

The image shows two carburetors, one on the left and one on the right, with their respective jets and needles. The carburetors are made of a dark metal, possibly aluminum or steel, and have a complex, multi-ported design. The jets and needles are made of brass and are inserted into the carburetors. The background is a plain, light-colored surface.

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

Rev. 1

***Part 2A: PZ-24 and PZ-28
Carburetors***

***(see also Part: 2 K-37 Carburetor and
Part 2B: PZ-24 and PZ-28 Carburetor Assembly and Jet Drilling)***

***Ernie Franke
eafranke@tampabay.rr.com
12/2014***

PZ-24 and PZ-28 Carburetor (Карбюратор)

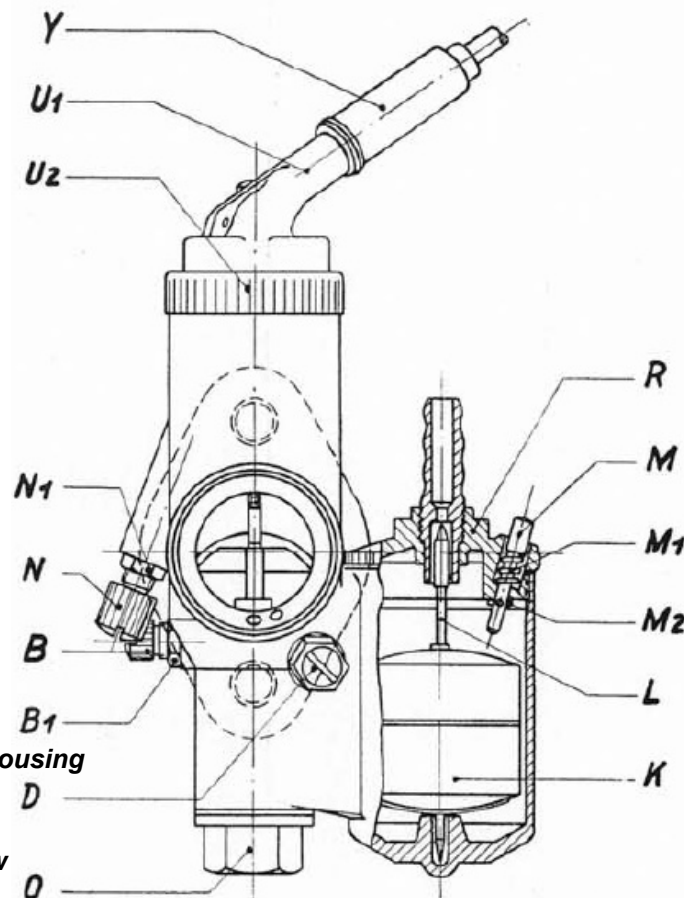
- **PZ-24 and PZ-28 Are Chinese Knockoffs of Russian K-37's, but Better Made**
 - **K-37 Carb Was a Russian Knockoff of the German Graetzin G24 for the BMW 71**
 - **Used in Chang Jiang 750 (CJ750) Motorcycle**
 - **CJ750 Was Chinese Knockoff of Russian M-72**
 - **Russian M-72 Was Knockoff of German 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.

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



- Y = Rubber Sleeve
- U₁ = Cover of Slide-Valve Housing
- U₂ = Screw Connection
- N₂ = Slide Valve Stop Screw
- N₁ = Locknut for N
- B = Idling Regulating Screw
- B₁ = Locknut for B
- D = Safety Screw in Idling Air Channel
- O = Cap Nut with Strainer
- R = Cover of Float Chamber
- M = Tickler
- M₁ = Tickler Spring
- M₂ = Split Pin
- L = Float Needle
- K = Float

Graetzin G24 Carburetor

“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.

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

CJ Model	Engine Type	Engine Designation	Engine Size	Produced	Horse-Power	Carb	Electrical	Compress Ratio	Remarks
M1	SV	Type I	746 cc	1957-1966	22 HP / 4500-4800 rpm	QH15 (72)	6-Volt	5.7:1	Almost exact copy of Russian M-72 engine
M1	SV	Type II	746 cc	1966-1972	22 HP / 4500-4800 rpm	QH15	6-Volt	6:1	Minor improvements/changes made to Type I engine
M1M	SV	Type II	746 cc	1972-1980	24 HP / 4500-4800 rpm	PZ-24	12-Volt	6:1	
M1M	OHV	Model 750E	746 cc	1980-1986	32 HP / 4700-5500 rpm	PZ-28	6-Volt	7:1	
M1S ("Super")	OHV	Model 750E	746 cc	1986-?	32 HP / 4700-5500 rpm	PZ-28 D	12-Volt	7:1	Difference between "D" and "F" in size of jets
M1S ("Super")	OHV	Model 750F	746 cc	1986-?	32 HP / 4700-5500 rpm	PZ-28 F	12-Volt	7:1	Difference between "D" and "F" in size of jets

Carb	Used On:	Size
Graetzin G24	German R71 (father of M-72)	24 mm
Graetzin G28	BMW R12, R51/3, R61, R71	28 mm
K-37/-37A	M-72, K-750, K-750M, MB-750	24 mm
CJ QH15	CJ M1 (SV)	24 mm
PZ-24	CJ M1 (SV)	24 mm
PZ-26	SV or OHV	26 mm
PZ-28D	SV or OHV, Ural 650, M-67	28 mm
PZ-28F	OHV	28 mm
K-38	Ural M-61, M-62, M-63 (all OHV's), Dnepr K-750 (SV)	24 mm

Notes:

- SV = Side Valve ("Flathead"), 2. OHV = Over-Head Valve, 3. CJ = Chang Jiang, 4. PZ-24 = K-37 = QH15,
5. 1 H.P. = 0.746 kW, 1 kW = 1.341 H.P., 6. Carb Size = Inlet Pipe Diameter

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.

Chang Jiang QHQ-15 Carburetors www.changjiangunlimited.com



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)



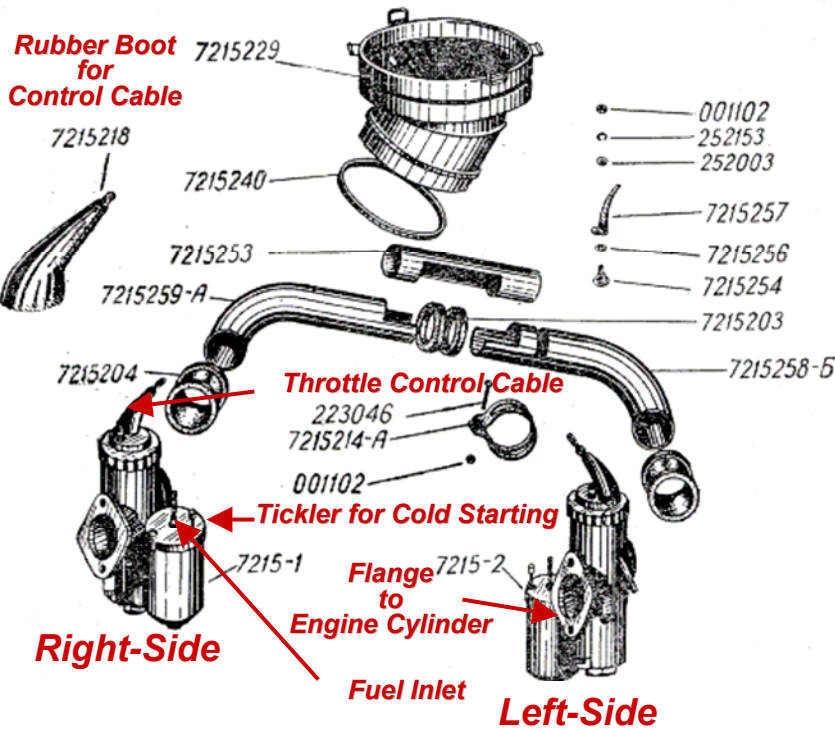
Carburetor PZ-28

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 #: 7215-1 + 7215-2
List Price: €110
(www.henriksson.ee)



Air Intake on a M-72 and CJ750

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.

