Walbro WG-8 Carb Disassembly

From: http://www.wind-drifter.com/technical/wg8walbro.php by Richard Cobb

Additional notes by Had Robinson

This shows the disassembly of Walbro WG-8 carb that was supplied with the Radne Aero 120 on a Mosquito NRG. Apparently some units are now shipping with the WG-10 carb. A comparison of specifications (see http://wem.walbro.com/walbro/group2.asp?FamilyName=WG) shows that they are nearly identical. The only differences I could find were:

- The WG8 lists a Nozzle Jet part 112-3051, the WG10 has this blank
- Metering cover screws(4) - The WG8 uses 96-589 and the WG10 uses 96-603

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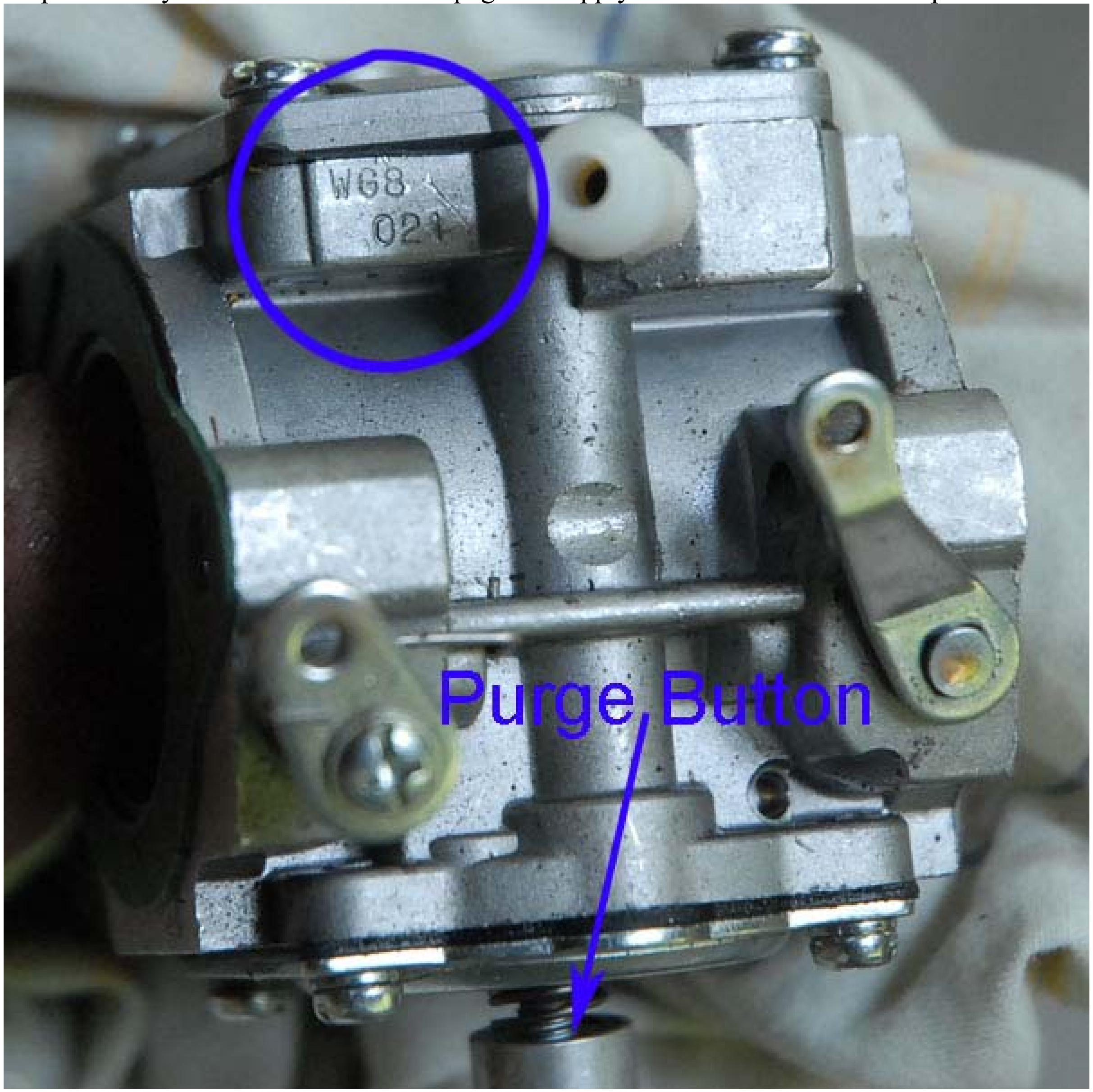
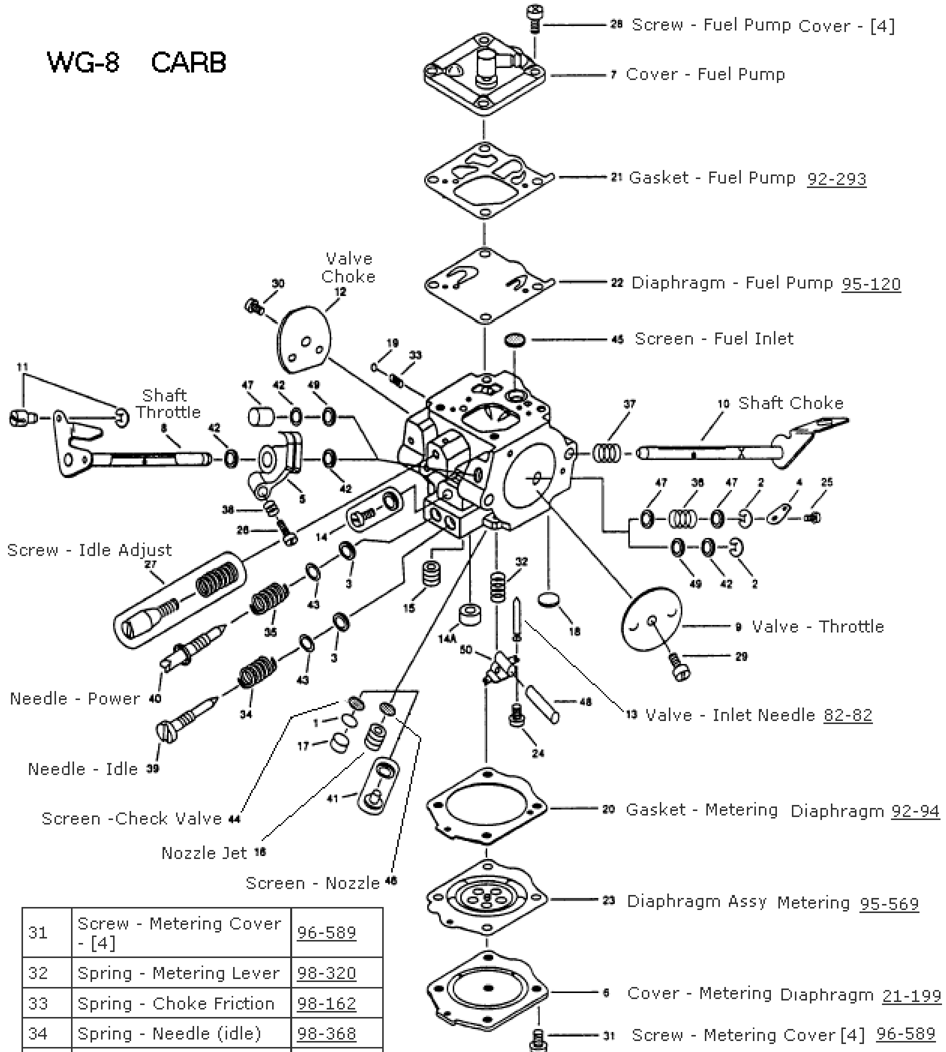
So presumably the information on this page will apply to the WG-10 in most respects.



