

[Tuning 40mm BING CV carburetors for BMW motorcycles by ear.](#)

Steve Doyle has put together this great and simple guide to tuning your Bing carbs.

- *Warm up. Minimum 15 minute ride. If not done, you will be left with a high idle once the bike warms up.
 - *This procedure is done with known good valve and timing settings, and a clean air filter. Ensure no air leaks around the carb connections or at the inlet stub on the cylinder.
 - *Throttle cables must have free play 2-3 mms. You should be able to slide the throttle cable outer (at carb) up and down in the cable adjuster 2-3mm.
 - *The jets/carb orifices, manifolds, seals etc are all clean, tight and not leaking.
 - *All adjustments must be done on the centre stand. Don't use the side-stand at all.
 - *Tools. You will need a working pair of ears, a flat end screwdriver, a 10 mm open end spanner and a fan for engine cooling. Do not let the bike overheat. A second person can hold the throttle open at 1500rpm, or use a throttle stop of some sort.
 - *When assessing equilibrium between the left and right, place your head between the exhaust outlets and listen for synchrony. Don't stay there too long as exhaust fumes aren't useful to you.
- The **orange highlights** are the basic setting adjustments. Tuning involves ensuring the effect on the engine is equal, and smooth. Everything else is supportive information.

To simplify the procedure, break down the whole procedure into 3 smaller procedures, doing them one at a time.

You must adjust and set-

1. Idle speed.
2. Idle mixture.
3. Cables in synchrony above idle.



1. Idle speed adjustment. Look down onto the top of the carbs. The throttle adjuster is the straight screw head between the carb and head, which sits above the throttle arm. The arm has the throttle cable attached to it. Your aim is to set the butterflies to open simultaneously.

If you are rebuilding or are just about to mount your carbs onto your bike, these settings can be visualized and adjusted easily before mounting. Otherwise, do them once mounted.

On both carbs, if they're mounted, you can use a thin piece of paper between the throttle adjuster screw and where the screw touches the throttle lever. Set equal opening of the butterflies here. Tighten / loosen the screw until it just grabs the paper. 1/2 to 1 turn tighter (clockwise) is about idle speed. That's where you start to play with a screwdriver and your ears.

2. The idle mixture screw is under the carburetor. Set both carb mixture screws equally, by clockwise rotation in all the way (the leanest), then back out counter-clockwise by 1.25 turns.

***These settings provide the baseline, so if you haven't already done the 15 minute warm-up ride, now's the time. It should run, unless there are other problems like blocked jets/orifices, inappropriate float levels, enrichener circuit is bad.

If you plan to further adjust back in the shed, then it's important to have a decent fan set up ready to switch on once you have parked the bike. The aim of the fan is to prevent overheating. The adjustments should not take more than 6-7 minutes without a cool down ride. Alternatively, go for a ride, take a screwdriver and a 10mm open end spanner, and plan a few stops on level ground to tinker. Leave your earplugs at home.

Making adjustments. For post 1980 bikes aim for 1100 rpm, and 1000 pre 1980. When one carb starts to dominate, that side muffler will start to "pop" more than the other side. Using the throttle adjuster adjust the other side up to match, or back down the "popping" side. ALWAYS USE SMALL INCREMENTS, eg 1/8th-1/4 turns. If you adjust one side up to match the other side, and it runs too fast, then you need to lower the other side to match.

***You may need to do this a few times to get it exact.

3. Setting cables, or the equal movement of the throttle lever, above idle speed is much the same method except you adjust your cables, not the mixture or idle speed screws.

Ensure-

- the idle speed is set, or at least both carbs at the paper "pinch" point
- the twist grip is fully closed
- throttle cables follow a nice path with no tight turns or impingements.
- 2- 3mm free travel of the outer cable over the inner cable.

If you don't have movement of the cable outer, the adjuster is screwed up out of the carb too much, you have a tight turn in the cable route or you may have a frayed cable inner. **To increase the free play, loosen the lock nut and screw the cable adjuster in. Loosely "tighten" the lock nut ready for further adjustments.**

***You must have that free movement of the cable outer. If the rpm increases when the handlebars are

moved lock to lock, then your free play may be too little or the cables aren't positioned freely.

Set the cables with the engine just above idle at about 1500 rpm, kneeling at the back of the bike and listening just as in setting the idle speed.

You'll read a variety of opinions at which the rpm should be set, and I have chosen 1500 because it represents something like the most common opinions. It worked for me, however the cable sync was the more difficult procedure and did require multiple adjustments. Use the throttle stop screw, or something between the right grip and throttle housing to maintain the 1500rpm. A helper is otherwise useful here.

How do you assess your settings?

Idle. Your ears between the exhausts will hear synchronous, glorious harmony, if you're lucky the first time! Listen for difference and make adjustments accordingly. If you're deaf, another method is to observe the bike's vibration, feel the muffler exhaust pulses simultaneously or have a clear cup with water fastened to the tank or seat. Watch for the smoothest movement of the water whilst adjusting. They are boxers, so don't expect absolute smoothness of water.

A ride when you think you're done will confirm how you've done.

Cable synchrony. Take note of the transition from idle to higher rpm. If it's smooth then you're good, but if there is vibration or shudder, then you need to revisit the cables.

After a long ride, let the bike cool then inspect the plugs, looking for an even light gray color. The colour of the exhausts at their tip should also be light gray and even.

The BING manual, page 13, suggests a different order of approach starting at setting the cables first, at 1200-1300rpm with a free play of 1/32 inch (about 1mm would be close).

The manual describes setting the idle speed next, followed by the idle mixture screw adjustment. The manual describes clock-wise (in) rotation of the mixture screw until the engine all but stops. Then take your screwdriver with you on a ride, stopping occasionally to tweak each screw ccw x the width of the screwdriver blade (they call that a notch). Expect the performance to bog for at least 2-3 minutes (until warm) before starting adjustments. When the bogging down disappears is "the point the idle mixture is as lean as the machine will tolerate, yet provide smooth transition. Anything further ccw would be a waste of fuel."

You may need to reset the idle speed. Repeat step 1 as described above, using very small increments when turning the screwdriver.

Steve Doyle 12/2008