<tr>
<td>650cc</td>
<td>IMZ-8.103-15001</td>
<td>K-68Y RH</td>
</tr>
<tr>
<td>650cc</td>
<td>IMZ-8.103-15002</td>
<td>K-68Y LH</td>
</tr>
<tr>
<td>750cc</td>
<td>IMZ-8.108-15001</td>
<td>K-68T, RH</td>
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<tr>
<td>750cc</td>
<td>IMZ-8.108-15002</td>
<td>K-68T, LH</td>
</tr>
</tbody>
</table>

The K-68Y was designed for the 650cc engine, whereas the K-68T was installed on the 750cc engines, and is still available at Ural stores for the Dnepr MT-11 and MT-16.
K-68 Pekar Carburetors

- Flange to Cylinder
- Tickler
- Throttle Control Cable
- Idle Mixture Adjustment Screw
- Fuel Feed Fitting
- Spigot Air Intake
- Float Chamber
- Enrichener (Cold-Start)
K-68s are side-specific (left or right), always putting the adjustments on the outside.
Typical Pair Carbs K-68Y L/R (www.russiangarage.com)

- One-Barrel Carburetor with Horizontal Stream of air-fuel mixture
- Ellipse-Shaped Throat
- Cylindrical Throttle Valve
- Central Float Chamber
- Protective Electro-Plating of Parts
- All Main Parts of Carb (body, throttle, float chamber) Made of Aluminum Alloy
- 100% Brand NEW
- Made by PEKAR (Russia)
K-68U (K-68Y in Russian) Carburetors for 650cc vs. K-68T for 750cc Engines
The body of K-68’s are right and left-hand specific, which allows the mixture control screw to be on the outside in each case.
Pekar K-68У (1107010) for 650cc
Mikuni VM-28 Round-Slide Spigot

- 28 mm Mikuni VM Was Standard Issue for 650cc '98 US Import Versions for Ural
- Added to Satisfy US EPA Requirements
- Every Ural Is Shipped Lean from the Factory
  - Re-Jet with 120 to 125 Main and 40 to 42.5 Pilot Jet
- Product Information
  - Left-Side Idle Screw
  - Right-Side Air Screw
  - Left-Side Lever Choke (can be converted to right side)
  - 35 mm OD Intake Spigot Fitting
  - 44 mm Filter Fitting
- VM-28 Round-Slide No Longer Manufactured by Mikuni
- Ural Changed to Keihin Seiki L22AA for US Imports in 2000

The 28 mm Mikuni VM was standard-issue for 650cc ‘98 US import versions for Ural until 2000, when Keihin took over.
VM-28-49 28 mm Round-Slide Carburetor

- Main Jet: 4/042 #200
- Pilot Jet: VM22/210 #60
- Needle Jet: N-8 #169
- Jet Needle: 5F21
- Throttle Valve: VM28-56 2.5
- Main Air Jet: BS30/97 0.5
- Needle Valve: VM26/26 2.5
- Dimensions:
  - A: 35 mm
  - B: 33 mm
  - C: 10 mm
  - D: 4 mm
  - E: 49 mm
  - F: 44 mm
  - G: 7 mm
  - H: 6 mm
  - I: 44 mm
  - J: 72 mm
  - K: 66 mm
  - L: 54 mm
  - Total Width: 72 mm
  - Throttle Adjuster: Left
  - Air Screw: Right
  - Weight: 0.55 kg
  - Material: Aluminum
  - Float Height: 15-17 mm (0.59-0.66”)
- VM28-49 Manufacture Discontinued
Exploded View