Pair of PZ-28D Carburetors (left and right) for Side-Valve (SV) Motorcycles



Item #: 162
List Price: €129.80 pair
(moto-boxer.com)



PZ-28 on a Chang Jiang 750 Motorcycle



Item #: 120820190529
List Price: \$100 pair
(www.ebay.com)



Item #: 002.609
List Price: €199 pair
(www.oldtimergarage.eu)



PZ-28D for M-72, K-750
List Price: 90 EUR
(www.ural-hamburg.de)

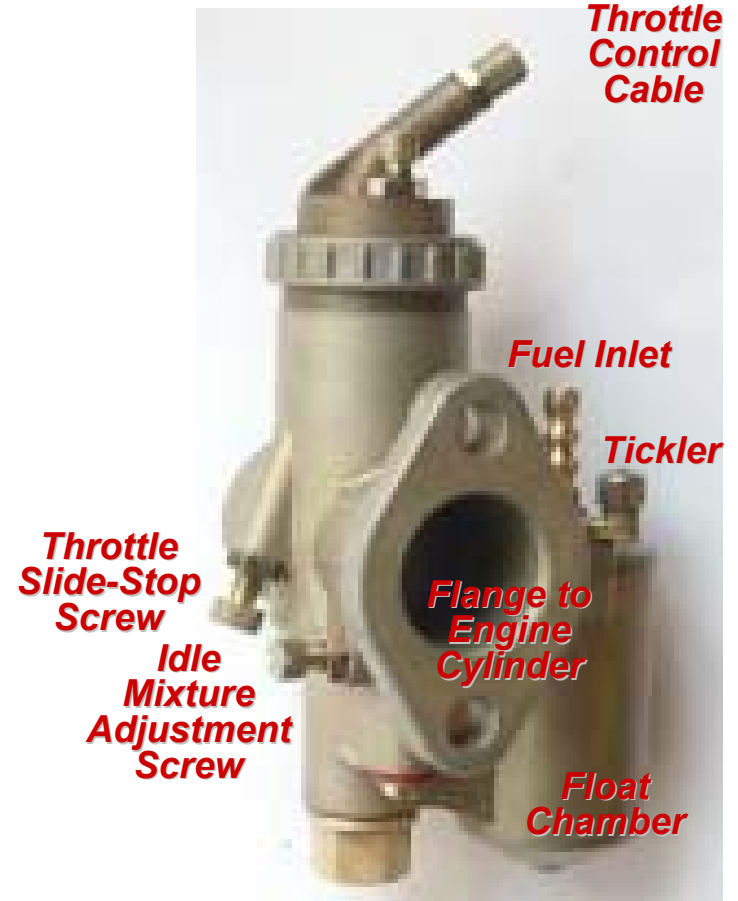
Carburetor Deni PZ-28D (replica Graetzin) Carburetor



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)



CJ750 Carburetor Repair Kit for PZ-28



Repair Kit for PZ-28
Item #: 360439553800
List Price: \$12
(www.ebay.com)



Repair Kit for PZ-28
Most parts also fit original K37-K38
Item #: 00-05
List Price: €23.50
(www.henriksson.ee)




Repair Kit for PZ-28
Item #: 140760597864
List Price: \$17
(www.ebay.com)



Repair Kit with Copper Float
Item #: I510000C
List Price: \$8
(www.sidecarpro.com)



Repair Kit with Plastic Float
Item #: I510000P
List Price: \$5.5
(www.sidecarpro.com)



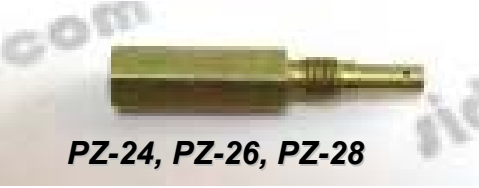
Adjustment Screws




Nipple



Throttle Jet Needle



PZ-24, PZ-26, PZ-28



Chang Jiang 750 Copper Floats Are Sometimes Referred to as Brass, Given the Similarity in the Luster of the Two Metals.

When tuning PZ-28's you probably need 2 each of the sizes between #94 and #106 5mm jets.

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)

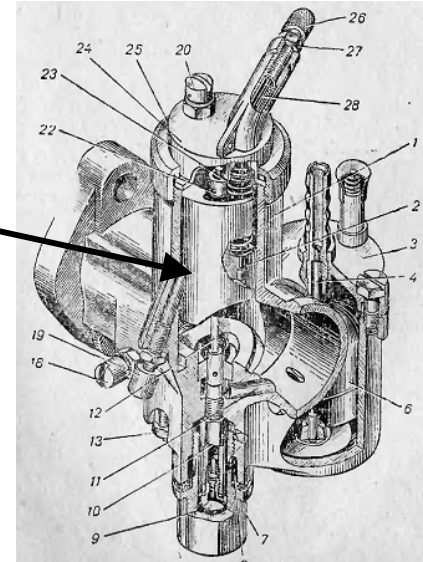


Graetzin G28 carburetor was optimized for the later OHV engines.

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

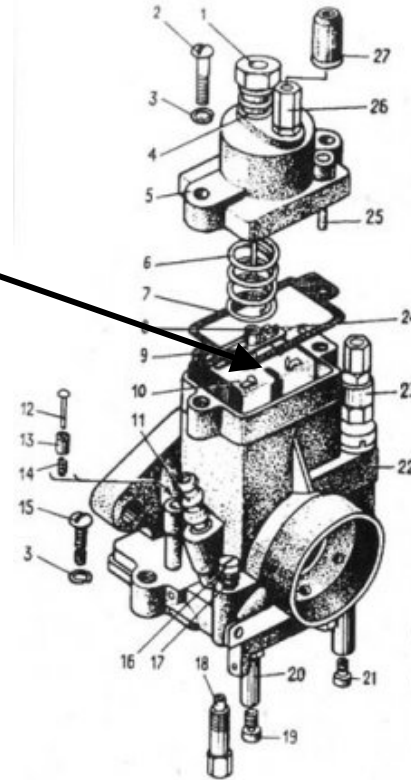
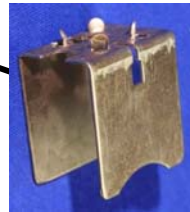
- **Round-Slide Throttle Valve**

- K-37 / K-38, **PZ-24 / PZ-28**
- K-68
- Kaptex VDC-RAM (Ukrainian copy of Pekar K-68)
- Mikuni VM-28
- Jikov 2928



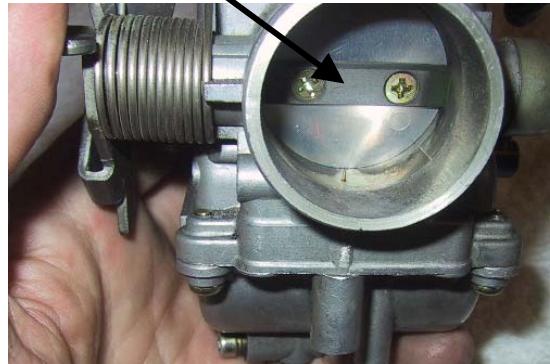
- **Flat-Slide Throttle Valve**

- 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

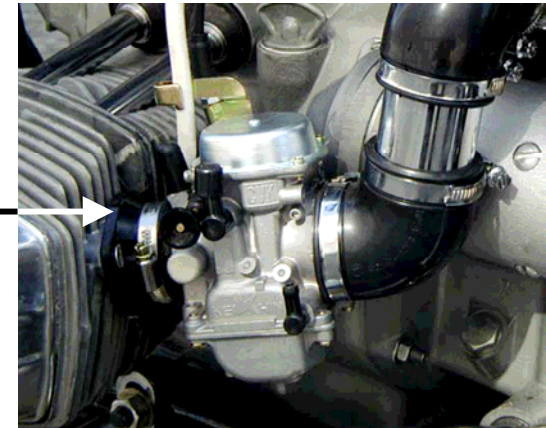
- K-37 / K-38, **PZ-24 / PZ-28**
- K-301 / K-302
- K-62 / K-63 / K-65 / K-68
- **Kaptex VDC-RAM** (Ukrainian copy of Pekar K-68)



• **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**

- K-37 / K-38, **PZ-24 / PZ-28**, K-301 / K-302



- **Horizontal Mounting Holes**

- K-62 / K-63 / K-65 / K-68

- Kaptex VDC-RAM (Ukrainian copy of Pekar K-68)



- **Transition from Vertical-to-Horizontal**

- Used to Transition from Older K-37/38 and K-301/302 Carbs to Modern K-62 / K-63 / K-65 / K-68 Carbs

