Tuning R/C Gas Engine Carburetor

A gas R/C carburetor are not difficult to tune if you understand how they work and how the adjustments interact. However, in my experience, about 95% of the gas airplanes at the field are not properly tuned. How can you tell? It's simple: at some point in flight, the engine begins to "four-cycle." A two-stroke engine should not four-cycle — period. This happens when the mixture is too rich, causing the spark plug to misfire intermittently, which makes the engine sound like a four-stroke.

The good news is that gasoline two-stroke engines are generally very tolerant of rich settings. Most of the time they will continue to run without obvious problems. However, running rich will; increase fuel consumption, create more oil residue on the airplane and eventually foul the spark plug(s).

So why do many pilots leave their engines tuned this way? Because a slightly rich engine; start more easily when cold and requires little or no warm-up time. Those are valid advantages. Still, the engine is not operating as efficiently or correctly as it should.

Understanding the Walbro Carburetor

Before tuning, keep these points in mind:

1. The **low-speed needle** is always the one closest to the engine.
2. The **high-speed needle** is closest to the intake/choke.
3. There is no direct fuel adjustment for idle — idle speed is controlled by airflow (idle stop screw or throttle servo).
4. Both the low-speed and high-speed needles affect fuel delivery at high throttle settings.

Tuning a Walbro Carburetor

Step 1: Baseline Settings

Set both the low-speed and high-speed needles on a 100cc engine or larger to L~ 1.5 to 2.0 turns, H~2 turns from lightly seated. Saito gas engines like the 61cc twin requires the high-speed to be a bit richer from 2.5 to 3 turns.

Choke or prime the carburetor until it is wet, then start the engine and allow it to warm up fully.

Step 2: Adjust the High-Speed Needle

Start with the high-speed (top-end) adjustment since it is easier.

1. Advance the throttle to full.
2. Adjust the high-speed needle for **peak RPM**.
3. Leave it at full throttle for about one minute and observe.

If the engine begins to lean out; open the low-speed needle slightly. If the engine continues to run smoothly at full throttle, move to the next step.

Step 3: Adjust the Low-Speed Needle

1. Slowly reduce the throttle until the engine begins to four-cycle.
2. Hold the throttle at that point.
3. Adjust the low-speed needle until the four-cycling stops.
4. Reduce the throttle further until it four-cycles again.
5. Repeat the adjustment.

Continue this process until you reach a smooth, steady idle.

Step 4: Transition Check

From idle, advance the throttle smoothly.

If the engine bogs or hesitates; open the high-speed needle slightly — just enough to eliminate the hesitation.

Summing it up!

Because at full throttle both needles contribute to the mixture, you can run the engine with lean idle and richer main needle for good mid-range, but starting will suffer.

You can also run the engine with rich idle, and leaned out main needle, but mid-range will suffer and burble.

A larger prop will run cleaner at mid-range.

Too large a prop will make a good tuning very hard to do, and it will be almost impossible to get full throttle just right.

Finally, if you travel to an R/C event a couple thousand feet in altitude higher than your normal flying field you engine will run richer the higher in elevation you are.