

Carburetion	
Carburetor model	Mikuni BSR 42mm
Main Jet	150
Pilot jet	45
Jet Needle	6CGY07-060-3
Needle Jet	O-OM
Pilot Screw	2.5 Turns Out
Pilot Air Jet	110
Float Height	13~14 mm (0.51~0.55")
Fuel Delivery	Fuel Pump
Fuel Requirement	87 Octane (minimum)



CHAPTER 4

FUEL SYSTEM/CARBURETION

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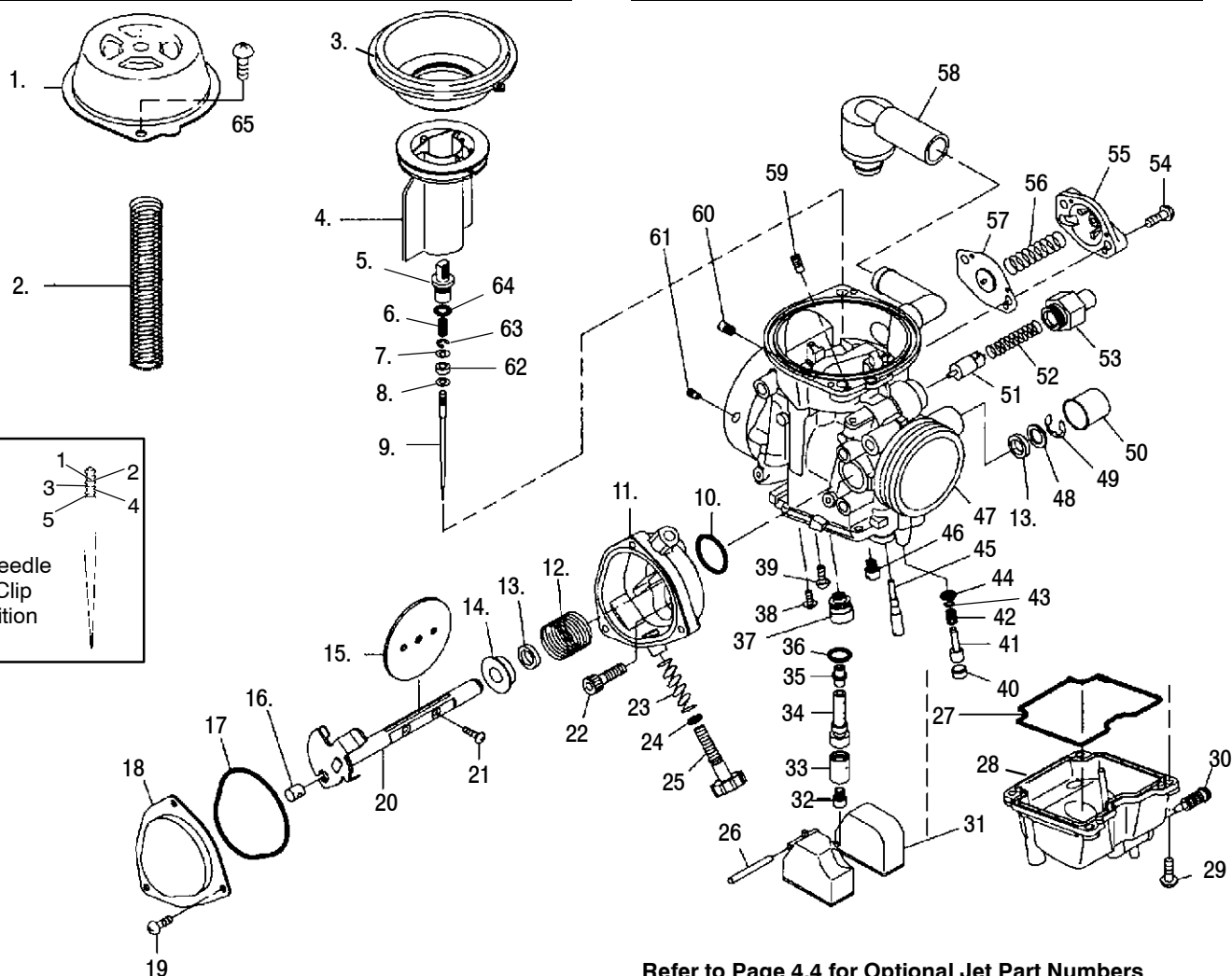




BSR 42 CARBURETOR EXPLODED VIEW

Ref.	Description	Ref.	Description
1.	Cover, Diaphragm	17.	O-Ring
2.	Spring	18.	Cover
3.	Diaphragm	19.	Screw
4.	Valve, Piston	20.	A-Shaft, Throttle
5.	Holder	21.	Screw
6.	Spring	22.	Bolt
7.	Washer	23.	Spring, Throttle Adjust
8.	Washer	24.	O-Ring
9.	Jet, Needle	25.	Screw, Adjust
10.	O-Ring	26.	Pin, Float
11.	Case	27.	O-Ring
12.	Spring	28.	Body, Float
13.	Seal	29.	Screw
14.	Ring	30.	Screw
15.	Valve, Throttle (105)	31.	A-Float
16.	Guide, Cable	32.	Jet, Main (150)

Ref.	Description	Ref.	Description
33.	Ring	49.	E-Ring
34.	Holder, Jet	50.	Cap
35.	Jet, Needle	51.	Asm., Plunger
36.	O-Ring	52.	Spring
37.	Valve, Needle	53.	Holder, Guide
38.	Screw	54.	Screw
39.	Screw	55.	Cover
40.	Plug	56.	Spring
41.	Adjuster	57.	Asm., Diaphragm
42.	Spring	58.	Filter
43.	Washer	59.	Jet, Air
44.	O-Ring	60.	Jet, Main (110)
45.	Jet, Pilot (45)	61.	Jet (120)
46.	Jet (42.5)	62.	Ring
47.	Asm., Carburetor	63.	E-Ring
48.	Packing	64.	O-Ring
		65.	Screw