(not all parts listed are available)
<table>
<thead>
<tr>
<th>Description</th>
<th>Mikuni Part #</th>
</tr>
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<tbody>
<tr>
<td>1. Rubber Cap, Throttle Cable</td>
<td>VM26/46</td>
</tr>
<tr>
<td>2. &quot;A&quot; Cable Adjuster (7mm)</td>
<td>VM28/256</td>
</tr>
<tr>
<td>3. Locknut, Cable Adjuster</td>
<td>B30/247</td>
</tr>
<tr>
<td>4. Top, Mixing Chamber</td>
<td>VM26/56</td>
</tr>
<tr>
<td>5. Gasket, Mixing Top</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gasket comes with each VM Mixing Chamber Top</td>
</tr>
<tr>
<td>6. Spring, Throttle Valve</td>
<td>VM28/58</td>
</tr>
<tr>
<td>7. Plate, Spring Seat</td>
<td>VM28/132</td>
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<tr>
<td>8. Needle Positioning Clip</td>
<td>VM20/369</td>
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<tr>
<td>9. Jet Needle</td>
<td>#5 Series (5DP7, 5F21, 5F3, 5L1)</td>
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<tr>
<td>10. Throttle Valve (Slide) Pg.131-132</td>
<td>VM28/56</td>
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<tr>
<td>11. Needle Jet</td>
<td>#189 Series</td>
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<tr>
<td>12. Rubber, Starter Plunger</td>
<td>VM20/455</td>
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<tr>
<td>13. Fitting, Starter Plunger</td>
<td>VM28/116</td>
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<tr>
<td>14. Lever, Starter</td>
<td>VM28/124</td>
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<tr>
<td>15. Spring Plate, Starter Lever</td>
<td>VM32/17</td>
</tr>
<tr>
<td>16. Starter Plunger Spring</td>
<td>VM16/42</td>
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<tr>
<td>17. Starter Plunger</td>
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</tr>
<tr>
<td>18. Mixing Chamber Body</td>
<td>Not Available Separately</td>
</tr>
<tr>
<td>19. Float Bowl Gasket</td>
<td>VM28/129</td>
</tr>
<tr>
<td>20. Float Bowl Baffle Plate</td>
<td>VM34/72</td>
</tr>
<tr>
<td>21. Pilot Jet</td>
<td>VM22/210</td>
</tr>
<tr>
<td>22. Float Arm Hinge Pin</td>
<td>BV25/22</td>
</tr>
<tr>
<td>23. Float Arm</td>
<td>VM28/166</td>
</tr>
<tr>
<td>24. Float (Independent, Type A)</td>
<td>VM28/164</td>
</tr>
<tr>
<td>25. Float Bowl</td>
<td>Not Available Separately</td>
</tr>
<tr>
<td>26. Main Jet Plug Washer</td>
<td>VM28/134</td>
</tr>
<tr>
<td>27. Main Jet Plug (Drain Plug)</td>
<td>VM28/133</td>
</tr>
<tr>
<td>28. Air Jet</td>
<td>BS30/97</td>
</tr>
<tr>
<td>29. Air Adjusting Screw</td>
<td>VM20/214</td>
</tr>
<tr>
<td>30. Air Adjusting Screw Spring</td>
<td>M12F/46A</td>
</tr>
<tr>
<td>31. Idle Adjusting Screw Spring</td>
<td>M20/221</td>
</tr>
<tr>
<td>32. Idle Adjusting Screw</td>
<td>VM24/224</td>
</tr>
<tr>
<td>33. Needle Valve Washer</td>
<td>VM26/25</td>
</tr>
<tr>
<td>34. Needle Valve Set (Needle Valve &amp; Seat Assembly)</td>
<td>VM26/26 All Needle Valve seats for VM series are thread-in type. See Chart</td>
</tr>
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<td>35. Main Jet Ring</td>
<td>VM28/228</td>
</tr>
<tr>
<td>35A. Main Jet Washer</td>
<td>VM15/80A</td>
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<tr>
<td>36. Main Jet</td>
<td>4/042 Series</td>
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<tr>
<td>37. Vent Tube Anchor Plate</td>
<td>VM15/164</td>
</tr>
<tr>
<td>38. Float Bowl Screw (4x16mm)</td>
<td>VM20/416</td>
</tr>
<tr>
<td>39. Main Jet Extender</td>
<td>Not Used</td>
</tr>
<tr>
<td>40. Needle Jet Setter</td>
<td>VM32/04</td>
</tr>
</tbody>
</table>

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**VM28 Spigot**

Vance Blosser reported finding "one last shiny brass piece," which is often missed. It is listed as an "air jet" part #28 on the above diagram. It is hidden down a small hole, on the very bottom of the inlet side of the carb, and takes a very narrow screwdriver to remove.
The arrows show the direction in which air, fuel, or air/fuel mixture flow.
Jikov 2928CE Carburetor

- Jikov 2928CE Replaced Dreadful Russian K-301 / K-302 Carburetors
  - Fitted on 1998-to-2000 Urals (650cc) Exported to United Kingdom
  - Used on Ural IMZ-8.1030 / IMZ-8.1230 / IMZ-8.401
  - Central Float Chamber to Reduce Foaming and Sloshing of Fuel
- Used on Java-638, 639, 640 and 688; Voskhod-SM and IZH-Jupiter-5-01
- Nice Carb, Mixes Fuel Well, Even Power-Delivery and Good Economy
- Few Spares Available Today
- Manufactured in Czechoslovakia

Properties
- Bore: 24 mm diameter
- Main Fuel Jet (Nozzle):
  - Jawa 638 and 639: 92 (0.92 mm)
  - Jawa 640: 100 (1.0 mm)
  - Jawa 688: 90 (0.9 mm)
  - Voskhod-ZM (“Sunrise”): 88 (0.88 mm)
- Enrichener (Choke) Starting Jet (Nozzle) (a.k.a. auxiliary system)
  - Originally (1972): 65 (0.65 mm) “Sunrise” to 72 (0.72 mm) Jawa
  - Later (Post 1985) Replaced with 85 (0.85 mm) Jet
  - Air Intake (duct) System for Starting Jet (Nozzle): 120 to 140 (1.2 to 1.4 mm)
- Idle Jet (Nozzle): 40 (0.4 mm)
- Channel Idle Mixture: 80 (0.8 mm)
- Idle Mixture Screw Position: 1-1/2 turns
- Location of Needle Jet: 2nd groove from the top
- Ekonostat Jet (Nozzle): 50 (0.50 mm)