WG-8 CARB



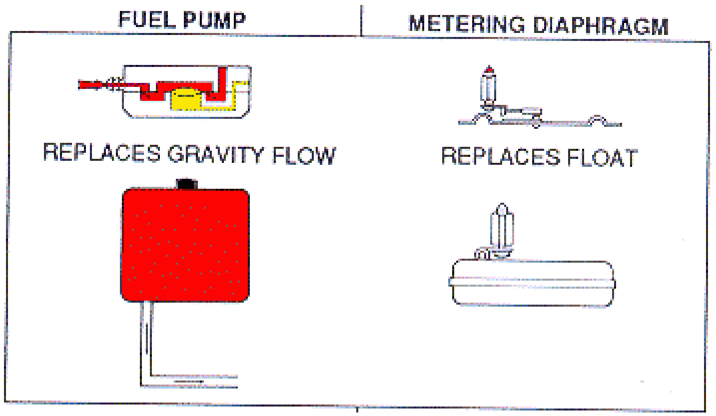
	Description	Part #
	Part Name	WG-8-1
	Venturi (mm)	22.82
*	Kit - Repair	K12-WG
**	Kit - Gasket/Diaphragm	D12-WG
1	Ring - Screen Retainer	--
2	Ring - Shaft Retainer - [2]	--
3	O'Ring - Needles - [2]	16-75
4	Lever - Throttle	18-242
5	Lever - Throttle (inner)	18-469
6	Cover - Metering Diaphragm	21-199
7	Cover - Fuel Pump	21-3004
8	Shaft Assembly - Throttle	30-1136
9	Valve - Throttle	34-305
10	Shaft Assembly - Choke	40-1121
11	Swivel Kit	--
12	Valve - Choke	62-166
13 *	Valve - Inlet Needle	82-82
14	Seat Assembly - Governor	--
14A	Seat Assembly - Check Valve	84-607
15	Nozzle Assembly - Check Valve	86-804
16	Nozzle Jet	112-3051
17 *	Plug - Cup	--
18 *	Plug - Welch (5/16)	88-171
19	Ball - Choke Friction	89-13
20 **	Gasket - Metering Diaphragm	92-94
21 **	Gasket - Fuel Pump	92-293
22 **	Diaphragm - Fuel Pump	95-120
23 **	Diaphragm Assy - Metering	
24	Screw - Metering Lever Pin	96-156
25	Screw - Lever Retainer	96-142
26	Screw - Lever Tension	96-394
27	Screw - Idle Adjust	96-680
28	Screw - Fuel Pump Cover - [4]	96-543
29	Screw - Throttle Valve	96-207
30	Screw - Choke Valve	96-207

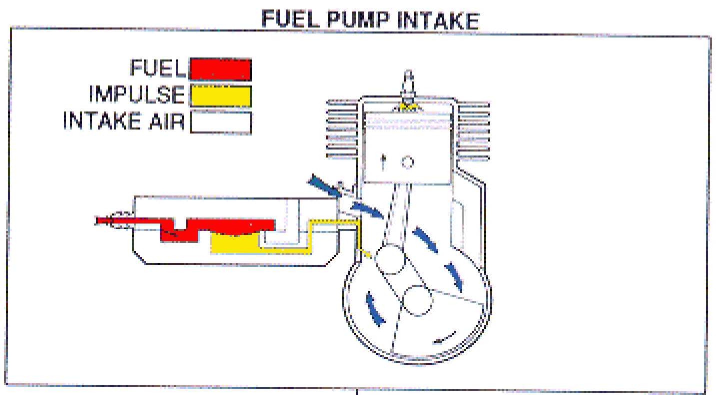
31	Screw - Metering Cover - [4]	96-589
32	Spring - Metering Lever	98-320
33	Spring - Choke Friction	98-162
34	Spring - Needle (idle)	98-368
35	Spring - Needle (power)	--
36	Spring - Throttle Return	98-3144
37	Spring - Choke Return	--
38	Spring - Lever Tension Screw	--
39	Needle - Idle	102-3072
40	Needle - Power	--
41	Jet Kit	--
42	Washer - Shaft - [2]	136-181