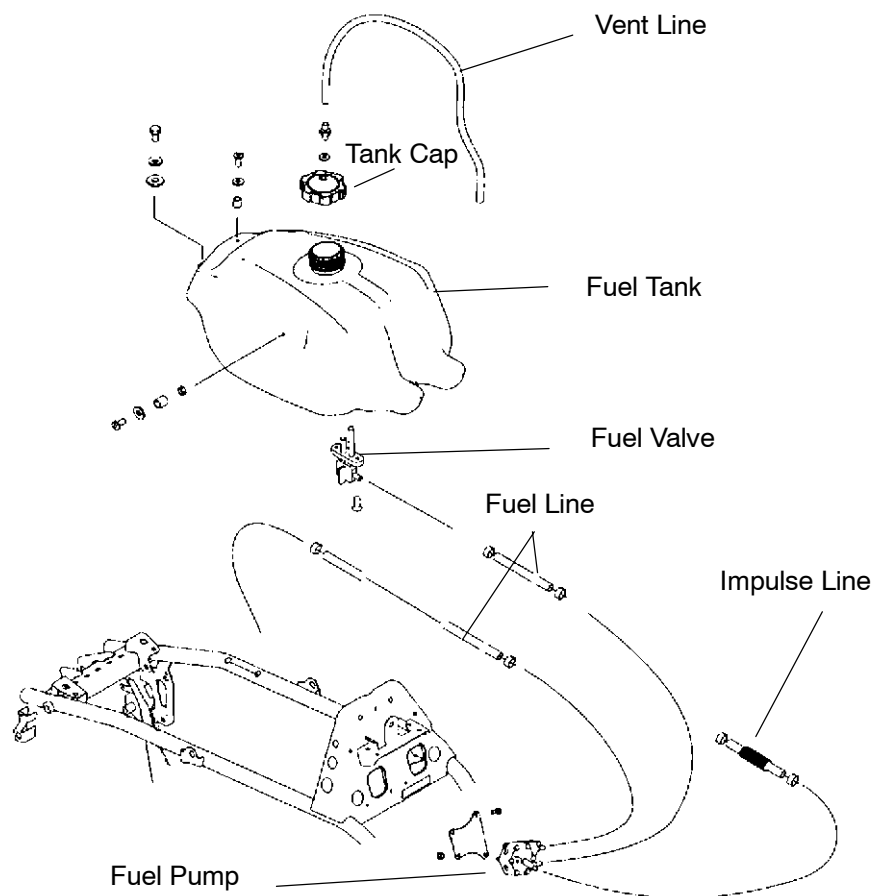


Refer to Page 4.4 for Optional Jet Part Numbers

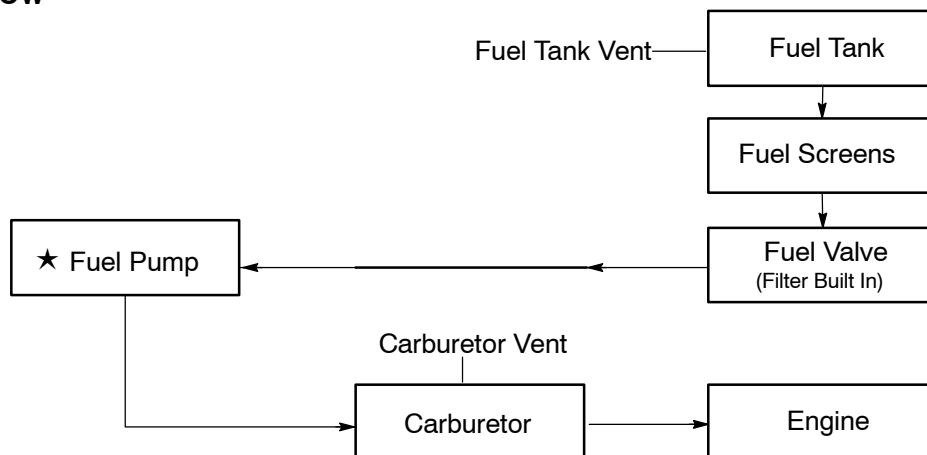




FUEL TANK ASSEMBLY



FUEL FLOW



★ Located on upper frame





SPECIAL TOOLS

PART NUMBER	TOOL DESCRIPTION
2870975	Mity Vac™ Pressure Test Tool
2872314	Carburetor Float Adjustment Tool

⚠ 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 overfill the tank. The tank is at full capacity when the fuel reaches the bottom of the filler neck. Leave room for expansion of fuel.
- ⚠ 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.
- ⚠ Never drain the float bowl when the engine is hot. Severe burns may result.
- ⚠ Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.
- ⚠ If you get gasoline in your eyes or if you should swallow gasoline, seek medical attention immediately.
- ⚠ If you spill gasoline on your skin or clothing, immediately wash with soap and water and change clothing.

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 is more dense and has more oxygen. In higher elevations and higher temperatures, the air is less dense with reduced oxygen.

Polaris ATV Carburetors are calibrated for an altitude of 0-6000 ft. (0-1800 meters) and ambient temperatures between +40 and +80° F (+5° to +26° C). Carburetors must be re-calibrated if operated

outside this temperature and/or altitude range. The jetting installed in production is not intended for all altitudes and/or temperatures. In addition, air screw / pilot screw adjustments and PVT adjustments may be required to suit operating conditions.

CARBURETOR JETTING

CAUTION:

A main jet that is too small will cause a lean operating condition resulting in serious engine damage. Select the correct main jet carefully for elevation and temperature according to the charts in the specifications section or in the Owner's Safety and Maintenance Manual for each particular model.

IMPORTANT: The following guidelines must be followed when establishing a main jet setting:

1. Select the lowest anticipated temperature at which the machine will be operated.
2. Determine the lowest approximate altitude at which the machine will be operated.
3. Select the correct main jet from the chart on Page 1.4.

