CHAPTER 4
FUEL SYSTEM / CARBURETION

Whenever servicing the carburetor or fuel system, it is important to heed the following warnings.

⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions.

⚠ Always stop the engine and refuel outdoors or in a well ventilated area.

⚠ Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored or used.

⚠ Do not overfill the tank. Do not fill the tank neck.

⚠ If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.

⚠ If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

⚠ Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

Jet Part Numbers

The following chart lists main and pilot jets and the part number of each that are presently available.

Mikuni

PILOT JET NO.	PART NO.
25	3130064
30	3130065
35	3130066
40	3130067
45	3130068
50	3130629
55	3130070

Mikuni

PILOT JET NO.	PART NO.
50	3130069
55	3130070
60	3130071
65	3130072

Keihin

PILOT JET	PART NO.
35	3050219-35
38	3050219-38
40	3050219-40
42	3050219-42
45	3050219-45
48	3050219-48

Keihin

PILOT JET	PART NO.
50	3050219-50
52	3050219-52
55	3050219-55
58	3050219-58
60	3050219-60
62	3050219-62
65	3050219-65

Mikuni

HEX HEAD

MAIN JET NO.	PART NO.
80	3130099
85	3130100
90	3130101
95	3130102
100	3130103
105	3130104
110	3130105
115	3130106
120	3130107
125	3130108
130	3130109
135	3130110
140	3130111
145	3130112
150	3130113
155	3130114
160	3130115
165	3130116
170	3130117
175	3130118
180	3130119
185	3130120
190	3130121
195	3130122
200	3130123
210	3130124
220	3130125
230	3130126
240	3130127

Mikuni

HEX HEAD

MAIN JET NO.	PART NO.
250	3130128
260	3130129
270	3130130
280	3130131
290	3130132
300	3130133
310	3130134
320	3130135
330	3130136
340	3130137
350	3130138
360	3130139
370	3130290
380	3130140
390	3130480
400	3130141
410	3130599
420	3130142
430	3130143
440	3130144
450	3130145
460	3130146
470	3130147
490	3130148
500	3130149
530	3130150
560	3130151
590	3130152
620	3130153

Keihin

Long Hex Head

MAIN JET NO	PART NO.
140	3050235-140
142	3050235-142
145	3050235-145
148	3050235-148
150	3050235-150
152	3050235-152
155	3050235-155
158	3050235-158
160	3050235-160
162	3050235-162
165	3050235-165
168	3050235-168
170	3050235-170
172	3050235-172
176	3050235-176
178	3050235-178
180	3050235-180
182	3050235-182
185	3050235-185
188	3050235-188
190	3050235-190
192	3050235-192
195	3050235-195
198	3050235-198
200	3050235-200
205	3050235-205
210	3050235-210
215	3050235-215
220	3050235-220

FUEL SYSTEM/CARBURETION
Jet Part Numbers

Jet Needle Part Numbers (Mikuni)

JET NEEDLE NO.	PART NO.
5DP7	3130155
5DT49	3130154
5DP10	3130333
5DP10	3130310
5DT2	3130473
5D78	3130667
5F81	3130528
6CEY6	3130476
6CF1	3130725
6CGY3	3130484
6CGY6	3130652
6DH3	3130470
6DH4	3130402
6DH5	3130391
6DH7	3130329
6DH8	3130645
6DH29	3130462
6DP1	3130156
6DP17	3130374
6EJ26	3130423
6EJ3	3130680
6F4	3130319
6F9	3130378

Jet Needle Part Numbers (Keihin)

JET NEEDLE NO.	PART NO.
R-1368G	3050244
R-1370G	3050220
R-1371G	3050256
R-1372J	3050247
R-1369G	3050245
R-1370J	3050221
R-1371J	3050246

Needle Jet Part Numbers (Mikuni)

NEEDLE JET NO	PART NO.
P-4 (159)	3130162
P-2 (166)	3130460
P-4 (166)	3130348
P-4 (166)	3130499
P-6 (166)	3130160
P-8 (166)	3130421
Q-2 (166)	3130376
O-4 (169)	3130166
O-4 (169)	3130409
O-6 (169)	3130358
O-6 (169)	3130469
O-8 (169)	3130453
O-8 (171)	3130035
P-0 (225)	3130579
P-2 (255)	3130608
P-2 (259)	3130161
P-0 (247)	3130671
P-2 (247)	3130672
P-4 (247)	3130641
P-6 (247)	3130655
P-8 (247)	3130382
Q-0 (247)	3130414
Q-2 (247)	3130165
Q-4 (247)	3130603
Q-8 (247)	3130485
R-0 (247)	3130477
P-0 (286)	3130607
P-2 (286)	3130608
O-4 (286)	3130635
O-6 (480)	3130429
O-8 (480)	3130683
P-2 (480)	3130675
P-4 (480)	3130639
Q-6 (480)	3130618
P–8 (513)	3130510

Throttle Valve Part Numbers (Keihin)

Throttle Valve No.	PART NO.
3.0	3050234-B02
4.0	3050234-C02
5.0	3050234-D02
5.5	3050234-J02
6.0	3050234-E02
6.5	3050234-K02
7.0	3050234-F02
7.5	3050234-L02
8.0	3050234-G02
9.0	3050234-H02

Mikuni TM-38 Jet Part Numbers

DESCRIPTION		PART NUMBER
Jet Needles		
Jet Needle J8-9FH04-57		3130794
Jet Needle J8-9EH01-57		3130795
Jet Needle J8-9DH01-54		3130796
Jet Needle J8-9CJB01-50		3130797
Needle Jets		
Needle Jet	O-8	3130798
Needle Jet	P-0	3130799
Needle Jet	P-2	3130800
Needle Jet	P-4	3130801
Needle Jet	P-6	3130802
Needle Jet	P-8	3130803
Needle Jet	Q-0	3130804
Starter Jets		
Starter Jet	130	3130805
Starter Jet	135	3130767
Starter Jet	140	3130768
Starter Jet	145	3130769
Starter Jet	150	3130770
Starter Jet	155	3130771
Starter Jet	160	3130772
Pilot Air Jets		
Pilot Air Jet	0.5	3130773
Pilot Air Jet	0.6	3130774
Pilot Air Jet	0.7	3130775
Pilot Air Jet	0.8	3130776
Pilot Air Jet	0.9	3130777
Pilot Air Jet	1.0	3130778
Pilot Air Jet	1.1	3130779
Pilot Air Jet	1.2	3130780

DESCRIPTION		PART NUMBER
Pilot Air Jets Cont.		
Pilot Air Jet	1.3	3130781
Pilot Air Jet	1.4	3130782
Pilot Air Jet	1.5	3130783
Pilot Air Jet	1.6	3130784
Pilot Air Jet	1.7	3130785
Pilot Air Jet	1.8	3130786
Pilot Air Jet	1.9	3130787
Pilot Air Jet	2.0	3130788
Piston Valves (Slides)		
Piston Valve	1.5	3130940
Piston Valve	2.0	3130789
Piston Valve	2.5	3130790
Piston Valve	3.0	3130791
Piston Valve	3.5	3130792
Piston Valve	4.0	3130793

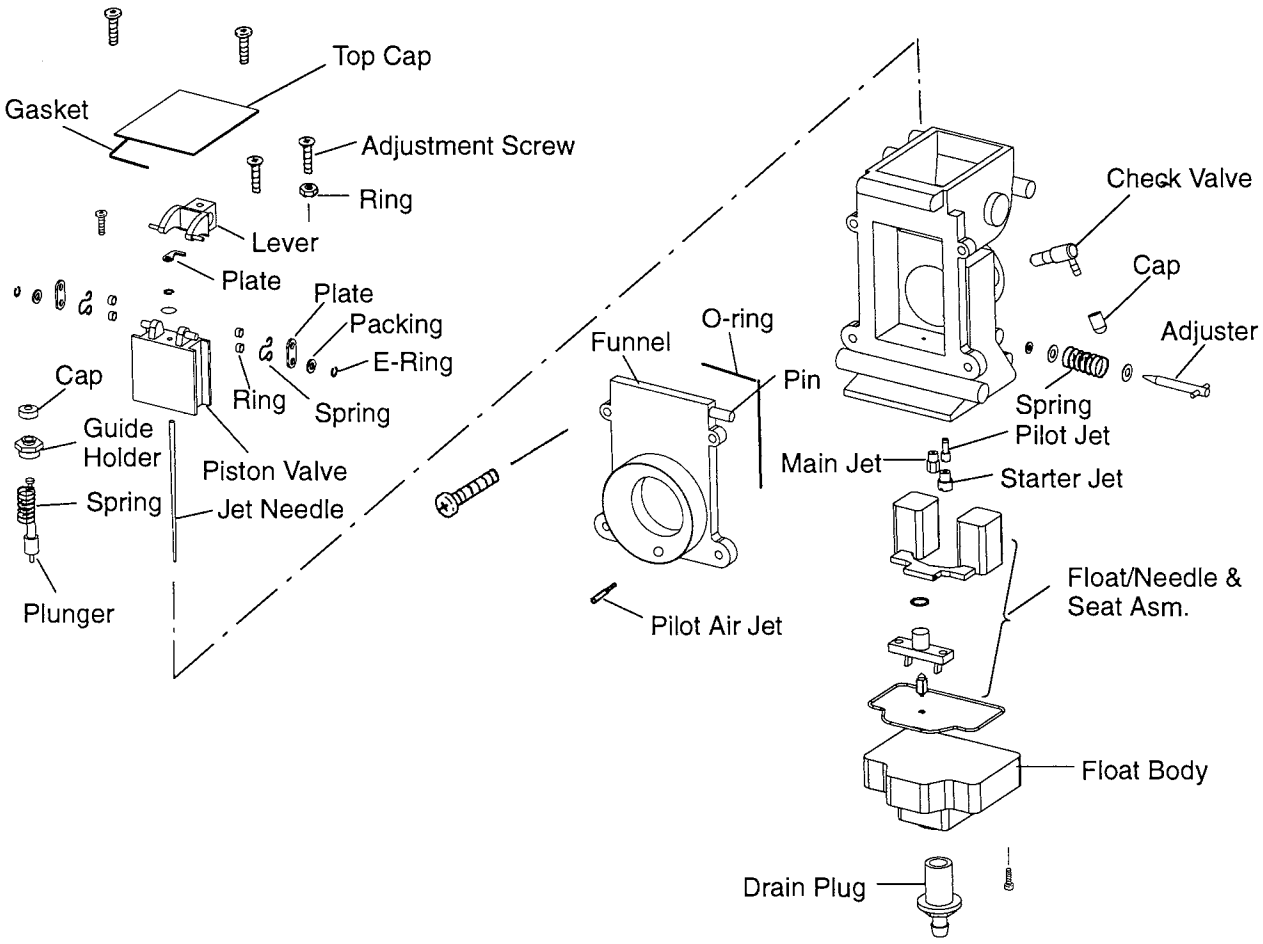
The part numbers for main jets and pilot jets are the same as Mikuni VM round slide carburetors.

FUEL SYSTEM/CARBURETION
1999 Condensed Data -

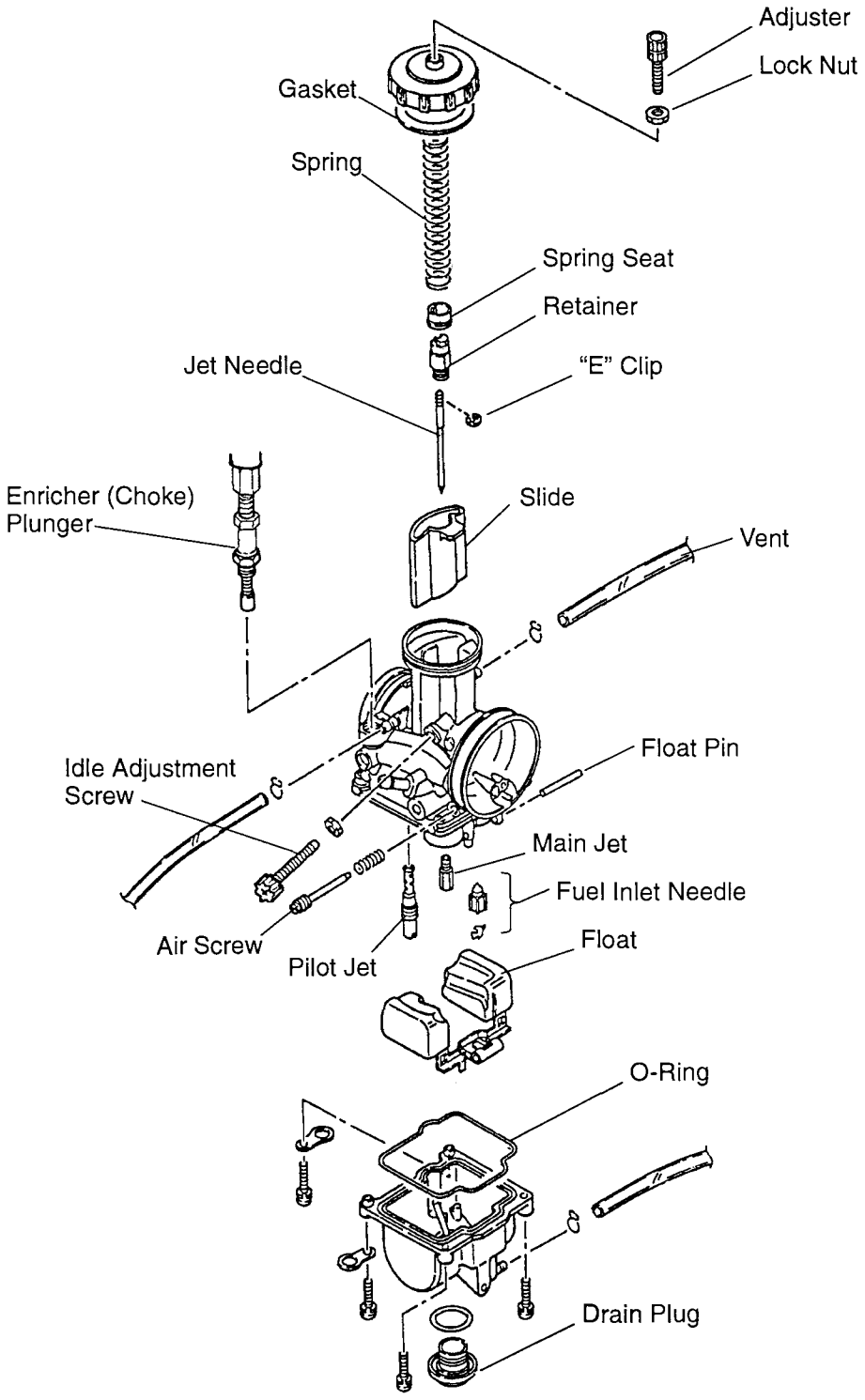
Machine Model	Engine Model	Carburetor Model, Mount Type & No.	Std. Main Jet	Std. Pilot Jet	Air Screw (Turns Out)	Jet Needle & E Clip	Needle Jet #	Throt. Valve Cutaway	Float Level (see note below)
Indy 340/ 340 Deluxe/ 340Touring	EC34-2PM051	VM30SS (2)Zinc	150	35	1 1/2	5DP7 #2	0-6 (169)	2.5 AL	1
Indy Sport/ Sport Touring/ TranSport	EC44-3PM025	VM34SS (2)Zinc	185	35	1	6FJ6 #3	P-8 (166)	2.0 AL	1
Indy XCF	EC45PM011	VM34SS (2)Zinc	270	40	1	6DP1 #3	P-8 (480)	3.0	1
Indy 440 XCR	SN44-44-98A1	VM34SS	360	45	1 1/4	6DH7 #3	P-4 (286)	2.0	1
Indy Trail/Touring	EC50PM044	VM34SS (2)Zinc	230	40	1	6DH7 #3	P-8 (166)	3.0	1
Indy Trail RMK	EC55PM021	VM34 (2)Zinc (ACCS)	270	35	1 1/2	6DH7 #3	Q-0 (480)	3.0	1
Indy Super Sport	EC55PM011	VM34SS (2)Zinc	310	35	1 1/2	6DH7 #3	Q-2 (480)	3.0	1
Indy 500/ 500 Classic	EC50PL172	VM38SS (2) AL	350	45	3/4	6F9 #3	P-6 (247)	2.5	1
Indy 500 RMK	EC50PL162	VM34SS (2)Zinc (ACCS)	260	55	1 1/4	6FJ43 #3	P-0 (480)	2.5	1
Indy Classic Trng	EC50PL192	VM34SS (2)Zinc	250	35	3/4	6EJ26 #3	P-2 (480)	3.0	1
Indy XLT SP	EC58PL160	TM-38 (3)	360	35	1 1/2	9DH3-54 #3	0-6	3.0	3
Indy XLT Classic	EC58PL131	VM34SS (3)AL	250	40	1	6DP17 #2	Q-4 (480)	2.5	1
XLT Touring	EC58PL131	VM34SS (3)Zinc	250	40	1	6DP17 #2	Q-4 (480)	2.5	1
Indy 500 XC / SP	S50-44-99A2	TM-38 (3)	370	45	2	6FH4-57 #3	P-6	1.5	3
Indy 600 XC / SP	SN60-70-99A2	Keihin PWK 39 (2) AL	185	38	1	R1368G #3	FIXED	5.5	2
Indy 700 XC / SP	SN70-70-99A2	Keihin PWK 39 (2) AL	PTO-185 MAG-190	38	1	R1368G #3	FIXED	5.5	2
Indy 600 RMK	SN60-70-99A1	Keihin PWK 39 (2) (ACCS)	185	50	1	R1367G #2	FIXED	6.0	2
Indy 700 RMK	SN70-70-99A3	Keihin PWK 39 (2) (ACCS)	190	48	1	R1368G #2	FIXED	6.0	2
Indy 700 SKS	SN70-70-99A1	Keihin PWK 39 (2) (ACCS)	PTO-185 MAG-190	38	1	R1368G #3	FIXED	5.5	2
Indy WideTrak LX	EC50PL202	VM34SS (2)Zinc	195	35	1/2	6EJ26 #2	P-6 (166)	3.0	1
Indy 700 XCR	EC70PL011	TM-38 (3)	430	50	1.5	9CG1-54 #3	P-4 (825)	2.0	3
Indy 800 XCR	EC79PL011	TM-38 (3)	450	50	1.25	9DH6-54 #3	P-4 (825)	2.0	3

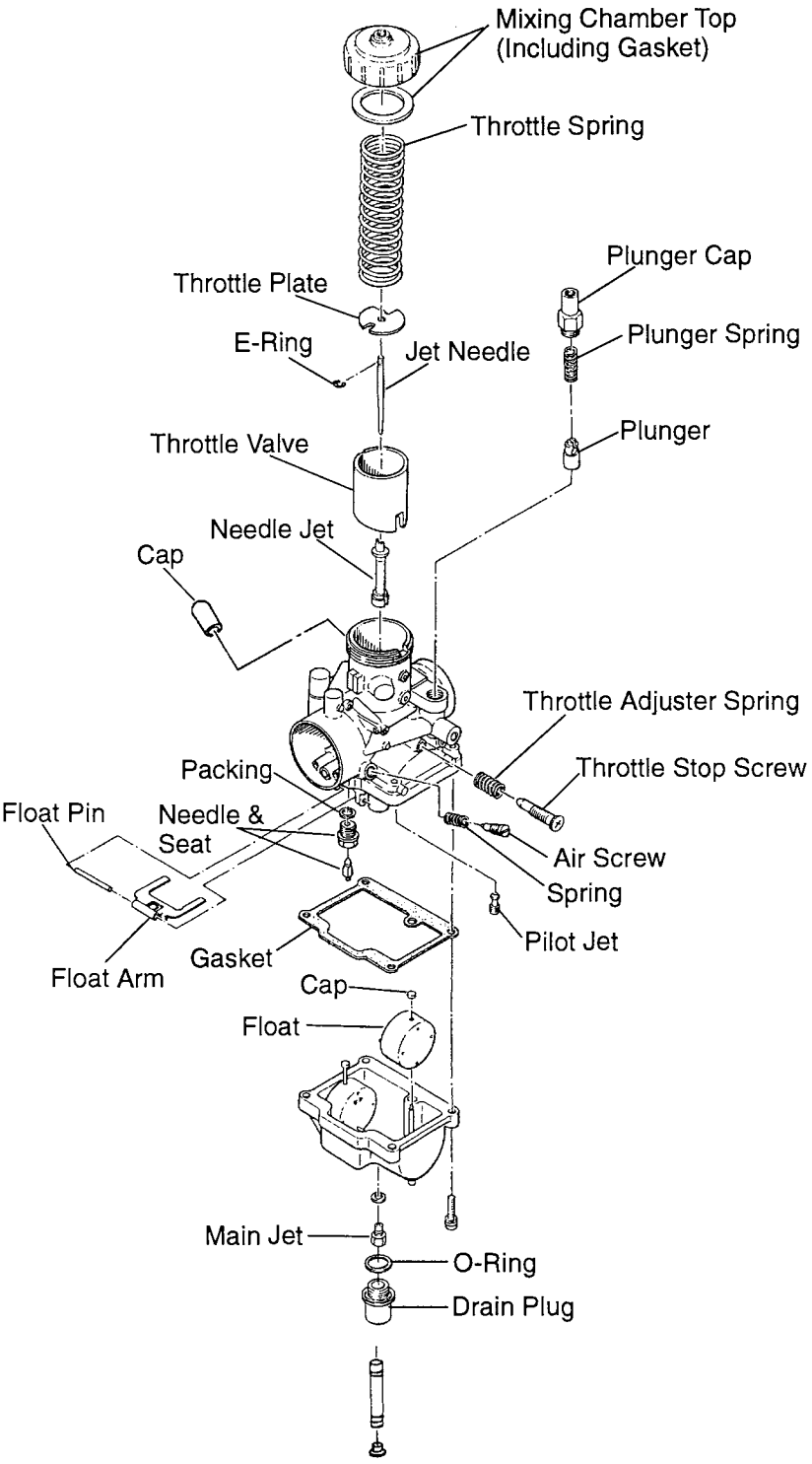
Fuel Requirements: All 1999 models 87 non-oxygenated or 89 oxygenated.

