

Engine Tuning

The first and foremost consideration when attempting to tune your glow engine is to understand the basic parts of a nitro and their functions. **IMPORTANT NOTE:** Make sure to completely break-in your nitro engine prior to tuning the engine for MAXIMUM performance.

Carburetor

The main function of the carburetor is to mix the fuel and air. Once this mixture is achieved, it is sent to the engine to be combusted. The carburetor can be adjusted to control the mixture ratio of gas/air that feeds to the engine. If you increase the amount of fuel in the mixture, you are making the mixture "rich" and alternatively, if you decrease the amount of fuel, you are making the mixture "lean".

An engine's performance is dependent upon the fuel mixture. The fuel mixture is regulated by the carburetor, which is regulated by a high speed, low speed, and idle speed needle.

IMPORTANT NOTE: Turn the mixture needles clockwise to lean the mixture and counterclockwise to richen it.

A lean fuel mixture will increase engine power. **CAUTION:** Never run an engine too lean, because it will cut out or begin to stall. This could cause engine damage. Symptoms of a lean mix include:

- ▶ Overheating (temperature above 270 F at the glow plug)
- ▶ Little or no blue smoke from the exhaust.
- ▶ Sudden cutting of power during acceleration
- ▶ Excessive exhaust temperatures (This can result in damaged engine components including exhaust baffle and housing)
- ▶ If the outlet looks fine but there still seems to be a restriction in the exhaust, then you may have a melted exhaust baffle. The baffle is the cone shaped piece inside of the tuned pipe.

If any of these symptoms are present, richen the high speed mixture by $\frac{1}{4}$ counterclockwise turn. The engine will be slightly richer at this setting and must be returned from this setting. In order to tune for performance, start with a rich setting and move towards the lean until an ideal setting is found. **CAUTION:** Never ever tune from a lean to a rich setting. There should always be a light blue stream of smoke coming from the exhaust. You can tell an engine is running rich by observing any of the following:

- ▶ Leaning the high speed fuel mixture increases performance.
- ▶ Sluggish acceleration with blue smoke coming from the exhaust tip.
- ▶ There is unburned fuel spraying from the exhaust tip.

▶ Step 1. High Speed Fuel Mixture Adjustment

This is primary fuel mixture adjustment. **It is located next to the air filter, where the fuel line goes into the engine.**

After the engine is warmed up, gradually lean the high speed mixture by turning it in $\frac{1}{16}$ increments clockwise. Make several passes with the nitro RC after each adjustment and note any changes in performance. Continue to adjust until at least one of the following conditions exists:

- ▶ Fluctuating idle speed
- ▶ Temperature measurement above 270F at the glow plug
- ▶ Noise or clattering sound during decelerating
- ▶ Smoke or steam from the engine (not exhaust)
- ▶ Hesitation or stalling during acceleration Richen the fuel mixture to the optimum setting by richening the high-speed needle at least $\frac{1}{8}$ turn counterclockwise and retest.



▶ Step 2. Low-Speed Fuel Mixture Adjustment

The low speed mixture adjustment is always performed after the high speed needle is correctly adjusted. The easiest way to adjust the low speed mixture is by doing the "pinch" test. The valve is located where the throttle arm pivots.

- ▶ Having set the high speed correctly, take the RC vehicle and pinch the fuel line going into the carburetor. The engine should run for 2-3 seconds, speed up, and die.
- ▶ If the engine runs longer than 3 seconds, then give the low speed needle a 1/16 clockwise turn, have several high speed runs, and retest.
- ▶ If the pinch test results in the engine dying immediately, without speeding up, richen the low speed needle by giving a 1/8 counter clockwise turn, have several high speed runs and retest.



Once the low speed needle is correctly adjusted, the engine throttle response will be very quick – it is now time to adjust the idle speed.

▶ Step 3. Idle Speed Adjustment

This spring tensioned screw is located beneath the oil filter, facing towards the front of the vehicle.

In order for an engine to run, it must have enough internal inertia engine built up in the engine to continue the entire ignition cycle. Generally speaking, you want to adjust the idle speed to the slowest idle before it stalls. The key is to set the idle speed as low as possible while still maintaining reliable running characteristics. In order to do this, turn the idle screw counterclockwise to reduce the idle speed. Turn it clockwise to increase it.



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This chart indicates the direction in which you should adjust the fuel mixture when faced with changing conditions. It assumes the engine is currently well tuned. You could face any combination of conditions listed in the chart; knowing which way to go with the mixture adjustments is half the battle.

Higher Air Pressure	Lean
Lower Air Pressure	Rich
Higher Humidity	Lean
Lower Humidity	Rich
Higher Barometric Pressure	Rich
Lower Barometric Pressure	Lean
Higher Altitude	Lean
Lower Altitude	Rich
Higher Nitro Content	Rich



Lower Nitro Content	Lean
Higher Oil Content	Lean
Lower Oil Content	Rich
Hotter Glow Plug	Rich
Lower Glow Plug	Lean



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