MIKUNI JET PART NUMBERS

Main Jets		Pilot Jets	
Jet Number	Part Number	Jet Number	Part Number
122.5	3140120	40.0	3130624
125	3130085	42.5	3130526
130	3140121		
137.5	3130090	45.0	3131023
140	3130091		
150	3130093		
152.5	3130570		
155	3140171		
165	3131143		
170	3130096		
175	3130097		
180	3130098		





CV CARBURETOR SYSTEM **FUNCTION**

Carburetor Component Function			
System	Main Components	Main Function	Main Affect
Float System (Level Control)	Inlet Pipe, Needle and Seat, Float, Float Pin	Maintains specified fuel level in float chamber (carburetor float bowl)	All systems All throttle ranges
Venting	Passages in Carburetor, Vent lines to frame	Supplies atmospheric pressure to float chamber	All systems All throttle ranges
Starter (Choke/Enrichment)	Choke Lever, Cable, Plunger, Return Spring, Carb Passages (Starter Jet, Starter Bleed Pipe)	Supplies additional fuel air mixture necessary for cold starting	All throttle ranges Greatest effect at low throttle settings and idle
Pilot (Idle System)	Pilot Jet/Passageways, Pilot-Mixture Screw with Spring Washer and Sealing O-Ring, Bypass Ports (Behind Throttle Plate), Pilot Air Jet, Pilot Outlet, Throttle Plate	Primarily supplies fuel at idle and low throttle positions	Mainly idle to 1/4 throttle Minimal effect after 1/2 throttle
Main System	Main Jet, Main Air Jet, Main Air Passage, Needle Jet, Jet Needle, Vacuum Slide, Throttle Plate	Supplies fuel at mid-range and high throttle settings.	1/4 to full throttle

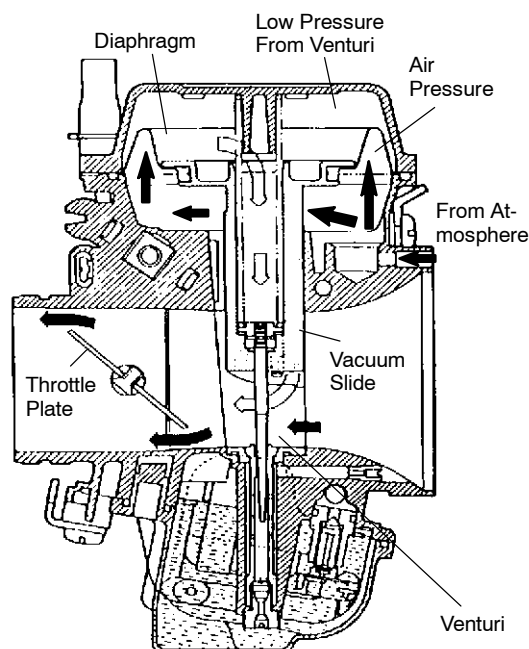
VENT SYSTEMS - CV CARBURETOR

The carburetor float bowl vent lines supply atmospheric pressure to the float bowl. The lines must be free of kinks, restrictions and be properly routed. This allows fuel to flow in the proper amount and prevents contaminants from entering the carburetor.

MIKUNI CV CARB OPERATION

The constant velocity carburetor incorporates a mechanically operated throttle plate and a vacuum controlled slide valve (vacuum slide). The venturi cross-sectional area in the carburetor bore is increased or decreased automatically by the vacuum slide, which moves according to the amount of negative pressure (less than atmospheric) present in the venturi.

A diaphragm attached to the top of the vacuum slide is sealed to the slide and to the carburetor body forming two chambers. The chamber above the diaphragm is connected to the venturi area by a drilled orifice in the center of the vacuum slide. The chamber below the diaphragm is vented to atmospheric pressure by a passage on the air box side of the carburetor. A spring, installed in the center of the vacuum slide, dampens the slide movement and assists the return of the slide.



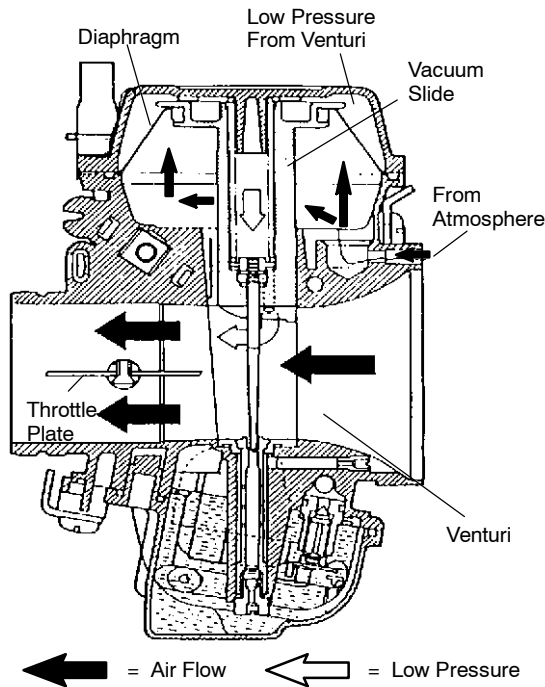
← = Air Flow ← = Low Pressure





CARBURETOR OPERATION CONT'D

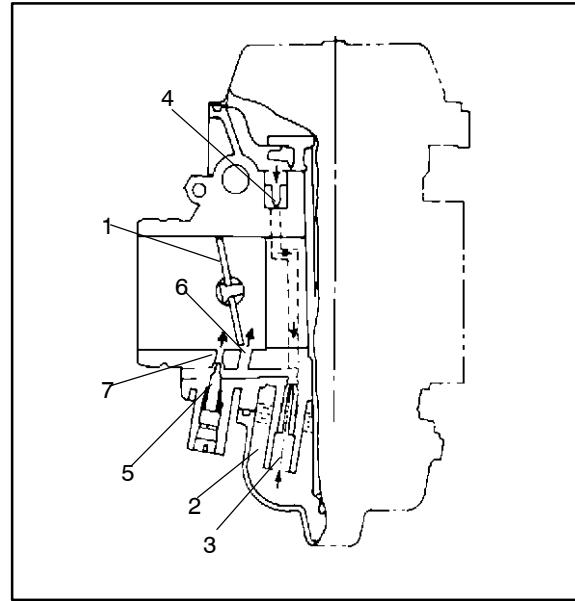
When the throttle plate is opened and engine speed begins to increase, the pressure in the venturi (and therefore in the chamber above the diaphragm) becomes significantly lower than atmospheric. Atmospheric pressure in the chamber below the diaphragm forces the diaphragm upward, raising the slide against spring pressure. When the pressure above and below the diaphragm are nearly equal, the slide moves downward under spring pressure. Raising or lowering the slide increases or decreases the cross sectional area in the venturi, and therefore the air velocity in the venturi is kept relatively constant. This provides improved fuel atomization and optimum fuel/air ratio.