Float Levels:
1. With carburetor inverted and float bowl removed, float arm must be parallel with float bowl gasket mating surface.
2. Use Keihin float level gauge tool PN 2872126 to achieve 16mm float height
3. Floats are not adjustable on Mikuni TM-38 carburetors.

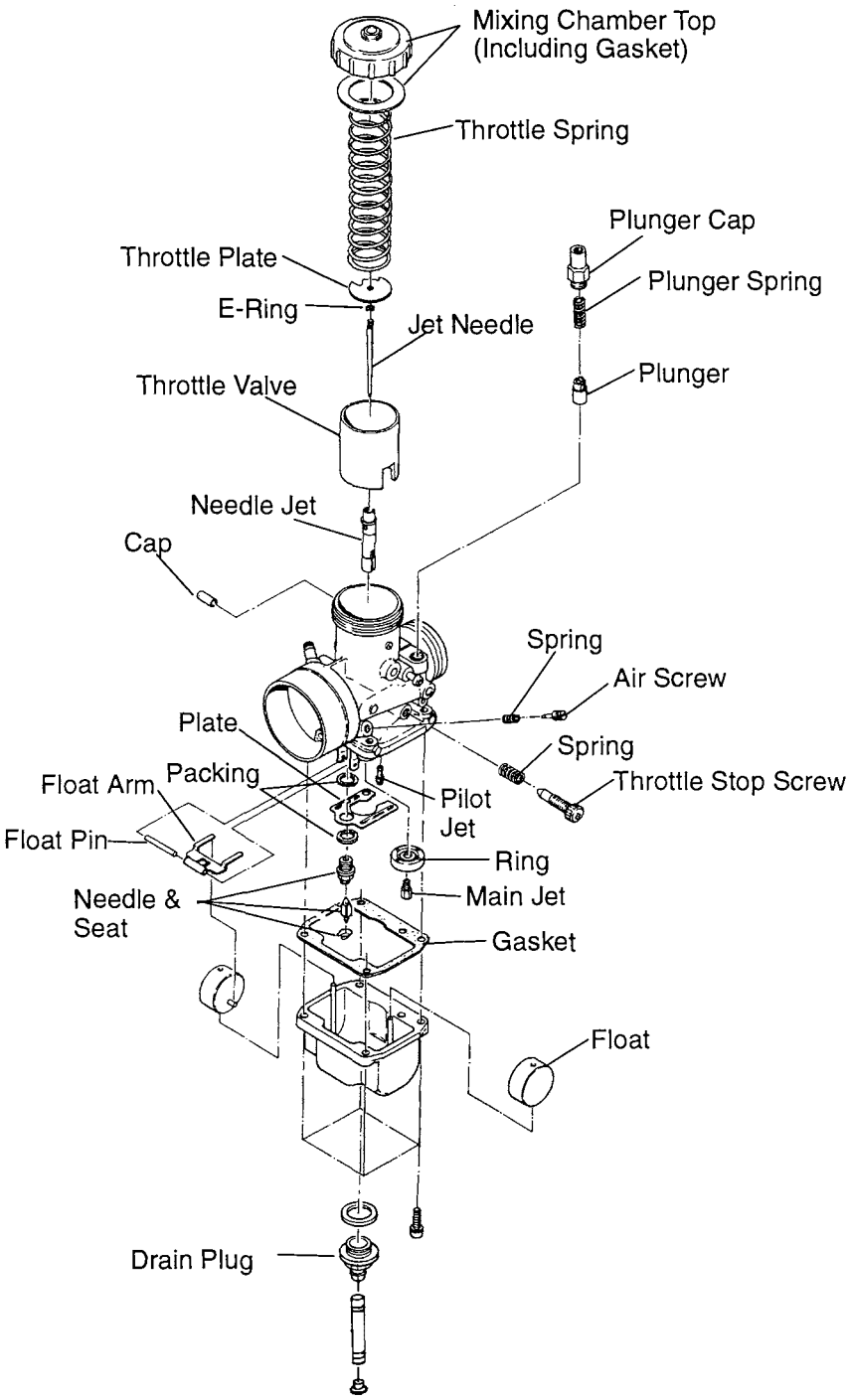

Top Cap
Gasket
Adjustment Screw
Ring
Lever
Plate
Plate
Packing
E-Ring
Cap
Ring
Spring
Guide Holder
Piston Valve
Spring
Jet Needle
Plunger
Funnel
O-ring
Pin
Pilot Air Jet
Check Valve
Cap
Adjuster
Spring
Pilot Jet
Main Jet
Starter Jet
Float/Needle & Seat Asm.
Float Body
Drain Plug

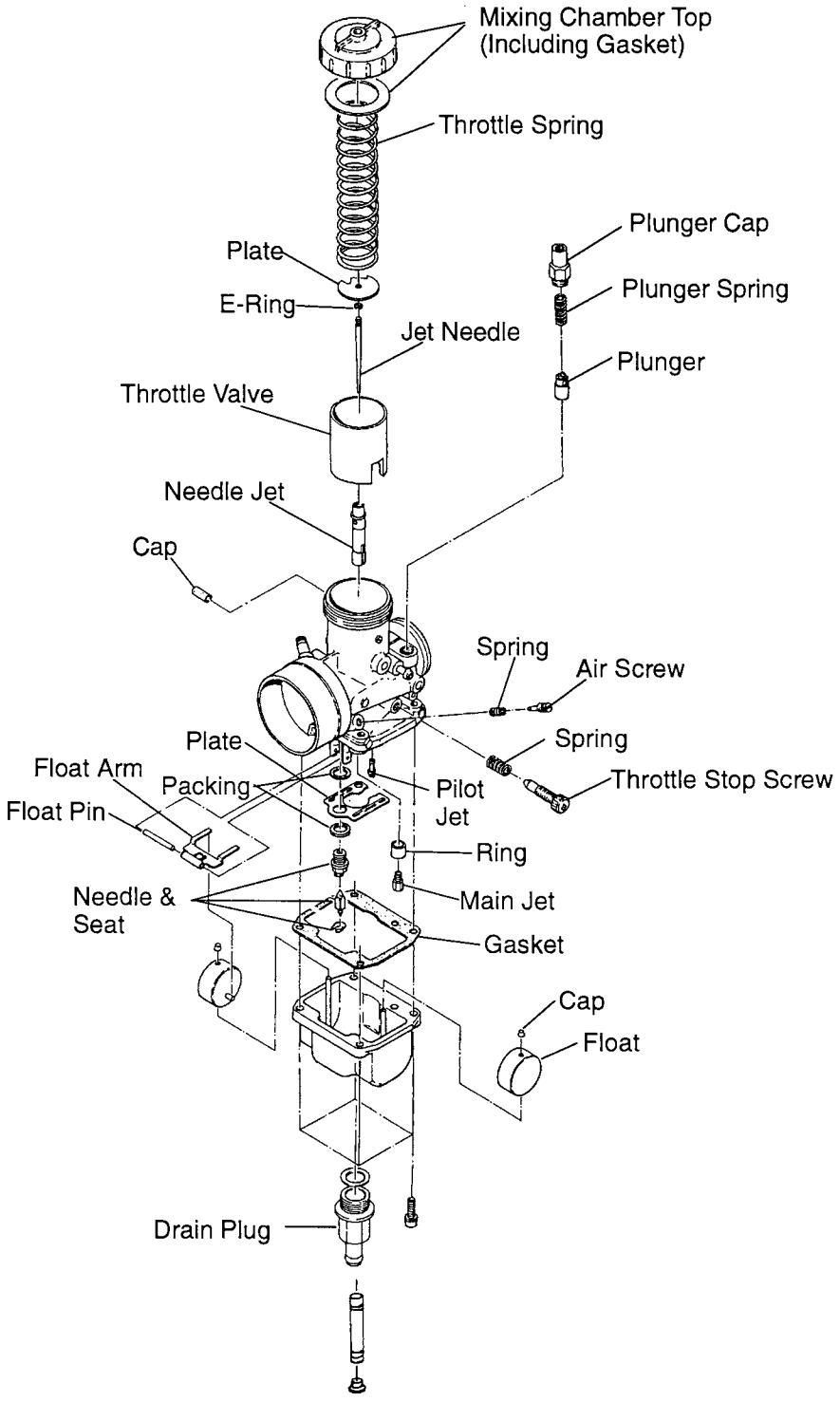
Exploded View - Keihin



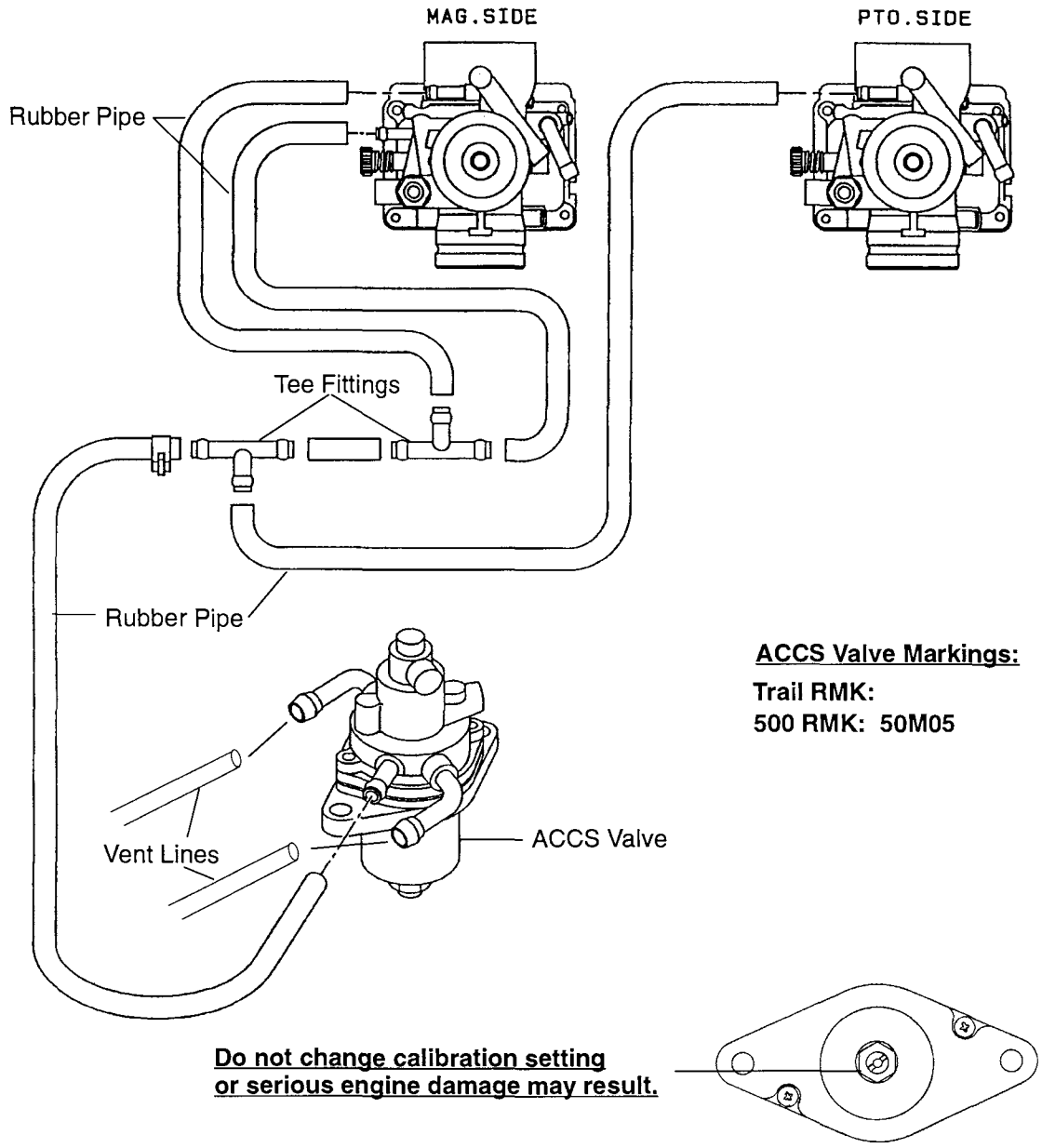

Mixing Chamber Top
(Including Gasket)
Throttle Spring
Plunger Cap
Throttle Plate
Plunger Spring
E-Ring
Jet Needle
Plunger
Throttle Valve
Needle Jet
Cap
Throttle Adjuster Spring
Throttle Stop Screw
Packing
Float Pin
Needle &
Seat
Air Screw
Spring
Pilot Jet
Gasket
Float Arm
Cap
Float
Main Jet
O-Ring
Drain Plug

Exploded View - VM34SS




Mixing Chamber Top
(Including Gasket)
Throttle Spring
Plunger Cap
Plate
Plunger Spring
E-Ring
Jet Needle
Plunger
Throttle Valve
Needle Jet
Cap
Spring
Air Screw
Plate
Spring
Float Arm
Packing
Pilot
Jet
Throttle Stop Screw
Float Pin
Ring
Needle &
Seat
Main Jet
Gasket
Cap
Float
Drain Plug

Exploded View - VM34SS with ACCS - Trail RMK/500 RMK



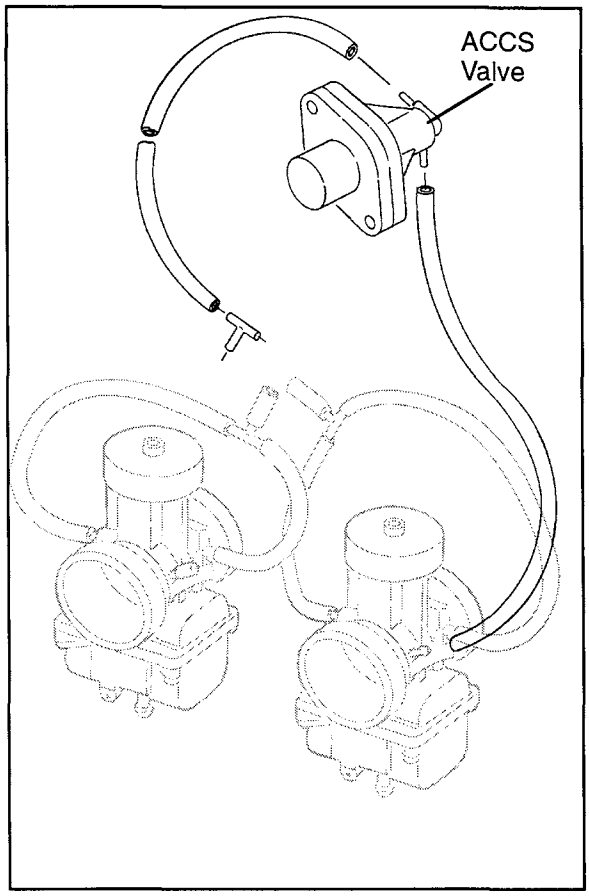
ACCS Valve Markings:

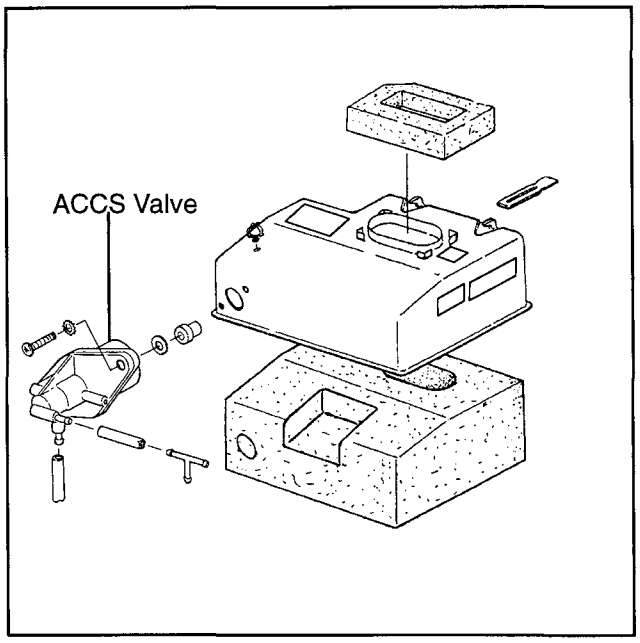
Trail RMK:
500 RMK: 50M05

Do not change calibration setting or serious engine damage may result.

ACCS valves cannot be interchanged between models. When replacing a faulty valve, be sure the identification number stamped on the valve body is correct.

Exploded View - Keihin Carbs with ACCS - 600 RMK/700 RMK

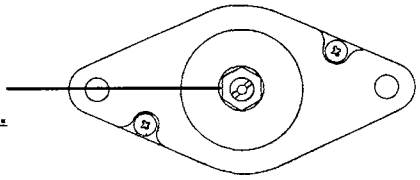




ACCS Valve Markings:

600 RMK: 1253232
700 RMK: 1251086

Do not change calibration setting or serious engine damage may result.

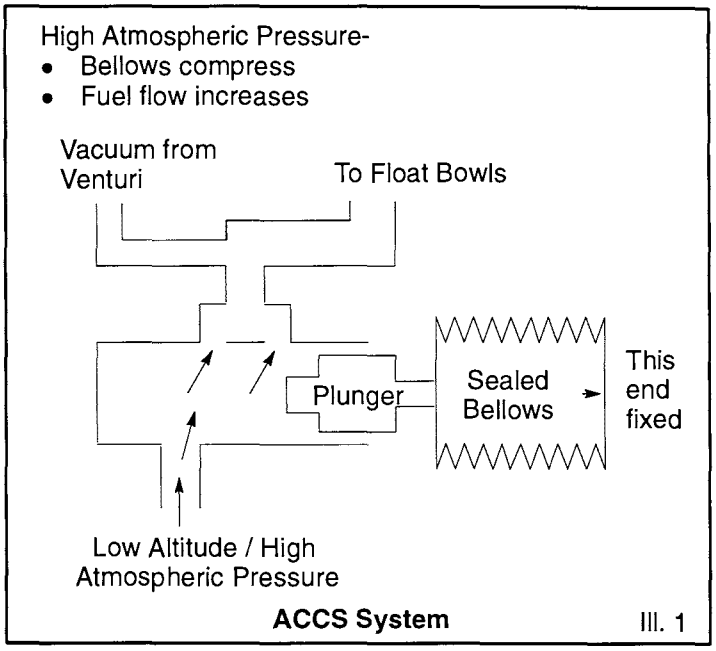


ACCS valves cannot be interchanged between models. When replacing a faulty valve, be sure the identification number stamped on the valve body is correct.

Altitude Compensating Carburetor System (ACCS)

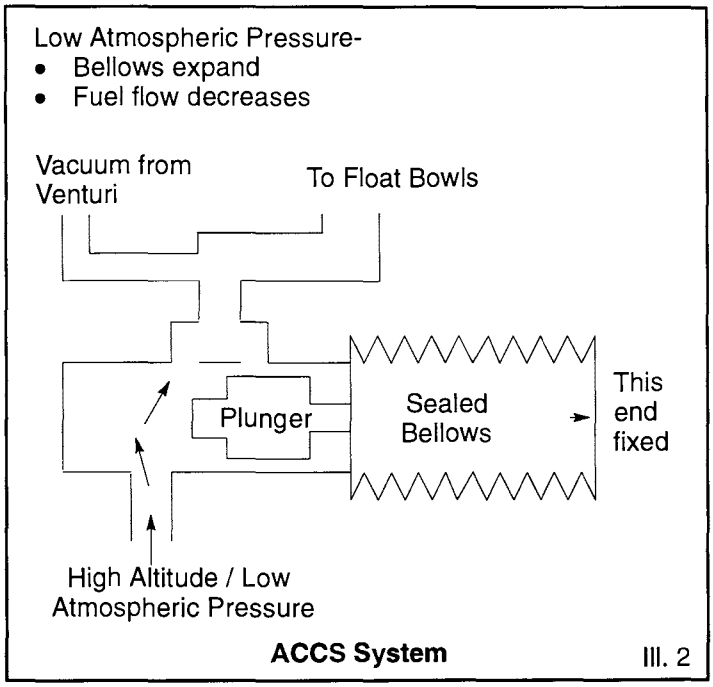
The Altitude Compensating Carburetor System (ACCS) is designed to automatically compensate for changes in altitude. This allows the snowmobile to operate in changing elevations without having to change jets, although extreme temperatures may require re-jetting for optimum performance. Refer to the jetting compensation chart in the specifications sections.

