GROSVENOR WORKS

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FAX MESSAGE

TO : Coventry Spares
ATTENTION: John
FAX NO. : 00508 429 6213
DATE : 26.02.2002
FROM : Tom Ullman
NO. of SHEETS (inc. top sheet): 2

John

RE PILOT CIRCUITRY

It was a little difficult trying to explain the advantages and disadvantages of the two arrangements over the telephone and I have to offer my apologies about the fuel pickup position. I overlooked the fact that the 4 stroke pickup point is now drilled at the engine side of the float bowl. This makes it a little easier to explain and I hope the following is more coherent:-

1) 2 stroke - air cleaner end position of pilot jet.
This system has the pilot jet near to the point of fuel pickup in the float chamber, which is necessary for stable fuel metering with a low signal, but then has a long passage for the metered fuel to traverse before encountering the emulsion air. This type of arrangement has the distinct disadvantage of having metered fuel having to fill (or partially fill) the passageway before it discharges from the pilot and progression outlet holes. If the engine is operated mainly at light loads, when the idle and progression circuits are almost always flowing, then having the passage partially filled with fuel can be an advantage as it is possible a "rich slug" of fuel will be discharged on initial acceleration, although this will depend upon the sizing of the two outlet holes. If the engine has long periods of heavy load running, then fuel can be drained from the pilot passageway and this will result in a "lean" hesitation when attempting to accelerate after a deceleration.
The position of the emulsion air passage is such that it does not help to move the fuel through the long passage on this 2 stroke arrangement.
A long transfer passage, as in this arrangement, can lead to temperature sensitivity and unstable idle with increasing body temperature due to heat transfer into the fuel leading to pockets of vapor in the fuel and subsequent variations in mixture strength at the pilot outlet.
Virtually all Mark 2 two stroke carburetter specifications derived in Spain still use this circuitry arrangement, although in the UK we favour the 4 stroke arrangement, except when the carburetter is mounted in an inclined position.

2) 4 stroke - pilot jet at engine end.
This again has the pilot fuel metering jet close to the point of fuel pickup, but has the distinct advantage of having a short passage between the metering jet and the pilot mixing cavity and outlet holes. My only minor criticism of this arrangement is that the pilot air only assists fuel transport and atomisation at the outlet holes and varies with the setting of the pilot screw. Ideally, fixed air and fuel jets should be used with adjustment being only on the volume of mixture flow.

The short passage lengths mean a more controllable and stable idle circuit.

For correct tuning, it is an advantage to tune the sizes of both the pilot and progression outlet holes, but for the average "biker" this is not a sensible option.

Hope the above helps and my apologies again for the confusion over the 'phone. I WASN'T THINKING CLEARLY.

Tom

Tom

AMAL

Subj:	**Re: Spray Tubes**
Date:	Monday, May 8, 2006 10:38:00 AM
From:	Tz750d
To:	JOHNTIOC

Mikuni call those shrouded needle jets "primary venturis", and to see what they mean, picture the slide at a lift of around 1/8 - 1/4". In this case, the shroud is acting as a fence, behind which is the actual delivery orifice. Surrounding the fuel tube back there is a cylindrical space connected to the air jet, located in the face of the bellmouth at 6 O'clock. The larger this air jet is made, the more primary air wells up around the fuel tube, softening the effect of the high vacuum around it. Air jets were normally supplied all the wsay from a solid plug to a 2.0-mm and even to deletion of the air jet, for maximum effect

Mikuni make the semi-circular primary venturi in various heights - 2, 4, 6-mm, &c, and in many cases they even stick up into a counterbore in the underside of the (solid) throttle slide, to allow their action to continue over so much of the slide's lower lift.

Mikuni generally specified an 8-mm shroud height for piston-port engines, which have the most severe "pop" when they open, generating a strong metering signal (they open 75-100+ deg. BTDC). The weakest intake metering signal comes from rotary valve engines, whose disks open generally in the 130-145 BTDC range, and so have much less "pop". Such engines were given very rich slides (like a 0.5) and there was either no jet shroud or it was a 2-mm. Very small air jets were usual on rotary valve engines - or even jet plugs.

When the carbs were used on four-strokes, the needle jet took a different form, having a slender shank (the fuel tube), perforated at various heights by bleed holes. The air jet opened into this region, so that as the engine's air demand increased, the height of fuel in the volume outside of the delivery tube dropped progressively, exposing one after another of the bleeds in the tube. This defeated the carb's natural tendency to enrich as the engine revved higher.

Therefore to get a good set-up on a four-stroke, you had to achieve a balance between the main and air jets. Too much air jet and your engine's fuel delivery slope would favor richer on the bottom, leaner on the top. Too little air jet and the slope would be the other way. Getting the slope right would result in an engine that both accelerated and had good top power.

The Lectrons (Miles Baldwin called them Lack-Tunes) because of how they worked had no air jet, so to make TZ750s accelerate adequately, they had to be jetted to look about two sizes rich on top. Then why use them? Their part-throttle vaporization was so good that they would tolerate fair-sized mistakes and still carburete well there. Nick Richichi showed us all how bad Lack-Tunes reall were when he put a set of four zero-cutaway Miks on his 750. It pulled very hard everywhere. Schl and I had the same experience in Europe in 1981 - when we ditched the Lack-Tunes on our 250 in favor of properly set up zero-cutaways, he was instantly competitive. They were Mikuni's answer to the mid-range advantages of the Lack-Tunes - a carburetor with no idle system at all - all metering took place from the needle, needle jet, and main jet. Their disadvantage was that they took quite a pull to get the slides unstuck from the closed position.

Then the world moved on.

KC