- Adapter Plates Readily Available



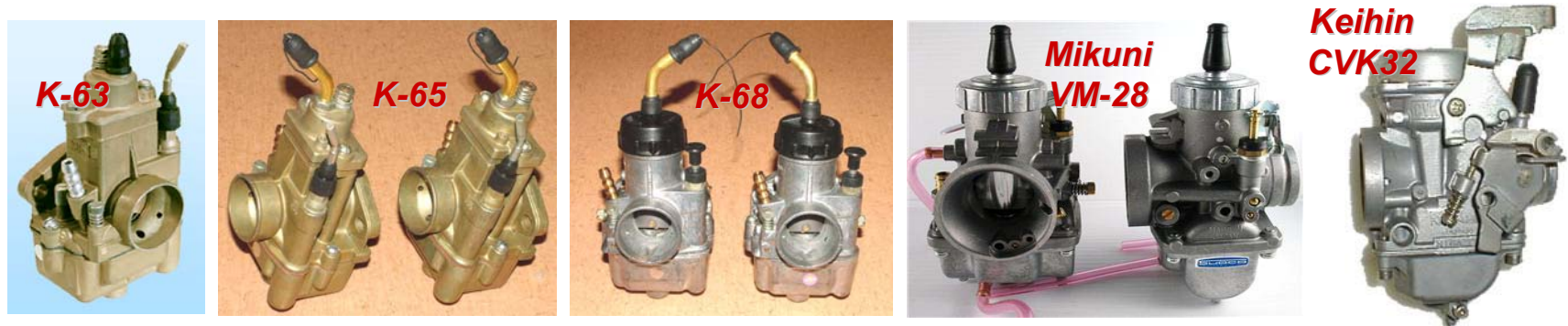
An adapter plate is needed to upgrade older motorcycles to the modern **horizontal pattern** for the K-63 / K-65 / K-68 type carbs.

Characteristics: In-Line vs. **Off-Axis Float Chamber Mount**

- **Older Float Chamber (Bowl) Offset from Carburetor Body**
 - **Vertical vs. Slanted Float Chamber (Bowl) Mount**
 - **Vertical: K-37 / K-37A / K-38, PZ-24 / PZ-28, K-301 / K-302**



- **Modern Float Chamber (Bowl) In-Line with Center of Carburetor Body**
 - **K-62 / K-63 / K-65 / K-68, Mikuni VM-28, Jikov 2928CE, Keihin CVK32**



Older Russian carburetors had external float bowls, with some built on a slant, with greater foaming of the fuel under vibration.

Characteristics: Left-or Right-Hand vs. Similar Construction

- **Left-Hand or Right-Hand Construction (mixture-adjust on opposite sides)**
–K-37 / **PZ-28**, K-301 / K-302, K-68, Kaptex VDC-RAM (Ukrainian Copy of Pekar K-68)



- **Identical Construction (mixture-adjust on same side, top or bottom)**
–K-62 / K-63 / K-65, Mikuni VM-28, Keihin CVK32 (L22A)



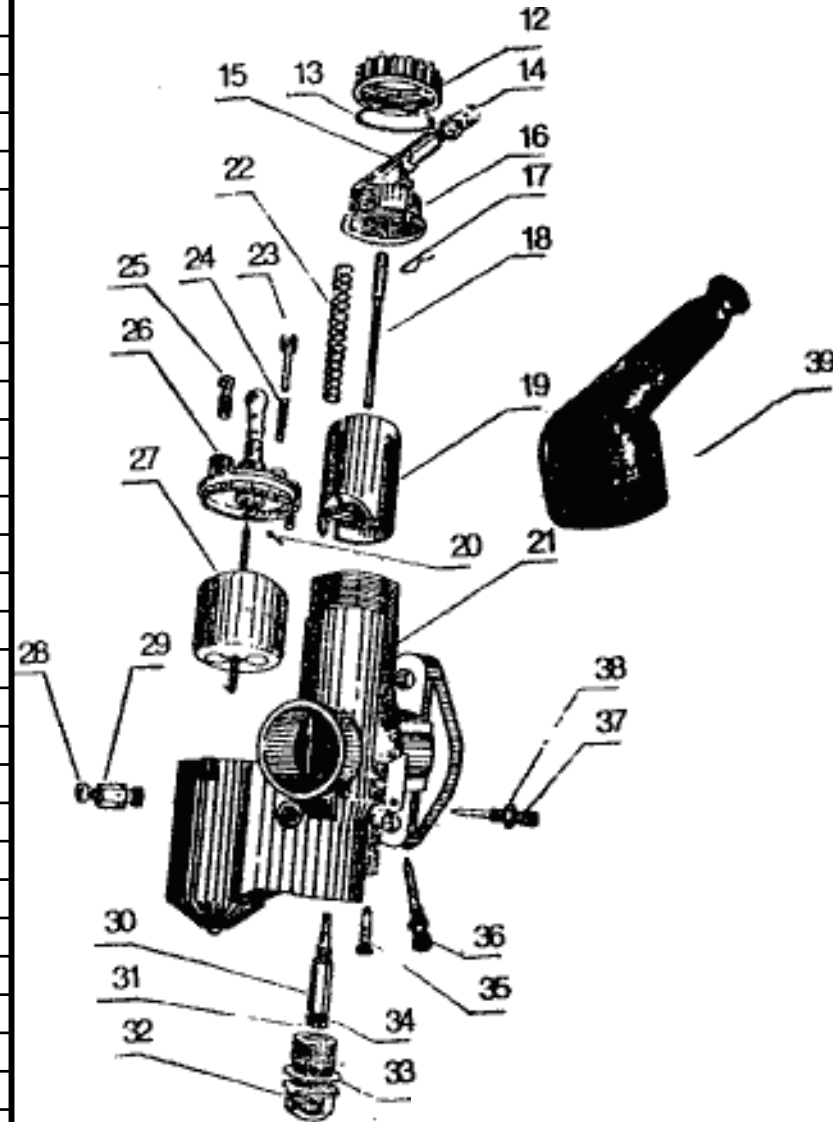
A few Russian carburetors (L/R) were built so that the mixture-adjust screw was always on the outside.

PZ-28D Installation (ural.hu)



Chang Jiang CJ750 M1 PZ-28 Carburetor

Part #	CJ 750 Part Name	Part #
12	Cap Nut	QHQ-15-18K
13	Spacer	QHQ-15-20
14	Union	QHQ-15-22
15	Upper stop screw	QHQ-15-11
16	Right cover	QHQ-15-19AK
16	Left Cover	QHQ-15-19K
17	Clip	QHQ-15-28
18	Main Jet Needle	QHQ-15-02
19	Round-Slide Throttle Valve	QHQ-15-01K
20	Split Pin	GB91-58 (1 X 6)
21	Right Case	QHQ-15-10-01
21	Left Case	QHQ-15-10-01A
22	Spring	QHQ-15-21
23	Tickler (Enrichener)	QHQ-15-20-00
24	Tickler Spring	QHQ-15-17
25	Screw	QHQ-15-24
26	Oil Cup Cover	QHQ-15-03K
27	Float Assembly	QHQ-15-30-00
28	Screw head	QHQ-15-16
29	Air Adjustment Screw	QHQ-15-14 (inclg QHQ-15-15 Air Filter)
30	Main Jet Nozzle	QHQ-15-04
31	Main Jet Nozzle Screw	QHQ-15-05K
32	Oil Filter Assembly	QHQ-15-40-00
33	Spacer	QHQ-15-23
34	Spacer	QHQ-15-06
35	Idle Nozzle	QHQ-15-07K
36	Lower Stop Screw	QHQ-15-12
37	Idle Adjust Screw	QHQ-15-10
38	Hexagonal left and right screw	QHQ-15-27 (M6 X 0.75)
39	Rubber Hood or Sleeve	K7211325



Chinese maintenance manuals use M-72 part numbers; 7211902 (QHQ15) right carburetor and 7211901 (QHQ15) left carburetor. 20

CJ750 Floats, Rubber Protective Caps and Gaskets Fit PZ-Series Carbs (PZ-24, PZ-26, PZ-28)



Rubber Cover for K-37, K-38, PZ-24, PZ-28
Item #: S393
List Price: €3.77
(www.ural-zentrale.de)



Float Valve Needle

Float for PZ-28, K-37, K-38
Item #: 37-37c
List Price: €9
(www.henriksson.ee)