Note: Diagrams are for explanation of theory only, and are not true representations of Mikuni BST carburetor.

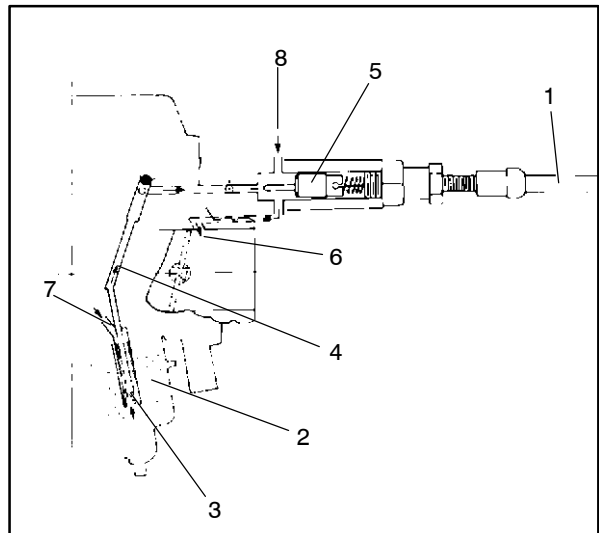
PILOT (IDLE AND SLOW) SYSTEM

This system supplies fuel during engine operation with throttle valve closed (1) or slightly opened. The fuel from float chamber (2) is metered by pilot jet (3) where it mixes with air coming in through pilot air jet (4). The mixture then goes up through pilot passage to pilot screw (5). A part of the mixture is discharged into the main bore out of bypass ports (6). The remainder is then metered by pilot screw and discharged into the main bore through pilot outlet (7).



STARTER SYSTEM (CHOKE OR ENRICHMENT)

When the choke cable (1) is activated, the starter plunger (5) is lifted off the seat.



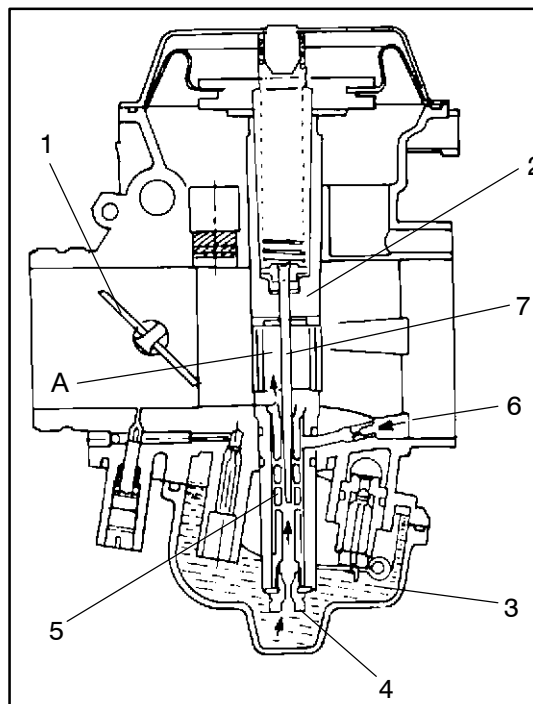
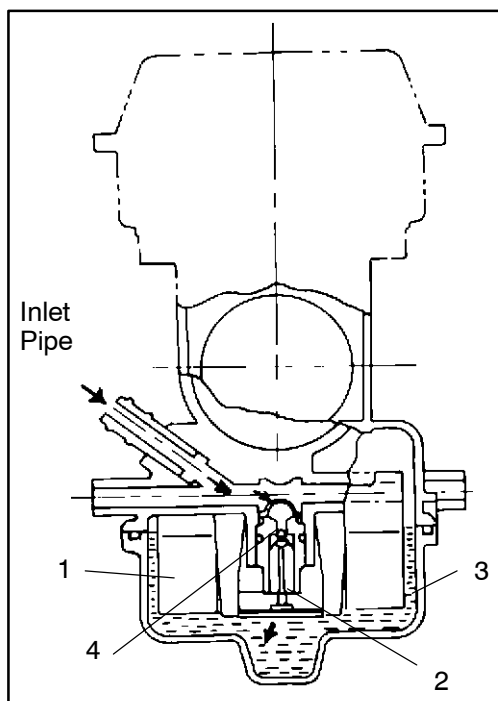
Fuel is drawn into the starter circuit from the float chamber (2) through the starter jet (3). Starter jet meters this fuel, which then flows into starter pipe (4) and mixes with the air (7) coming from the float chamber. The mixture, rich in fuel content, reaches starter plunger and mixes again with the air coming through a passage (8) extending from underneath the diaphragm. The rich fuel/air mixture for starting is discharged through starter outlet (6) in the the main bore.





