HIGH SPEED BYPASS VALVE

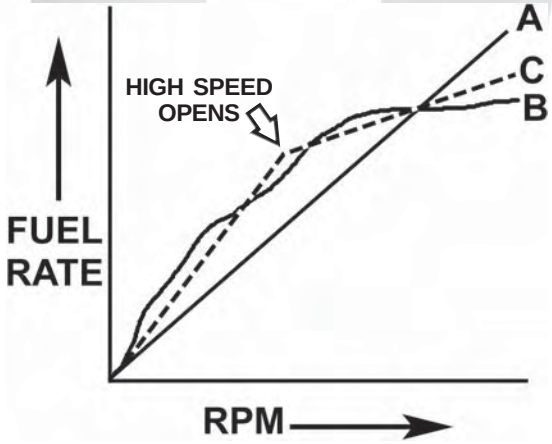
WHY YOU NEED A HIGH SPEED BYPASS

A high speed bypass is needed to obtain maximum horsepower because the engine will experience a loss of volumetric efficiency at RPM above the peak torque. At high RPM the inlet valves are open for such a small amount of time that the cylinders do not have enough time to completely fill with fresh mixture:

Fuel curve "A" shows the flow of a system with a main bypass jet only. An engine with the same volumetric efficiency at all speeds would have this fuel rate requirement.

Fuel curve "B" is the actual fuel requirement of a typical engine. Note that curve "A" is too rich at high engine speed, resulting in a loss of power.

Fuel curve "C" represents the flow rate attained by using a richer main jet to obtain a steeper initial curve, then a high speed to break it over to follow the engine requirement.... A very close compromise to curve “B”.



THE HIGH SPEED ALSO BENEFITS THE MID-RANGE PERFORMANCE

If an engine is jetted to obtain maximum horsepower at high RPM without a high speed bypass, it would be lean around the peak torque RPM (see fuel curve "A" compared to the engine fuel requirement, “B”). Unfortunately jetting rich enough for best mid-range power will cause the engine to run rich and lose power at high RPM. By installing a high speed bypass, separate control of the mid-range and high RPM fuel rates are possible. The main jet can be run richer for best mid-range performance, while using the high speed to lean the system for best power at high RPM.

TUNING TIPS AND BASIC ADJUSTMENTS

Turning the screw "in" on a diaphragm type high speed or changing to a heavier spring, and/or adding more shims in a jet can type, will raise the pressure (RPM) at which the valve opens, making the system richer on the top end. The high speed is usually adjusted to start opening about 500-1000 RPM above peak torque. If a high speed is installed on a fuel system when it is calibrated by Kinsler, the main jet and high speed bypass setting should be very close for best power. However, if the system does not seem to have the ideal fuel rate “as received”:

1) If the fuel curve seems too rich throughout the RPM range, go to a leaner main jet.
2) If just the top end seems rich; go lower on the high speed pressure setting until the high rpm mixture is correct.
   A) If the system has a restrictor jet, try going .004" - .010" larger per run. (Note: the calibrated pressure settings of the high speed should not require a major adjustment if the original main jet is being utilized.) Compare this with the results obtained by going lower on the valve pressure setting.
   B) If the system still seems rich after step "A" above, lower the opening pressure of the high speed by approximately 3 PSI. CAUTION: We recommend you reinstall the original restrictor jet before lowering the pressure setting.
   C) If the engine still seems rich with the lower pressure setting, repeat step "A". While this method may require several runs of the engine it has be found to be a safe way to tune the system while avoiding engine damage from going too lean.
3) If the system is adjusted to give a proper fuel curve, but the overall curve needs to be richened or leaned due to changes in the engine displacement, air density, weather, altitude, etc., adjust the high speed pressure for each main jet step you adjust.
4) Tune the engine for best performance, not just what appears to be good plug readings.

IMPORTANT NOTE: When properly adjusted, a high speed bypass's engagement should not be felt by the driver.
If the driver feels the high speed bypass engage because the engine's power increases dramatically, then either the main jet is adjusted too rich or the high speed is opening at too high a RPM. Either condition will cause the engine’s output to be lower than optimum. There should be no sudden burst of power, only a steady strong pull.

RESTRICTOR JETS

The pressure setting of the high speed is used to control the RPM at which the valve opens, while the restrictor jet is used to limit the flow through it after it opens. The smaller the jet, the less fuel that can flow through the high speed and back to the tank, thus richening the system at higher RPM levels.

In some Oval Track applications the use of a restrictor jet assures that the high speed does not dump off too much fuel at high RPM part throttle.... for example coming down a straight away and quickly closing the throttles causing a pressure spike. The high speed will open and start returning fuel. The restrictor jet will then restrict the amount of fuel bypassed during this overrun condition.

If you own a high speed bypass valve that doesn't have a provision for a restrictor jet. Simply use a jet can after the valve by removing the poppet and stretching the spring out to hold the jet in place. Make sure the jet can has a jet sealing o-ring.

For better understanding of the operation of the restrictor jet see the fuel curves on Page #83.

WHEN THE JET IS DROPPED INTO THE END OF THE VALVE MAKE SURE THE NUMBER IS FACING YOU

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