Idle Mixture Adjust Screw
For PZ-28, K-37
List Price: €1.90
(www.ural-hamburg.de)



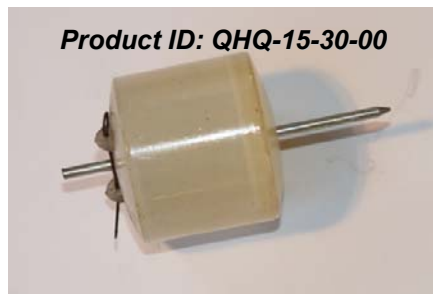
K7211325 - M1M-OC-54 - S/N 39 - Sleeve
Product ID: K7211325
M1M-OC-54 - S/N 39 - Sleeve



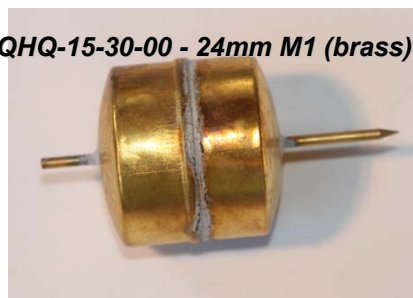
CJ750 Carburetor Gaskets
Item #: D012000G
List Price: \$1.50 pair
(www.sidecarpro.com)



Rubber Cover for K-37, K-38, PZ-24, PZ-28
Part #: 7215218
List Price: €4
(www.henriksson.ee)



Product ID: QHQ-15-30-00



QHQ-15-30-00 - 24mm M1 (brass)



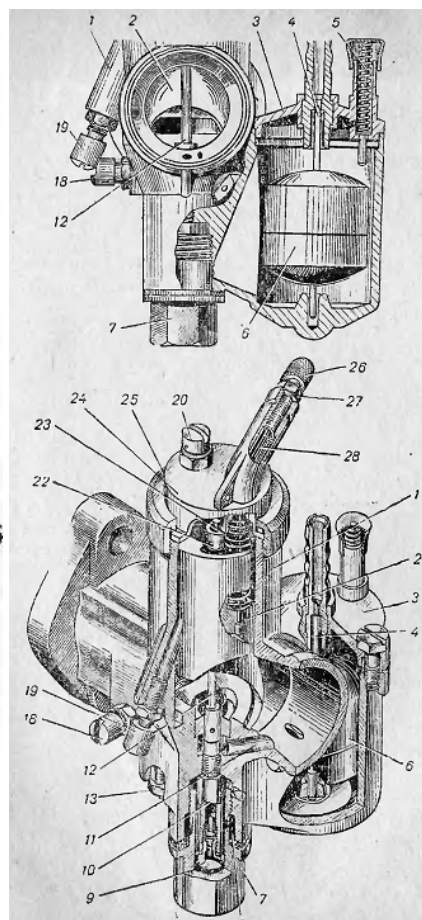
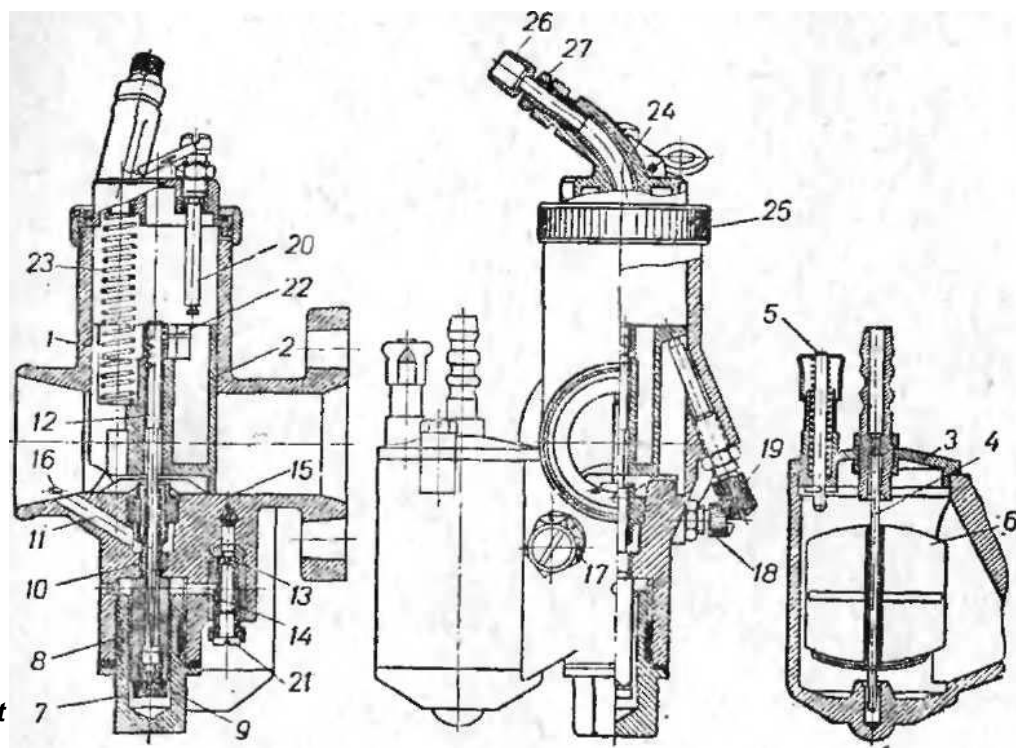
Carburetor Gasket
Item #: 04-0016
List Price: \$0.50
(www.changjiang750sidecar.com)



Rubber Cover for K-37, K-38, PZ-24, PZ-28
Item #: 04-0018
List Price: \$10
(www.changjiang750sidecar.com)

Many carb parts are interchangeable between the K-37 and the PZ-28.

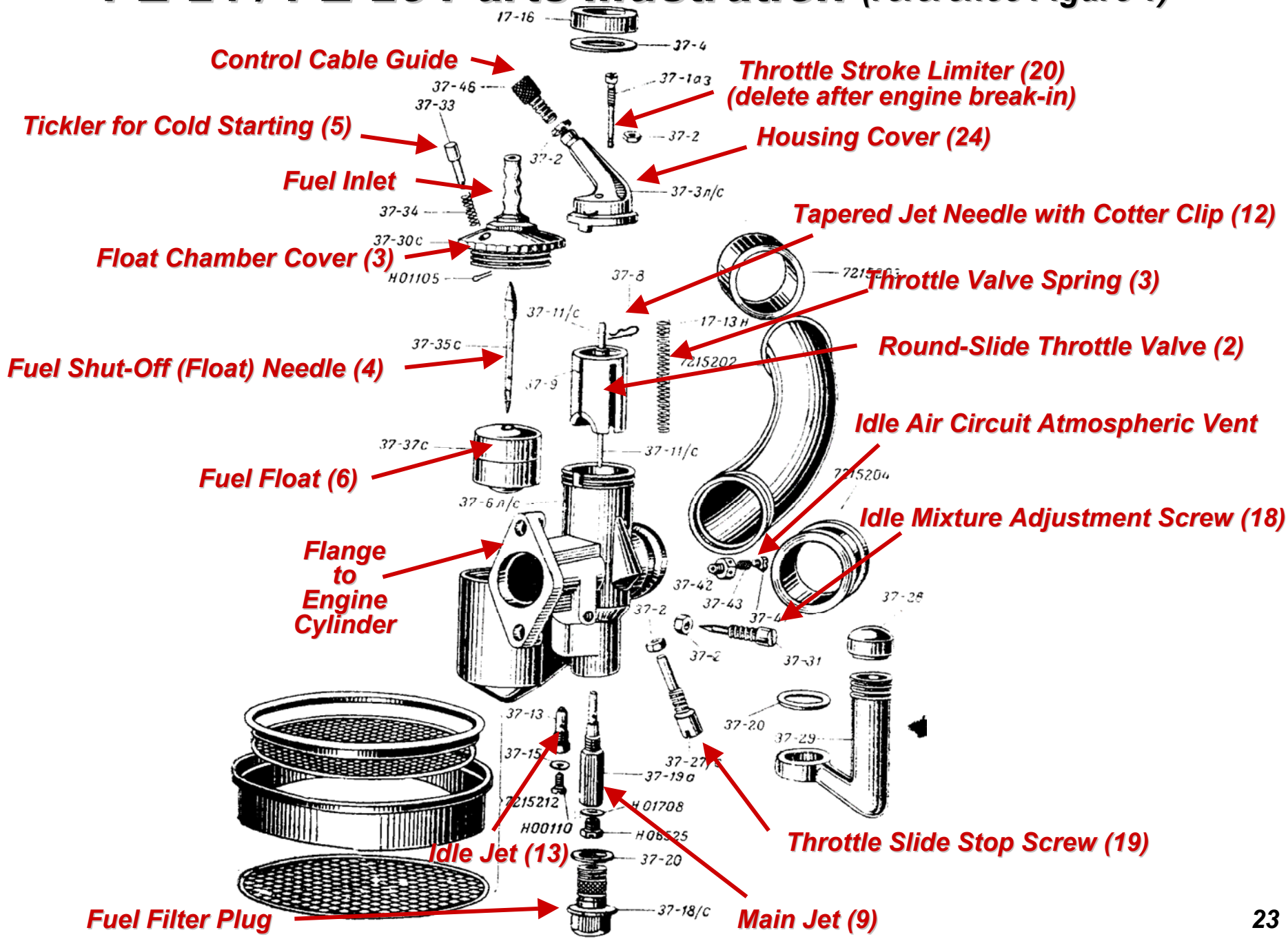
PZ-24 / PZ-28 Carburetor Parts Breakdown Figure 1