FLOAT SYSTEM

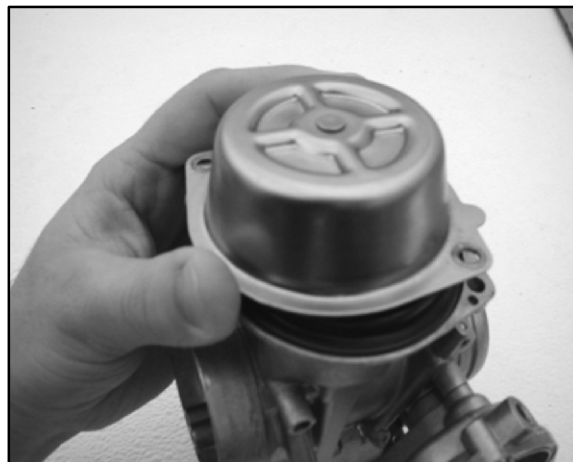
Fuel enters the float chamber (3) by means of the inlet pipe and passage, through a screen on the back of the inlet needle seat (4), and around the inlet needle (2). As the fuel fills the float chamber, the float (1) rises and forces the inlet needle against the seat, shutting off the orifice in the seat. When fuel level is up in float chamber, floats are up and needle valve remains pushed up against valve seat. Under this condition, no fuel enters the float chamber. As the fuel level falls, floats go down and needle valve unseats itself to allow fuel into the chamber. In this manner, the needle valve releases and shuts off fuel alternately to maintain a constant fuel level inside the float chamber.



CARBURETOR DISASSEMBLY - MIKUNI CV

Use the following disassembly, assembly, and inspection techniques to service a CV carburetor.

1. Remove carburetor diaphragm chamber cover with a ratchet style screwdriver. DO NOT use an impact driver to remove the screws or carburetor may be permanently damaged.



MAIN SYSTEM

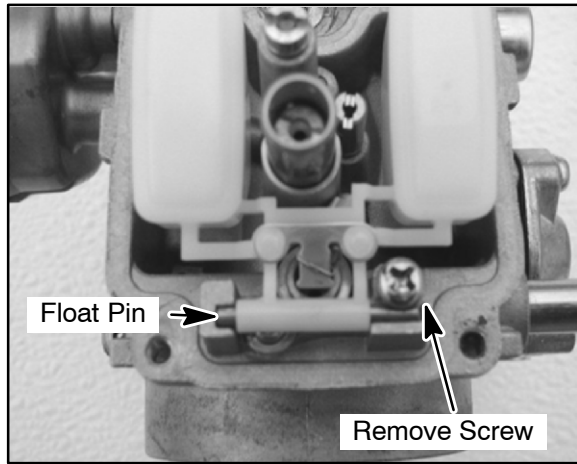
As throttle valve (1) is opened, engine speed rises, and this increases negative pressure in the venturi. Consequently the vacuum slide (2) moves upward. The fuel in float chamber (3) is metered by main jet (4), and the metered fuel enters needle jet (5), in which it mixes with the air admitted through main air jet (6) to form an emulsion. The emulsified fuel then passes through the clearance between needle jet (5) and jet needle (7), and is discharged into the venturi (A). Mixture proportioning is accomplished in needle jet (5); the clearance through which the emulsified fuel must flow is determined ultimately by throttle position and vacuum slide height.



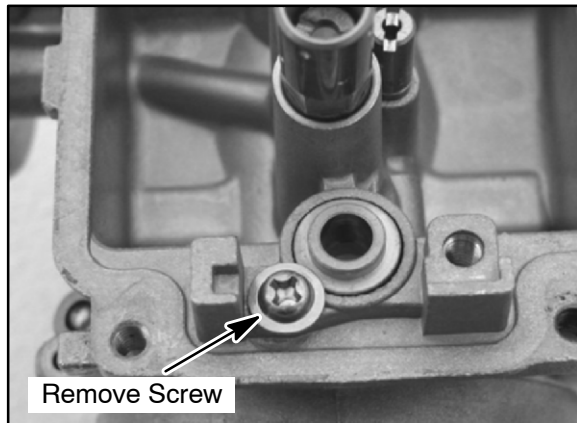


CARBURETOR DISASSEMBLY CONT'D

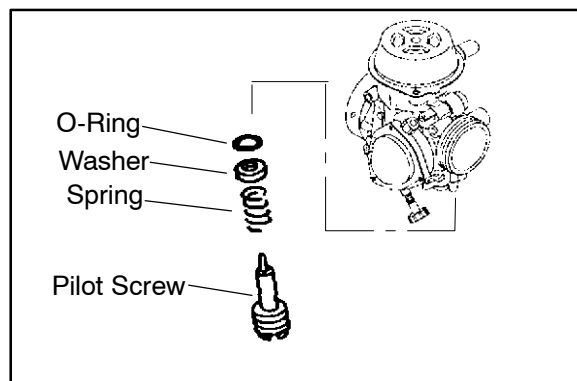
2. Remove float bowl. Remove the float pin screw. The float and float pin can be removed.



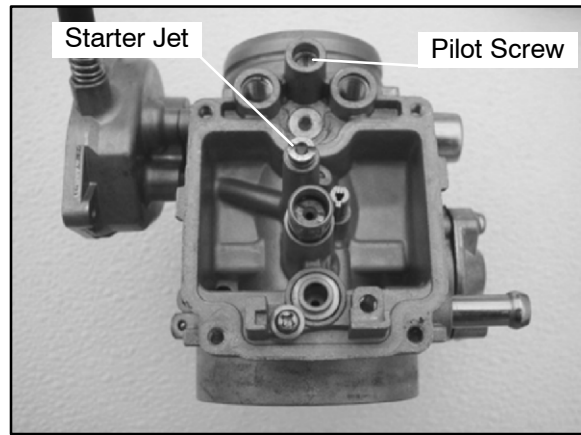
3. Remove inlet needle seat retaining screw along with plate, and carefully remove needle seat. **NOTE:** Do not use a pliers to remove the seat or permanent damage may occur.



4. Remove the pilot mixture screw, spring, flat washer, and O-Ring. If an anti-tamper plug is installed over the pilot screw cavity, it must be removed for access.



NOTE: The starter jet is removeable. Upon disassembly, place the parts in a container for safe keeping.



CARBURETOR CLEANING

⚠ WARNING

Protect eyes from contact with cleaner. Take appropriate safety measures during these procedures. Safety glasses and chemical resistant gloves are required. Should you get cleaner in your eyes or if you swallow cleaner, seek medical attention immediately.