A vacuum line is connected to the float bowl. The ACCS valve is connected to this line via the 4-way manifold. At low altitude the ACCS valve supplies atmospheric pressure to the vacuum line and the float bowl (see Ill. 1).



At high altitudes the bellows expand, moving the plunger to the left and closing off some of the passageways through the ACCS valve (see Ill. 2). This prevents atmospheric pressure from reaching the float bowl, allowing the vacuum line to reduce the pressure in the float bowl. This reduces the amount of fuel supplied through the carburetor, preventing the mixture from becoming too rich.

NOTE: The ACCS valve is calibrated specifically for the model it was intended. There are no adjustments for the valve, and it should not be tampered with in any way.



Explanation of Gasoline Volatility

One of the sometimes misunderstood properties of gasoline is its volatility, or ability to vaporize at different ambient temperatures and altitudes during the year.

When gasoline is blended, it is given a Reid Vapor Pressure (RVP) number which reflects its ability to vaporize or mix with air at a given temperature range. Gasoline vapor pressure is measured by putting a sample of fuel inside a closed container and applying a specified amount of heat to the container for a certain amount of time. RVP will vary from about 7.0 PSI during the summer to approximately 13.5 PSI during the colder months. Service stations selling a large volume of fuel will normally have the correct blend to work well at all times throughout the year in their local area.

When the weather is very cold, gasoline must be able to vaporize very quickly in order for an engine to start and warm up properly. If summer blend fuel is being used in the winter, little or no vaporization will occur. Droplets will form causing flooding and very hard starting.

If winter blend fuel is being used during the summer months, it may cause vapor lock (boiling fuel) inside the fuel lines, fuel pump, or carburetor. This will cause warm engine driveability problems and hard starting when warm. Some states are limiting the Reid Vapor number to 9.0 PSI year around to help meet evaporative emissions standards.

Warm Weather

Cold Weather

Maximum Reid Vapor		Ambient Air Temp. Range	
Class	Pressure	Low	High
A	7.0 PSI	60° F	110° F +
B	9.0 PSI	50° F	110° F
C	10.5 PSI	40° F	97° F
D	12.0 PSI	30° F	85° F
E	13.5 PSI	20° F	69° F

Add 2.4° F for each 1000 feet above seal level.

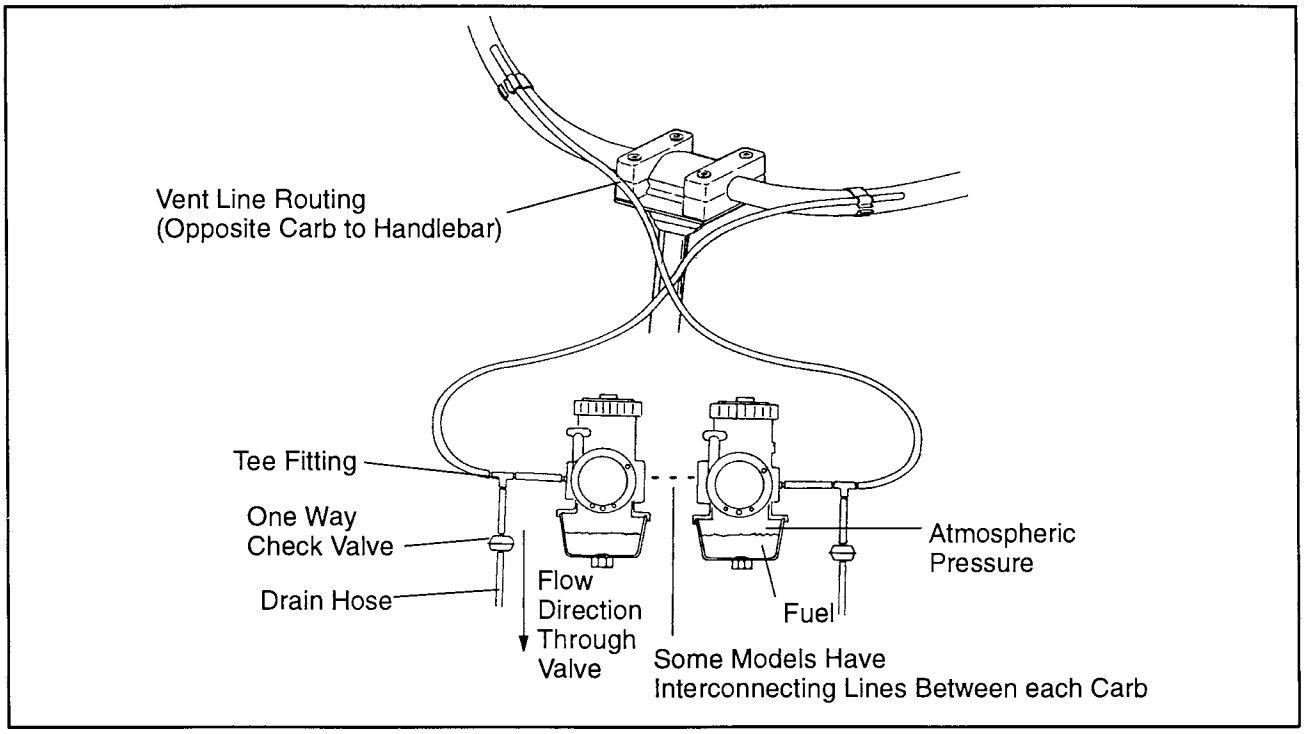
Low Vaporization Rate

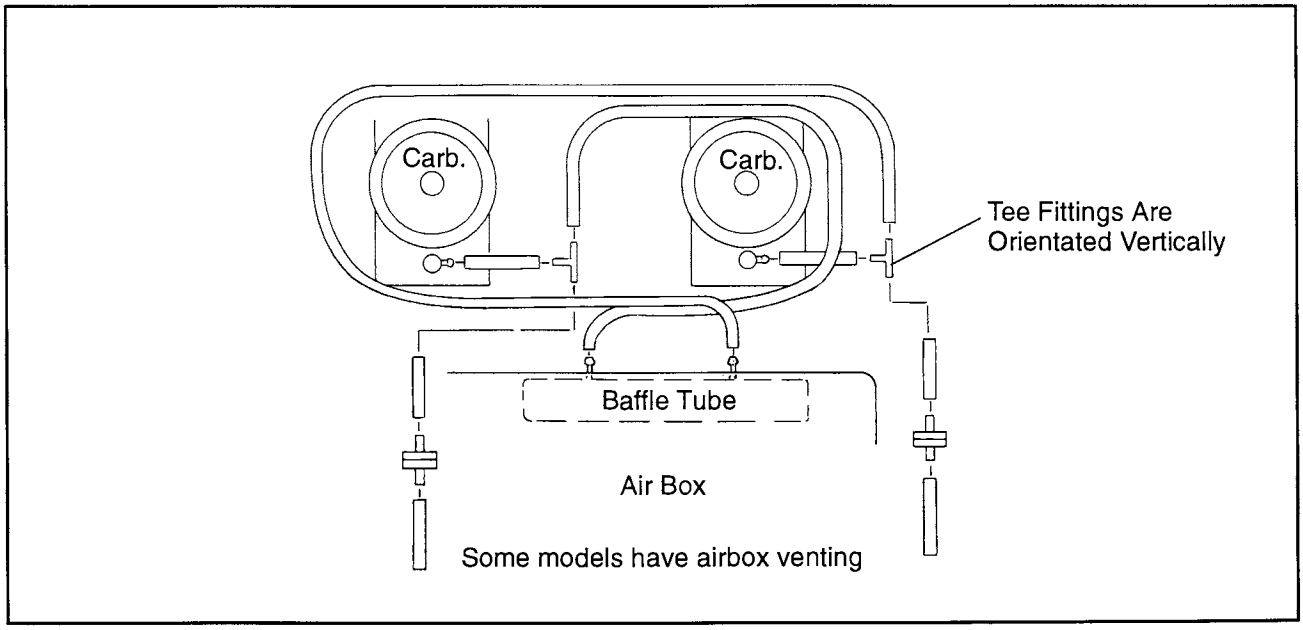
High Vaporization Rate

Float Chamber Venting

Fuel flows through a carburetor by creating a pressure difference between the venturi and the float bowl. The greater the pressure difference, the greater the fuel flow. On some models the float bowl is vented to the handlebars. This provides consistent atmospheric pressure for a consistent fuel flow. If the vent lines become kinked, plugged, or exposed to fluctuating pressures (under hood) the pressure difference will change, causing erratic fuel flow.

Polaris has airbox venting on some models. The vent lines are connected to a baffle inside the airbox. This provides a more consistent pressure difference between the carburetor venturi and the float bowl as the vacuum inside the airbox changes. For example, if the airbox foam filter becomes restricted with snow when riding in powder, the airbox vacuum increases. Without airbox venting, the pressure difference would increase substantially, choking or flooding the engine. With airbox venting, the pressure difference remains the same, creating a slightly-leaner mixture to compensate for reduced air flow.





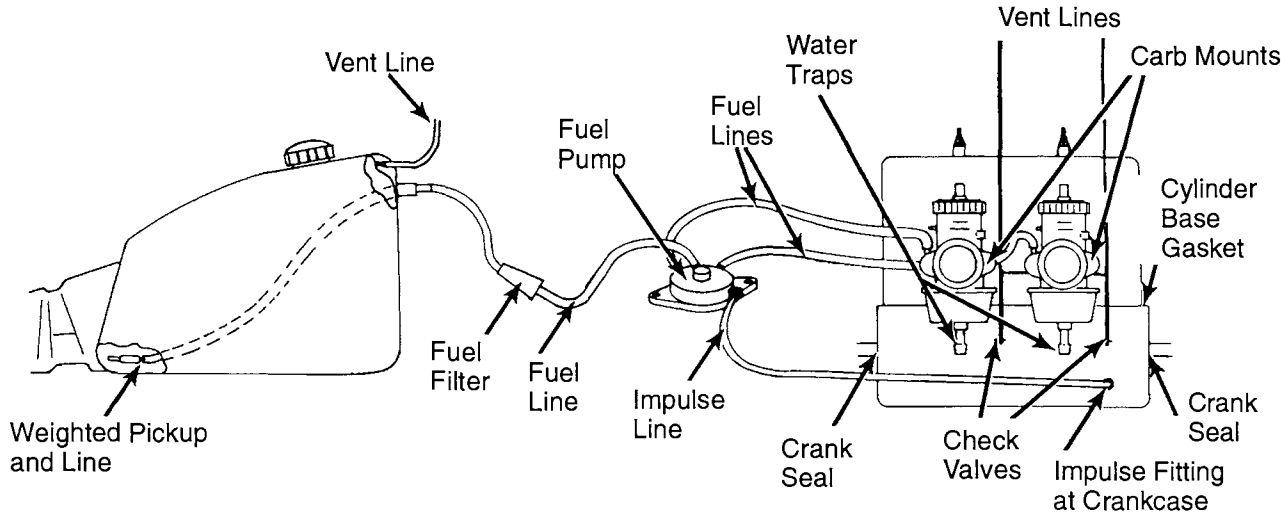
Fuel Delivery System - Typical

The fuel system contains many components which directly affect fuel mixture and driveability. When performing diagnosis or carburetor maintenance, the entire fuel delivery system should be inspected. The illustration below shows parts of the system requiring periodic maintenance to ensure there is no fuel or air leaks present.

Fuel filters should be replaced at least once per season or more often if any contamination is suspected.

Fuel lines should be replaced every other season or more often if they become brittle or swollen. Fittings should be inspected at that time for cracks or leaks.

Test run and check the fuel system for leaks any time parts are replaced. Verify that all lines are routed correctly away from any moving parts.

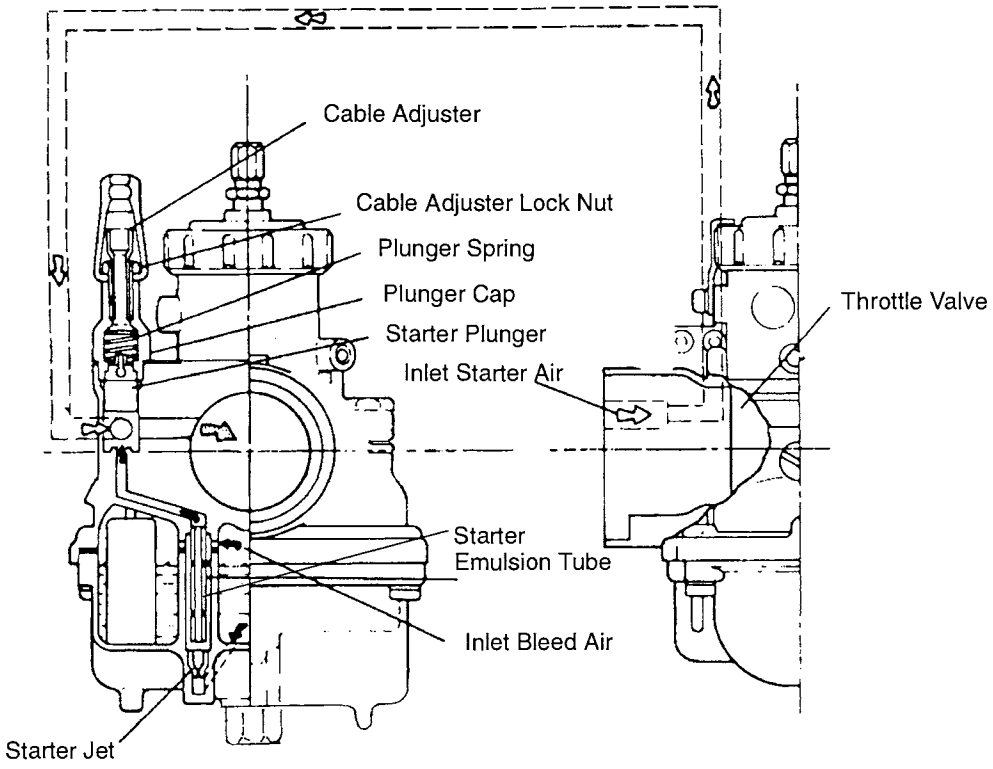


NOTE: 1999 500 XC and 500 XC SP fuel filters are inside the fuel tank. To inspect/replace filter:

- Remove fuel from tank
- Remove air box
- Remove fuel line fitting from fuel tank
- Pull fuel line, pickup, and filter from tank

FUEL SYSTEM/CARBURETION
Typical Mikuni Starter System - Closed Throttle

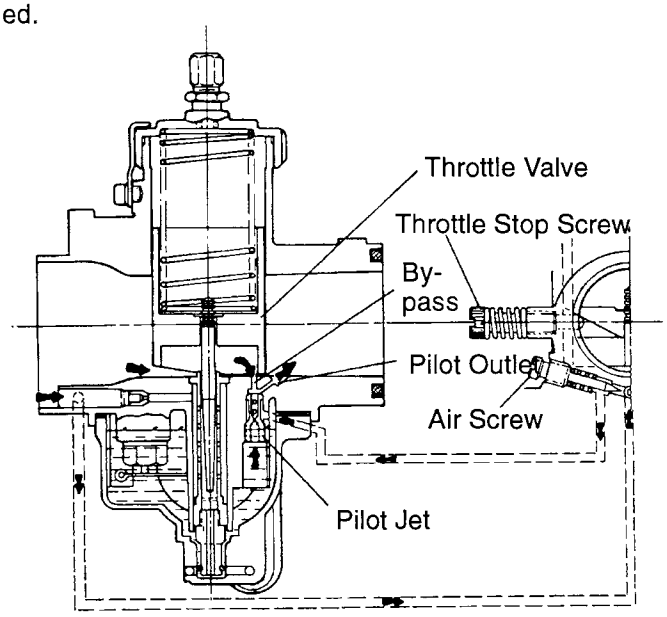
Mikuni carburetors use a starter enricher system rather than a choke. In this type of carburetor, fuel and air for starting the engine are metered with entirely independent jets. The fuel metered in the starter jet is mixed with air and is broken into tiny particles in the emulsion tube. The mixture then flows into the plunger area, mixes again with air coming from the air intake port for starting and is delivered to the engine through the fuel discharge nozzle in the optimum air/fuel ratio. The starter is opened and closed by means of the starter plunger. The starter type carburetor is constructed to utilize the negative pressure of the inlet pipe, so it is important that the throttle valve is closed when starting the engine.



The pilot system's main function is to meter fuel at idle and low speed driving. Though its main function is to supply fuel at low speed, it does feed fuel continuously throughout the entire operating range.

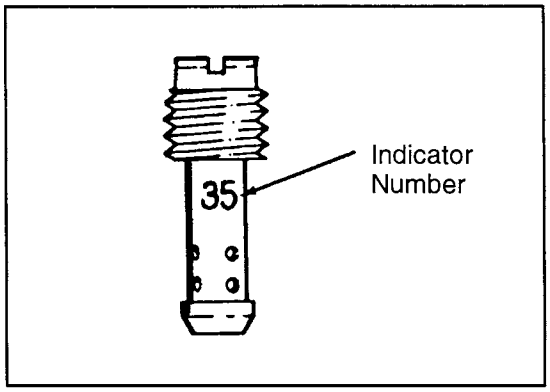
Fuel for the pilot jet is drawn from the float bowl, mixed with air regulated by the air screw, and delivered to the engine through the pilot outlet.

The mixture is regulated to some degree by adjusting the air screw. When the air screw is closed, the fuel mixture is made richer as the amount of air is reduced. When the air screw is opened, the mixture is made more lean as the amount of air is increased.



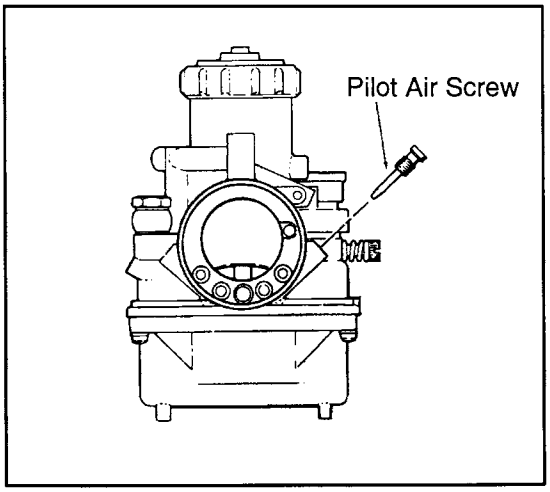
Pilot Jet

From idling to low speeds, the fuel supply is metered by the pilot jet. There are several air bleed openings in the sides of the pilot jet which reduce the fuel to mist. The number stamped on the jet is an indication of the amount of fuel in cc's which passes through the jet during a one minute interval under a given set of conditions.



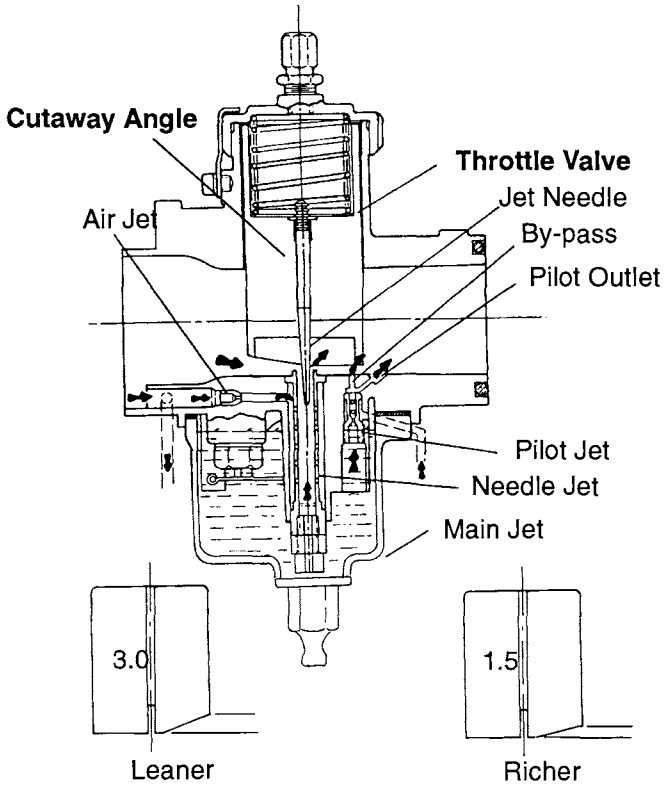
Pilot Air Screw

The pilot air screw controls the fuel mixture from idle to low speeds. The tapered tip of the air screw projects into the air passage leading to the pilot jet air bleeds. By turning the screw in or out, the cross sectional area of the air passage is varied, in turn varying the pilot jet air supply and changing the mixture ratio.