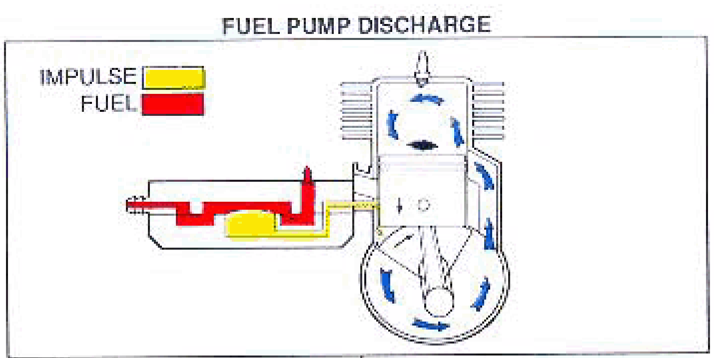
43	Washer - Needle - [2]	136-106
44 *	Screen -Check Valve	--
45 *	Screen - Fuel Inlet	140-70
46 *	Screen - Nozzle	--
47	Bushing - shaft - [2]	148-69
48 *	Pin - Metering Lever	144-60
49	Seal - Dust - [2]	--
50 *	Lever - Metering	166-55

There are two repair kits available. The K12-WG has almost all the parts, including needle, fuel strainer screens, etc. Note that it does **not** have a metering spring. The D12-WG has just the gaskets and diaphragms (metering and pump).

The reprint on the next page shows the operation of the fuel pump and the fuel pump diaphragm on the WG-8. Air impulse pressure on one side of the diaphragm serves to pump the fuel on the other side. The blue arrow points to the final fuel filter screen (which has collected some debris in the photo).







The Fuel Pump System

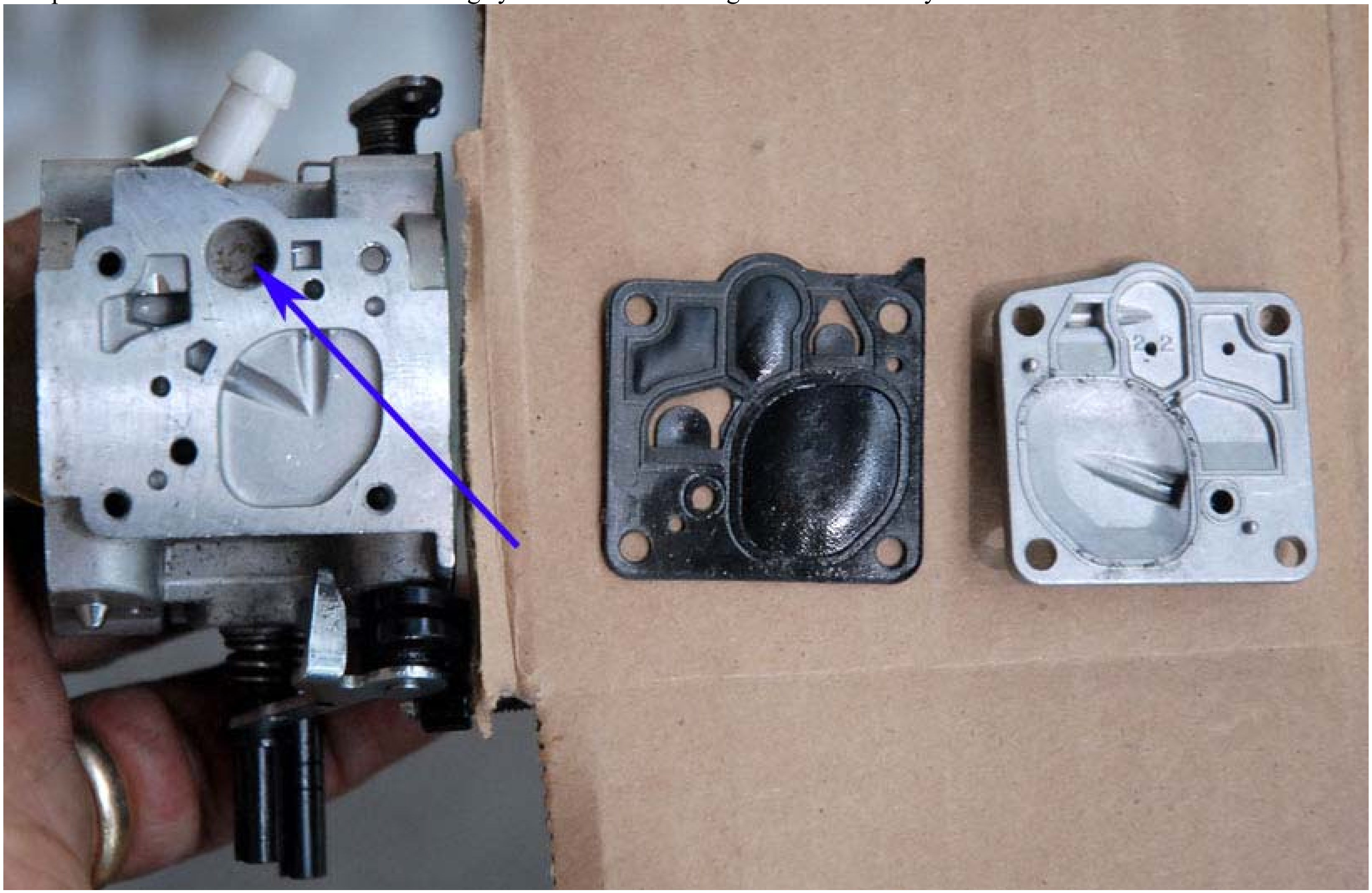
The power to operate the fuel pump comes from the crankcase impulse. The pressure and vacuum pulses travel through either a drilled passage or an impulse line. The pump is made up of the diaphragm bubble and a series of check valves. The fuel pump provides pressure which the rest of the carburetor depends on. As the piston moves up into the cylinder it creates a low pressure area in the crankcase. This vacuum pulse travels through the impulse passage and draws up on the pump diaphragm creating a vacuum within the fuel chamber. Atmospheric air pressure is allowed into the fuel tank and pushes the fuel through the fuel filter, the fuel line, and opens the inlet check valve to fill the vacuum. The vacuum closes the fuel pump's discharge check valve.

