



# GUIDE TO MASTERING THE MISUNDERSTOOD KEIHIN FUEL SCREW

## MXA'S MOST COMMONLY ASKED QUESTION



FUEL SCREW.

**“DON'T THINK OF YOUR BIKE'S FUEL SCREW AS A CONFUSING PIECE OF YOUR CARBURETOR. THINK OF IT AS A SEPARATE CARBURETOR.”**

In the last five years, the MXA wrecking crew has written five different tech articles on fuel screws and answered over 200 e-mails from readers seeking help. The fuel screw is of critical importance to getting the best performance out of your four-stroke and, obviously, it is a subject that will never die (and never be fully understood). So, for the benefit of those who are still at a loss when it comes to the mysteries of the fuel screw, this is Fuel Screw 101.

Don't think of your bike's fuel screw as a confusing piece of your carburetor. Think of it as a separate carburetor. That big chunk of Keihin metal handles all your bike's fuel needs above one-quarter turn of the throttle, while below that the fuel screw does the majority of the work. Why does a four-stroke need a second carb hidden inside the normal Keihin FCR carb? Because, at low rpm, the main carburetor's circuits (main, pilot and needle) cannot process enough oxy-

gen to effectively atomize the fuel. To keep a four-stroke engine from stumbling all over itself, a four-stroke needs a secondary carburetor, with its own air and fuel circuits, that can atomize fuel even when the bike is idling. This second carb is called the fuel mixture circuit. Here are the basics of how a fuel screw works.

**When does the fuel screw come into play?** The fuel screw works at low engine speeds. You might think that since most racing takes place while you're on the gas (and utilizing the carburetor's needle and main jet circuits) that you wouldn't need the fuel screw once you were moving. Wrong! In order to get on the gas, you have to pass through no-throttle and quarter-throttle settings in every corner. So, even when you are moving, the fuel screw is working for you. If it is not adjusted properly, the bike will stumble and run rough.

**How do you adjust a fuel screw?** By turning a screw under the float bowl.

**Is a fuel screw the same as an air screw?** No. An air screw meters the amount of air that makes it to the pilot jet nozzle. A fuel screw meters the amount of fuel that makes it to the carb's main body. Two-strokes have air screws. Four-strokes have fuel screws.

**Why do four-strokes use a fuel mixture screw?** Because they don't have enough low-speed vacuum for an air screw. At low rpm, four-strokes create less engine vacuum than two-strokes. The vacuum is what sucks fuel out of the float bowl and into the engine. Without enough vacuum, a

four-stroke can't vaporize the fuel via its main circuits. The fuel screw's minute orifices don't need as much air velocity to create suction, thus they flow fuel at starting and idling rpm.

**Are air screws and fuel screws adjusted the same way?** No. Turning an air screw "in" restricts the air flow and richens the mixture. Turning a fuel screw "in" restricts fuel flow and leans the mixture.

**How do you reach the fuel screw?** With great difficulty. Its under-the-float bowl location makes it next to impossible to reach. It takes a special shorty screw driver.

**How do you adjust a fuel screw?** First, warm the engine up. Second, bring it up to a fast idle. Third, with the bike at a steady 1800 rpm, slowly turn the fuel screw in. Tighten the screw until the engine rpm drops (and nearly dies). Then, slowly turn the screw back out. Stop turning the fuel mixture screw at the exact moment when the engine hits peak rpm. Peak rpm is when the engine runs the cleanest and fastest. Next, reset the idle stop to a low or no idle position. Last, ride the bike. If it bogs, stumbles or coughs, adjust it again. It is largely trial and error until you get a feel for the sound.

**What is the proper setting?** The proper fuel mixture adjustment is usually between 1/2 and two turns out.

**What if peak rpm is at three turns?** If the engine doesn't reach peak rpm until the screw has been turned more than two turns out, it might indicate that the pilot jet is too small (lean). Try the next larger pilot. Conversely, if peak rpm is reached at less than one-half turn out, it could mean that the pilot jet is too rich. Try the next smaller size.

**How often should the fuel screw be checked?** Every race day. Twice a day if it is cool and overcast during practice and bright and sunny later. Temperature, elevation, humidity and barometric pressure changes will require fuel mixture adjustments to stay current.

Adjust at will. It's free horsepower. □