FUEL SYSTEM/CARBURETION
Slide Cutaway (1/8-3/8 Throttle)

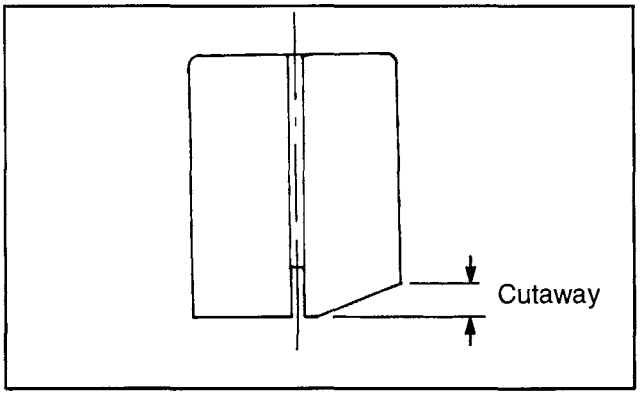
Throttle valve cutaway effect is most noticeable at 1/4 throttle opening. The amount of cutaway is pre-determined for a given engine to maintain a 14:1 air/fuel ratio at part throttle. A steep angle would indicate a fairly lean mixture because there is less resistance to air flow. A flat angle would provide a much richer mixture because there is more resistance to air flow. The venturi shape can be adjusted for each engine's breathing characteristics by using a different valve cutaway angle. A number will be stamped into the bottom of the valve (e.g. 2.5) indicating the size of the cutaway. The higher the number, the steeper the angle. (Leaner mixture).



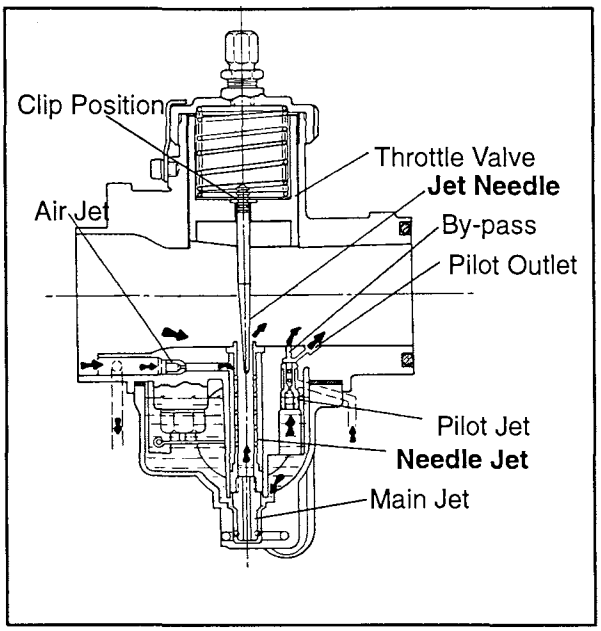
Throttle Valve

The throttle valve controls the rate of engine air intake by moving up and down inside the main bore. At small throttle openings, air flow control is performed chiefly by the cutaway. By controlling air flow the negative pressure over the needle valve is regulated, in turn varying the fuel flow.

The throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway. The higher the number, the leaner the gasoline/air mixture.



The jet needle and needle jet have the most effect between 3/8 and 3/4 throttle opening. Some mixture adjustment can be accomplished by changing the location of the "E" clip on the needle. Moving the clip down raises the needle in the jet passage and richens the mixture. Moving the clip up lowers the needle in the jet passage and leans the mixture. Letter and number codes are stamped into the needle and the jet indicating sizes and tapers (needles only) of each.



Jet Needle / Needle Jet - Fig. 1

The jet needle tapers off at one end and the clearance between the jet needle and the needle jet increases as the throttle valve opening gets wider. The air/fuel mixture ratio is controlled by the height of the "E" ring inserted into one of the five slots provided in the head of the jet needle. The chart at right shows the variation of fuel flow based on the height of the "E" ring.

Needle Jet - Fig. 2

The needle jet works in conjunction with the jet needle to regulate fuel flow rate. An air bleed opening in the side of the needle jet brings in air measured by the air jet. This air initiates the mixing and atomizing process inside the needle jet. Mixing is augmented by a projection at the needle jet outlet, called the primary choke. The letter number code stamped on the jet indicates jet inside diameter.

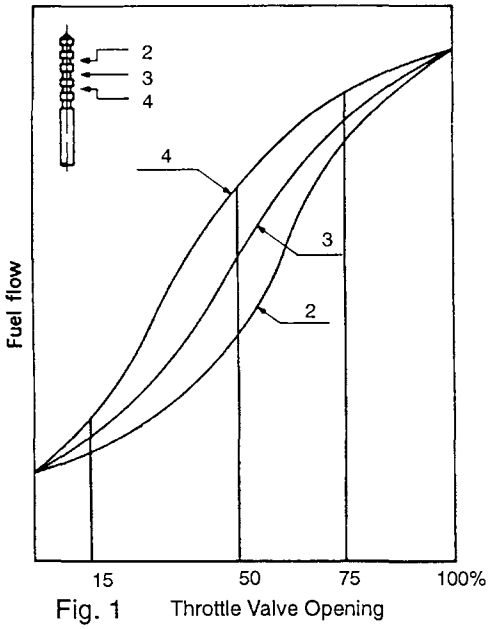


Fig. 1

Throttle Opening vs. Fuel Flow - Fig. 3

In a full throttle condition the cross sectioned area between the jet needle and the needle jet is larger than the cross sectioned area of the main jet. The main jet therefore has greater control over fuel flow.

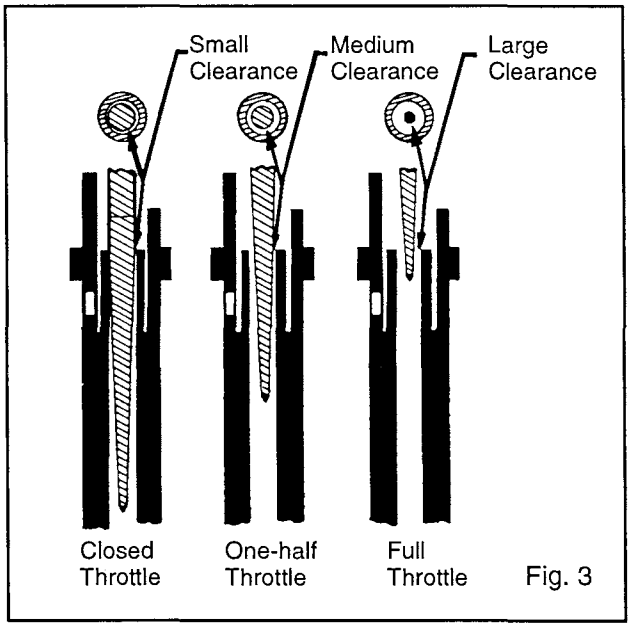


Fig. 3

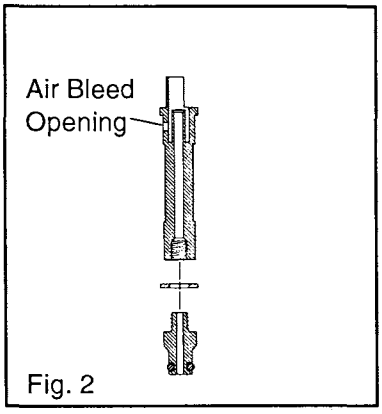
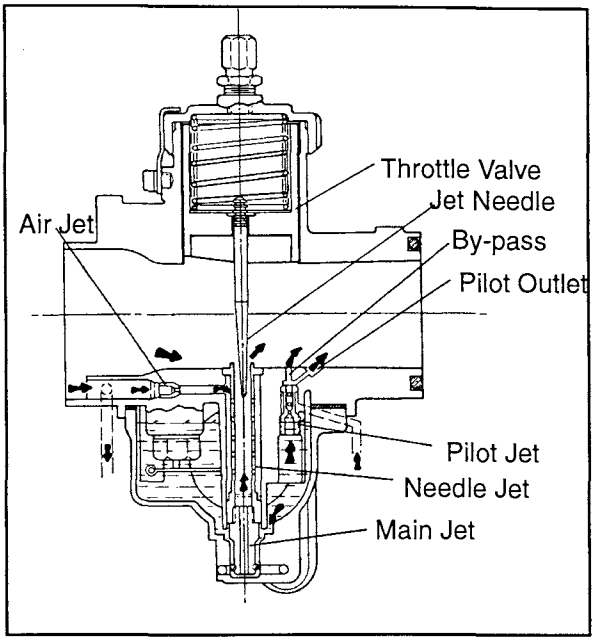


Fig. 2

FUEL SYSTEM/CARBURETION
Main System (3/4 to Full Throttle)

The main system is designed to deliver fuel between low speed and high speed operation. This system is made up of the jet needle, needle jet, and main jet. The main system begins to take effect as soon as there is enough air flow into the carburetor venturi to draw fuel up through the main jet and needle jet assembly. This system works in conjunction with the needle jet system.

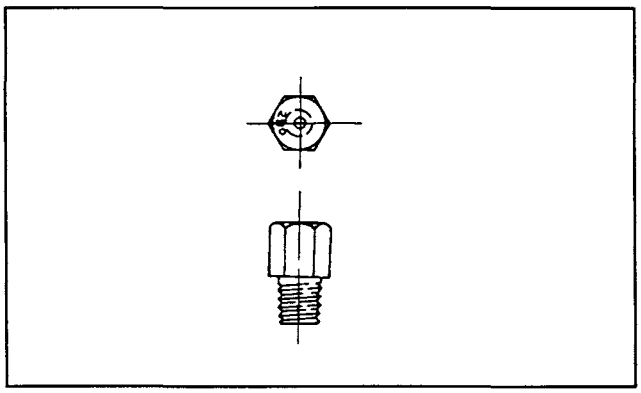
During low speed driving, there is very little clearance between the jet needle and the needle jet; therefore, very little fuel from the main jet can pass between the jet needle and the needle jet. As the throttle valve opening is increased, the tapered jet needle is raised farther out of the needle jet, allowing greater fuel flow. Under full throttle opening, the cross sectioned area of clearance between the jet needle and the needle jet becomes greater than the cross sectioned area of the main jet. Thus the main jet is now controlling the amount of fuel flow.



Main Jet

When the throttle opening becomes greater and the area between the needle jet and jet needle increases, fuel flow is metered by the main jet. The number on the jet indicates the amount of fuel CCs which will pass through it in one minute under controlled conditions. Larger numbers give a greater flow, resulting in a richer mixture.

Main jets are screwed directly into the needle jet base.



Keihin Main Jet

The number on the Keihin main jet corresponds to the diameter of the metering orifice.

Jetting Guidelines

Changes in altitude and temperature affect air density, which is essentially the amount of oxygen available for combustion. In low elevations and cold temperatures, the air has more oxygen. In higher elevations and higher temperatures, the air is less dense.

Carburetors on *most* Polaris models are calibrated for an altitude of 0-3000 ft (0-900 meters) and ambient temperatures between -20° to +10° F (-29° to -12° C). All carburetors must be re-calibrated if operated outside the production temperature and/or altitude range. The main jet installed in production is not correct for all altitudes and/or temperatures.

CAUTION:

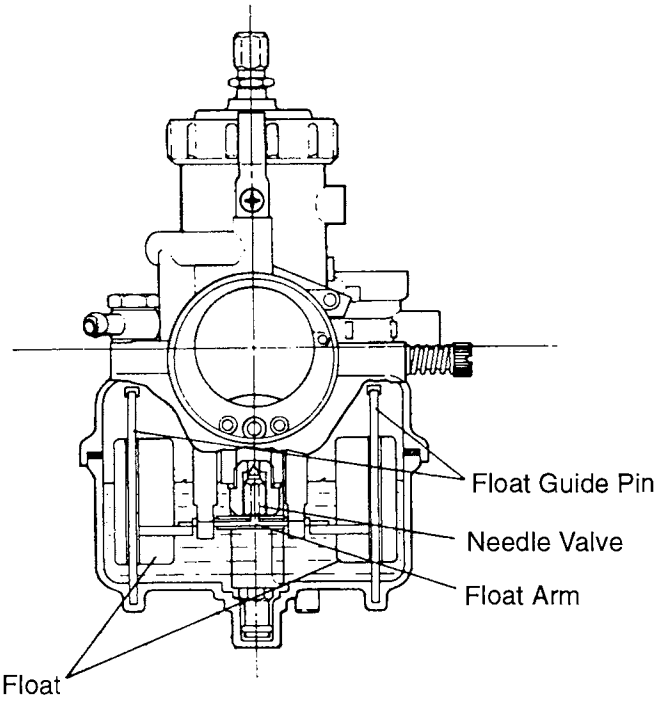
A main jet that is too small will cause a lean operating condition and may cause serious engine damage. Jet the carburetors carefully for elevation and temperature according to the jetting charts in this manual, or the jetting charts in the Owner's Safety and Maintenance Manual for each particular model.

NOTE: It is the owner's responsibility to ensure that the correct jets are installed in the machine for a geographical area. Be very careful when jetting down in warm weather. As the weather turns colder it will be necessary to re-jet upward to prevent engine damage. When selecting the proper main jet *always* use the *lowest* elevation and temperature that is likely to be encountered.

The function of a carburetor is to produce a combustible air/fuel mixture by breaking fuel into tiny particles in the form of vapor, to mix the fuel with air in a proper ratio, and to deliver the mixture to the engine. A proper ratio means an ideal air/fuel mixture which can burn without leaving an excess of fuel or air. Whether the proper mixture ratio is maintained or not is the key to efficient engine operation.

The engine of a vehicle is operated under a wide range of conditions, from idling with the throttle valve remaining almost closed, to full load or maximum output with the throttle valve fully opened. In order to meet the requirements for the proper mixture ratio under these varying conditions, a low speed fuel system, or pilot system, and a main fuel system are provided in Mikuni VM type carburetors.

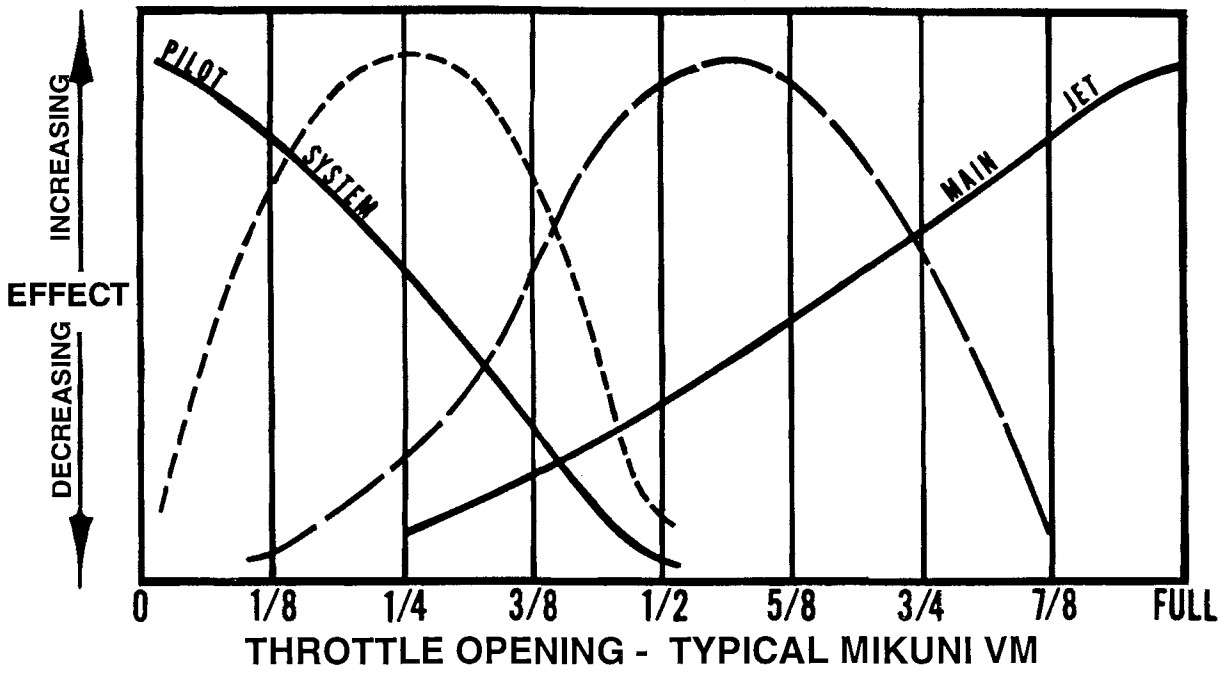
The Mikuni carburetor has varying operations depending upon varying driving conditions. It is constructed of a float system, pilot system, main system, and starter system or initial starting device.



Float System

The float system is designed to maintain a constant height of gasoline during operation. When the fuel flowing from the fuel pump into the float chamber through the needle valve reaches the constant fuel level, the floats rise. When the buoyancy of the float and the fuel pressure of the fuel pump balance, the needle valve sticks fast to the needle seat, preventing further delivery of gasoline, thereby holding the standard level of gasoline.

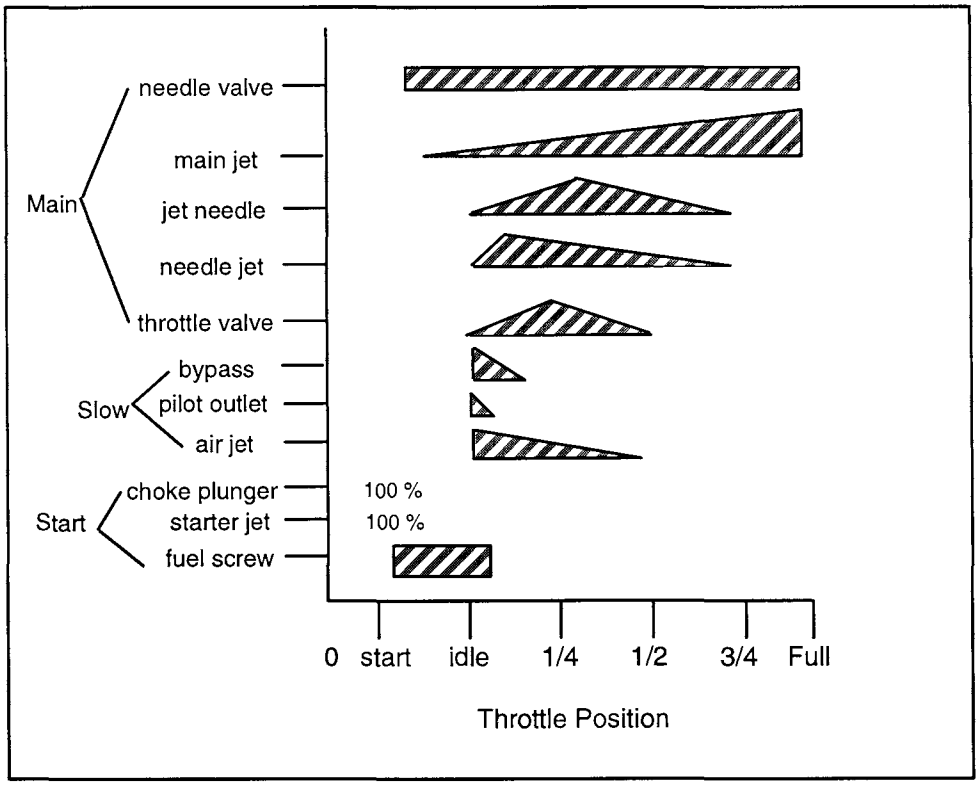
The fuel level in the bowl assists in controlling the amount of fuel in the fuel mixture. Too high a level allows more fuel than necessary to leave the nozzle, enriching the mixture. Too low a level results in a leaner mixture, since not enough fuel leaves the nozzle. Therefore, the predetermined fuel level should not be changed arbitrarily.



Throttle Valve Cut-Away

Jet Needle/Needle Jet

Polaris TM-38 Mikuni component effect versus throttle opening chart.