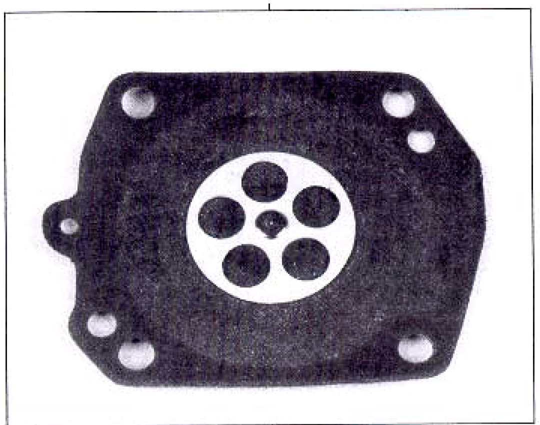
As the piston moves down into the crankcase it pressurizes the air. The pressurized air travels through the impulse passage into the carburetor fuel pump; it then presses down on the diaphragm pressurizing the fuel. The pressurized fuel then closes the inlet valve and opens the discharge valve in the fuel pump.

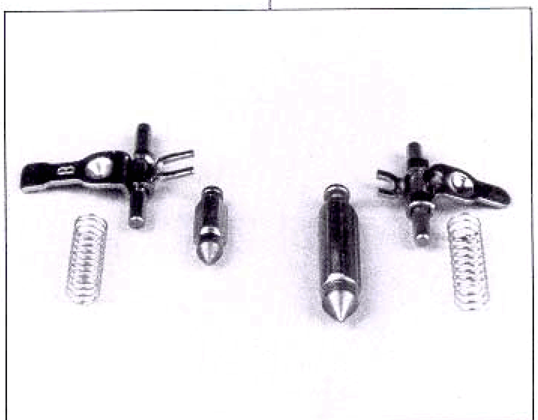
From the pump, the fuel travels to the fuel inlet screen. The screen has an important job as the final protection against dirt in the inlet needle and the seat. The inlet screen is sized in conjunction with the fuel filter selected by the engine manufacturer.

The inlet needle and seat control fuel flow through the carburetor. It is essential that they be in good condition for the carburetor to function properly. The actual seating area needs to be quite small to seal back the pressure from the fuel pump. Because of the small seat area, the inlet needle and seat are susceptible to leaking caused by dirt and debris. Walbro carburetors will either have a machined-in aluminum seat or a pressed-in brass seat. The pressed-in seat is used only for ease of manufacturing; it should not be pressed out for service.

The photos below describe the fuel metering system and show 2 stages of dis-assembly. Note the debris in the fuel intake filter screen.