- 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 (reference Figure 1)



Carburetor Tuning: CJ750 toolbox Assembly Instructions for M1, M1M and M1S by Ray Costa (www.changjiangunlimited.com)

- **Carburetor tuning: The carbs have to be synchronized for the engine to run well. If you can find a flow meter gauge, commonly used on old British sports cars, this will make life easier. Mine is called a Unisyn and I've had it for 25 years. If you have the tool, you know how to use it, so 'nuff said.**
- **Start with a warm engine. [The choke should be fully open when you perform the following procedure.] There are three adjustments on each carburetor. These are the cable adjuster at the top, the idle speed stop on the bottom (at an angle) and the idle air bleed screw on the side. Start by loosening the locknut on the bleed screws of both carbs and screwing them in gently all the way. Now back both out 1.5 turns and tighten the lock nuts just a bit. Next, loosen the lock nuts on the idle speed screws. Turn these screws out until no resistance is felt. Now run them back in until you can barely detect upward movement of the throttle slide. This is better accomplished with a clean finger than by eye. Now tighten the lock nut on one side. On the other side, disconnect the spark plug wire and ground it by plugging an old spark plug in and laying it on top of the cylinder head. Screw in the speed screw a couple of turns and start the engine. Run the screw in and out until you get the lowest idle you can get without the engine stalling. Tighten the lock nut. Now back out the idle air bleed screw one half turn at a time. The idle speed should go up. At some point the mixture will become too lean and the engine speed will start to decrease again. Back the screw in to maximum RPM and then run it in again one more half turn. Set the lock nut and turn off the engine. Repeat the process on the other side. Now hook up both spark plugs and start the engine. It should start and idle smoothly. If the idle speed is too low, adjust both idle speed screws in an equal amount. Blip the throttle. If the engine hesitates or coughs, adjust both air screws in one half additional turn. Do this until the hesitation disappears and the idle speed is steady and not too slow. If it gets too slow, adjust the stop screws again.**
- **Lastly, adjust the cable adjusters until there is almost no free play on either side. Now, with the engine off and the slides all the way in the down position, look at one slide at the same time you have a finger lightly placed on the other side (because you can't see both at the same time). Turn the twist grip slightly and adjust the cables so that both throttle slides lift off at precisely the same time. This takes a few tries. Remember to keep your hands clean! Replace the rubber dust boots.**
- **Now go ride the bike and see how it runs on the road. If things are good, ride it for a few days and then remove the spark plugs. The color of the electrode should be brown or tan. If it is white, the mixture is too lean, and if it is black, the mixture is too rich. Adjust the mixture by lowering or raising the metering needle. Raising it a notch at a time richens the mixture, and lowering it leans out the mixture. To get to the metering needle, loosen the ring nut at the top of the carb and pull out the slide. There is a little clip that holds the needle in place. Slide off the clip, move the needle up or down, and replace the clip. Don't lose the clip! Now do the same for the other carburetor. Drive the bike again for a few days and check the spark plugs again. If your bike is still not running beautifully, check the points and timing.**
- **The 1973 Chilton BMW manual describes this process a little differently. It recommends at each step of the operation to pull a spark plug wire and listen to the engine, then pull the other one. Whichever side runs slower, adjust the idle speed screw so that both cylinders run independently at the same speed. Then do the same thing with the air bleed screws. The idle speed will then be too fast, so back off the idle speed screws equal amount for both cylinders. Chilton recommends a millimeter of free play on the throttle cables.**

CJ750 Carburetor Adjustment (www.chang-jiang.com)

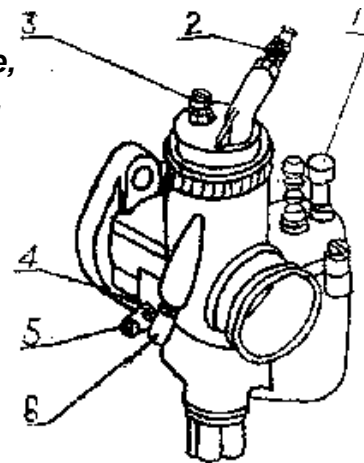
- **Two carburetors are used on left and right cylinders (one for each) in operation. Since two carburetors are used in operation simultaneously they must operate in same state. Otherwise, engine power, fuel consumption, starting performance and low speed stability will be poorer. So the carburetors should be adjusted one by one.**

- **Idle Speed Adjust**

- Start the engine, carry out the following steps after engine warms up to normal temp.
- Turn throttle twist grip fully home (idle).
- Screw in the idling adjusting screw (6) clockwise to raise the throttle valve, increase slightly the engine RPM so that one cylinder can operate continuously with throttle at minimum operating state. Remove the high tension cable from the other cylinder and ground it .
- Slowly turn idling mixture adjusting screw (5) to increase the engine RPM to maximum and to make engine operate stably at that speed .
- Gradually screw out the idling adjusting screw (6) to reduce the throttle valve to minimum engine RPM and to keep engine operating stably and continuously at that speed.
- Repeat the steps above to make the engine operate at minimum stable RPM.
- Tighten the lock-nuts (Item 4) of the two screws.
- Adjust the other cylinder at idle speed by using the above methods. Improper adjustment at idling will result in uneasy starting, unstable operation, even if it is started and single cylinder operation is impossible when a high tension cable is removed from the other cylinder and checking its operation.