Carburetor cleaners can be extremely caustic. Extended periods of soaking can loosen the adhesive sealer on the passage drill-way plugs. *Do not* soak rubber or plastic components (such as the vacuum slide diaphragm, needle seat screen, or O-Rings in caustic cleaning solutions. Irreparable damage may occur. Do not use agitator-type carburetor cleaning equipment. Rubber parts must be cleaned with mild detergent and hot water only.

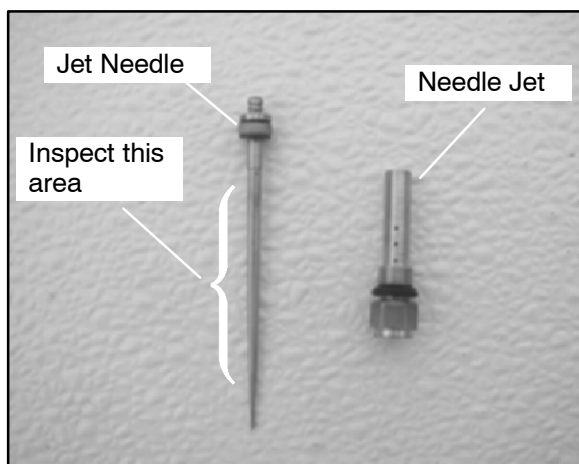
1. Thoroughly clean the carburetor body, jets, and all passages with carburetor cleaner or electrical contact cleaner.
2. If the carburetor is extremely dirty or contaminated with fuel residue and varnish, soak for short periods only in carburetor cleaner, and rinse in hot water.
3. Replace the jets if they have a buildup of fuel residue or bacterial growth that cannot be removed. Even a small amount of residue will reduce the flow characteristics of the jet.
4. Verify all passages and jets are unobstructed by spraying electrical contact cleaner through the passages. **CAUTION:** Do not use wire or welding tip cleaners as the orifice size may be altered.
5. Use low pressure air to dry carburetor body and all components.



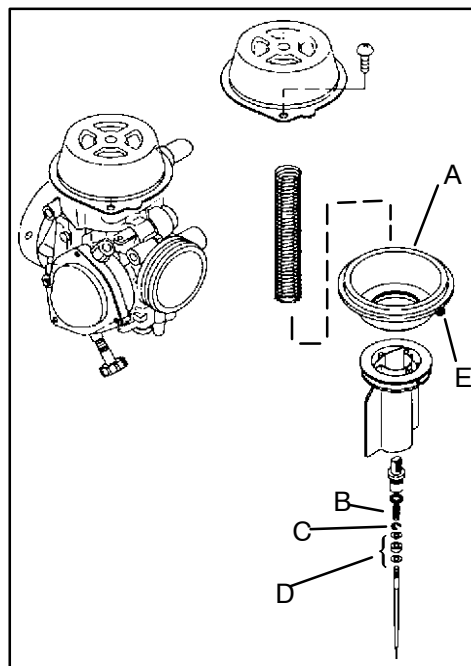
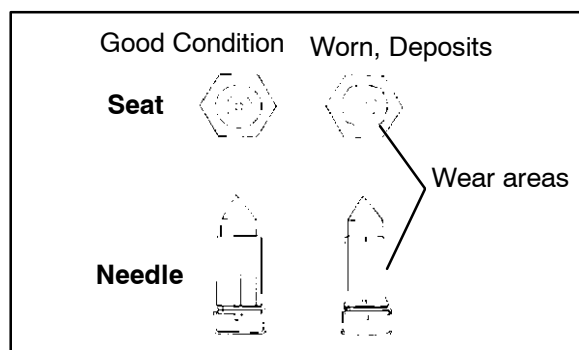


CARBURETOR INSPECTION

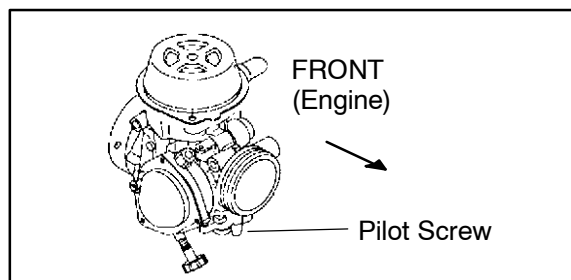
1. Inspect jet needle and needle jet for wear. Look for discoloration, shiny spots, or an area that looks different than the rest of the needle. The middle to upper portion of the needle contacts the needle jet and is the most likely wear point. If jet needle shows signs of wear replace *both the needle and needle jet* to prevent a rich condition. TIP: A worn *needle jet* is difficult to spot. To check, slide a slightly larger *new jet needle* into the needle jet and hold it to a light source. Light will be visible between the needle and needle jet if it is worn.



2. Inspect the inlet needle tapered surface for any sign of wear or damage. Be sure the spring loaded pin is free moving and returns freely when pushed. The inlet needle and seat should be pressure tested after assembly.



3. Replace parts in proper order. The spring seat (B) is stepped and must be placed on TOP of "E" Clip (C). Spacer washer (D) must be installed below the E-clip. Refer to parts manual for more information.
4. Be sure the tab (E) on outer edge of diaphragm is positioned properly in the carburetor body.



5. Install the pilot mixture screw, spring, washer, and O-ring as an assembly. Lubricate the O-Ring with oil or light grease before installation. **CAUTION:** Do not damage the O-ring during installation. Turn the screw in until it *lightly* contacts the seat. Back out the specified number of turns. NOTE: The final pilot (idle) mixture must be adjusted with the engine running. Refer to Page 2.13.

CARBURETOR ASSEMBLY

Inspect the diaphragm (A) for holes, deterioration, or damage. Make sure the diaphragm is pliable but not swollen. The diaphragm should fit properly in the carburetor body. Replace diaphragm assembly if diaphragm is damaged.