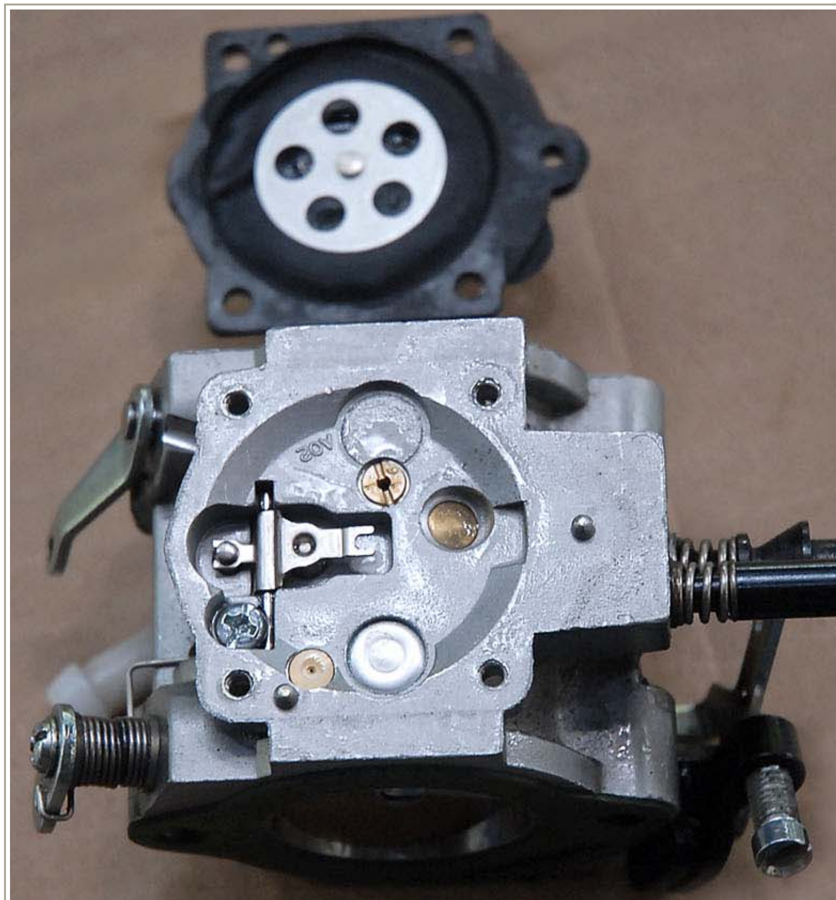


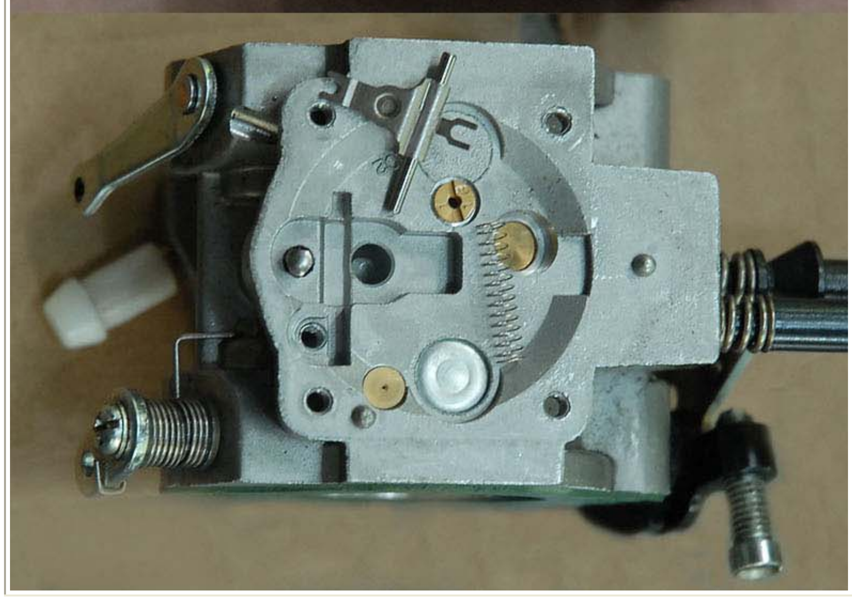


The Fuel Metering System

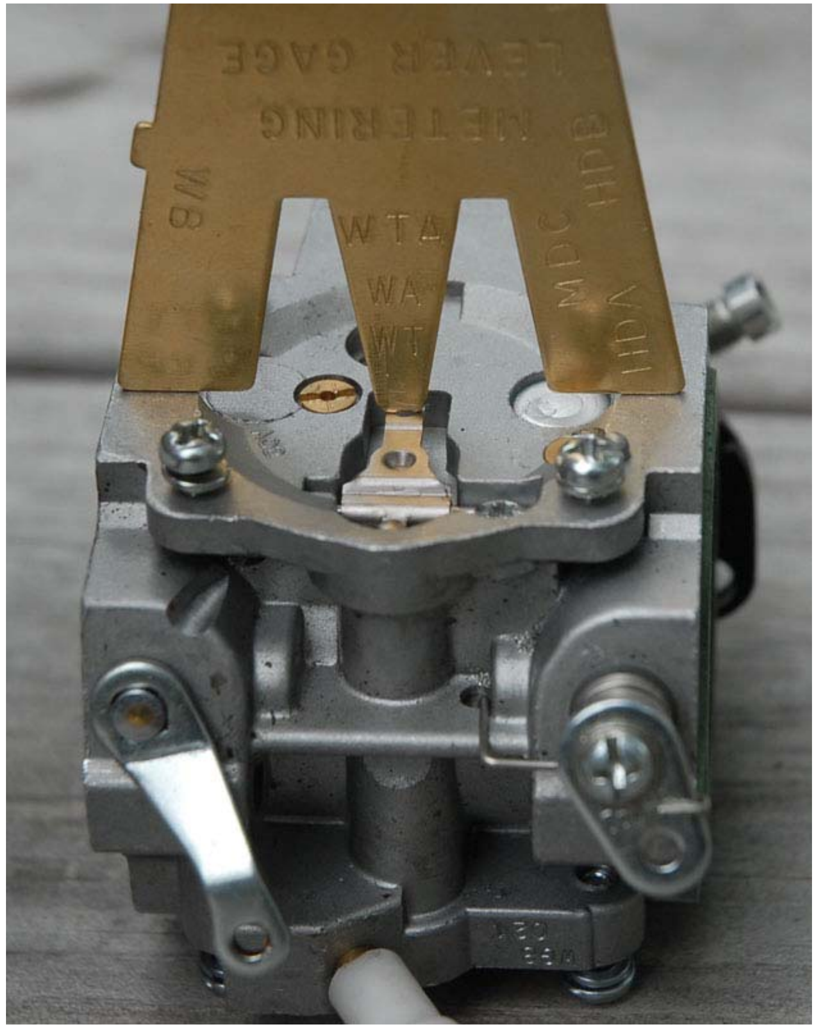
There are four components to the fuel metering system: 1) the Metering Diaphragm; 2) the Metering Lever; 3) the Metering Spring; and 4) the Inlet Needle. The metering diaphragm is a very sensitive device. It must respond instantly to slight changes in the fuel vacuum within the metering chamber. The diaphragm is made of a nitrile rubber compound over woven silk, with the convolution molded in to allow for greater movement. A stiffener plate and button are attached at the center. Because the diaphragm must respond to each intake stroke of the engine, it must be of the proper weight and resiliency. If it is too stiff or too heavy, it will not respond fast enough and the engine will starve for fuel at high speeds.

The metering lever transfers the pressure of the spring to the inlet needle, holding the needle closed and preventing fuel from flowing from the pump. When the engine is running, the metering lever does not lift the needle off the seat; since the needle tip is under pressure from the fuel pump, it lifts off the seat as soon as the metering diaphragm travels far enough down to override the spring force. Metering lever height is very important in controlling when and how far the inlet needle opens. If the lever is set too high, the engine may run rich; if it is too low the engine will run lean.



