

TOMMY'S TECH TIPS

Over the years Harley Davidson has used many carburetors on its big twin engines. Names like Linkert, Tillotson, Bendix, and Kehin may or may not be familiar to you but around here they are common as cold weather in January. Many of these carburetors have a venturi opening of 34mm to 38mm. The 1989 and earlier EVO engines have a butterfly type 38mm Kehin carb, with the California models using a 34mm. The 1990 and up Kehin CV carburetor has a 40mm opening. Intake manifolds have changed also. The Shovelhead intake has abrupt "edges" instead of nice radius bends. The "edges" make it difficult for the air/fuel mixture to bend around the corners, restricting airflow. The next generation intake (84-89 EVO) had the same problems as the shovel intake and had leakage problems (compliance fittings) where it mounts to the head. In 1990 H.D. engineers gave us a much better short side radius manifold with no sharp edges but- the back side radius is too straight for best airflow. Due to these problems, the intake manifold should be replaced with a higher flow design to make more horsepower. On a stock engine with a decent performance exhaust and ignition, a performance carb will usually give you a 15-20% improvement in power. The biggest power gains will be in the 3500-4000 rpm range because below 3500 rpm most carb / intake setups will handle the engines air fuel requirements. Remember significantly increasing the size of your engine without increasing the intake and fuel delivery will cause the engines torque to peak at very low rpm's and then fall flat on it's face. This is because the engines large displacement runs out of its ability to breathe very quickly. Since Torque X RPM=Horsepower, it's easy to see why power drops off. This also happens to stock engines but to a much lesser degree. Now don't get the idea that you need the biggest carb out there either because here is the lowdown on size. A big carb is great for a big engine (107 cubic inch or more) or high rpm power but it can reduce power on smaller engines (less than 107 c.u.) or at low rpm operation. At the same time, too small of a carb will give great low and midrange performance, but top end power will be reduced. When selecting a carb, look for one that will give you the highest signal strength for your engines displacement and the rpm range you will be running it at. High airflow needs to be balanced against good fuel metering and throttle response. Sometimes it is better to choose a carb not because it flows more air but because it has a better fuel curve for your needs. The most important factor for acceleration is torque, not horsepower. Remember torque moves objects. Too large of a carb kills torque in the low and mid rpm's and can even kill torque at high rpm.

Now, after all of that technical mumbo jumbo, Let's re-jet and talk about types of carburetors. The most common is the butterfly type. These include most of the older carbs up to 1989 in the Harley lineup and currently used on the S&S Super, Rev tec, Zenith and other carbs. These carbs get their name from the use of a pivoting throttle plate to control the airflow through the carbs throat. It is a simple carb, good for high end throttle response and power. S&S and some others have added secondary circuits and an accelerator pump to smooth out the overall response of the carb. Low speed operation is not their strong point. It's easy to over do it on the butterfly carb so be careful. Top end rush can lead to low speed mush if you go to big. S&S has the popular "G" carb, I only use it on 107" and up engines. I use the "E" carb on less than 107" applications. I do like the S&S carbs especially on Shovels and Evo's. Next lets talk about the CV carb. This is the carb used on H.D.'s from 90 and up. (88 up on xl's) They are really a hybrid using the butterfly and a vacuum operated slide. The CV uses vacuum to lift the slide. Upon opening the throttle, vacuum increases moving the slide up. The higher the slide rises, the more the throat vacuum decreases. The slide stops moving when throat vacuum is equal to the vacuum in the chamber. The CV carb is great for good gas mileage and reliability but the air has to flow around two things in the way, the bottom of the slide and the throttle plate. I have used these carbs after doing some major mod's and had great success. On a 95" twin cam we got 107-110 H.P. and 50-55 M.P.G. not to shabby. Last we will cover slide carbs. These can produce a lot of power and have the smoothest transition from idle to full throttle. There is no butterfly in the way, and since the slide itself controls the venturi size, air speed across the jet is sometimes 10 times as fast as in a butterfly carb of the same size. This leads to fantastic throttle response. These carbs are not for the faint of heart though as they can be a nightmare to tune. Get it right and there is none finer. Get it wrong and its worse than being in the doghouse with the ol lady. Most of the time we have had tuning troubles was due to the exhaust system. These carbs hate drag pipes. Some examples of slide carbs are Edelbrock and the newer PSI Big Air carb. It is American made billet for great looks and performance. As close to fuel injection as a carb can get without the electronic hassles. No jets to change, all adjustments are made externally in seconds while running. NO MORE GAS ON YOUR FINGERS!

Accelerate with the response of a 38 on bottom, but flows like a 48 on top! Easy to use and understand, the 3 external fuel adjustments, pilot, needle, and main jet are simple to adjust in seconds. Carb adjustments are made by turning external clickers with the simple and easy concept of "righty-tighty and lefty-loosely". Turn clockwise for less fuel and counter clockwise for more fuel - while the bike is running. I have used the PSI on some show bikes and they look and work flawlessly. I have also liked using Edelbrocks carbs, they really pull hard all the

way from 0 to redline, but are more difficult to tune because to have to change metering rods and then fine tune from there. The psi was really the easiest carb to tune I have ever used. This wraps the carb tech section, I hope you learned a thing or two. Lets hope for warm days and clean roads so we can get our motors runnin!



(PSI Big Air)



(S&S on the left, CV Keihin on the right)



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