Pulsoid Optimisation Process

Introduction

This document is specifically intended for those using Wizards of Nos (WON) Pulsoids and progressive controller. Generic American based solenoids are not adjustable and therefore can not deliver optimum results under pulsed conditions.

In order to deliver a controlled amount of power lower than the actual jet orifice size of a fixed metering jet set-up (i.e. 25hp from 100hp jets), the controller 'pulses' the solenoids proportionately to achieve the desired output. The faster the Pulsoid is cycled, i.e. the higher the pulse frequency, the smoother the power delivery will be.

With non-optimised Pulsoids, intended for use over the widest possible pulse width range (20% to 80%) it is normal to achieve good Pulsoid response at 25Hz. However, if the Pulsoids were optimised it should be possible to achieve good results at a frequency of 35Hz or higher, depending on the exact parameters of usage.

The lower the frequency used the more definite the Pulsoid response will be and the wider the range the Pulsoid will work over, but the higher the frequency used, the more even the delivery of fuel/nitrous and the smoother the power delivery will be, which should lead to the ability to achieve higher power gains than would be otherwise achievable.

NOTE: Where a higher frequency is set without optimising the Pulsoids, the Pulsoids may fail to open at lower delivery percentages and may stay fully open at high percentages (instead of pulsing).

The optimum pulse response rate of a Pulsoid depends on the following key variables:

1. Available Voltage
2. Pressure
3. Desired pulse width range
4. Desired flow rate

Therefore to achieve optimum performance it is advisable to consider the above factors before completing this process.

WARNING: Fuel spillage may be unavoidable during this process. Every precaution must be taken to reduce the risk of fire.

WARNING: Before making any adjustments, ensure there is no residual fuel pressure in the Pulsoid.

CAUTION: The adjustable seat is made from a thermo plastic material and can be easily damaged. Care must be taken when carrying out any adjustments.

Fuel Pulsoid Optimisation Process

Fuel Flow Test

Dependant on your vehicle fuel system it may not be possible to have the fuel pump running without the engine running. Where possible, it is advisable not to complete the test with the engine running for safety reasons.

Objective: To maximise the fuel flow through the fuel Pulsoid in relation to the vehicle fuel system.

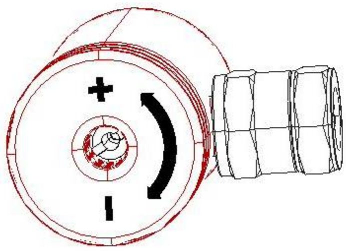
1. Remove the fuel jet from the jet holder and then refit the jet holder to the Pulsoid outlet.

2. Activate the system – (the controller will cease delivery after 5 seconds).

3. Catch the fuel in a suitable graduated container and measure the full flow through the fuel Pulsoid.

4. Remove the jet holder from the Pulsoid outlet.
   Insert a seat adjustment tool (or a flat blade screwdriver with a ¼ inch blade) into the Pulsoid outlet and carefully engage it in the seat adjustment slot.

5. **CAUTION:** The adjuster should never be turned more than 1/4 of a turn (90 degrees) in either direction, as damage to the seal/seat could occur, and or, cut off nitrous flow entirely.
   Turn the adjuster anti-clockwise by approximately 10 degrees to increase the flow through the Pulsoid.



6. Install the jet holder and repeat the flow test.

7. Repeat steps 3 to 6 until the flow measurement **stops** increasing and then turn the adjuster back (clockwise) by 5 degrees.

WARNING: Before making any adjustments, ensure there is no residual nitrous pressure in the Pulsoid.

CAUTION: The adjustable seat is made from a thermo plastic material and can be easily damaged. Care must be taken when carrying out any adjustments.

Nitrous Pulsoid Optimisation Process

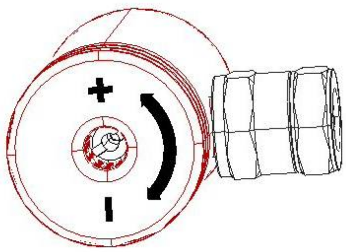
Objective: To reduce the flow rate of the Pulsoid so that the flow rate with jets removed is only marginally higher than that with jets installed.

1. Perform the nitrous flow test with the jets removed.

2. Install the intended final jet and repeat the flow test.

3. Remove the jet holder.
   Insert a seat adjustment tool (or a flat blade screwdriver with a ¼ inch blade) into the Pulsoid outlet and **carefully** engage it in the seat adjustment slot.

4. **CAUTION:** The adjuster should never be turned more than 1/4 of a turn (90 degrees) in either direction, as damage to the seal/seat could occur, and or, cut off nitrous flow entirely.
   Turn the adjuster clockwise by approximately 10 degrees to reduce the flow through the Pulsoid.



5. Repeat the nitrous flow test.

6. Repeat steps 3 to 6 until the flow measurement with the jet installed is slightly less than with the jet removed.

Nitrous Flow Test

The objective of this process is to match the Pulsoid flow rate to the intended jet sizes and so maximise frequency response.
Should you change the final jet sizes at a later date the process will need to be repeated to match the flow rate with the new intended jet size.

NOTE: When testing using large jet sizes it is advisable to either, refill and heat the bottle between tests, or start each test with a fresh bottle at the same temp/pressure to ensure each test starts with the same volume and pressure.

NOTE: For maximum accuracy it is wise to repeat the process **at least** twice for each test.

1. Ensure you start the test with a full bottle of nitrous.

2. Set the Max Extreme to 100% power for 5 seconds.

3. Stand the bottle on the most accurate scales available with the supply line connected to the nitrous system.

4. Take an accurate measurement of the bottle weight.

5. Activate the system – (the controller will cease delivery after 5 seconds).

6. Take an accurate measurement of the weight after the test and record the result.

Determining The Optimum Controller Frequency To Use

Again, because there are a number of variables that affect the Pulsoid response capability, it is best to determine the optimum frequency by specific testing on the vehicle it is being used on.

Now that the Pulsoid has been optimised for flow and pulse response, the performance can be further optimised by determining the range of pulse width to be used (minimum start percentage to full power settings) and selecting the appropriate frequency to suit.

The lower the start percentage used, the lower (relatively), the frequency to be selected should be, but it should always be as high as possible.

If you were intending to use start percentages only as low as 40%, you could probably achieve good Pulsoid response at 35 Hz or a higher setting, however if you wanted start percentages as low as 20%, then you may need to select a frequency of 30 Hz or even 25 Hz.

The lower the frequency used the more definite the Pulsoid response will be and the wider the range the Pulsoid will work over, but the higher the frequency used, the more even the delivery of fuel/nitrous and the smoother the power delivery will be, so it's a matter of determining the highest frequency that suits your particular requirements and that delivers reliable and consistent results.