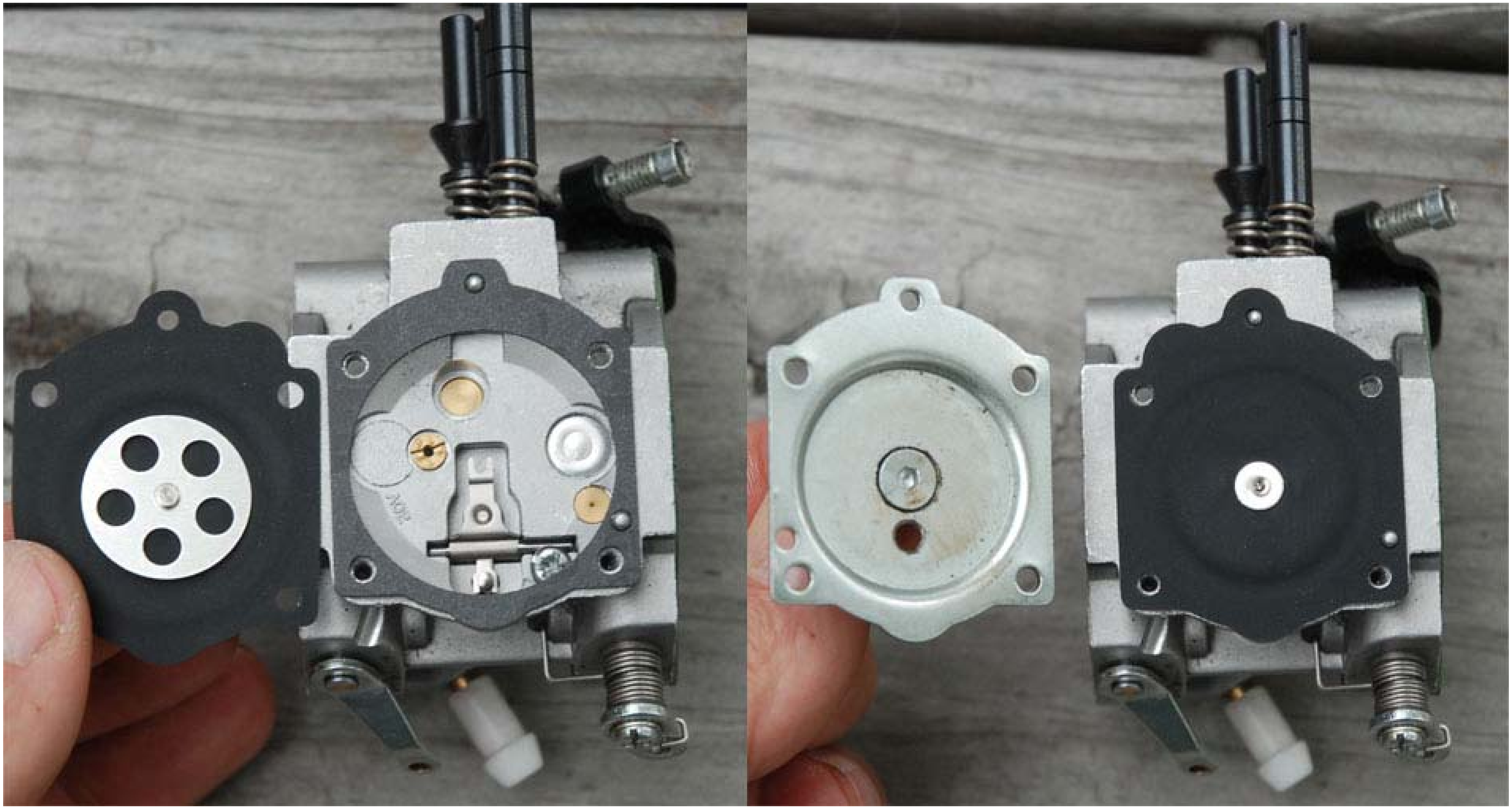


Walbro has a gage for setting metering lever height, as shown below.



You can buy the gage from Walbro, or you can make your own. If you download [WalbroGage.pdf]() you can print out an exact scale image of the gage (be sure to turn off page scaling when you print it). If it does not print correctly, there is a ruler in the picture you can use to scale it. The dimensions are also included.

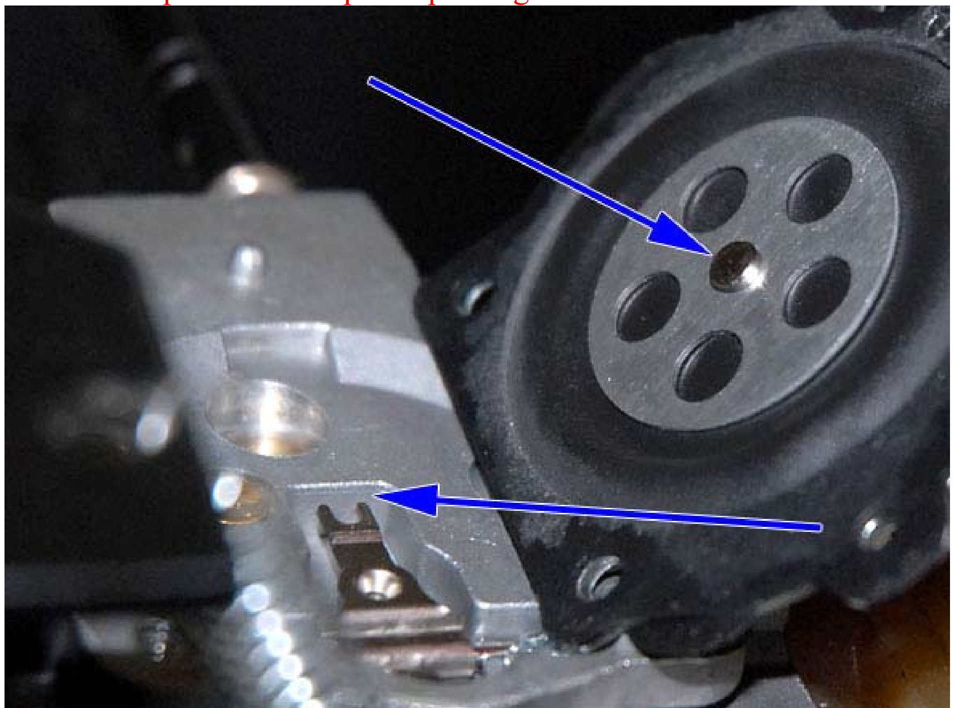
The photos on the next page show the installation of the metering diaphragm and cover. <u>Note that the gasket goes on first, then the diaphragm</u>. (this is the opposite of the pump side).



