

# How to Set Up a BG Speed Demon (basic)



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Rev. C 1-2-10

This tech paper will discuss basic set-up of the Barry Grant Speed Demon carbs to establish an initial starting point for a good-running carb.

## Overview

The BG carbs are similar to the Holley carbs in their layout and design. The BG carbs have some refinements that make them easily tunable for most street applications, providing this tuning is done correctly and in the right sequence. BG carbs come factory-set so that they will run well right out of the box, but I have found that the setup can be refined and tweaked a little to optimize the carb a little better. It is also important that the tuner/owner understand these tuning processes when re-adjusting idle speeds and idle mixtures so as not to get the carb settings really messed up.

This paper will only discuss basic initial setup. For tuning and tweaking, check out my paper on How to Tune a Holley – the tuning processes for the BG are very similar once the initial setup described here has been completed.

### Tech Tip #1

BG carbs use mostly the same gaskets as a Holley. However, the throttle plate gasket (the gasket between the bottom throttle plate and the upper body of the carb) on a BG has 4 idle fuel transfer holes that are not in the same location as the Holley. If you use a Holley gasket, you will not get any fuel flow through the idle metering circuit on the BG, and the idle mixture screws will not work. You can use the Holley gasket, but you need to slot the idle fuel transfer holes in the gasket to match the holes in the BG carb.

## Tools and Equipment Required

As a minimum, you will need the following tools:

1. Vacuum Gauge
2. Small cup to drain fuel into
3. Screwdrivers
4. Box end wrenches
5. Spark plug removal tools
6. Rags

## Procedure

Here is my recommended sequence and procedure for doing a basic BG set-up:

### 1. Bench-Set the Idle Speed & Idle Mixture.

The BG Speed Demon carbs have 4-corner idle metering. This means that they meter idle fuel and idle air through all 4 of the throttles – primary and secondary. For this system to work properly, it is absolutely critical that all 4 of the throttle blades ALWAYS be set at the same setting (never set idle speed by only adjusting the primary idle speed screw), and all 4 of the idle mixture screws should be set to the same metering setting. This will assure that the carb is balanced and working right from the beginning. Once you get the engine up and running well, a slight difference in mixture screws between the primary and secondary side may be required, but start by balancing everything out as follows:

Before installing the carb to the engine (if you have installed it, yank it off), turn the carb upside-down on your workbench. If you look at the throttle bores just below the edge of the throttle plates (“butterflies”), you will see a vertical slot. Open the throttles a little to see the whole slot. This slot is called the “transfer slot,” and it provides a fuel discharge transition circuit between the idle circuit (which discharges fuel out of the round idle discharge holes below the throttle plates) and the main metering circuit (which discharges fuel out of the main discharge nozzles once airflow through the venturies is high enough to pull the fuel through the nozzles). The transition slot receives its fuel from the idle metering supply circuit.

With the throttles fully closed against their idle stop screws (not on the fast idle cam), noting that the secondaries and primaries both have separate idle stop screws, there should be exactly .020” of the transition slot exposed below the throttle plates. Use a .020” feeler gauge to measure this: Place the feeler gauge on the throttle plate up against the transition slot and adjust the idle speed screw so that the slot JUST BARELY disappears behind the feeler gauge. At .020” slot exposure, the slot will appear to be a perfectly square hole. Adjust the primary and the secondary idle speed screws so that both of the throttle shafts are at this same position.

If your carb is equipped with the “Idle EZ” center air bleed screw, close this screw to eliminate airflow through this circuit. The additional air bleed is not required for most mild and moderate street engines provided the idle screws have been balanced as noted above.

**NOTE:** Holley carbs also have a secondary idle speed screw, and it should be adjusted in a similar fashion. The Holley screw is located on the passenger side of the carb, but you have to flip the carb upside-down to see it: It is a small screw recessed into a hole in the bottom surface of the throttle plate. This screw is often partially seized, so you have to use a small screwdriver with a pair of vice grips attached to the shank of the screwdriver to turn the screw. It’s best to “rock” the screw back and forth to get it loose enough to turn. The next thing to note is that the secondary transition slots on a Holley are often located higher in the throttle bores than on the primary side: If you try to obtain the .020” transition exposure on the secondary side of a Holley, you will often end up with the secondaries opened significantly more than the primaries. To avoid this, use the following secondary throttle adjustment on the Holley carbs: After adjusting and setting up the primary throttle blade angle as described above (.020” transition slot exposure), hold the carb up to a light and look up the bottom of the carb – note the amount of “light gap” around the primary throttle blades. Now, adjust the secondary idle speed screw to duplicate the primary “light gap” on the secondary side. This will usually get the secondary throttle blades close to the transition slot, but you may not have .020” exposure. Idea is to get the same blade angle and airflow through all 4 corners of the carb – the “comparative light gap” method allows you to get this very close.

Once the primary and secondary throttles have been set to this initial idle speed setting (which should make your car idle very close to the correct idle rpm range, but idle speed may be a bit high), it is your job as a tuner to assure that any further idle speed changes occur by adjusting both of the screws equally from this point on. Never adjust the idle speed by only adjusting the primary screw: if you adjust the primary idle speed by ¼ turn, you MUST adjust the secondary idle speed screw ¼ turn as well. Keep the two throttles adjusted the same.

Now, turn all 4 of the idle mixture screws all the way IN until they LIGHTLY seat, and then back them all out 1 turn.

