

The HRAK

By jhumbertoap

Here it is what I called the HRAK,(just to give it a name)... which is a simplified version of the RAK.

I've been quite satisfied with my stock-bike performance all the way up to low 60s mph; but the stock Star-650 accelerates quite slowly after that, although it can get up to 90+ mph. And I learned in this forum that doing some simple mods the 650 can perform much better. But I've had two problems: time and money.

So, based on the knowledge gained out of this forum, I had an idea, which is quite simple and it seems to be working pretty good!

I did the slot cut in front of the duct-inlet, but (unlike the regular RAK) I didn't drill the two one-inch holes in the air filter housing; I just made sure that the small inlet hole that takes the air into the bagel was totally exposed:



This means nothing at low speeds: it's still a stock bike breathing through the "restricted" factory inlet hole; for this reason the adjustment of the PMS screws or shimming the needles is not necessary. I realize that it is still a restricted intake, again AT LOW SPEEDS; in the other hand, it is this restriction in conjunction with the 28mm carbs (quite small for a 650) what increases air velocity at low RPMs and gives the stocker that initial punch off the line. (At least that was Yamaha's intention...)

Now, at high speeds the incoming wind is going to pressurize the filter housing through the exposed inlet duct; this is especially true because there are no other holes in the filter housing to release that pressure: just one input facing forward and no output. The pressure inside the filter housing facilitates the air flow into the cylinders (through the carbs). If no other action is taken, this change is going to make the air-fuel mixture very lean at high speeds! And I know some people may say "you need to re-jet". Well.... not necessarily... in this particular case there is an alternative that many of you have done with other configurations: pressurize the bowls at the same rate!!!

And that's exactly what I did: I connected the bowls vent hose to a hose-to-pipe adapter (1/4" to 5/8") to create a funneling effect and direct more air into the bowls at high speeds. I attach the adapter to the fuel petcock facing forward.

- 1) Remove vent hose:



- 2) Get a hose to pipe adapter (1/4 to 5/8):



- 3) Attach it to the petcock facing forward:



If you think about it, that's what most intake configurations that work do: they maintain equal pressure in the intake and bowls at all speeds:

- The stock = pretty much atmospheric pressure all the time. Actually, at high speeds the pressure inside the bowl could be negative.
- The HC: both intake and bowls are pressurized at the same rate, as they both are connected to the HC.
- The GAK: works better with the vent hose facing forward.

RESULTS:

- 1) Smoothness: flawless response throughout the entire rpm range. No hesitations, no stuttering, no wandering, no nothing. Smooth!
- 2) Acceleration: there was a significant improvement in acceleration that becomes noticeable above 40mph, and very noticeable between 60 and 80. I can now take the ramp to get into my nearest highway at 80+mph, when it used to be at 75 max.
- 3) Top speed: not a significant change: 92 ~ 93mph.
- 4) Gas consumption: 47 ~ 53mpg riding solo. Highway (72mph) two up, 45mpg; I used to get 40 riding two up when the bike was totally stock.
- 5) Roll off test, choke test, both OK.
- 6) Rev limiter points: 1st=30+, 2nd=45, 3rd=65, 4th=82. These speeds are lower than those posted in the webpage. But my bike is 2006 and is equipped with exhaust catalytic converters (catz) and fuel cut solenoid valves that close when the engine RPMs are too high, around 5800 according to a service manual, and about 6700 based on the speed to rpm calculator. Removing the O-rings attached to the main jets inside the bowls bypasses these solenoid valves and I did it just for test purposes, and yes, the rev. limiter points increased to what the webpage says, but I didn't notice better acceleration, plus you lose the purpose of this mod: not messing with the carbs.