Note by Had Robinson: The metering lever in kits supplied by Walbro is preformed to be 1.7 mm below the body surface. According to the Italian version of the Top 80 service manual, the correct height is 0.5mm – 0.7mm. Do not install the metering lever without correcting it for the proper height. What is odd is that I measured the metering lever heights on (2) new Top 80's and the height was 1.7 mm. This restricts the range of movement of the diaphragm to respond to high load conditions. My tests demonstrated that the engine would hesitate under a sudden full throttle when the height was 1.7mm but not when it was set to 0.7mm. A high metering lever height can lean out the engine at high loads. This is because the diaphragm cannot move down far enough to raise the needle valve enough to provide a greater amount of fuel.

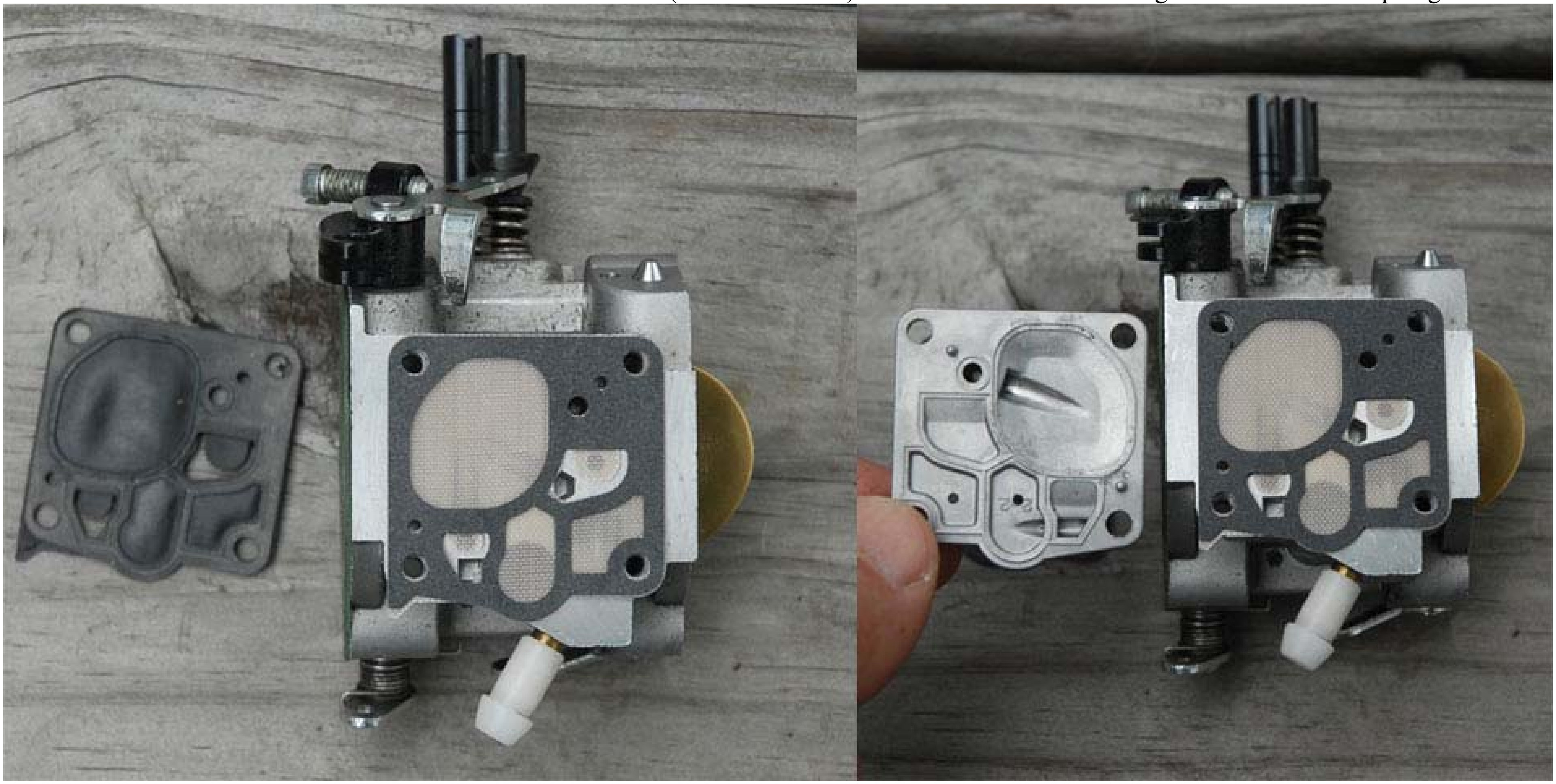
This photo on the next page further clarifies the travel limiting effect of the metal plate on the carb body.

Note by Had Robinson: Even though the plate limits the movement of the diaphragm against the metering lever, it is still possible to bend the lever by pushing on the diaphragm with a foreign object. It is safest and best to purchase or make a tool that limits the movement of the diaphragm to no more than 4mm. Most new carburetors from Miniplane have a special priming lever on the carburetor.