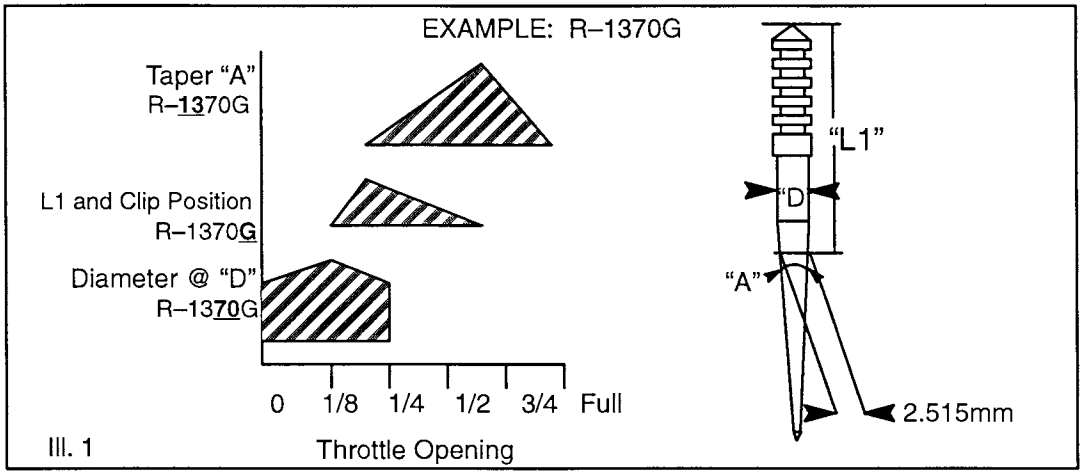
Keihin Needle Explanation

Polaris currently uses Keihin PWK 39 carburetors on some of the domestic engines. What follows is an explanation of Keihin jet needle nomenclature.

NOTE: Polaris carburetors are calibrated correctly for their intended use. It is not necessary to change needles for normal applications. The following is intended to be used as information to better understand the operation of Keihin carburetors and does not suggest that a technician should be changing jet needles for any reason. The only change for the needle that Polaris normally recommends is to the "clip" position.

Use illustrations below and the explanation to determine the affect and characteristics of different jet needles.
Keihin needles generally affect fuel delivery in three areas:

1. The diameter (D) of the needle primarily controls fuel delivery from 1/8 to 1/4 throttle openings. A needle with a smaller diameter at "D" would be richer than a needle with a larger diameter at "D" in the 1/8 to 1/4 throttle range.
2. The length (L1) of the needle mainly affects fuel delivery from 1/4 to 1/2 throttle openings. A shorter needle will be richer and a longer needle will be leaner. This produces same effect as raising or lowering the needle clip, but to a larger degree.
3. The taper (A) primordially controls fuel delivery from 1/2 to 3/4 throttle openings. A steeper taper will deliver more fuel in this throttle position range.



Ill. 1

R = Aluminum Construction

13 = Taper Angle of the needle (depicted at point "A")

13= 1°34' a 14 would be 1°45'

The larger the number = the steeper the taper.

A steeper taper is richer than a shallow taper.

An R–**14**70G needle would be richer in the 1/2 to 3/4 throttle range than a R–**13**70G needle.

70 = Diameter of the straight portion of the needle (see point "D").

A larger diameter needle at point "D" would be leaner in the 1/8 to 1/4 throttle range than a needle with a smaller diameter at point "D".

A R–13**68**G has a diameter of 2.**68**5mm at point "D"

A R–13**70**G has a diameter of 2.**70**5mm at point "D"

G = The length from the top of the needle to a point on the taper that is 2.515mm in diameter.

A "G" is shorter than a "J".

This length mainly affects mixture in the 1/4 to 1/2 throttle range.

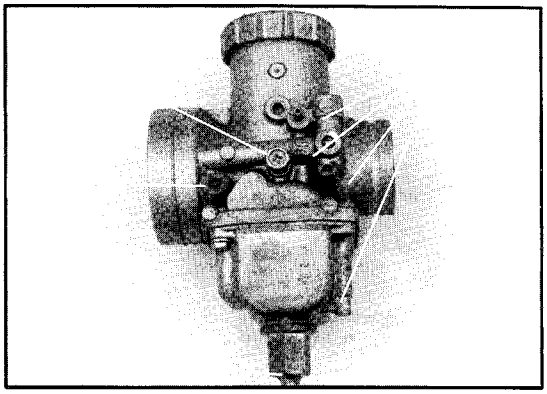
A R–1370**G** is shorter at "L1" than a R–1370**J** and a R–1370G is richer in the 1/4 to 1/2 throttle range than a R–1370J.

CAUTION:

Wear eye protection when using compressed air or cleaning solvents. Review all fuel system warnings found on page 4.1 before proceeding.

Carburetor Removal, Disassembly, and Inspection (Typical VM Mikuni)

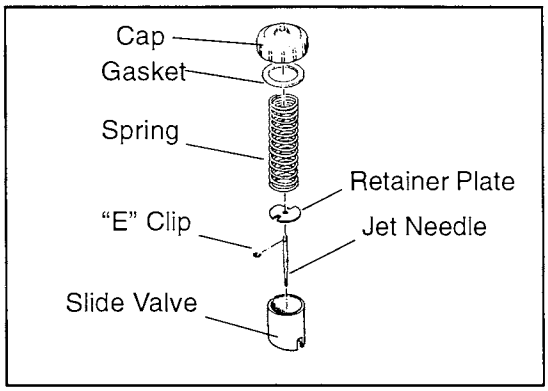
1. Remove carburetor from engine. Before disassembling, clean outside of carburetor thoroughly with solvent.



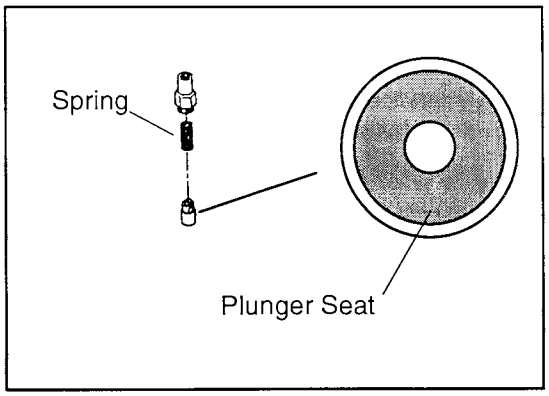
CAUTION:

Do not use compressed air to dry at this time. The float chamber could become pressurized resulting in damage to the floats or inlet needle and seat..

2. Remove slide valve. Inspect for nicks or burrs which may cause sticking.
3. Remove jet needle by compressing return spring toward top cap and removing throttle plate which rests on top of needle "E" clip. Note the "E" clip position and inspect needle taper for wear. An indication of wear would be an hourglass shape or polished spots somewhere along the taper.

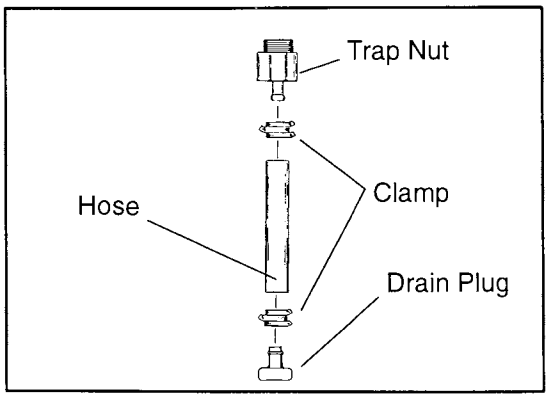


4. Remove enricher (choke) plunger. Check condition of seal on tip of plunger. Any nicks or cuts will cause leakage and a rich fuel condition, usually most evident at idle and low speeds. Inspect the plunger seat for damage or foreign material.
5. Check choke cable movement. Plungers and springs should move back and forth freely, without binding.

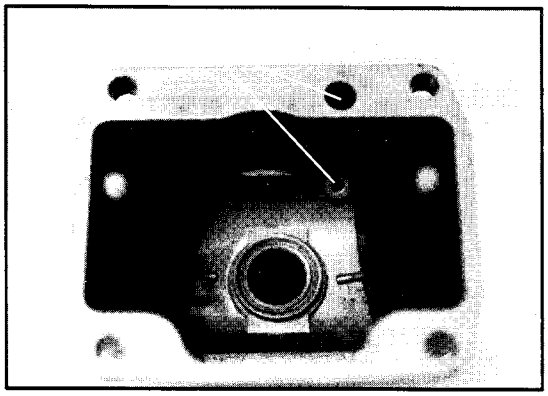


Carburetor Disassembly and Inspection

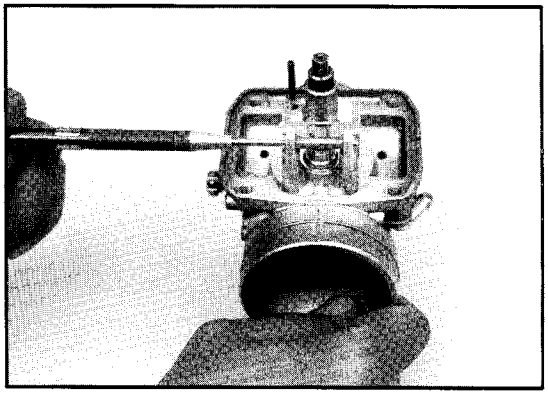
6. Remove water trap assembly from float bowl and inspect O-ring, hose and clamp condition. Refer to exploded view corresponding with carburetor being serviced.



7. Inspect enricher (choke) fuel supply passage in bowl for obstruction.



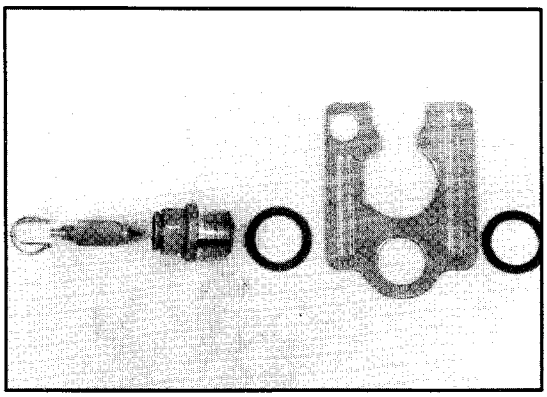
8. Use an automatic center punch to remove float arm pin. Remove inlet needle and seat assembly.



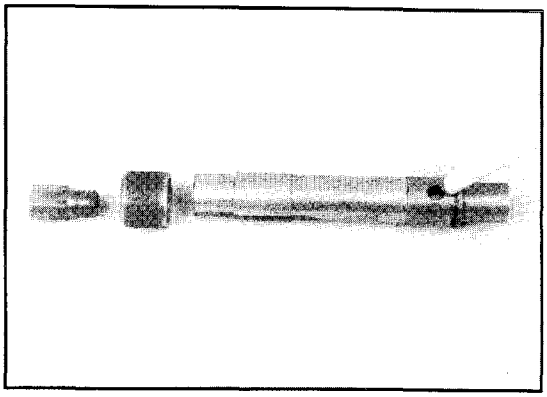
9. Inspect needle for wear and replace sealing washers upon reassembly.

CAUTION:

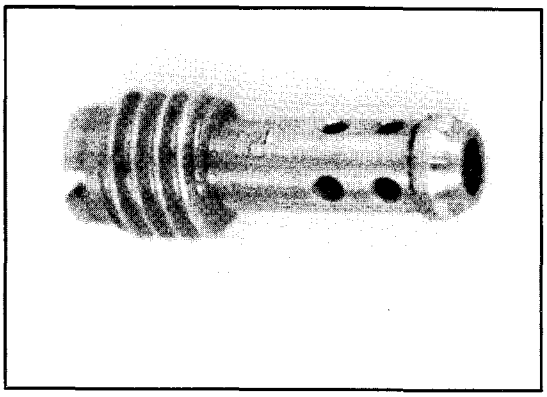
Do not bend float arm during disassembly. Do not use excessive force to remove float arm pin. The float pin tower castings are very easily damaged and are not repairable.



10. Remove main jet and washer (or spacer ring) and push needle jet into the slide valve chamber to remove. Clean air bleed hole in needle jet.



11. Remove pilot jet.



CAUTION:

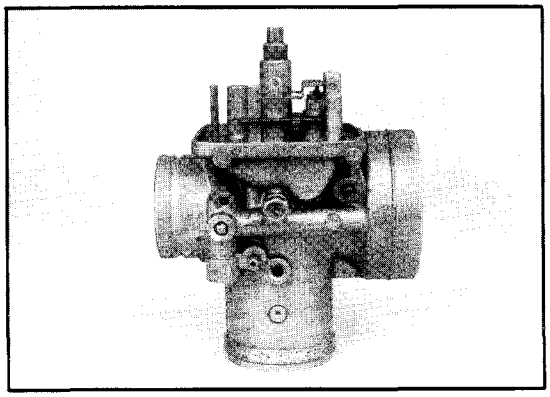
Wear eye protection when using compressed air or cleaning solvents. Review all fuel system warnings found on page 4.1 before proceeding.

12. Remove pilot air screw and clean all passages in the carburetor body with carburetor cleaner. Dry all passages and jets with compressed air. Replace gaskets and any parts which show wear or damage.
13. Reassemble carburetor, adjusting float level before installing float bowl.

Refer to page 4.27 for float level adjustment and leak testing procedures.

Float Level Adjustment

1. Remove float bowl.
2. With carburetor in an inverted position, float arm (A) should be parallel with body (B). See illustration at right. Arms must be parallel to each other.
3. To adjust float arm, bend tang contacting inlet needle.



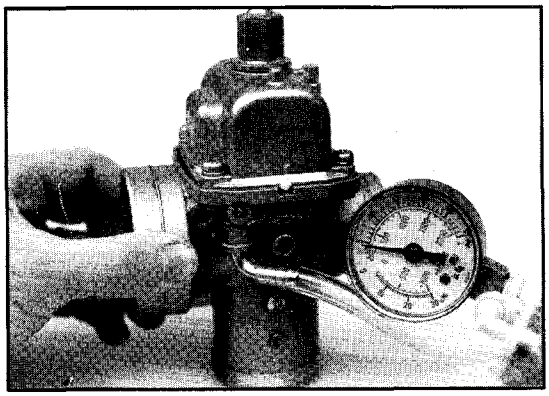
CAUTION:

Never bend the float arm itself.

Leak Testing Needle and Seat

1. Be sure float level is adjusted properly.
2. Invert carburetor.
3. Install float chamber and connect pressure tester PN 2870975 to fuel inlet fitting.

Pressure Tester PN 2870975



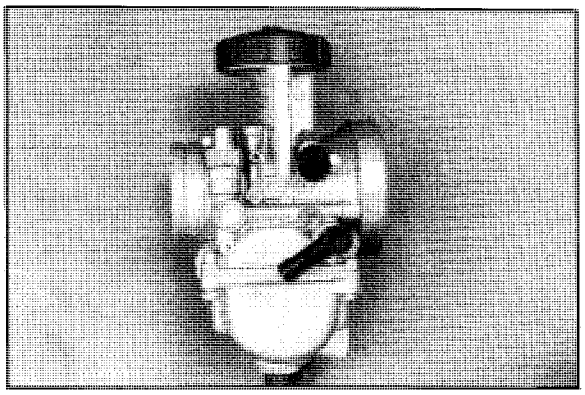
4. Apply approximately 5 PSI pressure and wait for one minute. The needle and seat should hold pressure indefinitely. If the pressure drops rapidly replace the needle and seat assembly and/or sealing washers.

CAUTION:

Wear eye protection when using compressed air or cleaning solvents. Review all fuel system warnings found on page 4.1 before proceeding.

Carburetor Removal, Disassembly, and Inspection

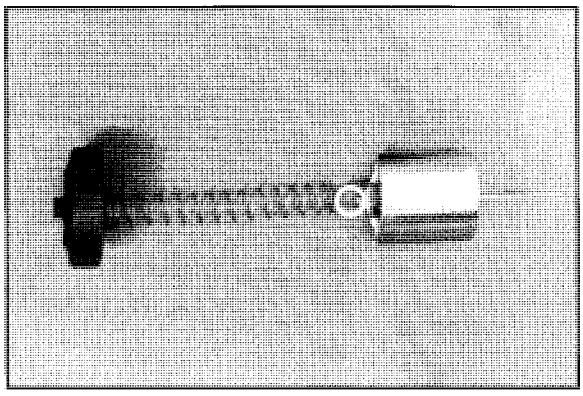
1. Remove carburetor from engine. Before disassembling, clean outside of carburetor thoroughly with solvent.



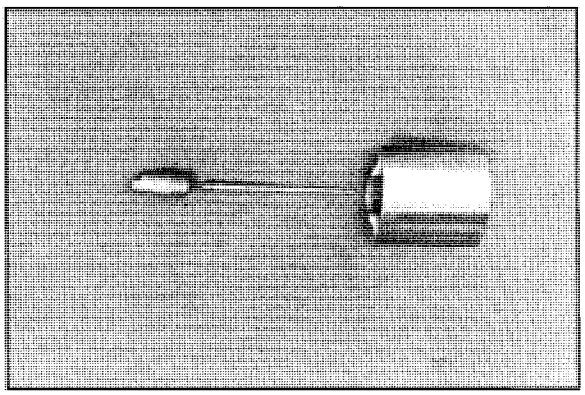
CAUTION:

Do not use compressed air to dry at this time. The float chamber could become pressurized resulting in damage to the floats or inlet needle and seat. Do not soak Keihin carburetors in carb cleaner. Clean only with aerosol cleaner.

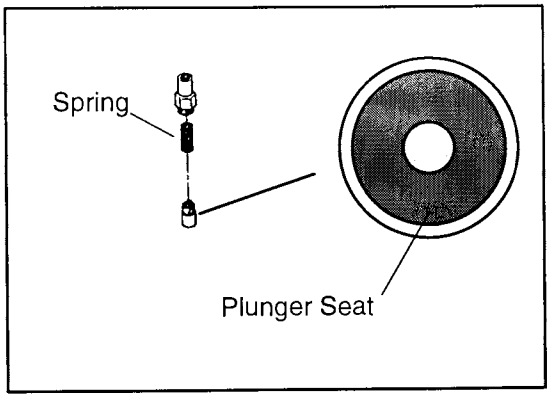
2. Remove slide valve. Inspect for nicks or burrs which may cause sticking.



3. Remove jet needle by compressing return spring toward top cap and removing throttle cable. Disconnect cable holder and remove jet needle. Note "E" clip position and inspect needle taper for wear. An indication of wear would be an hourglass shape or polished spots somewhere along the taper.

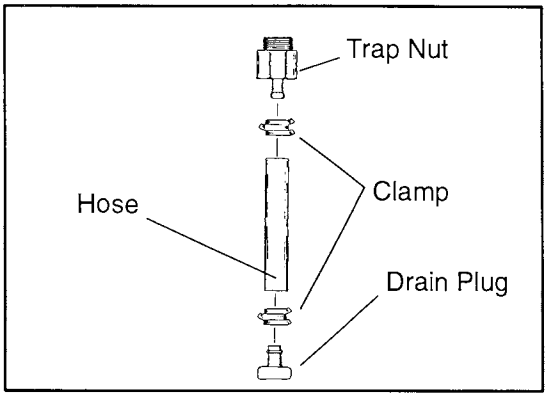


4. Remove enricher (choke) plunger. Check condition of seal on tip of plunger. Any nicks or cuts will cause leakage and a rich fuel condition, usually most evident at idle and low speeds. Inspect the plunger seat for damage or foreign material.
5. Check enricher (choke) cable movement. Plungers and springs should move back and forth freely, without binding.

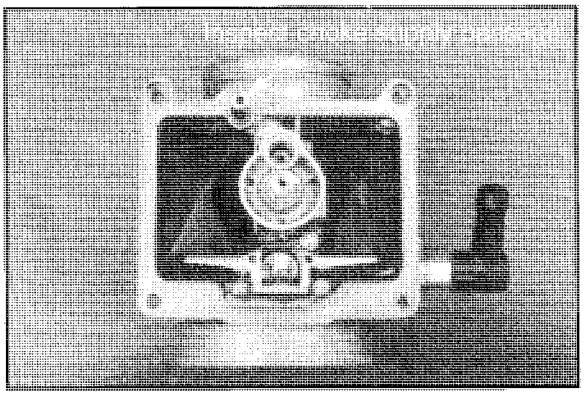


Disassembly Cont.

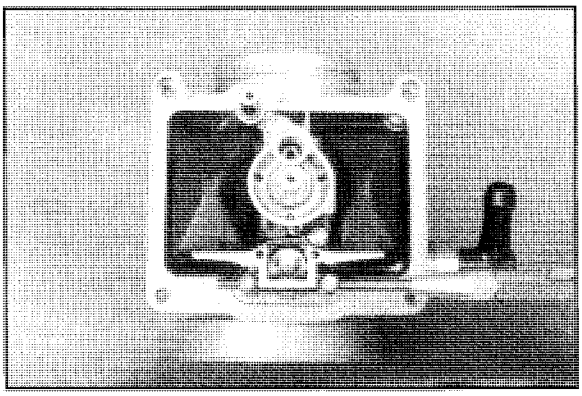
6. Remove water trap assembly from float bowl and inspect O-ring, hose and clamp condition. Refer to exploded view corresponding with carburetor being serviced.