## **2. On-Engine Settings.**

You can now bolt the carb onto the engine and hook up your fuel and choke (if you're running a choke). See my article on "BG Carb Installation" for some additional tips on the installation process. If you have a choke, make sure you hook up the wire to a switched 12-volt source. Note that the "hot" wire going to the "+" side of the coil on a points-style ignition system is not 12 volts due to the resistor wire in the ignition circuit, so don't use the coil wire for your choke. BG chokes tend to be set very rich from the factory, so you might want to loosen the 3 choke cover screws and rotate the black choke housing cover so that the choke plate begins to open – in its factory setting, it is tightly closed. Note that the BG carbs do not have in-carb fuel filters like a Q-Jet, so you MUST run an in-line filter between your fuel pump and the carb (don't install filters on the suction side of the fuel pump).

Start the engine and allow it to warm up. If you have a choke, you can adjust the fast idle screw to your preference at this time. If you do not have a choke, you can turn BOTH idle speed screws in the same amount (usually about ½ turn-or-so) to keep the engine running during this warm-up period. NOTE how much you turn them both in. While the engine is warming up, you can check and verify your float levels: There are 3 lines on the bowl sight glasses: for a street car, set the primary and the secondary float levels to the lower line. The float levels are set by loosening and adjusting the float adjusters on the tops of the float bowls. If your float levels need to be lowered, do this slowly, as the fuel in the bowl will only drop as fast as the engine is using the fuel at idle speed. You can deplete the bowl level faster by pumping the accelerator pump arms on the primary and secondary sides.

As the engine warms up, make sure the choke is opening, and get the engine off fast idle. Once the engine is up to normal operating temperature, start playing with your idle speed screws: Adjust both of the screws equally to obtain the slowest practical idle. This should be very close to your bench setting. Once a low idle speed has been obtained, you are running on the idle circuit. You can now adjust idle mixtures.

If desired, you can now hook up a vacuum gauge to use as a tuning aid. I recommend an initial setting of all 4 screws at 1 full turn out from lightly seated. When adjusting idle mixture, all 4 screws MUST be turned the same amount and be kept equal. To test for proper adjustment for your application, play with the primary (forward) idle screw on the passenger side as follows: With the engine warmed up and running, turn this screw ½ turn IN. Note what the engine does (idle drops; idle gets better, etc). Bring the screw back out to the original setting. Now, turn the screw ½ turn OUT. Note what the engine does. If the idle quality improves with one of the settings (for example, if idle quality improves when you turned the screw OUT), adjust all 4 screws ¼ turn in that direction (turn all 4 screws ¼ turn OUT from the 1 turn base setting). Once completed, repeat the entire procedure by turning the one forward screw a little in and a little out to see what direction you need to equally move the 4 screws. As you keep doing this process, keeping all 4 screws equally adjusted, you can narrow down your adjustment to 1/8 turn increments of the screws. You may need to adjust idle speed as you optimize the mixture, keeping both idle speed screws adjusted exactly the same. I suggest running the idle mixture screws just a *tad* to the rich side of best idle: This will give you better cold-run characteristics and will reduce off-idle stumble tendencies.

With the engine now good and hot, re-check your float levels (making sure the car is on a level surface). Float levels will change slightly as the engine/carb/fuel heats up. If the levels seem a little high, you can slowly discharge some fuel out of the bowls by actuating the accelerator pump lever(s). If the level remains the same, you need to lower the float slightly.

This completes the initial setup of your BG carb. You should now have a very good idle, and off-idle throttle response should be crisp and instant.

## **3. Accelerator Pump Arm.**

To assure proper operation of the accelerator pump, make sure that the pump arm is properly set up against the pump arm screw (spring loaded screw on the lever). With the engine OFF, verify that there is no gap at all between the end of the screw and the pump lever – it should have a little bit of “pre-load.” Verify that the SLIGHTEST movement of the throttle produces an instant discharge of fuel out of the discharge nozzles. Now, open the throttle fully and verify that there is still a little bit of travel left in the pump arm (make sure it’s not bottomed out and jammed solid).

#### **4. Throttle Cable Check.**

Before you go for a drive, make sure you have full throttle travel, and make sure you have a positive throttle stop. One of the most common performance problems I see are carbs that do not go to Wide Open Throttle (WOT) due to improperly adjusted linkage. Also make sure that your throttle linkage does not restrict the carb from a full return to idle speed. Make sure you have a throttle return spring attached (don’t rely on the carb throttle shaft spring to do the work for you). Now, with a helper in the car, observe the throttle shaft lever as the helper slowly presses the gas pedal to the floor. Verify that the throttle opens fully. Verify also that the gas pedal hits the floor or a fabricated pedal stop just as the throttle hits its wide open point. If you rely on the carb to stop your gas pedal, you will bend and destroy your carb – your leg has more power in it than the sheet metal lever on your carb. You may need to swap throttle cable attach points on the carb throttle lever, and you may need to play with your throttle linkage geometry to make this all work right, but it’s imperative to check and correct as required.

#### **5. Secondary Opening Rate (Vacuum Secondaries).**

If you’re running a vacuum secondary BG, you can gain some performance by playing a little with the secondary diaphragm spring. BG sets up the secondary opening rate very conservatively to avoid a secondary tip-in bog. But this results in secondaries that open very slowly, and often they fail to ever open fully. You can buy a secondary spring assortment kit from BG, Summit, Holley, Jeg’s, or your local NAPA store and play with this a little. I have had best success using the lightest spring in the kit or the second-lightest spring. Use the lightest spring you can that prevents a bog when you go into the secondaries.

### **Questions, Comments & Technical Assistance**

If you have questions or comments regarding this article, or if you notice any errors that need to be corrected (which is quite possible since I’m writing this from memory...), please feel free to drop me an e-mail. Also, if you need any technical assistance or advice regarding this process, or other maintenance issues, feel free to contact me:

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