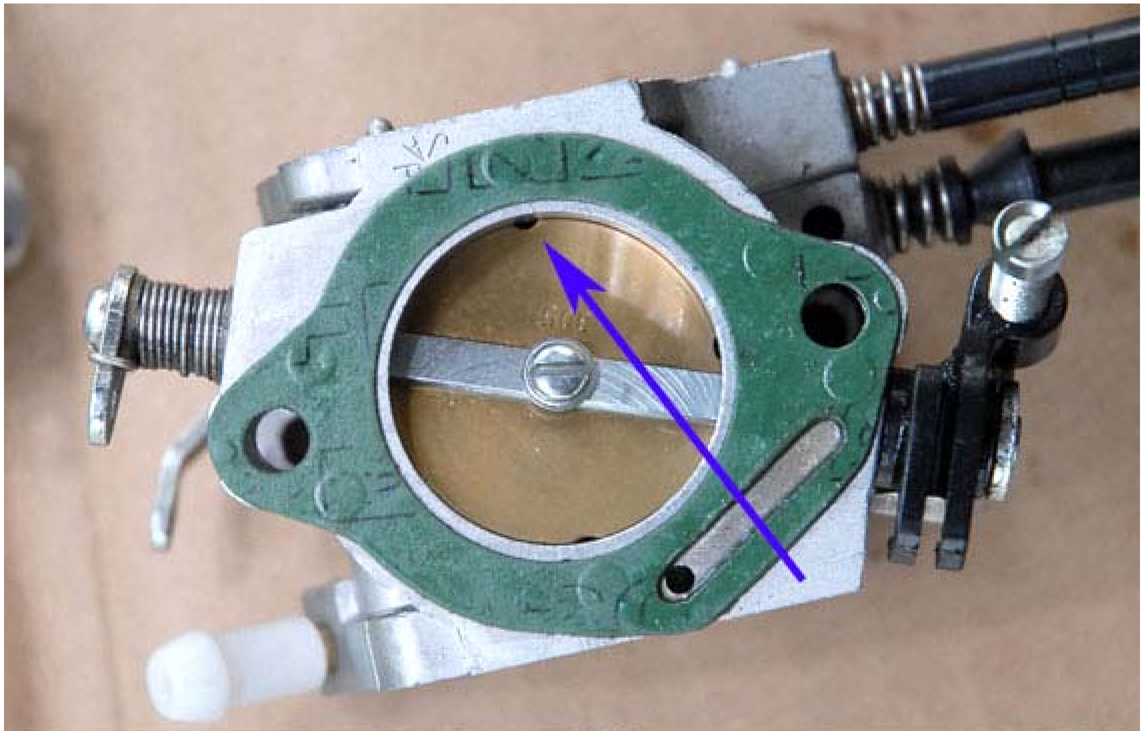


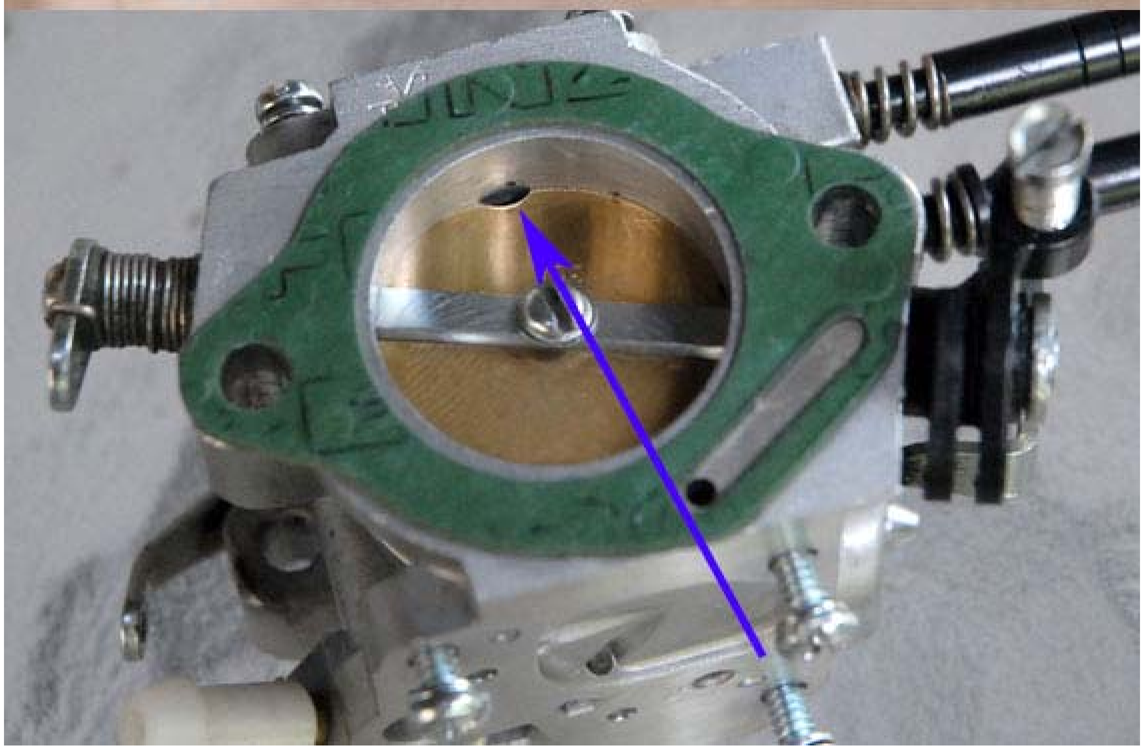
In the photos on the next page, you can see that, on the pump side, the installation order between diaphragm and gasket is reversed - that is, the pump

<u>diaphragm portion goes on first, then the gasket</u>. Note that the material for the pump diaphragm has changed. The original (black) one is at the left, the newer version is translucent with an embedded mesh visible (ethanol resistant). Kits also come with the original black rubber diaphragm.



The figure on the next page shows the throttle plate modification to improve idle and mid-range operation. This is discussed in detail by Gerry Farell: http://webspace.webring.com/people/bf/flphg/idle_adaptation.html The blue arrows show the notch before and after enlarging.





(See photos next page)

The fuel line on many units has a 1/4" line, which can allow bubbles to collect, especially in hot weather (fuel percolating). Even at full throttle the fuel flow is not sufficient to move the bubbles from a high spot in the line, where they eventually collect and slow fuel flow enough to cause performance to decrease. A solution with which many have reported success is to use a smaller 1/8" (~3mm) line, which also involves removing the white plastic barb on the carb fuel inlet. Before (top) and after(bottom) are shown below:

(The silver braid is/was a failed attempt to suppress radio noise from the ignition - resistor spark plugs are a much better solution).

I have discovered that the nylon TyWraps work well for securing the fuel line, however, be sure to take <u>two wraps</u> around the hose, as a single wrap will not apply uniform pressure all the way around.