- **Intermediate Speed Adjust**

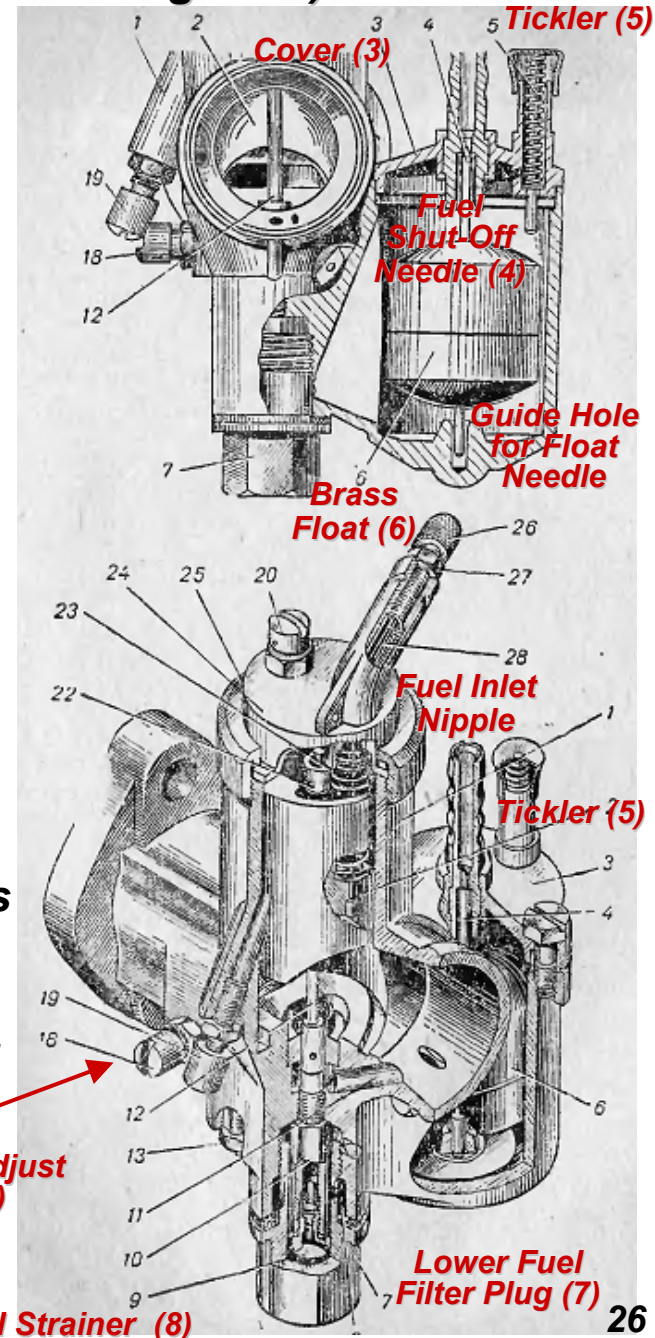
- Turn inwards the throttle twist grip for about a quarter turn. Alternately remove high tension cable from cylinders , and listen to the operation sound of the other cylinder. Remove rubber cover from carburetor upper cover of lower speed cylinder, adjust the steel cable connector (2).
- Check carefully the two cylinders for identical operation and then tighten steel cable connector nut.
- To check the carburetor operation turn the throttle twist grip rapidly to center position. At that moment, engine RPM should increase sensitively.
- If it increases sluggishly, adjust it as per the above method. The two cylinders should operate in balance when the throttle twist grip is turned fully and rapidly. If flameout happens, adjust it as per the method for adjusting at idling.
- If acceleration is not satisfactory when two cylinders are operating in same state, lean mixture or rich mixture can be checked by closing the air valve narrower or opening the air valve wider. If its power performance becomes better after closing the air valve narrower, it is the lean mixture causing the problem, which can be solved by checking fuel line for being unimpeded or by raising needle in throttle, valve for 1 or 2 holes. If exhaust sound is heavy, it is rich mixture, which can be solved by dropping appropriately needle in throttle valve.
- For the well-adjusted engine, the surface of spark plug insulator skirt should be dry and brown .



1. Float chamber push-button
2. Steel cable connector
3. Upper speed limiting screw
4. Lock nut 5. Idling mixture adjusting screw
6. Idling adjusting screw

Fuel Flow and Tickler (reference Figure 1)

- **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 Flows from Float Chamber, 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**



Idle Mixture Adjust Screw (18)

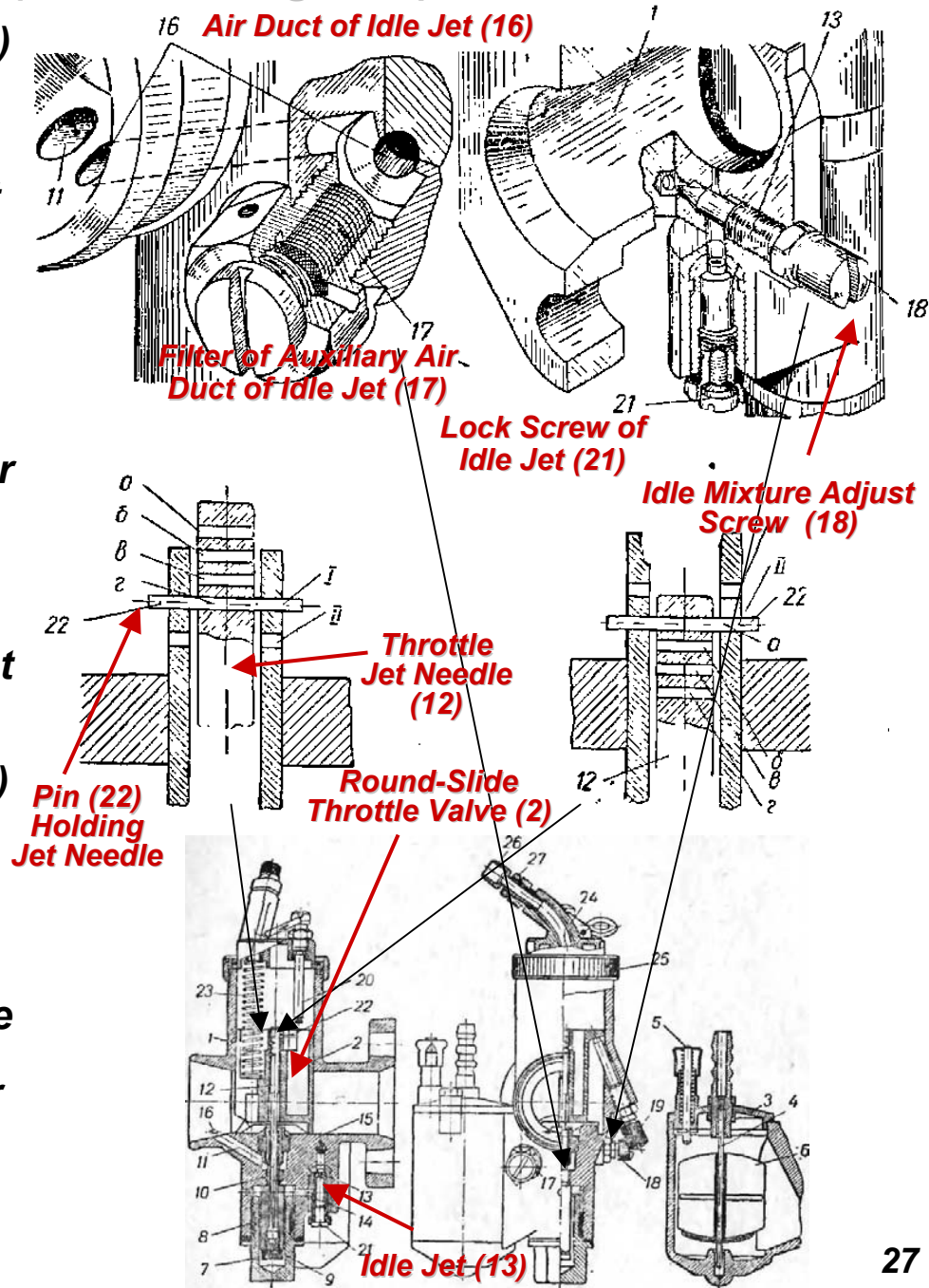
Fuel Strainer (8)

Lower Fuel Filter Plug (7)

Idle-Speed (reference Figure 1)

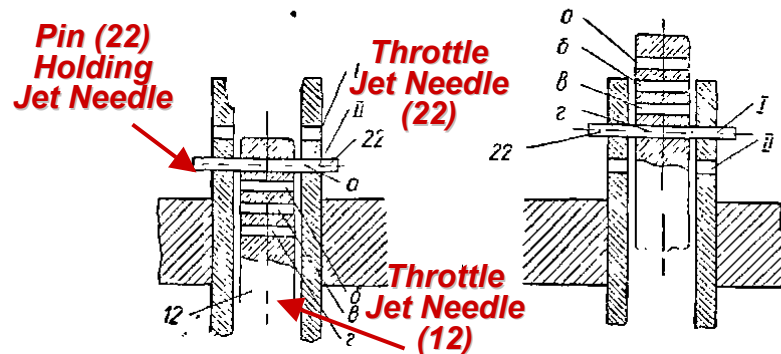
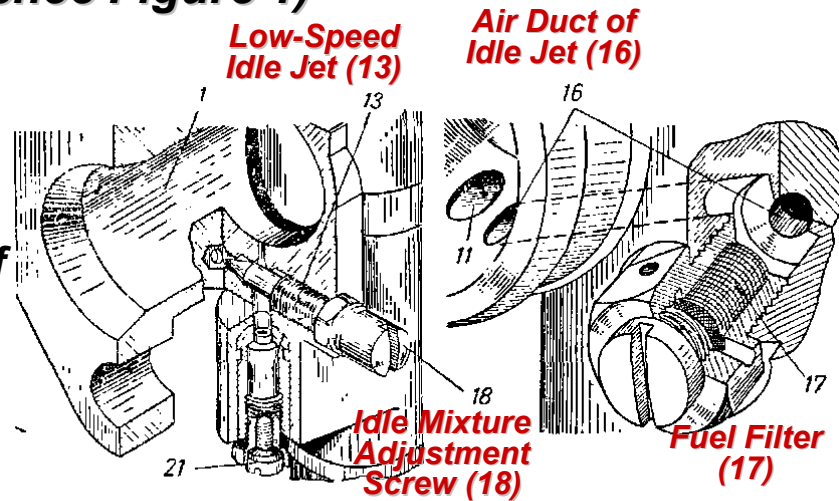
Idle Jet (13)