**Pilot Mixture Screw Base Setting
(Set at Factory)**

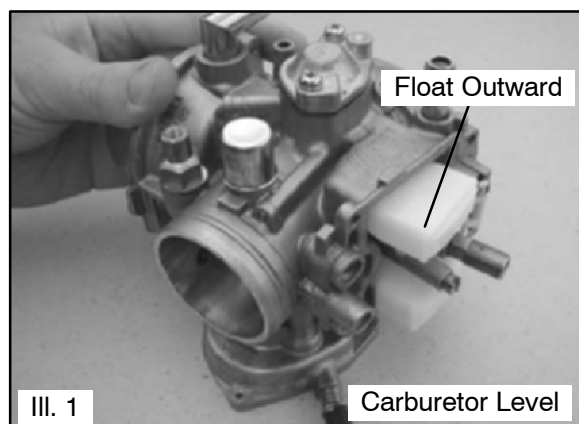
Factory Specification: 2.5 Turns Out



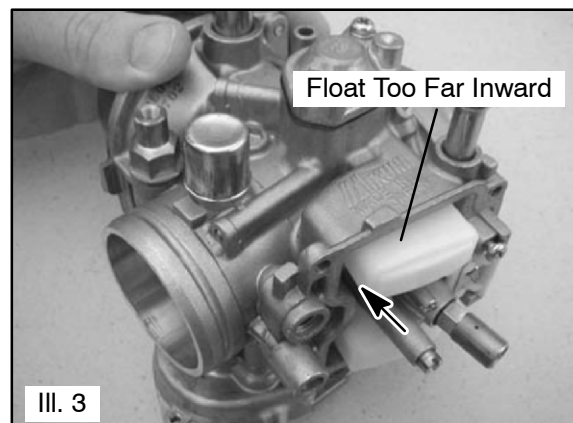
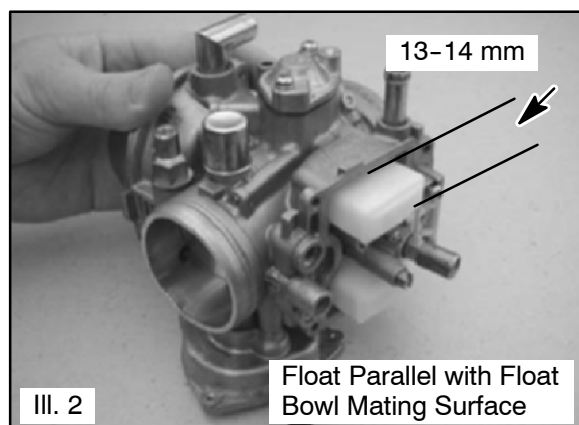


FLOAT HEIGHT ADJUSTMENT

- Illustration 1:** Place the the throttle side of the carburetor on a level surface to remove weight from float arm. In this position, the float tongue will rest slightly outward.



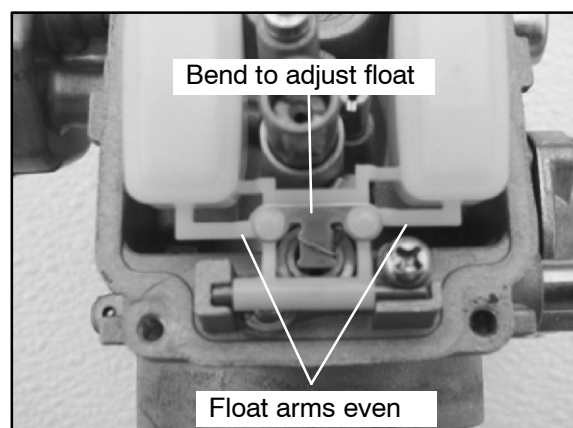
- Illustration 2:** With the carburetor still resting on the level surface, use one hand to slightly tilt the carburetor back. The float will then fall into the correct position, with the float tongue resting lightly on the inlet needle valve pin without compressing the spring. The bottom of the float should be parallel with the float bowl mating surface. **Illustration 3:** **NOTE:** If the float is past parallel with the mating surface, the carburetor has been tilted back too far and the float tongue is likely compressing the needle valve pin.



- Measure the height from the float bowl mating surface to the top of step of the float as shown in Illustration 2. Both sides of float should be parallel to each other. The measurement should be made at the mid-point on top of the float using Float Adjustment Tool (PN 2872314) or a vernier caliper. When measuring the height, be sure the inlet needle valve spring is not compressed.

Float Bowl Height: 13-14 mm

- If adjustment is necessary, bend the tongue slightly. Be sure float measurement is even on left and right side.



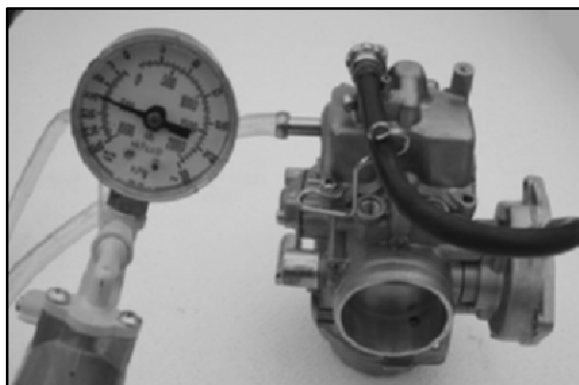
NEEDLE AND SEAT LEAKAGE TEST

- Install the float bowl. Invert the carburetor and install a Mity-Vac™ (PN 2870975) to the fuel inlet





fitting. Apply 5 PSI pressure to inlet fitting. The needle and seat should hold pressure indefinitely. If not, inspect needle and seat and seat O-ring.

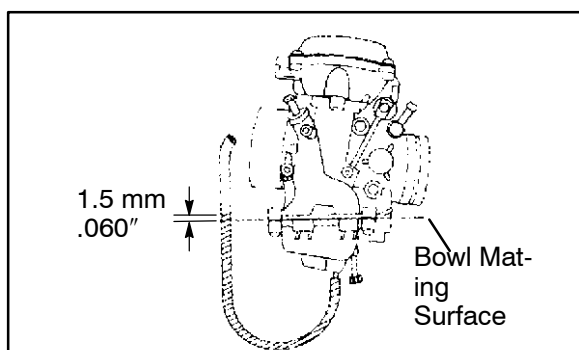


Mity Vac™ (PN 2870975)

FUEL LEVEL

A fuel level test can be performed on some models if the drain hose fitting is accessible. Be sure to re-attach the bowl drain hose after performing the test. A fuel level test allows you to observe the height of the fuel in the float bowl without removing the carburetor. The fuel level can be observed with the engine either running or shut off, however, engine must run briefly to allow fuel level to stabilize..