7. Inspect choke fuel supply passage as shown for obstruction.



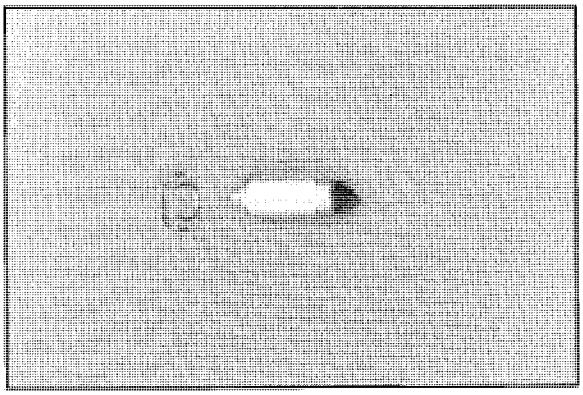
8. Remove float arm pin. Remove inlet needle. **NOTE:** Seat assembly is not replaceable. DO NOT remove.



9. Inspect needle for wear.

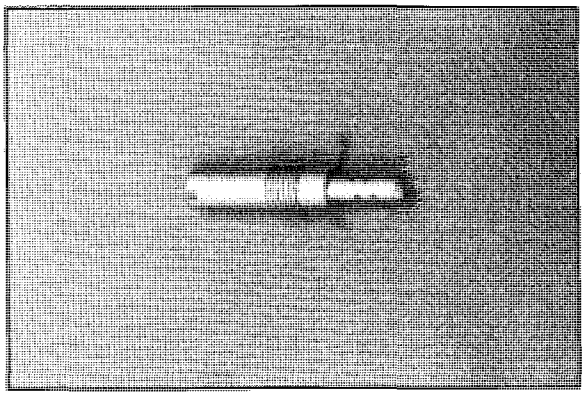
CAUTION:

Do not bend float arm during disassembly. Do not use excessive force to remove float arm pin. The float pin tower castings are very easily damaged and are not repairable.

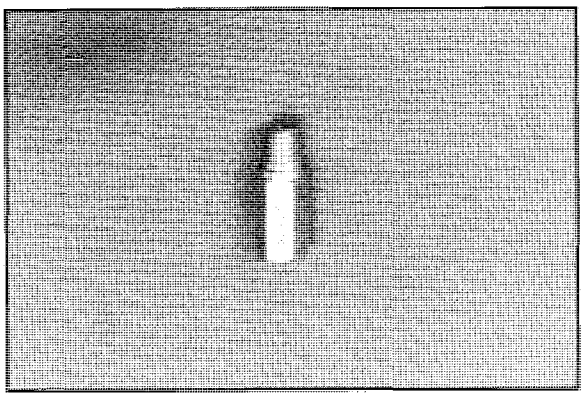


Carburetor Disassembly Cont.

10. Remove main jet.

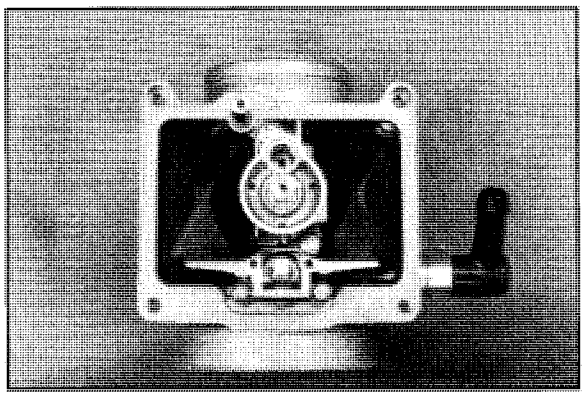


11. Remove pilot jet.
12. Remove pilot air screw and clean all passages in the carburetor body with carburetor cleaner. Dry all passages and jets with compressed air. Replace gaskets and any parts which show wear or damage.

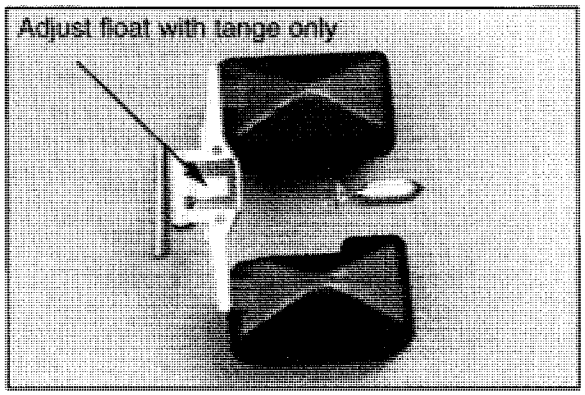


Carburetor Assembly

1. Install pilot jet and main jet.



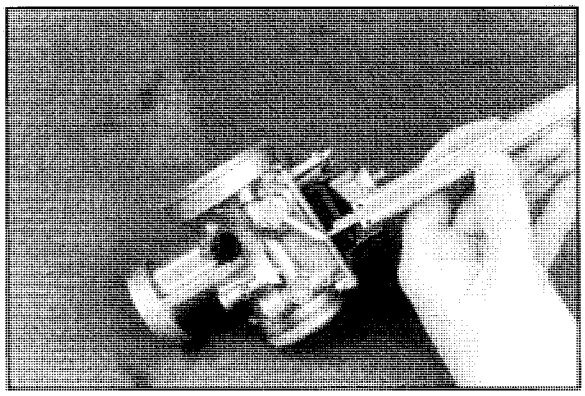
2. Install inlet needle and float assembly.



3. Hold carburetor at angle shown so needle spring is not compressed. Measure from gasket surface of carb body to highest point on float. Measurement should be within specification.

Float Height - Keihin:16mm ± 2 mm

Float Level Guage: PN 2872126



4. To adjust float level, bend tang contacting inlet needle. See photo above.

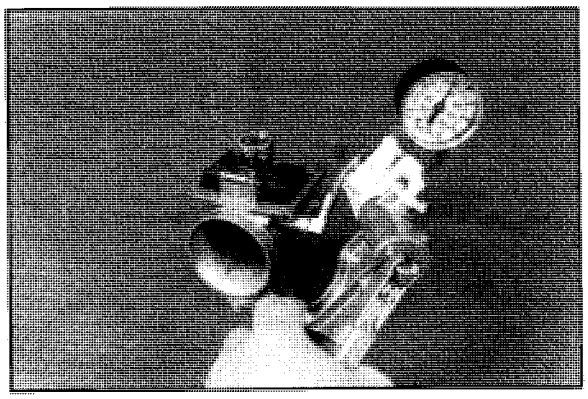
CAUTION:

Do not bend float arm. Adjustment should be made with tang contacting inlet needle.

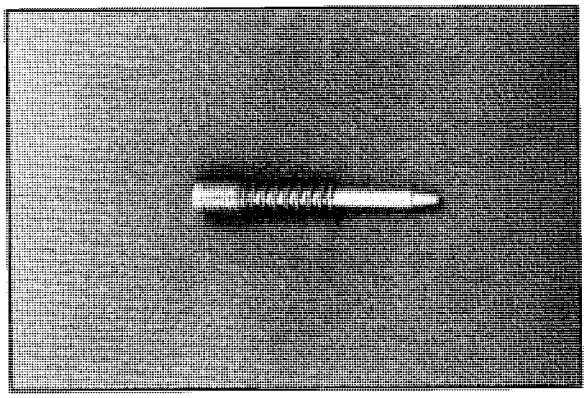
Leak Testing Needle and Seat

1. After adjusting float level, place carburetor in an inverted position.
2. Connect pressure tester to fuel inlet fitting. Apply 5 psi pressure and observe for one minute. The needle and seat should hold pressure indefinitely. If the pressure drops, carefully inspect the needle and the needle seat. The needle can be replaced if necessary. The needle seat cannot be replaced. If the seat surface is damaged replace the carburetor.

Pressure Tester PN 2870975



3. Carefully inspect float bowl gasket and replace if necessary. Install float bowl on carburetor.
4. Install idle screw and air adjusting screw.
5. Install jet needle E-clip into correct groove on needle jet.
6. Install jet needle into throttle valve.
7. Screw cable holder into throttle valve to secure jet needle and throttle valve.
8. Inspect gasket under throttle cap. Install throttle cable, spring, and collar. Connect cable to slide valve.
9. Install carburetor top cap until seated on carburetor body.



Throttle Synchronization Procedure-Mikuni and Keihin

1. Remove air box, noting position of throttle cable junction block. Reposition throttle cable and junction block in same position when air box is reinstalled.

Throttle Cable Synchronization (Throttle Gap)

2. Referring to specification section in chapter 1, select correct diameter **Throttle Gap** synchronization drill gauge for your engine.

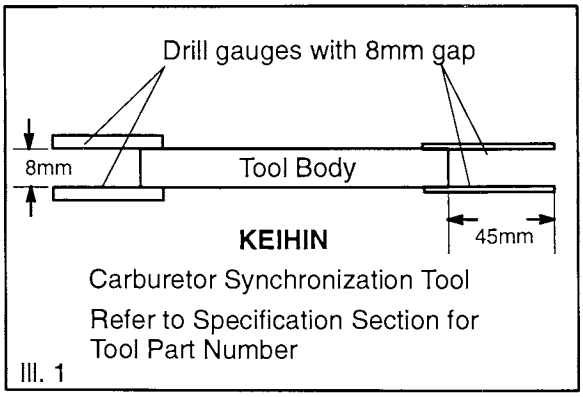
NOTE: Keihin carburetors, require a special tool with two drill gauges separated by an 8mm gap. See illustrations at right.

3. Back out idle screws about three turns.
4. Slightly lift throttle slides with throttle lever and insert tool or drill gauge under throttle slide. Allow throttle slides to return. **NOTE:** Be sure tool is positioned properly on Keihin carburetors - see Ill. 2 and Ill. 3. Mikuni see Ill. 4.
5. Loosen lock nut and turn throttle cable adjuster (on top of carburetor) in (clockwise) or out (counterclockwise) as required until a slight drag can be felt on the gauge or tool.
6. Securely tighten throttle cable synchronization lock nut.
7. Repeat steps 3 through 5 on remaining carburetor.

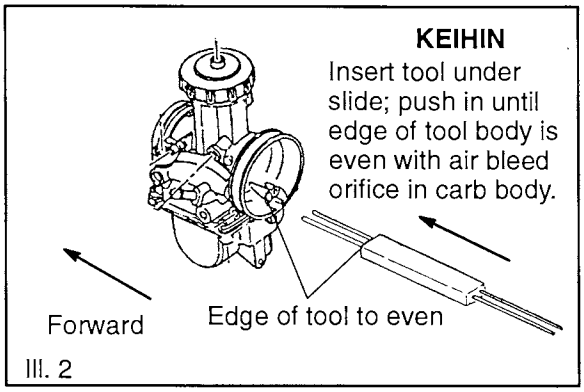
Idle Gap Synchronization

8. Referring to chart in the Specifications section, chapter 1, select correct diameter **Idle Gap** drill gauge for the engine.
9. Slightly lift throttle slides with throttle lever and insert idle gap drill gauge under throttle slide. Allow throttle slides to return.
10. Turn idle adjustment screw in as required until only a slight drag can be felt on the gauge.
11. Repeat steps 8 through 10 for remaining cylinders.
12. Verify proper throttle lever free play and adjust if necessary, by loosening cable adjuster locknuts and turning adjusters out equally until throttle lever freeplay is correct.

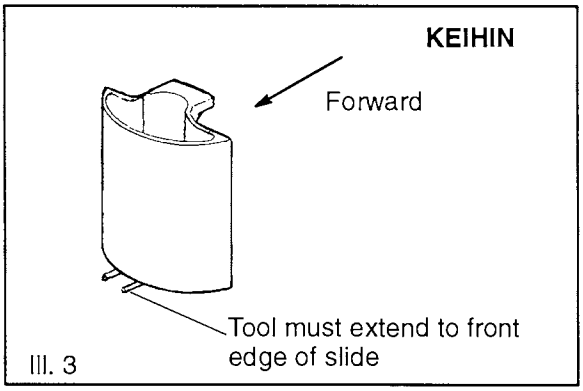
Throttle Free Play -
(Std.) 0.010 - 0.030" (.25-.76mm)
EZ Throttle 0.050 - 0.060" (1.25-1.50mm)



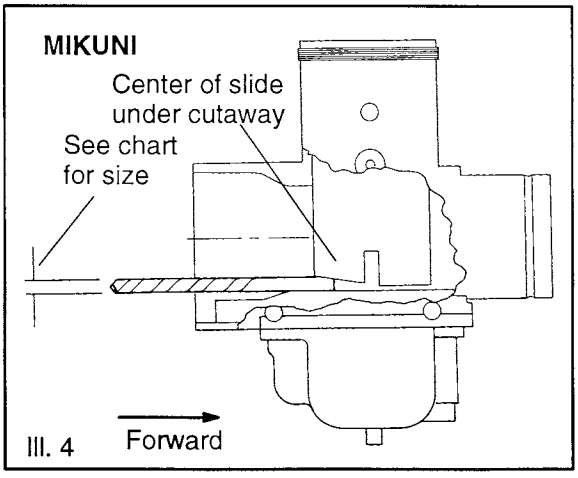
Carburetor Synchronization Tool
Refer to Specification Section for Tool Part Number
Ill. 1



Ill. 2



Ill. 3



Ill. 4

Mikuni TM-38 Carburetor Service

CAUTION:

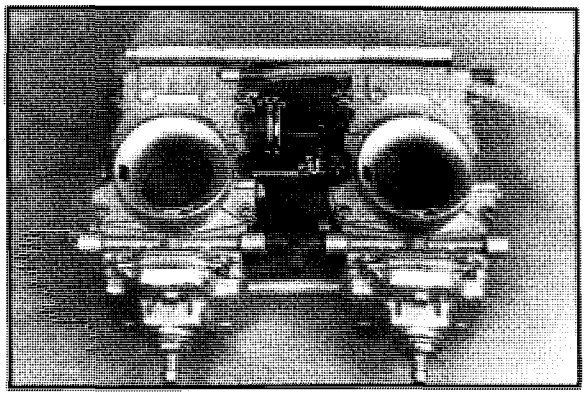
Wear eye protection when using compressed air or cleaning solvents. Review all fuel system warnings found on page 4.1 before proceeding.

Carburetor Removal, Disassembly, and Inspection

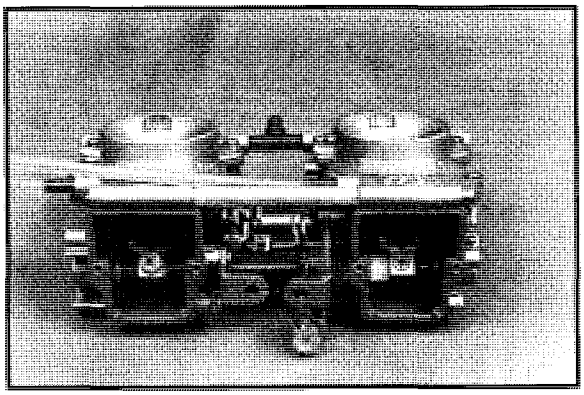
1. Remove carburetor rack from engine. Before disassembling, clean outside of carburetor thoroughly with solvent.

CAUTION:

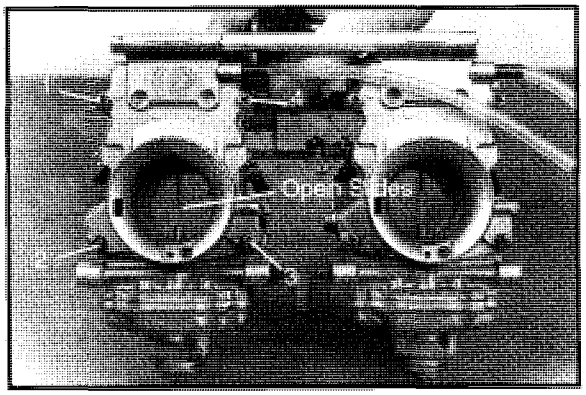
Do not use compressed air to dry at this time. The float chamber could become pressurized resulting in damage to the floats or inlet needle and seat. Do not soak carburetors in carb cleaner. Clean only with aerosol cleaner.



2. Remove top caps.



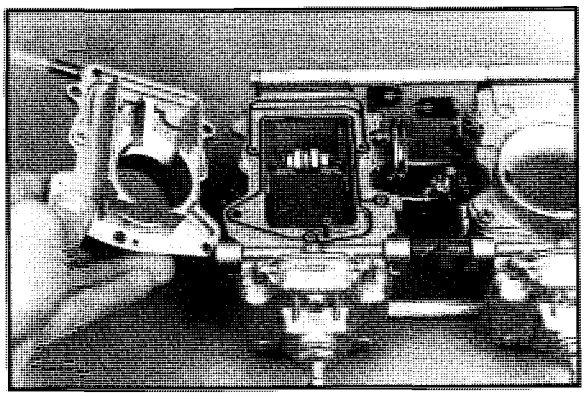
3. Remove four screws on funnel.



4. Turn throttle shaft so slide opens all the way.

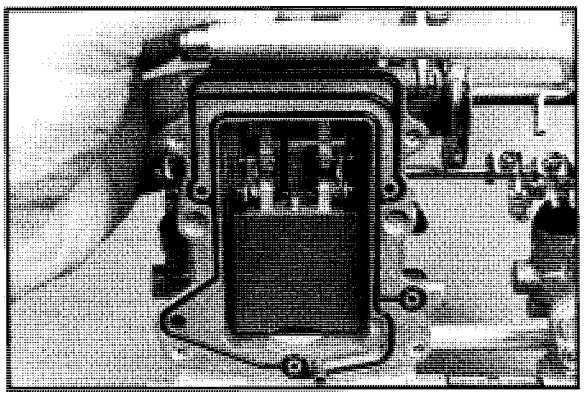
NOTE: You may have to turn out slide stop screw for slide to move farther up body.

5. With slide fully open, pull funnel out bottom first.

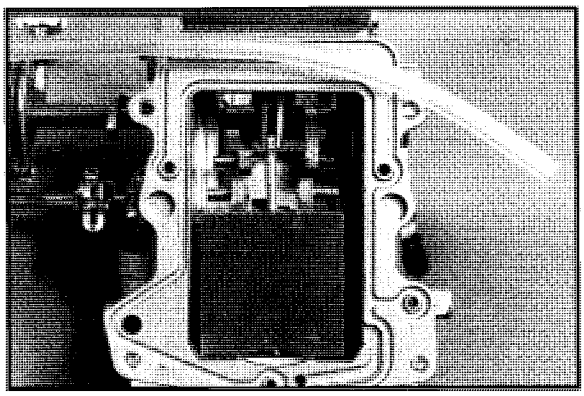


Disassembly Cont.

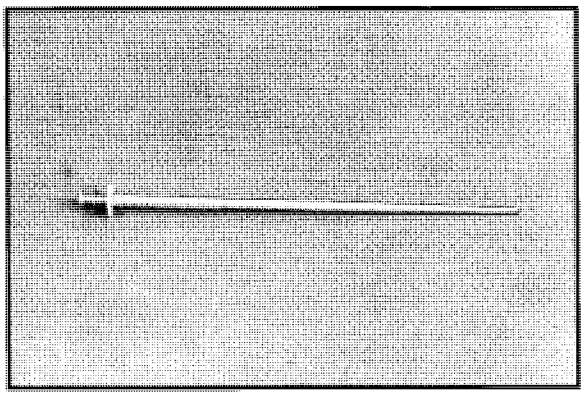
6. From top of carb, loosen allen head screw holding needle in position. Slide holding plate to side.



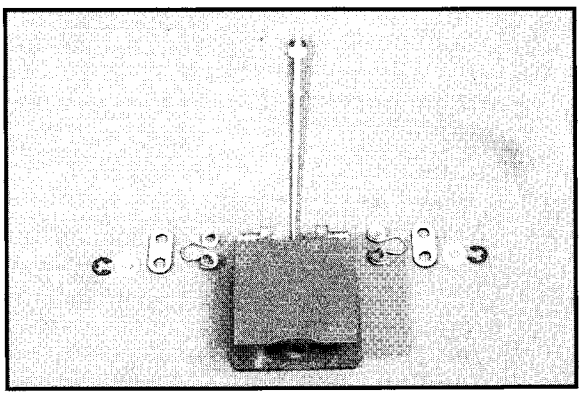
7. Reach into top of carb with a long nose pliers and pull out needle.