- At Bottom of Carburetor Is Low-Speed (Idle) Jet (13), which Is Screwed into Carb and Has at Top of Calibrated Hole (15) and Two Transverse Holes
- From the Bottom, Locking Screw of Idle Jet (21), which Is Unscrewed for Blowing-Out Nozzle
- Fuel to Idle System Comes from Float Chamber thru Channel (14)
- Chamber Connected to Idle Jet Nozzle thru the Holes in the Carburetor Body. Air to the Low-Speed (Idle) Jet Is Supplied from an Air Nozzle thru Air Channel (16) by an Additional Channel Connected to the Reticulated Air Filter (17)
- Air Channel Orifice Is Covered by Idle Speed Adjustment Screw (18) with Lock-Nut
- Over-Spray in the Vertical Guide Housing Throttle Valve (2) Is Set Mounted by Means of a Pin (22), Jet Needle (12) and Spring (23)
- Throttle Needle Enters Inner Channel of Main Jet
- Fuel Supplied to Jet by Annular Gap between Channel Wall Nozzle (Needle Jet) and Jet Needle
- Lower Part of Jet Needle Has Conical Shape –Raising Jet Needle, Annular Gap Increases, and Fuel Supplied to Atomizer Increases (Mixture is Enriched)



Jet Needle (reference Figure 1)

- Throttle Jet Needle (12) Connected to Throttle Slide Valve (2)
- Jet Needle Goes into Internal Channel of Main Atomizing Nozzle
- Fuel Arrives at Atomizer by Circular Gap between Channel Wall of Atomizer and Conical Needle Itself
- Clip Pin (22) at Head of Jet Needle
 - Four Openings in Jet Needle
 - Two Holes in Throttle Slide Valve
 - Eight Different Provisions of the Needle
 - When Tip is Lower: Leaner Mixture, Higher: Richer
 - Leanest Mixture Obtained Using Upper Hole in Jet Needle and Bottom Hole in Slide Valve
 - Richest Mixture Coincides with Lower Hole in Jet Needle and Upper Hole in Slide Valve
- Idling Speed
 - Fed by Small Orifice (13) from Air Duct of Idle Jet (16) thru Filter (17)
- Cross-Section of Air Duct, and Hence Amount of Air Reaching Low-Speed (Idle) Jet Can Be Changed by Idle Mixture Adjustment Screw (18)



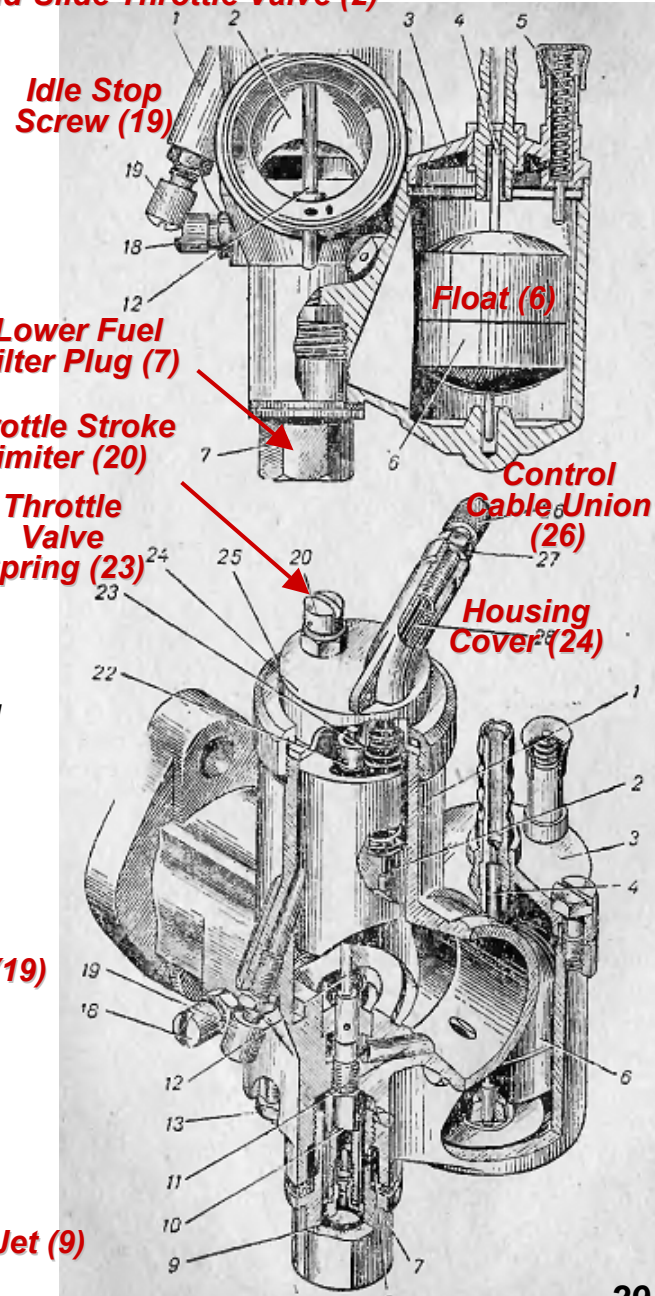
Lowest Position of Jet Needle (Lowest Casing Hole and Highest Needle Hole) Leaner Mixture

Highest Position of Jet Needle (Highest Casing Hole and Lowest Needle Hole) Richer Mixture

Idle Mixture Adjustment Screw (reference Figure 1)

Round-Slide Throttle Valve (2)

- As Throttle Valve Is Raised, Low-Speed (Idle) Orifice Gradually Shuts Down and Fuel Starts Spraying thru Main Jet (9)
- Throttle Valve Has Slant for Outlet Air, and on the Side, Two Longitudinal Grooves
 - One Locking Groove, Eliminating Rotation of Throttle Valve in the Guide
 - Other Groove Make It Interchangeable for Left and Right Carbs
- Upper Bevel Groove Rests Against Stop Screw (19) with Lock-Nut, Designed for Minimum Idle Adjustment
- Throttle Spring (23) Presses Down on Throttle Valve
- Rise of Throttle Valve Limited by Stroke Limiter (20), which Is Screwed into Housing Cover (24)
 - Prevents Excessive Engine Speed during Break-In
- Throttle Valve Connected by Cables with Swivel-Handle Mounted on Right-Side Handle-Bar
- Essence of Control Is to Eliminate Dead Transitions as You Roll-On the Throttle, Achieved by Installing the Cable Stop (26) Shells into Position and Subsequent Tightening of Lock-Nuts (27)

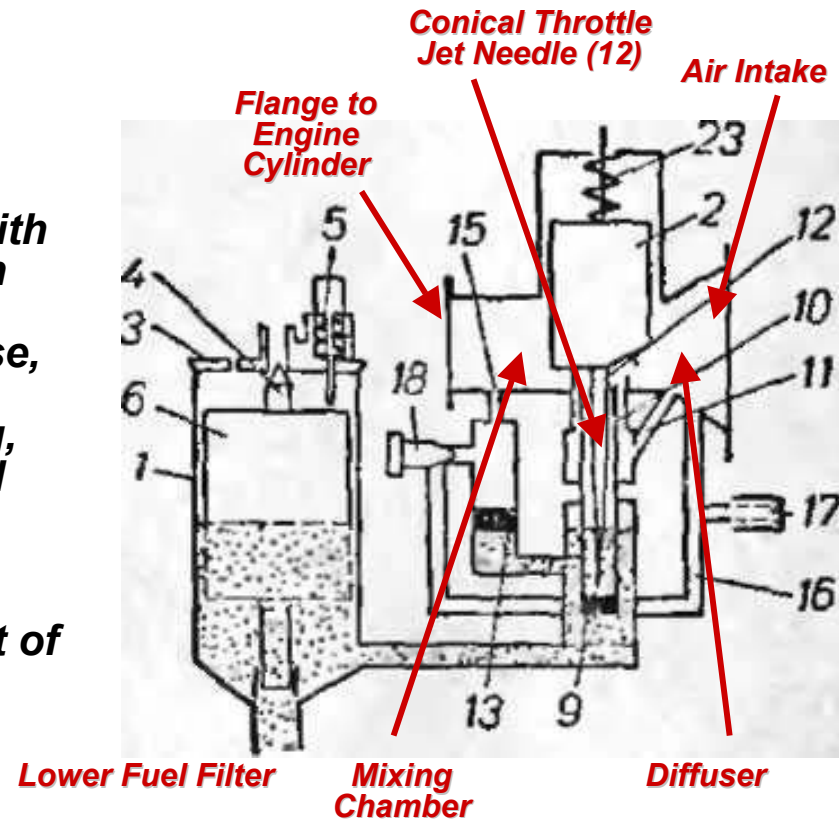


Throttle Stop-Screw (19)

