

Tuning and Altitude adjustments

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The Tuning information will be helpful if your carburetors are in good working order. It will help you understand the workings of your carbs, and make things like altitude and performance adjustments easier. If you cannot tune your carbs with this information, or with that provided in our installation instructions, give us a call.

If you are looking at this to adjust your newly delivered carbs **Please call us first!** The only adjustments you should have to make on freshly restored carburetors should be minor and only to conform to your specific engine requirements.

Make sure your electrical system is healthy and the distributor works properly. Many times a faulty distributor will create symptoms that mimic carburetor issues. The advance should be working properly and there is no bouncing; that it always comes back to the same point. Do not let anyone try to convince you that a Petronix is the solution to a faulty distributor if you have a six volt vehicle!

You will also want to have either a Synchronizer or Unisyn as part of your tool box. We find the synchronizer to be a little easier to work with and they are usually available on Ebay or The Samba. Sometimes you will have to use a little duct tape to get a tight fit with the top of your carburetor.

Carburetors work by creating a proper ratio of gasoline to air mixture. When new, or when purchased as restored, they are set to operate at sea level (unless requested otherwise). Jetting is done according to original manufacturer specifications with appropriate adjustments for modern fuel mixtures. If your car gets a big bore kit, the cam is replaced, you drive at a substantially different altitude level (1000 meters / 3200 feet or more) you will note changes in engine performance. Any of these changes may require adjusting of jets to get the ratio of gasoline to air mixture back in balance.

Tuning your carbs. Restored carburetors from 356 Carburetor Rescue should need little adjusting, many say they are just bolt and go. But as all engines are not equal after all these years, some adjustments may be necessary. Zeniths need a little time for the leather skirt on the pump to absorb gas, so please allow for this.

Make sure your carburetors are installed correctly, and start up your car. Check for air or fuel leaks. Adjust the throttle screws so the engine is idling at just under 1000rpm. Use the synchronizer (preferred by many over the Unisyn) as you adjust the throttle screws to get equal draw and keep the RPMs between 800 & 900 (*we have done this as part of the restoration process, but again, you may have to make adjustments to suite your engines performance*). If you need to, adjust your volume control screws (per detailed instructions for [Zeniths](#) and [Solexes](#)) to get an even idling engine. You will find more information on tuning Solex in [this excerpt](#) from Duane Spencer's book.

Check your spark plugs. The plugs will tell you how the combustion chamber is burning fuel, so you can make proper adjustments. Since an idling engine will almost always run rich, your plugs should be dark from the initial idle set up process. Before making any other adjustments, drive the car about 20 miles. For the best results, turn off your engine and coast to a stop. As this is not always possible, shut off your ignition IMMEDIATELY when you stop. When cool enough, check the spark plugs and compare to how they looked at start up.

The general parameters for judging are: black and/or wet equates to a rich running engine, brown is right and grey/white is lean. If all plugs are the same, and no amount of adjustment corrects the situation, fuel input needs to be adjusted through pump volume, float level, or resizing jets. When individual plugs vary, one from the other, you adjust the appropriate volume control setting - turning them in if the plugs are black, out if running lean. Each time you make adjustments, do the drive and check the plugs again. If you are still having problems **CALL US**

If the problem is cylinder specific, and jet adjustments have not solved the problem, do a leak down and compression test. See your mechanic for any further assistance.

Altitude adjustments

For anyone who has driven their car to a holiday, over long distances, or lives at anything much over sea level; altitude and jet sizing is an ongoing subject. There are formulas, for those so inclined. The workshop manual provides recommendations. Articles have been written. The following is a good rule of thumb to start your adjustment process, and comes from the workshop manual.

Main jet metering is of great importance when operating at considerably varying altitudes for which the following rule-of-thumb may be applied: change main jet calibration by 6% for each 1,000m (3280') altitude variation. For example, (if) normal main jet calibration at an altitude of 400m (1312') is 0115; proper jet size for an altitude of 1400m (4592') is 0110

The truth is, after 50 or so years of use, engines have developed their own idiosyncrocies, fuels have changed, and/or there are have been engine modifications made. So there is no one size fits all answer. The final jetting set up for each car is determined through trial and error, although some guidelines, such as the jetting note above, give a starting point.

First, why are changes necessary? If the carburetors are set for sea level performance (400m / 1312'), the proper fuel:air mixture has been established. As you increase altitude, the actual density of the air decreases. There is less oxygen available and the fuel:air ratio is changed. There is too much fuel / too little air. So jetting has to be adjusted to bring back the proper ratio. If the altitude change is temporary, you might choose to let it be, or just make adjustments in your volume control screws. But if the altitude change is great enough, or the time spent at altitude is long enough, you may want to swap out your jets.

When carburetors are tuned for altitude driving and then brought down in altitude, the opposite happens due to denser air.

Is the car running too rich, or too lean? Unburned gasoline will leave sooty deposits in your tailpipe, turn your spark plugs black and cause popping in the carbs and backfiring through the exhaust. When lean, the spark plugs will be light grey or white, carbs will spit back, and the car will run hot.

Slight changes in elevation are accomplished by adjusting the volume control screws; Turn in if running rich, turn out if running lean. Volume control screw adjustments less than 1 turn can mean the need for a smaller jet size. A general recommendation is a change of 0.05mm for every 3000 feet of altitude change.

If carburetors are still running too rich, adjust the idle screws. If it is necessary to turn the screws much over 1-1/2 turns, then replace the idle jets also.

When driving in varying altitude conditions, it is probably better to run the engine a little rich. An engine running on the rich side will run cooler, while one running lean could get dangerously hot.

If traveling to another altitude for any extent of time, as in a vacation or Registry Holiday, a change in main jet size should be considered. Main jets are relatively easy to change. If plugs are fouling, and there is no chance to change jets, be prepared to replace the plugs regularly on the trip.

And when ever in doubt, please consult with your mechanic or give Carburetor Rescue a call!