8. Inspect needle for wear.

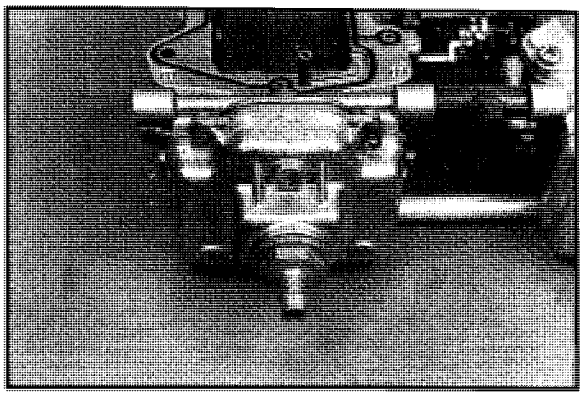


9. Remove E-rings, packing, plate, spring, and rings connecting slide to lever.



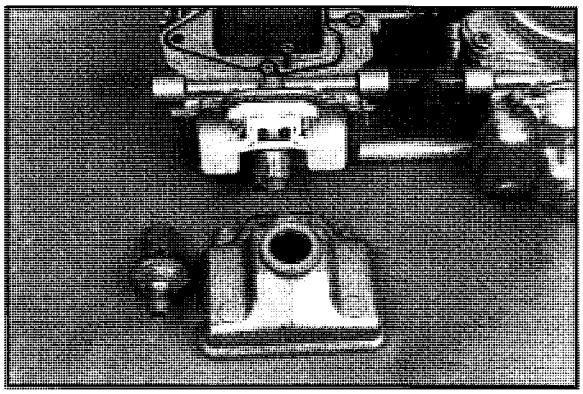
Carburetor Disassembly Cont.

10. Remove water trap/drain plug (17 mm) and single screw on bottom of carb.

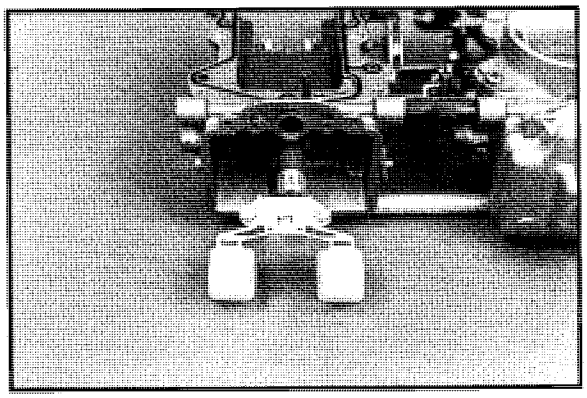


11. Remove float body

NOTE: Float body will not come off unless water trap/drain plug is removed, which is threaded and screws into main jet housing.

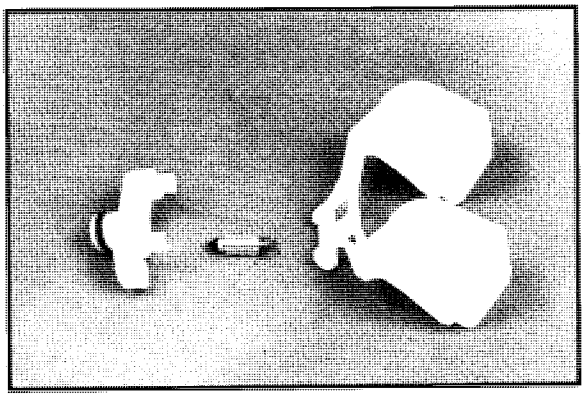


12. Remove 2 screws holding float/needle & seat assembly in position. Remove float/needle & seat assembly.



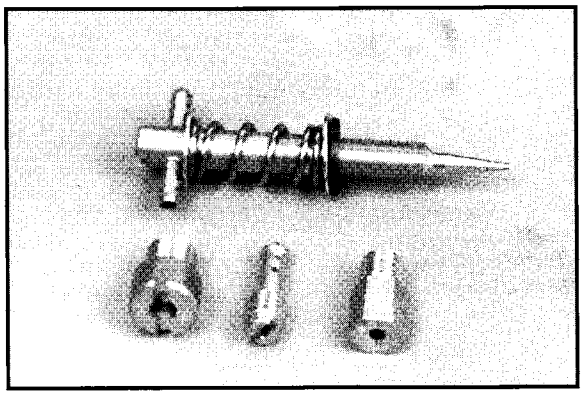
13. Inspect needle for wear.

NOTE: Needles are not available separately. If needle is bad, you must replace float/needle & seat assembly.

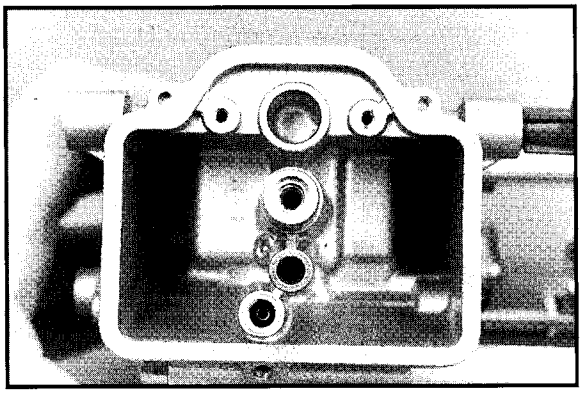


Carburetor Disassembly

1. Remove main jet, starter jet, pilot jet, and idle screw.

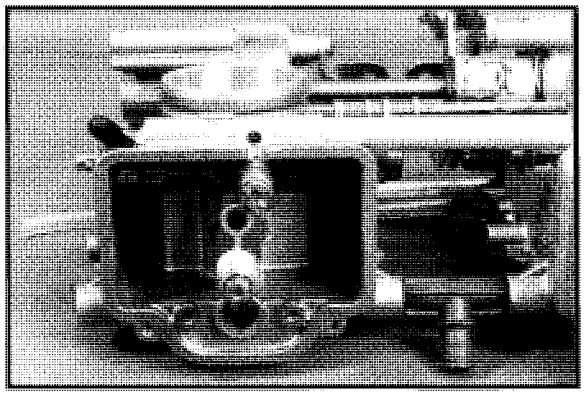


2. Clean all passages in carburetor body with carburetor cleaner. Dry all passages and jets with compressed air. Replace gaskets and any parts which show wear or damage.

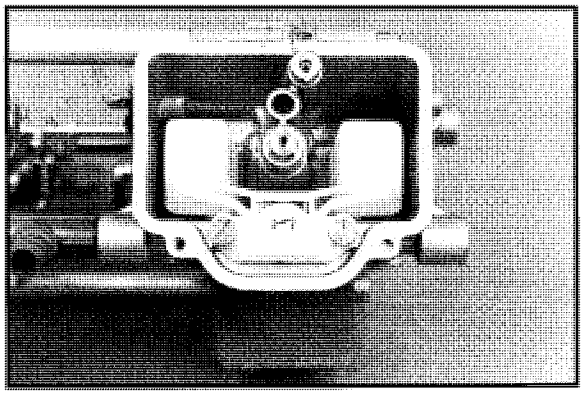


Carburetor Assembly

1. Install pilot jet, main jet, starter jet, and idle screw.

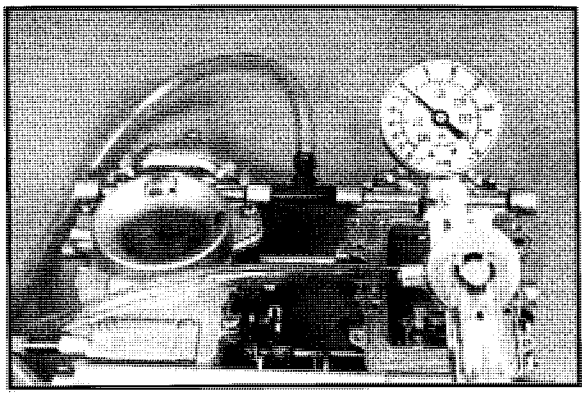


2. Install float/needle & seat assembly.

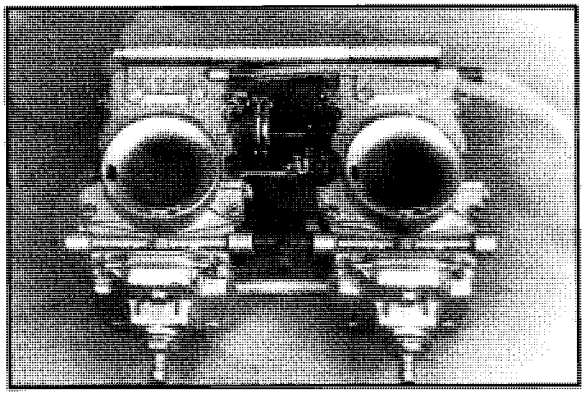


3. Place carburetor in an inverted position.
4. Connect pressure tester to fuel inlet fitting. Apply 5 psi pressure and observe for one minute. The needle and seat should hold pressure indefinitely. If the pressure drops, carefully inspect the needle and the needle seat. The needle can be replaced (needle comes with float). The seat cannot be replaced. If the seat surface is damaged replace the carburetor.

Pressure Tester PN 2870975



5. Carefully inspect float bowl gasket and replace if necessary. Install float bowl on carburetor.
6. Install float body.
7. Install air adjusting screw.
8. Install throttle slide.
9. Install jet needle.
10. Install funnel.
11. Install carburetors on snowmobile.
12. Synchronize carbs as outlined on pages 4.39 - 4.40.
13. Replace top caps.

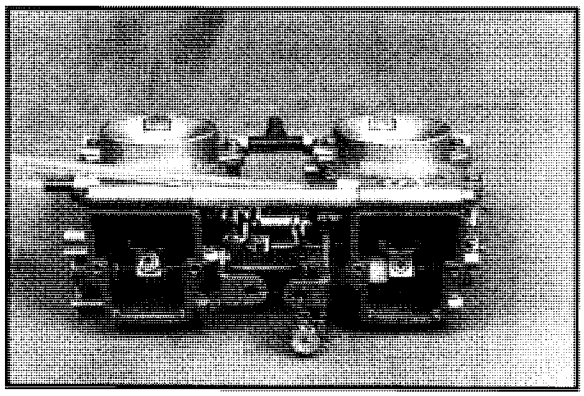


Throttle Synchronization Procedure- Mikuni TM-38 Flatslide Carburetors

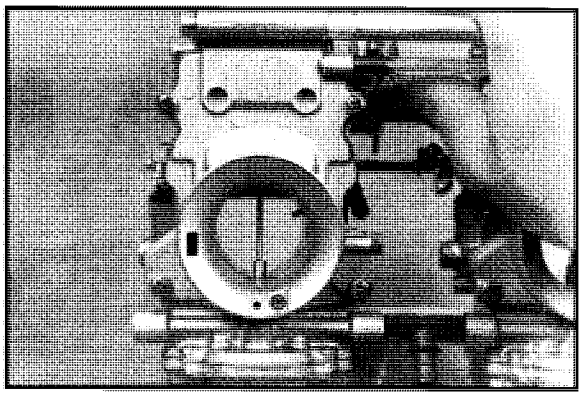
Mikuni TM-38 carburetors are synchronized at wide open throttle without the engine running. The middle carburetor on triples, and the PTO side carburetor on twins have a non-adjustable set screw on the throttle shaft. This carburetor is what the other carb(s) is synchronized to.

1. Remove airbox

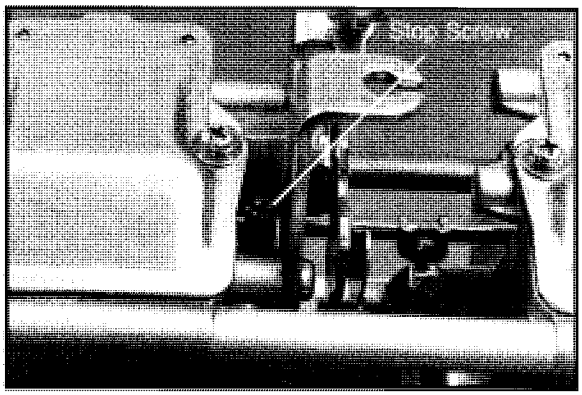
2. Remove top caps on all carburetors



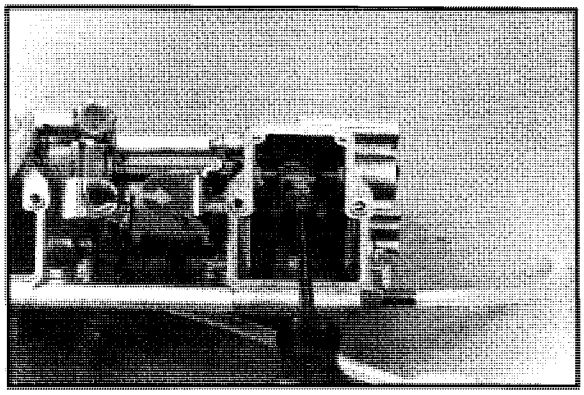
3. Hold throttle wide open and view position of carburetor slide on set carburetor. (Middle carb on triples, PTO carb on twins.)



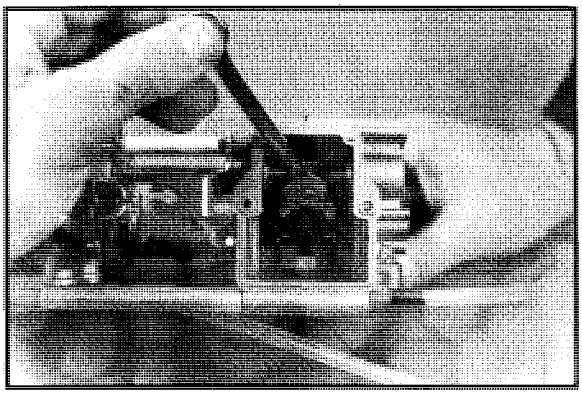
4. With throttle held wide open, turn the slide stop screw with screwdriver until slide is flush with top of carb opening.



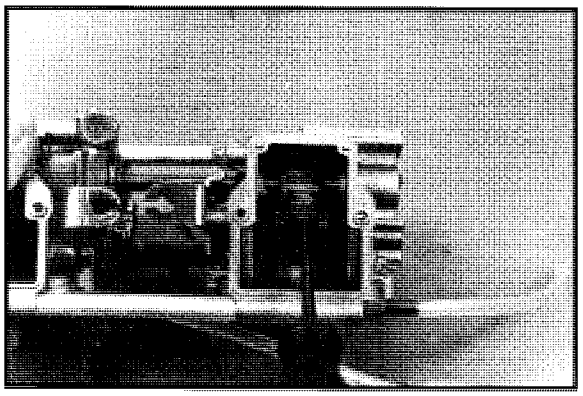
5. On remaining carb(s), loosen phillips head screw inside the offset nut.



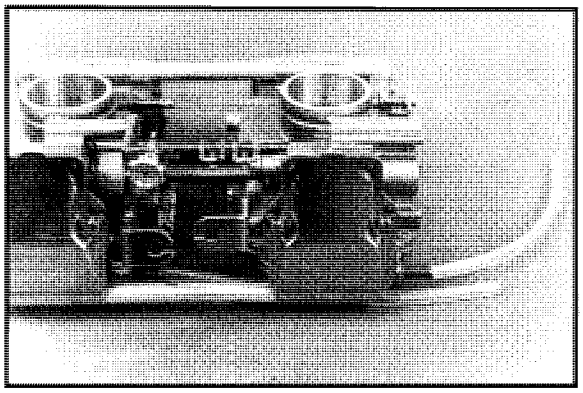
6. When screw is loose, hold throttle to wide open. Turn offset nut until throttle slide is in same position as set carburetor.



7. Tighten phillips head screw.



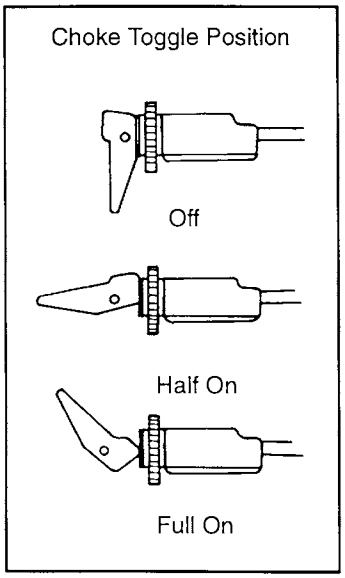
8. Replace top caps.



Choke Adjustments

With the dash mounted choke control toggle flipped to the full off position, the choke plunger must be seated on the fuel passage way in the carburetor. If the plunger is not seated on the passage way, the engine will flood or run too rich, causing plug fouling and very poor engine performance.

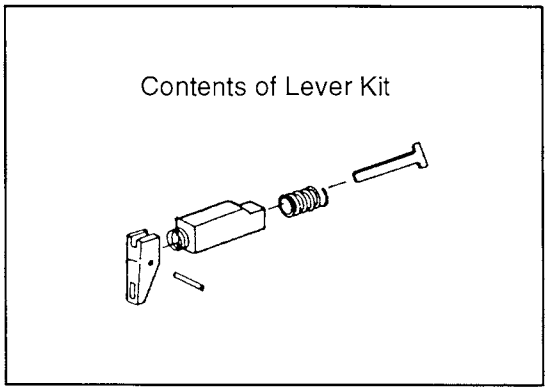
If cable slack is too great there will be excessive toggle free play resulting in hard starting. Also, the half on position used for intermittent applications will not function.



If the choke lever assembly becomes damaged, a lever kit is available. This allows replacement of the lever assembly rather than the entire cable assembly. Installation instructions are included with the kit.

Choke Lever Kits -

2 Cylinder PN 2200188
3 Cylinder PN 2200189

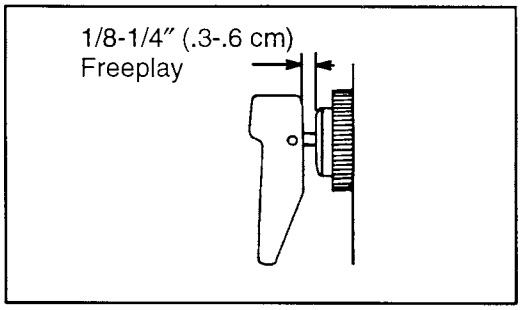


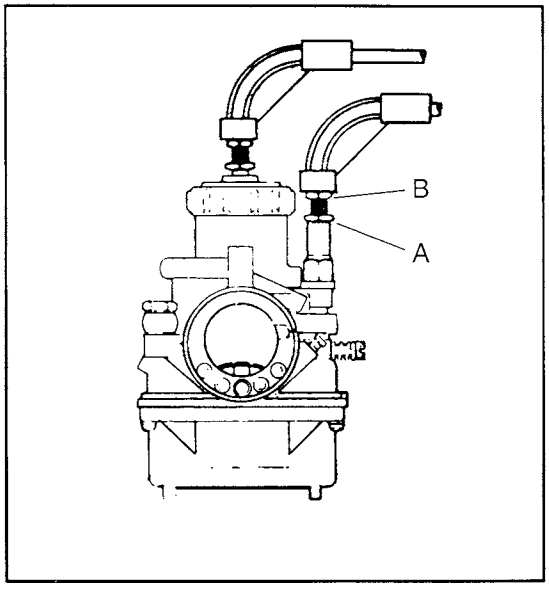
Adjustment Procedure

1. Flip choke toggle to full off position.
2. Loosen adjustment locknut (A) on carburetor(s).
3. Turn cable sleeve adjusting nut (B) clockwise on carburetor(s) until 1/4″ (.6 cm) or more choke toggle free play is evident.
4. Turn cable sleeve adjusting nut counterclockwise on one carburetor until toggle has zero free play, then rotate it clockwise until 1/8″-1/4″ (.3-.6 cm) toggle free play is evident.
5. Tighten adjustment locknut (A).
6. Repeat steps 4 and 5 for remaining carburetor(s).

