

Tuning Your S.U. Carbs (originally found in the VTR pages)

Well, it's not really that hard to set up SU's, just different. Of course it always gets more interesting when you have more than one... There is a very good Haynes SU carb manual available, recommended reading. The basic syncing process also applies to Zenith-Stromberg's, but the adjustment mechanisms are different. Here is a layman's guide to adjusting SU's (long):

step 1- Tune up the rest of the engine- REALLY! clean or replace, and set the points, set the timing, plugs, valve lash, and remove the air filters. (have new ones ready) All of these things can affect the setting of the carbs, which should be done LAST, (if at all). The carbs rarely need to be adjusted, once set. Also replace/install the gas filter. Of course, it helps if the carbs are in good mechanical condition as well. But you can consider a rebuild once you have gotten things working first!

step 2- clean the carbs! use gum-out or similar stuff, clean all external linkages, shafts, and stuff.

step 3- Remove the float bowl covers, clean the float bowls, remove old sediment, and check/adjust the float setting. (turn the cover upside down, and get a *1/8" in drill bit, set the drill bit across the cover, the float tab should just touch the bit.) Make sure the needle is moving and seating properly. This is just like *most* floats. Replace the cover. * This is for HS4 SU's- (1/8-3/16") if you are dealing with 1", H's, HS2's HS6's, HIF's, etc.- check the spec for your carb Note: You can check for matching float settings, after setting the mixture, by removing the pistons, and peering down at the jets. The fuel level should be about the same on both carbs, a little below the top surface of the jet. (After car has been run only)

step 3b- Go get a pint of ale, or something close, and set it nearby.

step 4- Remove the piston covers. CAREFULLY remove the piston, DO NOT BEND THE NEEDLE. Set the piston down on a clean wadded rag to prevent rolling. Clean the inside of the carb. Check operation of the throttle. Check the throttle shaft slop- this is the most common place for wear on an SU, and is often where air/vacuum leaks occur. The bushings and shafts can be replaced, but it requires some machining. A small amount of leakage can be tolerated, the car just won't idle as evenly. Clean the piston. Stare in awe at the odd carburetor design, simple and effective, (constant velocity). Dump the old oil out of the damper if you haven't already spilled it. clean. Reassemble, check piston movement, raise it, then let go, it should fall freely. If not, check assembly again, make sure the piston isn't binding against the carb body, it should ride only on the damper shaft. Do not stretch the spring. When all is operating properly, fill the damper with Marvel Mystery Oil for light damping, or use motor oil for heavier damping. (I use MMO) If you get "flutter" on, acceleration, you might try the heavier oil.

step 5- Start the car and warm it up, then turn off/disconnect/otherwise disable the choke mechanism. (Loosen the nuts on the clamps so that the choke stuff isn't doing anything) This will get set later. (Later Zenith-Strombergs have a thermostatic choke, not a cable.)

step 6- Check coarse throttle adjustments- make sure the throttle cable pulls on both carbs equally, and returns completely when released. This is adjusted by loosening the set screws on the throttle shaft and matching the two sides. You can also adjust the cable length at this time, using the cable set screw/retainer at the end of the cable. You can check the float adjustments now by removing the piston & cover, and looking at the fuel level in the needle seats. Both carbs should be about even, a little below the top surface of the jet. If not, readjust one or both floats to match the level.

step 7- Synchronize the throttles- if you have a uni-syn, here's your chance to use it, (or other air flow gauge), if not use a tube and listen to the airflow. The Uni-Syn is much easier to use, and

can result in better balance. Alternately adjust the idle screw on each carb, attempt to set the idle as low as possible (~800-1000 RPM). Adjust until the airflow is *close* to the same at each carb. The engine may now be running rough, just keep the idle speed high enough to keep running. Give the throttle a quick snap to make sure everything is settled, then check sync again. Periodically snap the throttle to make sure everything is seated. Large differences in where you can adjust the two carbs may indicate air/vacuum leaks, or other problems, such as a bad valve) Magic Time- Relax, and shake your voodoo rattle...