Main Jet (9)

Carburetor at Medium and Full Speed

- **Carburetor at Medium Engine Speeds**
 - In the Range of Lifting the Throttle Valve from 1/4 -to- 1/2 Travel
 - Corresponding Increase in Cross-Section of Diffuser Nozzle
 - Low-Speed Gradually Ceases and Main Nozzle Takes Over
 - Dilution Air Decreases Due to Lifting of Slide Valve, Causing Impoverishment of the Working Mixture
 - Conical Jet Needle (12) Rises Simultaneously with Slide Valve, Resulting in Increased Ring Section between Dispenser and Jet Needle
 - Fuel Flow from the Nozzle becomes More Intense, and Mixture Begins to Enrich
 - At Approximately 3/4 Throttle Slide Valve Lifting, Mixture Is Regulated by Throttle Slide Valve and Jet Needle
- **Carb at Full Throttle**
 - Opening between the Jet Needle and Dispenser Ring Cross-Section Is So Large that the Amount of Fuel Supplied to the Spray Is No Longer Dependent on Position of Jet Needle, but Determined Only by Size of Main Jet



Setting K-301 / K-302 / K-37 / PZ-24 / PZ-28 Carbs (FoilHeadz Home)

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

Adjusting K-37 Carbs (Works on PZ-24 / PZ-28)

(reference Figure 1, www.goodkarmaproductions.com)

- **Three adjustments: Throttle Cable Adjustment (26) which Controls Depth of Slide Valve, a Throttle Slide Stop-Screw (19) that More or Less "fine tunes" the Throttle Slide Valve, and Idle Mixture Adjustment Screw (18) that Sets Air / Fuel Ratio**
- **Cautions:**
 - Spare Needles and Other Parts are Hard to Find
 - Parts DO Fall Off If Lock Nuts Aren't Tight. Also, they do require pretty regular tweaking to keep things running smooth.
- **Suspect Carb Problems, Indicated by Excessive Backfiring, Difficulty Starting Even with Good Spark, or Having Boots Soaked with Gasoline... There Are Few Things to Check before Tearing Things Apart**
 - Ensure Good Spark and Points and Plugs Are Gapped Properly
 - Check Color of Spark Plugs
 - Should Be a Nice Brown Color
 - Realistically Usually Dark, but Shouldn't Be Caked with Carbon
 - Check Floats
 - Cut Fuel Off and Drain Bowls by Loosening the Lower Filter Plug (7)
 - Pull Float Covers and Make Sure Float Is Seated Correctly with Plenty of Free Travel
 - Check Air Intake Tubes for Leaks
 - Check Nuts Holding Carb Body to Cylinder Head
 - Check for Good Fuel Flow from Tank, Even on Both Sides
- **Determine Running Rich or Lean, As Indicated by Spark Plug Color**
- **Two Screen Filters Need to Be Checked If You're Lean:**
 - In Petcock (fuel tap) under Tank at Top of Bowl and / or Another Inside Bowl
 - In Carburetor: Wrapped around Fuel Port in Lower Filter Plug (7)
- **If Filters Are Clean and Idle/Throttle Adjustments Are Good, then Mixture Should Be Adjusted**
 - Fuel Control Mixture Screw; so CCW (out) Is Rich and CW (in) Is Lean
 - Rule of Thumb Is that If Mix Adjustment Is On Outflow Side (next to the cylinder), Then It's a Fuel Control Screw and CCW = Rich and CW = Lean

Balancing Carbs & Setting Idle Adjustment

(reference Figure 1, www.goodkarmaproductions.com)

- **Remove Rubber Tubing to Access the Bottom of the Round-Slide Throttle Valve (2)**
- **Loosen Lock Nuts on Cable Adjustment Screws (26) and Slide Stop Adjustments (19)**
- **Turn Out Stop Adjustment (19) until They're Loose**
- **Insert a 6mm Drill Bit into Bottom of Breather Intake**
- **Adjust Cable Screw until Base of Throttle Slide Resting on Top of the 6 mm Bit**
- **Tighten Down Lock Nuts on Cables and Turn Stop Adjustments Back In until They Just Make Contact with Throttle Slide**
- **Assuming Your Mixture Screws Are Original and Both The Same Size, Back Them Out about Halfway and Use a Set of Dividers to Measure the Thread Distance from Carb Body, Setting Them Both the Same**
- **Fire Up Bike, Set the Manual Spark Advance Lever Forward (M-72, K-750, etc.)**
- **Pull One Plug Wire and Adjust Stop Screw until That Cylinder Is Running Smooth**
- **Turn the Mixture Screw In until the Cylinder Starts to Choke Out, then Back It Off Slowly until Everything Sounds Right**
- **Plug in Other Cylinder, Unplug First One, and Repeat Process Tuning It by Ear to Match First Cylinder as Closely as Possible**
- **Now Shut It Off and Let Engine Cool Down**
- **Block Front and Hack Wheels and Jack-Up Back of Bike so Pusher (rear wheel) Is Free**
- **Crank It Up Again and Work It Up to 4th gear. (You need somebody to hold the throttle open now at a good RPM unless it stays in place by itself as most of the older ones do.)**
- **Readjust Mixture Screws Using Same procedure as Before, One Cylinder at a Time.**
 - **Do This Quick to Prevent Excessive Strain on the Engine**
- **If Problems Persist, then Likelihood Is a Clogged Port Somewhere**
 - **Carefully Take Carbs Apart and Blow Everything Out with a Compressor, Then Start Over**

Carburetor Heat Shields



**Set of Carb Heat Protectors for SV engines
(K-37, PZ-24 and Graetzin)
Item #: 001.145
List Price: €9.50
(www.oldtimergarage.eu)**



**Carburetor Heat Guards
Item #: 24
List Price: \$45/pr with intake gaskets
(www.blitzbikes.com)**

Heat shields reduce the amount of heat shed by the motor to the carburetor, reducing the foaming or boiling of fuel in the float chamber.

CJ750 PZ-28 Deni (China) Carburetor

(http://www.sidecarpro.com/Intake_fuel_exhaust-CJ750-PZ28-carburetor.html#sthash.Fyf6QDsE.dpuf)

- Copy of Original Graetzin Carbs on BMW R71 and Later K37 on Ural M-72
– Item # I510001S \$103 (2014 USDs) for Pair
- Excellent replacement for the K37, K38, K301 and K302 carburetors
- Easy to Service and Maintain
- Repair Kits Available



PZ-28D Carb Repair Kit (Plastic Float)

http://www.sidecarpro.com/Intake_fuel_exhaust-CJ750-PZ-carb-repair-kit-plastic-float.html

- PLA Specification, NOS (New Old Stock, Early 1990's)
- Standard Plastic Float
- Item # I510005P \$7.50 (2014 USDs) each carb



PZ-28D Carb Repair Kit (Metal Float)

http://www.sidecarpro.com/Intake_fuel_exhaust-CJ750-PZ-carb-repair-kit-copper-float.html

- Metal (Copper) Float
- Item # I510005C \$13 (2014 USDs) each carb



CJ750 Copper Carb Floats

http://www.sidecarpro.com/Intake_fuel_exhaust-CJ750-copper-carb-floats.html

- Sometimes Referenced as Brass Floats, Given Similarity in Metals' Lustre
- Item # I512700B \$12 (2014 USDs) for Pair

