DannyP

Weber Carb Adjustment and Sync

by Danny Piperato

Any carburetor adjustment has to start with a good foundation. I cannot stress how important this is. It means the difference between a well running car that holds its tune and one that burps, farts, backfires, and stumbles.

What does “foundation” mean? We all know there are three things that are needed for internal combustion: spark, fuel, and compression (mechanical integrity). Mechanical integrity and spark MUST be up to snuff before you even think about the carbs. So first, before we start, your car needs a valve adjustment (engine COLD), and either new or clean and properly gapped plugs. We need a good cap, rotor, and wires. We also need a correctly timed engine, which would be 28 degrees BTDC at 3000 rpm for an 009, which most people run. And we need to verify that you have 3 to 3.5 pounds of CLEAN fuel getting to the carbs. Check it, with a gauge, so that you KNOW. Don’t guess. Check everything. It is essential to the success of your adjustment.

Also, if there is any slop at all in the linkage, you may as well be whistling Dixie because your synchronization will NOT hold!

Once you are POSITIVE that your foundation – all the above – is in good order, we can move on. Get some carb cleaner spray, clean rags, a couple of differently sized flat screwdrivers, a metric combination wrench set, and some small open ends (I use an old ignition wrench set) to deal with the downlinks or pull-rods of your linkage. You will also need a “snail” type synchrometer. I would not recommend a Uni-syn – too much trouble to use. Finally, set up a nice clean table and comfortable chair in a well-lit place, and lay out some clean rags and all your tools. Maybe not the dining room table, but whatever your situation allows (wife??).

Take the carbs off the car, especially if it’s a Speedster, where there’s no room to work. I can work on them installed on my Spyder because it’s wide open. Only work on one carb at a time. Try to make sure all the parts go back into the same barrel of each carb. Make especially sure there are no parts left over!

There are some good online pictorials that go step by step for disassembly, cleaning, and reassembly. I really like http://www.carburetorclinic.com/. Click on “Tech Articles,” then “Weber IDF Tech Articles,” then “Setting Up Your Weber IDFs.” If you’ve done a carb cleaning before, it’s easy, but if you haven’t, the pictures help big time. Take your time, go slow, and make sure to get all the parts back in.

Set the float height. Make sure it’s the same on each carb. This is REAL important. I go 10mm from the top of the float to the carb top gasket, and about 22-25 mm on the drop, which is less critical. The top measurement is crucial, and you can play with this to help the tuning a small amount. Just make sure to get them the same on both carbs.

Make sure you don’t lose the O-rings on the idle jet holders and the idle mixture screws.

Before you put the carbs back on the manifolds, you must do a few things.

First, screw all the idle mixture screws in all the way. A gentle hand is needed here; the needles and seats are SOFT, and you can ruin them easily. Turn them IN until they just stop, then turn them all 1-1/2 turns OUT. Some engines will need 2 turns, but really, any more than 1-3/4 turns, and what you need are bigger idle jets.

Second, the idle stop screws need to be backed out and screwed in until they just touch the throttle stop, and then half a turn more.

Third, loosen the locknut on the idle bypass screws (all 4) and close them. Then tighten the locknut. This makes it easier to set the idle and sync when the carbs are installed. We may open one or two of them later on.

Re-install your carbs on the engine. Re-attach the linkage for now. Start and warm the engine. Depending on the weather, this could take a while. If it will idle on its own, fine. If not, give each idle speed screw a quarter turn IN, and repeat as necessary, until the engine will run. If it is popping, spitting, etc., don’t worry about it. Nothing can be adjusted until the engine is fully warmed up. You want a nice, low idle, around 800 or so, because this makes it much easier to set the air and the mixture. It also makes sure that you’re using the carb idle circuit and not the progression port!

Once the engine will run on its own and is warm, disconnect one of the downlinks to one of the carbs. You can leave the other carb connected. They just need to be independent while you set the mixture and speed.