Choke Lever Freeplay -

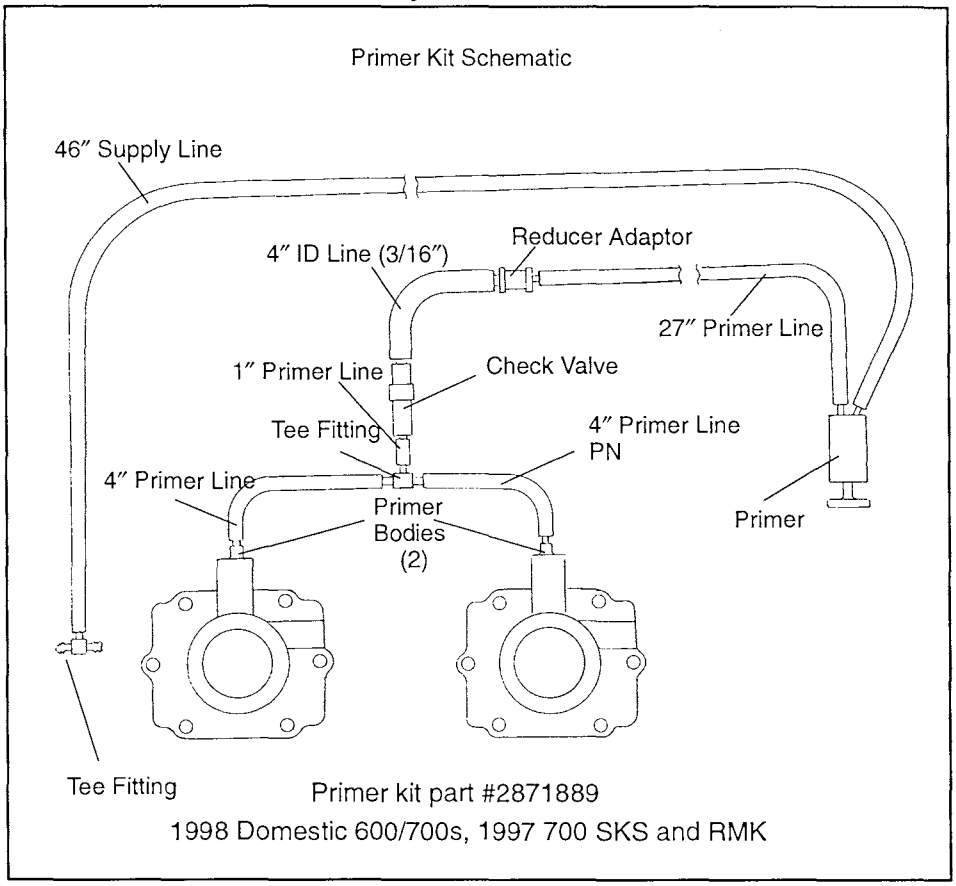
1/8 - 1/4″ (.3 - .6 cm)





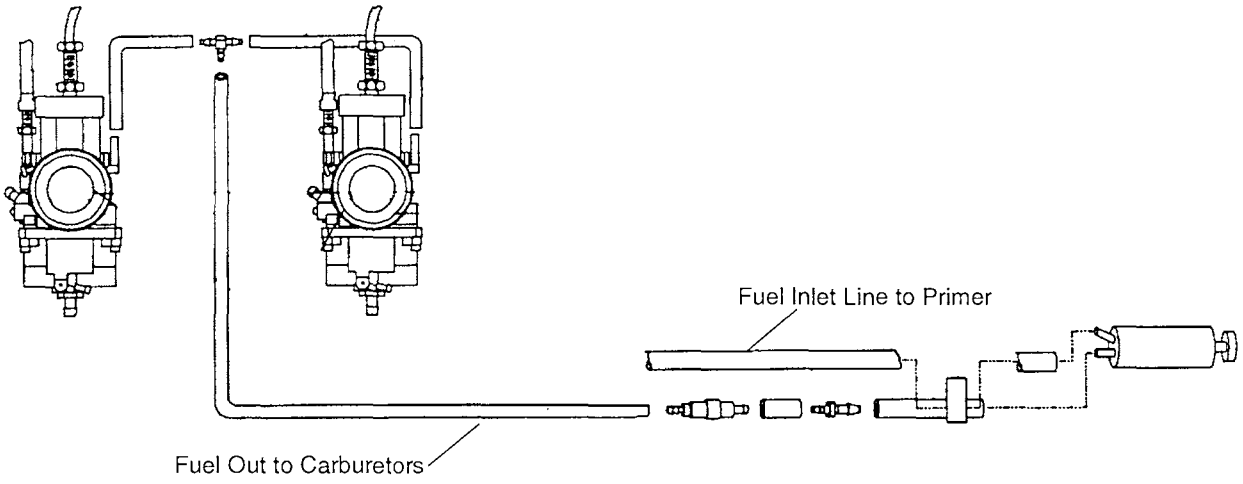
Primer Systems

Domestic 600 & 700 Primer Systems



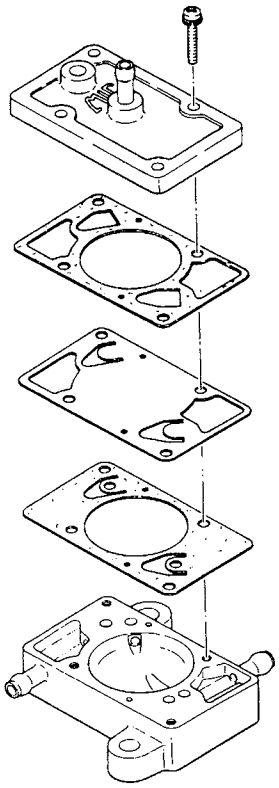
Primer kit part #2871889

1998 Domestic 600/700s, 1997 700 SKS and RMK



Standard primer routing diagram for 1999 600/700 twins

The fuel pumps on all Polaris engines are basically the same. The differences are in the size and location of the pumps. Pumps may be mounted to the engine or to the chassis.



In the two cycle engine, the pressure in the crankcase changes with the up and down stroke of the piston. The amplitudes of pressure vary according to the RPM and degree of throttle opening. Whether idling or at full throttle, the pressure built up in the crankcase has enough amplitude to operate the pump.

When the piston is on the upstroke, crankcase pressure in that cylinder becomes less positive. The diaphragm in the fuel pump moves toward the engine, causing a negative pressure or suction in the pump chamber. This causes the inlet valve from the fuel supply to open and permits fuel to enter the chamber. This same suction causes the outlet valve (to the carburetor) to close so that fuel cannot return form the carburetor.

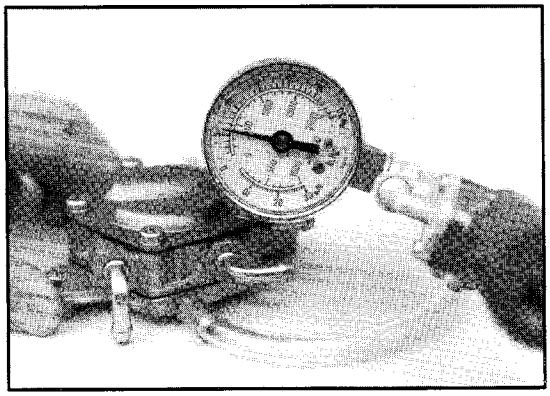
When the piston begins its downward stroke, the pressure from the crankcase becomes positive, causing the fuel pump diaphragm to move in the opposite direction and reversing the pressure in the fuel pump chamber. This causes the inlet valve in the pump to close and the outlet valve to open, filling the float bowl in the carburetor. When the float level in the carburetor reaches its standard level, the needle valve will close, preventing more fuel from entering the carburetor, even though the fuel pump continues to try to provide the carburetor with fuel.

Maintenance

The impulse operated diaphragm fuel pump does not require any specific scheduled maintenance. However, the following procedures should be observed.

Operation:

- The pump may be checked for operation by removing the fuel supply line from the carburetor and placing it into a container. With the engine idling at approximately 2000 RPM, a steady flow of fuel should be visible.



Cleaning:

- The pump and impulse line must be disassembled and cleaned of foreign material in the event of piston or other internal engine part failures which produce fragments.

Inspection:

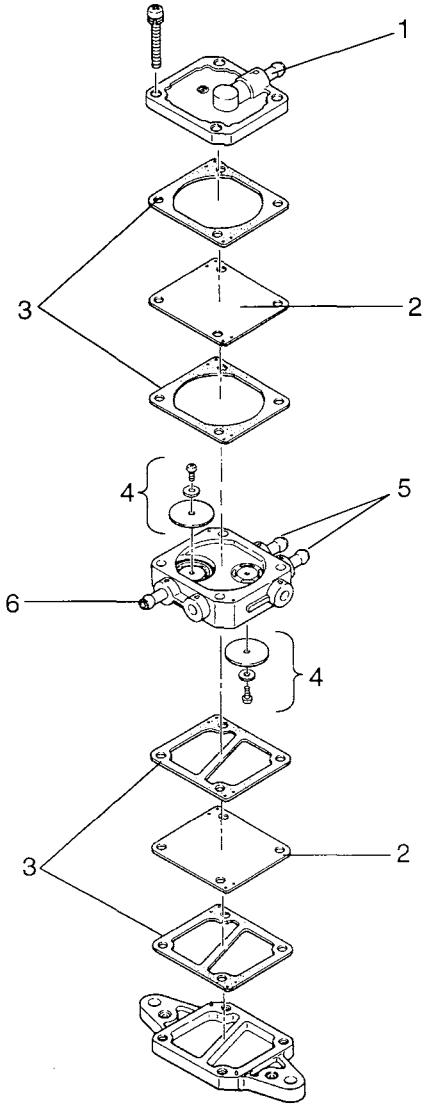
- Disconnect impulse line from pump. Connect Mity Vac™ to impulse fitting (or line) and apply 4-6 PSI pressure. Diaphragm should hold pressure indefinitely.
- The diaphragms and check valves must be carefully examined for cracks, holes, or other damage. If in doubt as to the condition of any internal parts, replace all diaphragms, check valves, and gaskets.

Exploded View Fuel Pump

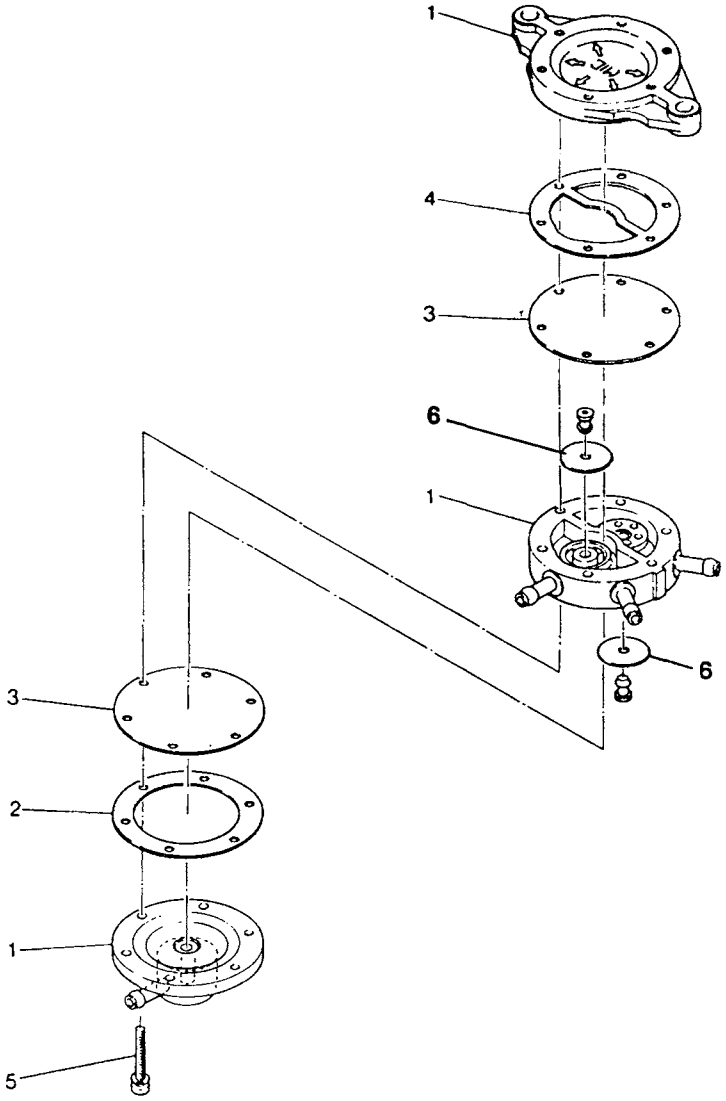
Taio Giken

Description of Parts

1. Vacuum (from crankcase)
2. Diaphragm
3. Gaskets
4. Check Valves
5. Fuel Outlets (to carbs)
6. Fuel Inlet (from tank)



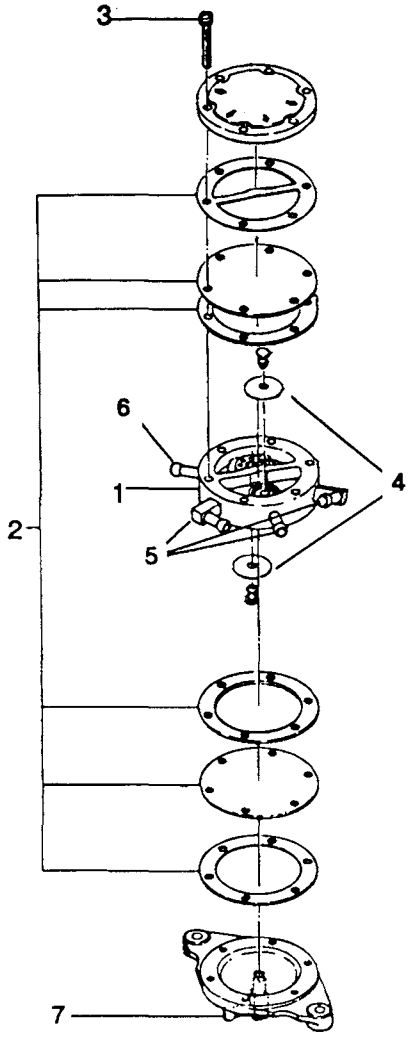
Exploded View - Twin Cylinder (Typical) Fuel Pump



Parts Description

1. Pump Body Assembly
2. Lower Gasket
3. Diaphragm
4. Upper Gasket
5. Screw (6 used)
6. Check Valve

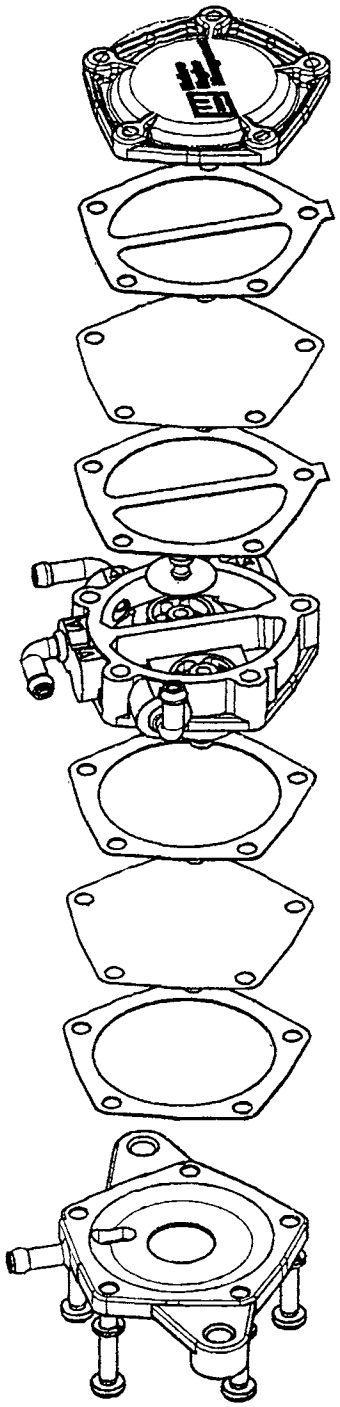
FUEL SYSTEM/CARBURETION
Exploded View - 3 Cylinder Fuel Pump



Parts Description

1. Pump Valve Body
2. Diaphragms and Gaskets
3. Screw (6 used)
4. Check Valves
NOTE: Be sure of proper order and position of gaskets and diaphragms upon reassembly.
5. Fuel Outlet (3 to carbs)
6. Fuel Inlet (from tank)
7. Vacuum/Pressure (from crankcase)

Exploded View - Twin Cylinder Domestic Fuel Pump



Walbro Fuel Pump

NOTE: Individual parts are not available for domestic engine fuel pumps. If any internal parts are faulty, the pump must be replaced.

FUEL SYSTEM/CARBURETION
Water Trap Service

⚠ WARNING

Fuel spillage will occur during this installation. *Gasoline is extremely flammable and explosive under certain conditions.*

⚠ Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

⚠ Do not weld or operate a torch near the fuel system. Remove fuel tank before any chassis welding is performed.

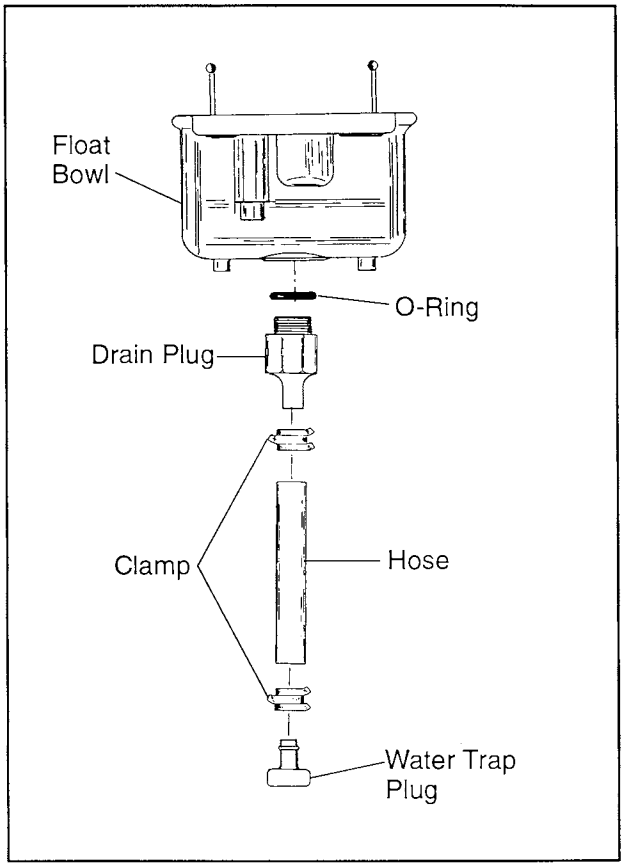
⚠ If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.

⚠ If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

⚠ Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

1. Turn fuel valve off.
2. Remove air silencer.
3. Position a shop cloth or container below drain plug and water trap plug.
4. Remove drain plug and sealing O-Ring, or slide clamp upward and remove water trap plug.
5. Drain water/fuel. Clean trap with electrical contact cleaner and dry with compressed air.
6. Lightly grease O-ring and install water trap assembly into bottom of float bowl, or reinstall trap plug in hose and position. Tighten securely.
7. Turn fuel on, start engine and check for possible fuel leaks.
8. Reinstall air box.

The water traps should be periodically inspected and drained. Draining frequency will depend upon fuel supply, riding conditions, and fuel handling precautions.



Fuel system diagnosis should follow a specific path, first examining the fuel tank, then the filters, fuel lines, vent lines, fuel pump, impulse hose, air box, exhaust system and finally the carburetors.

The following troubleshooting information assumes that the general mechanical condition of the engine (pistons, rings, bearings, etc.) is good.

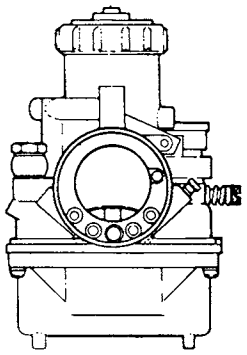
When the fuel/air mixture is diagnosed as improper due to spark plug readings, clean the carburetor and blow its passages clear with compressed air. Use the spark plug firing end condition as a guide for further determination of whether the mixture is too rich or too lean.

Use the throttle lever to determine at what degree of throttle valve opening the problem exists.

CONDITION	SYMPTOMS
Mixture Too Rich	-Black spark plug tip; plug fouling -Heavy exhaust smoke -Engine runs worse after warm up -Engine "loads up"
Mixture Too Lean	-Spark plug electrodes white -Fluctuation in engine speed -Power loss -Engine overheats -Cylinder scoring / Holing pistons -Backfiring - detonation -Throttle diagnostic opening check points
Poor Fuel Mileage	-Incorrect ignition timing -Improper track tension (too tight) -Incorrect carburetor jetting -Fuel leaks (lines, fittings, fuel pump) -Needle and seat leaks -Plugged exhaust -Carburetor vent line problems -Clutching incorrect for conditions / worn belt

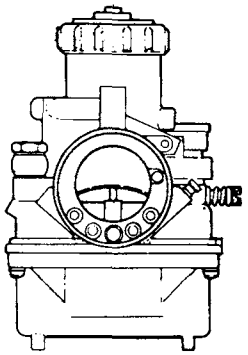
Troubleshooting Tips, 0-1/4 Throttle:

- Pilot air screw misadjusted
- Pilot jet of wrong size, loose, or obstructed
- Obstruction of pilot jet
- Pilot jet loose
- Choke plunger not seating (rich)
- Carburetor mounting air leak (lean)
- Crankshaft seal air leak (lean)
- Fuel pump diaphragm damaged (rich)
- Float level incorrect
- Air bleed obstructed



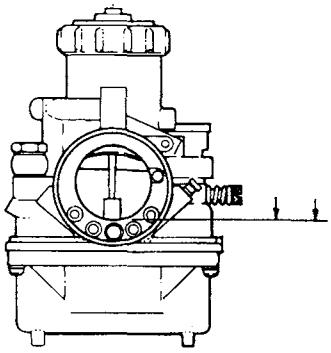
Troubleshooting Tips, 1/4-3/8 Throttle:

- Obstruction in main jet or needle jet
- Jet needle worn or out of adjustment
- Pilot system malfunction
- Incorrect throttle valve cutaway



Troubleshooting Tips, 3/8-3/4 Throttle:

- Main jet incorrect size or clogged (lean)
- Needle jet damaged or loose
- Needle jet/jet needle worn (rich)
- E-clip position incorrect for altitude and temperature



Troubleshooting Tips, Full Throttle:

- Main jet size (rich or lean)
- Fuel filter blocked (lean)
- Fuel vent lines or check valves plugged
- Exhaust system plugged
- Air box restricted
- Fuel pump weak
- Exhaust leaking into engine compartment (rich)
- Water in float bowl (lean)