step 8- Adjust the mixture- this is done with the spring-loaded hex fitting under the carb, where the fuel supply tube enters from the float. Turning the fitting raises and lowers the needle seat. Pick a carb, and turn the fitting 3 flats (1/2 turn), first in one direction, then back 3, then 3 in the other direction. Note where the engine runs better, idle speed should increase. Turn to the best setting. Repeat this procedure until you get the best operation you can, (highest idle speed), keeping track of flats turned will help you remember where you were. If you get lost, turn all of the way in, then back out 12 flats and start again. Periodically snap the throttle and push up on the fitting to make sure everything is seated. Note: Type HIF carbs (With integrated float bowl) no longer have the hex nut to adjust the mixture. Instead, there is a screw to twiddle, on front of the front carb, and behind the rear. The screw is connected to the needle seat through a temperature compensated gizmo, which is said to make the carbs more stable. Adjustment can be done in much the same way, by counting turns/flats of your screwdriver. There is less adjustment range than with the basic models. When you think you're close, stop, uncramp your fingers, breath deep, and do the same to the other carb. Then retune the first carb, and then the second again. This serves to match the mixture of the 2 carbs, and prepare you for the beer sitting over there in the sun. (why do you think the British drink warm beer?)

step 9- repeat step 7, setting the idle speed as low as possible, and re-syncing the idles. Now go back and readjust the mixtures. After a couple of iterations, the engine should be running smoothly (controlled by mixture) and at a low idle. Repeat as necessary. Set the final idle to 800-1000 RPM, depending on the condition of the rest of the engine. This is a standard mixture test, performed AT IDLE: Under operation, (air filter off) lift the carb piston by 1/16" with the lifting pin or a screwdriver, which leans the mix a tad. If :-RPM's rise and stay up, that carb is rich. -RPM's rise briefly, then drop, mix is about right. - RPM's fall, engine gets rougher- mix is lean.

step 11- Adjusting the choke- I won't get into the temperature compensation in the type HIF, or the Thermostatic choke in the later Strombergs. Check the manual for more info. The choke is supposed to do two things; the first half of travel moves a cam on each carb which opens the throttle, for warm up. The second half pulls down on the needle seat to enrich the mixture, for starting. Start with the choke in the off position (knob in). Adjust the so that the cam only starts moving the throttle after you start pulling out on the cable (adjust with shafts and adjusting screws). Try to get both carbs adjusted the same, so that both screws begin to hit the cam at the same time. This is not real critical, but you can use your Uni-Syn to match air-flow on both sides, with the choke partly engaged. After the cable is about halfway out, it should start engaging the lever which pulls down on the needle seats. Adjust the linkages so both carbs are acted on equally. You can do this by adjusting for even running of the engine. Of course, for a warm engine, the richness of this mixture will cause some roughness. Make sure the needle seats return freely when you release the choke

step 12- Drink that warm beer (only one, no DWI now...) it will taste great at this point!, go wash up, and go for a ride.

Notes: These procedures assume that your engine/carbs are in reasonable operating condition. If something is malfunctioning/leaking, etc., this should still help, but the results may vary. For instance, if you have leaky carbs, worn needles, engine modifications, etc., you may find things work better if you tune for optimum performance at open throttle rather than idle. The first time through carb adjustments can be confusing, once you've done it, all of the stuff in the manuals

makes sense. Go back and read them again- As always, I recommend Bentleys, which is a repro of the original factory manuals, and then Haynes, and throw out the Chiltons. (original factory manuals are to be read in a clean environment, repros are for smearing grease all over, except, if that's all you got, use it!) Haynes has an excellent manual just for SU carbs, it covers operation, theory, rebuild of all models, and has needle charts for hundreds of car/engine/carb setups. They also have a manual for Zenith-Strombergs, which, while similar, are a whole 'nother beast. - Roger Garnett Rev. 12/5/91