So valves adjusted cold, float height set, carbs CLEAN, filtered fuel at 3 to 3.5 pounds, ignition tip-top shape, and engine warm? Now we can adjust those carbs. First we set the air with the synchrometer; then we go to mixture and idle speed.

Check all four barrels with the synchrometer and record the results. At about 800-900 rpm, you should read about a 4 to a 7 on the gauge, depending on the gauge, efficiency of the engine, and idle speed. If you have one or two barrels a bit low, it’s ok, we’ll adjust it. In my experience, one will always be a bit low and the other three will fall within a needle’s width of each other on the sync gauge. I usually set idle speed with the rear two barrels, closest to you.

If two barrels are reading low on one carb, bring the reading up with the idle speed screw. If one barrel reads low on both carbs, we can use the idle bypass screw. If the difference on the synchrometer is half a point, or a couple needle widths, we can use the bypass screw. More than that, and something is either wrong with the carbs or that one cylinder. Or it could be a bad valve adjustment. Remember I stressed how important that was? It is! An engine is just an air pump. Remember to try to make it as even and efficient as you can.

Now we can start to adjust speed and mixture. It’s kind of a dance. You lean a cylinder out, and the idle speed increases, drawing down more air, and making a single cylinder’s mixture change less noticeable. Try to keep the rpms consistent and work on one cylinder at a time. Listen carefully to your engine. Turn one idle mixture screw IN 1/8 to 1/4 turn at a time. Wait a few seconds and listen. Watch your tachometer for the change in rpm. It’s VERY important to incrementally turn the screw and then wait and listen. If the rpms increase, keep turning the screw IN (leaning the mixture) until the rpms peak. As soon as the engine starts to slow down, stop turning IN and go the other way (out and richer) until you hit peak rpm.

Then stop. You’re done with that cylinder. Check the idle speed, bring it back to the 800-900 rpm range, and move on to the next cylinder. Keep going until all four cylinders are done.

When you decrease or increase the idle speed, adjust both idle speed screws and use the synchrometer to check and even out the air draw. Like I said, it’s a kind of dance, but you will get used to it as you learn the feel of the carbs on your engine. They’re all the same, but they’re all different too, kinda like women!

Okay, so the engine should be smooth now, putting along at a nice consistent idle. Check the speed and the air on all four barrels. If it is smooth, and a good speed, and the “snail” needle reads very close on all four cylinders, you’re done with low speed adjustments.

Now re-attach your linkage downrod. Did the speed or sync readings change? You may need to shorten or lengthen that downrod to the length that doesn’t alter the idle.

All good? Bring the engine up to 3000 rpm and hold it there. Alternate the synchrometer between left and right carbs and record the readings. It is VERY helpful to have a friend for this part, because the linkage should be worked from the point where the cable is attached. If the readings are the same on both sides, you’re done. If one side is lower, lengthen that downrod and re-check.

You can loosen the locknuts and twist them by hand sometimes. Sometimes you have to turn the engine off and do it by trial and error. It all depends on the linkage type, age (rust?), and installation. Always give a final check at idle and at high speed after all bolts are tightened just to make sure. Put your air filters back on and go for a ride.

I didn’t really touch on this before, but linkage is extremely important to how well and consistently your car will run. NO slop in ANY part of the linkage is acceptable. The downrods need to be the same length and be at EXACTLY the same angle. If they aren’t, the car will never run as smooth and as strong as it could. It’s basic geometry, but vital. Some of us have thrown away the crappy nylon bushings and quickly worn hex bars and changed over to heim joints in the linkage. I have 20,000 miles on my modified linkage, with no sign of wear! It only took 3000 miles for my CB linkage to wear badly. Cost me a little over $20. A very cheap and a good investment. You know – like the commercial: “Priceless”!

Another whole paper can be written about jetting, transition, accelerator pump volume, venturi size, air correctors, emulsion tubes, and air/fuel ratio. Plenty of info online at the Samba, aircooled.net, Harney’s Carb Clinic, and others. Good luck!