1. Attach a clear line to drain fitting. Be sure line fits tightly on fitting. Position hose along side of carburetor as shown.



2. Open bowl drain screw by turning counterclockwise approximately two turns. Start and run engine for 3 to 5 seconds to allow fuel level to stabilize in the line. If level is out of specification, remove carburetor and inspect inlet needle and seat, float height, passages, etc.

NOTE: If a line was removed to perform this procedure, it must be replaced.

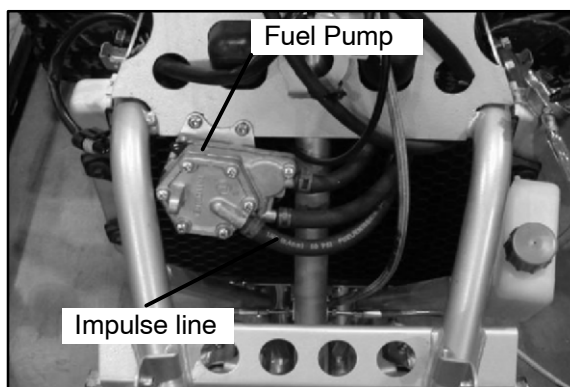
FUEL PUMP

The Predator 500 is equipped with a pressure regulated fuel pump (1-3 PSI). The pump is located in the front fender cavity of the machine.

To test the fuel pump:

1. Turn fuel off.
2. Disconnect impulse line from pump.
3. Connect Mity-Vac™ (PN 2870975) to the impulse line fitting on the pump.
4. Apply 5 inches (Hg) vacuum to the pump fitting. The diaphragm should hold vacuum indefinitely.

If fuel is present in the impulse line or vacuum chamber of the pump, the diaphragm is ruptured. The pump diaphragms must be replaced.



FUEL PUMP DISASSEMBLY

1. Remove the screws from the pump diaphragm cover. Note the location of the two longer screws.
2. Remove the diaphragm cover gasket, diaphragm, and valve body gasket.
3. Remove the outlet check valve cover, diaphragm, and gasket.

FUEL PUMP INSPECTION/ASSEMBLY

1. Inspect inlet and outlet check valves for cracks, warpage or damage. Inspect the diaphragms for cracks, holes or swelling.
2. To clean the valves or pump body, remove the set screw and washer. Remove the valve and wash with soap and water. Carburetor cleaner may be used to clean the pump body when the check valves are removed. **CAUTION:** Some carburetor cleaners are very caustic and should not be used to clean the non-metal parts of the fuel pump.
3. Check the sealing surfaces of the pump body and covers. Carefully remove all traces of old gasket





and check the surfaces for damage. Replace diaphragms and gaskets as a set.

4. Reassemble the pump in the reverse order of disassembly. Tighten all screws evenly.

TROUBLESHOOTING

FUEL STARVATION/LEAN MIXTURE

Symptoms: Hard start or no start, bog, backfire, popping through intake / exhaust, hesitation, detonation, low power, spark plug erosion, engine runs hot, surging, high idle, idle speed erratic.

- No fuel in tank
- Restricted tank vent, or routed improperly
- Fuel lines or fuel valve restricted
- Fuel filter plugged
- Carburetor vent line(s) restricted
- Plugged or restricted inlet needle and seat screen or inlet passage
- Clogged jets or passages
- Float stuck, holding inlet needle closed or inlet needle stuck
- Float level too low
- Fuel pump inoperative
- Air leak at impulse line
- Restricted impulse line (kinked, pinched)
- Intake air leak (throttle shaft, intake ducts, airbox or air cleaner cover)
- Ruptured vacuum slide diaphragm, Vacuum slide stuck closed or sticky
- Improper spring
- Jet needle position incorrect
- Incorrect pilot screw adjustment

RICH MIXTURE

Symptoms: Fouls spark plugs, black, sooty exhaust smoke, rough idle, poor fuel economy, engine runs rough/ misses, poor performance, bog, engine loads up, backfire.

- Air intake restricted (inspect intake duct)
- Air filter dirty/plugged
- Choke plunger sticking, incorrectly adjusted choke
- Choke cable binding or improperly routed
- Incorrect pilot air/fuel screw adjustment
- Faulty inlet needle and seat
- Faulty inlet needle seat O-Ring

- Float level too high
- Poor fuel quality (old fuel)
- Loose jets
- Worn jet needle/needle jet or other carburetor parts
- Dirty carburetor (air bleed passages or jets)
- Weak or damaged vacuum piston return spring
- Fouled spark plug

POOR IDLE

Idle Too High

- Idle adjusted improperly/idle mixture screw damaged
- Sticky vacuum slide
- Throttle cable sticking, improperly adjusted, routed incorrectly
- Choke cable sticking, improperly adjusted, routed incorrectly
- Plugged or restricted idle jet

Idle Too Low

- Choke cable bending or incorrectly adjusted
- Idle speed set incorrectly
- Idle mixture screw misadjusted or damaged
- Belt dragging
- Ignition timing incorrect
- Worn jet needle/needle jet
- Plugged or restricted idle jet

Erratic Idle

- Choke cable bending or incorrectly adjusted
- Throttle cable incorrectly adjusted
- Air leaks, dirty carburetor passages (pilot circuit)
- Pilot mixture screw damaged or adjusted incorrectly
- Tight valves
- Ignition timing incorrect
- Belt dragging
- Dirty air cleaner
- Engine worn
- Spark plug fouled
- Idle speed set incorrectly (speed limiter)
- Worn jet needle/needle jet
- Plugged or restricted idle jet