Float Chamber in Vertical Axis, Not Mounted on the Side, as in K-37 and K-301 Carbs

The Jikov 2928 carburetor (карбюратор) is Czechoslovakia.
Carburetor for Jawa 638 / 639 / 640 / 688

The Jikov 2928CE is easily cleaned without dismantling the carburetor or removing the control cable, by removing the rubber hose clamps and rotating the carb upward.
Carburetor maintenance begins with recognition of the basic components.
Jikov 2928CE Carburetor Action

- Throttle Valve (6) Controlled by Wire Control Cable
  - Opens or Closes Flow of Air/Fuel Mixture to Cylinder
- Main Nozzle (17) Affects Composition of Mixture at Higher Throttle Setting
  - Access Possible After Removing Carburetor
  - If Nozzle Is Dirty, Difficulties in Starting
- Tapered Throttle Needle Jet (7) Placed in Round-Slide Throttle Valve (6)
  - Cone Reaches the Hole and Main Nozzle
  - Lifting Throttle Increases Fuel Flow to Channel Inlet
  - Needle Location Changeable, Fixed with Fastener Clips (8) and Grooves
  - If Clip Is In Bottom Groove, Mixture Is Richer; If In Top Groove, Mixture Is Leaner
- Idling Nozzle (18) Affects Composition of Mixture at Idling Speed and Low Throttle
  - Idle Adjust Screw (9) Regulates Idling Speed of Cross-Section Air Duct
  - Flows Additional Air to Idling Engine
  - Tightening Screw: Mixture is Richer; Loosening Screw: Mixture Is Leaner
- Choke (30) Enabled Only for Starting, to Enrich Mixture into Cylinders
  - Lever (30) Activates Enichener (Starter), which Increases Opening of Starter Valve (26), Allowing Fuel Flow thru Main Jet (17)
  - After Engine Warms, Lower Starter Lever (30)
The carburetor consists of a body (1), float chamber (9), cylindrical, spring-loaded, round-slide throttle valve (7), tapered throttle needle jet (8) and fuel injectors (17-19).
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 650cc**
  - Main Jet: 118
  - Nozzle Idling: 38
  - Concentrator Nozzle (start): 65
- **Please See Part 13C for Re-Jetting of Carb**
  - 2002 CMSI 750cc: 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.
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.

- 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

- 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

## Parts List

<table>
<thead>
<tr>
<th>Part</th>
<th>Item Description</th>
<th>IMZ-Part-Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carburetor Keihin</td>
<td>IMZ-8.128-15001</td>
</tr>
<tr>
<td>2</td>
<td>Pan Screw</td>
<td>935000040081H</td>
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<tr>
<td>3</td>
<td>Coil Spring</td>
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<td>4</td>
<td>Vacuum Piston Comp.</td>
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<td>5</td>
<td>Spring Seat</td>
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<td>6</td>
<td>Jet Needle</td>
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<td>7</td>
<td>Needle Jet</td>
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<td>Needle Jet Holder</td>
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<td>Main Jet 118</td>
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<td>Main Jet 122</td>
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<td>Main Jet 125</td>
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<td>12</td>
<td>Slow Jet 0.38</td>
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<td>13</td>
<td>Slow Jet 0.40</td>
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<td>Float Body Gasket</td>
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<td>Drain Screw</td>
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<td>Pan Screw</td>
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<td>O-Ring</td>
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<td>24</td>
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<td>25</td>
<td>Vacuum Port Cap</td>
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<td>26</td>
<td>Breather Cap</td>
<td>IMZ-8.1037-15157</td>
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<td>27</td>
<td>Carburetor Protection RH</td>
<td>IMZ-8.1037-15194</td>
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</table>

## Additional Information

- **IMZ Part #: IMZ-8.128-15001 for 750 cc Urals**
- **Breather Port Cap (does not need to be air-tight)**
- **Vacuum Port Cap (needs to be air-tight)**

Parts are still readily available for the Keihin L22A.
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
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

38 jet = 0.38mm or 0.0149 in.
45 jet = 0.45mm or 0.0177 in.
125 jet = 1.25mm or 0.0492 in.
Never use a metal adapter between the carburetor and cylinder head.
32CVK Keihin Carburetor

Front-View, Compliance Fitting Side

Left-Side View

Branch Tubing or Intake Side

Vacuum Port Cap (needs to be air-tight)

Breather Port Cap (does not need to be air-tight)

Top-View Diaphragm Cap

Bottom-View, Bowl Drain

Right-Side, Idle Setting Screw